

## THE FOOD PLANTS OF SCALE INSECTS (COCCIDÆ).

By T. D. A. COCKERELL.

*Entomologist of the New Mexico Agricultural Experiment Station.*

*Introduction.*—It is not pretended that the following summary is complete; to make it so would involve a much more elaborate search through the scattered literature than the writer has now opportunity for; and even then, a few months would inevitably bring new records, and make it incomplete again. It is, however, hoped that the summary will be of service, as bringing together the great majority of the records, and indicating to the horticulturist what scale insects he may expect to find on any given plant or group of plants. While it can not be regarded as valid negative evidence, it presents a large mass of facts which are of great importance from several points of view. Two practical points may be emphasized—one, the unexpected number of coccids found on many of the cultivated trees and shrubs; and the other, the frequency with which species dangerous to fruit trees will occur on ornamental plants, which may be carried from place to place and be the means of disseminating the scales.

In preparing the summary, it has been found in many cases necessary to correct the names of the plants given by writers on Coccidæ. It is much to be desired that entomologists should be more careful to correctly cite the names of plants they have occasion to mention.

A card catalogue of host plants of Coccidæ is in preparation, and may be seen at the United States Department of Agriculture. It may be possible some day to complete it and publish a second and complete edition of the present essay. Such a second edition would be much larger than the present, for not only would it contain all the scattered records of the past, but very numerous additions, which will be found in Green's forthcoming monograph of the Coccidæ of Ceylon, and other works projected or in preparation.

It must of course be understood that the plants given as the hosts of Coccidæ have been in very many cases so infested only since they came into cultivation. It would be very desirable to distinguish in every case between the endogenetic and exogenetic coccids on a plant; and also between those exogenetic in a state of nature, and those only so in cultivation. But to do this would require more information than we at present possess.

The abbreviations used will be understood by all coceidologists; but it may be mentioned that "Sign. Essai" is Signoret's "Essai sur les Cochenilles," "Comst., 2d Cornell Rep." is Comstock's 1883 report as entomologist of Cornell University Experiment Station, "Tr. N. Z. Inst." is the Transactions of the New Zealand Institute, and "Scale Ins. N. Z." is Maskell's work on the Scale Insects of New Zealand.

### RANUNCULACEÆ.

*Dactylopius destructor* Comstock (= *citri* Risso) has been found on the garden *Pawonia*. (Howard, Bull. 5, Div. Ent., U. S. Dept. Agric., p. 17.) Sasaki records *Diaspis patelliformis* from *P. moutan*.

### DILLENiaceÆ.

A small order of tropical and Australian trees and shrubs. *Hibbertia*, much the largest genus, contains a number of species cultivated in greenhouses.

*H. linearis*, Robert Brown, and *H. virgata*, Robert Brown, both natives of Australia, are the food plants of *Dactylopius hibbertiæ*, Maskell. This is a dark purple mealy bug, resting on a cushion of yellow cotton.<sup>1</sup>

### MAGNOLIACEÆ.

Trees of Asia and North America, with some representatives in South America. In Australia and New Zealand the order is represented only by a few species of *Drimys*: *D. colorata*, Raoul, in New Zealand, supports *Mytilaspis drimydis*, Maskell, and *Inglisia patella*, Maskell. Comstock quotes Maskell as to *Mytilaspis cordylinidis*, Maskell, being also found on *Drimys*. Two species of the genus, at least, occur in cultivation.

Coquillett records the exogenetic *Aspidiotus nerii*, Bouché, on the North American *Magnolia fetida*, Linnaeus (*grandiflora*, Linnaeus).

*Lecanium tulipiferæ*, Cook, which is very likely the same as the undescribed *Coccus liriodendri* of the last century, infests *Liriodendron tulipifera*, Linnaeus.

The Asiatic Magnoliaceæ certainly should be searched for Coccids.

### ANONACEÆ.

A large order of tropical trees, several being valuable for their fruit. The Sweet Sop, *Anona squamosa*, Linnaeus, is a native of tropical America, and in Jamaica is infested by *Lecanium hemisphaericum*, Targioni-Tozzetti, and *Dactylopius virgatus*, Cockerell. It has also been taken for the sake of its fruit to India, where it becomes a food plant of *Tachardia lacea*, Kerr<sup>2</sup> and the unrecognizable *Coccus trichodes*, Ander-

<sup>1</sup>Tr. N. Z. Inst., XXIV, p. 32.

<sup>2</sup>Watt, Diet. Ec. Prod. India.

son. The Sour Sop, *Anona muricata* Linnaeus, is a small tree, native of the West Indies; on it are found *Lecanium hemisphaericum*, Targioni-Tozzetti, and *Ceroplastes denudatus*, Cockerell. *Anona cherimolia*, Miller (syn. *tripetala*), is also neotropical, but in Fiji it supports *Lecanium chirimolia*, Maskell, which, however, is now considered a synonym of the wide-spread *L. longulum*.

The lancewood of Jamaica (*Bocagea*) is the host plant of *Ceroplastes jamaicensis*, White.

### MENISPERMACEÆ.

A large order of tropical climbing plants. *Tinospora* (olim *Menispermum*) *cordifolia* is recorded as supporting the unrecognizable *Coccus oogenes*, Anderson, in India.

### BERBERIDEÆ.

The palæartic *Berberis vulgaris* is the food plant of *Lecanium berberidis*, Schrank.

### CRUCIFERÆ.

A boreal species, *Arabis stricta*, produces *Asterolecanium arabidis*, Lichtenstein.

### CISTINEÆ.

*Lecanodiaspis sardoa*, Targioni-Tozzetti, is found upon *Cistus*.

### VIOLACEÆ.

Cultivated violets in Jamaica are infested by *Dactylopius virgatus*, Cockerell, and *Orthezia insignis*, Douglas. In New Zealand *Melicytus ramiflorus*, Forster, produces *Chionaspis dysoxylis*, Maskell; and *Hymen-anthera crassifolia*, Hooker, is the food of *Ctenochiton hymenanthera*, Maskell; *Diaspis santali*, Maskell, occurs on *Melicytus*.

### PITTOSPOREÆ.

*Pittosporum* is a comparatively large genus of small trees and shrubs, with often fragrant flowers. Maskell records *Fiorinia astelia*, Maskell, on the New Zealand *P. tenuifolium*, Gaertner; and *Eriococcus paradoxus*, Maskell, and *Parlatoria pittospori*, Maskell, on the Australian *P. undulatum*, Ventenat. He also records from *Pittosporum*, species not stated, *Ctenochiton perforatus*, Maskell, *C. viridis*, Maskell, and *Dactylopius glaucus*, Maskell. In cultivation in this country the species of *Pittosporum* seem rather subject to the attacks of exogenetic coccids; Coquillett mentions *Teerya purchasi*, Maskell, and *Lecanium hesperidum*, Linnaeus.

*Bursaria* consists apparently of only two species, one in Australia, the other in the Philippine Islands. The former, *B. spinosa*, is infested by *Eriococcus eucalypti*, Maskell, and *E. tepperi*, Maskell.

## CARYOPHYLLÆ.

In Europe *Stellaria holostea* supports, in common with various other low plants, *Orthezia urtica*, Linnaeus.<sup>1</sup>

## TAMARISCINÆ.

A small order, best known by the Old World genus *Tamarix*, common in cultivation. *T. gallica* of Mount Sinai and other localities produces the *Gossyparia mamifera*, Hardwick. In cultivation, I have found the tamarisk free from coccids, but Coquillett records *Icerya purchasi*, Maskell, exogenetically upon it.

*Fouquieria splendens*, one of the most curious native plants of New Mexico and northern Mexico, commonly used for hedges, is rarely found infested by *Dactylopius townsendi*, Cockerell.

## HYPERICINÆ.

The unrecognizable *Coccus hypericonis*, Gmelin, is recorded from the European *Hypericum perforatum*.

## GUTTIFERÆ.

A large order of tropical trees and shrubs, mostly American and Asiatic. *Clusia alba*, Jacquin, is attacked by *Icerya montserratensis*, Riley and Howard, in Trinidad. *Mammea americana*, Linnaeus, is cultivated in the Sandwich Islands, and there infested by *Pulvinaria mammea*, Maskell, which, however, may be exogenetic. At any rate, no such *Pulvinaria* has been found on the mamee in the West Indies.

## TERNSTRÆMIACÆ.

Another fairly large order, well known from the camellia and tea plant, both now referred to the genus *Camellia*. *Schima crenata* is cited as a food plant of *Tachardia laeca*, Kerr. The common camellia, *C. japonica*, a native of Japan and China, is much attacked by scale insects in cultivation. The list is *Aspidiotus spinosus*, Comstock, *A. rapax*, Comstock, *A. degeneratus*, Leonardi, *Fiorinia fioriniae* var. *camelliae*, Comstock, *Parlatoria pergandei*, Comstock, var. *camelliae*, Comstock, *Pulvinaria camelicola*, Signoret, *Lecanium hesperidum*, Linnaeus, *L. olea*, Bernard, *L. hemisphaericum*, Targioni-Tozzetti. *Chermes camelliae* of Boisduval can not now be identified; it can not well be what Signoret called *Aspidiotus camelliae*, which is *A. rapax*. Boisduval's insect was also found on the tea plant. *Aspidiotus duplex*, Cockerell, was found by Mr. Ehrhorn on camellia from Japan, at a Japanese nursery in San Francisco. *Ceroplastes ceriferus*, Anderson, was found by Mr. Craw on

<sup>1</sup> Douglas, Trans. Ent. Soc. Lond., 1881, p. 298.

camellia from Japan, and sent to me by Mr. Ehrhorn. The tea plant, *Camellia theifera*, also produces several coccids. Maskell reports from it *Ceroplastes ceriferus*, Anderson, and in America Comstock records *Ceroplastes floridensis*, Comstock. Mr. E. C. Cotes has published<sup>1</sup> a useful account of the insects which attack the tea plant in India; the coccids he gives as follows: *Chionaspis thea*, Maskell, *Aspidiotus flavescens*, Green (syn. *A. thea*, Maskell), *A. transparentis*, Green, *Lecanium coffea*, Nietner. Green has recorded that *Lecanium viride*, Green, is occasionally found upon tea. According to Green in a letter to the writer, also, his *Aspidiotus flavescens* is a *Diaspis*, and therefore not identical with *Aspidiotus thea*, Maskell, which is a valid species. *Parlatori athea*, Cockerell, occurs on the tea plant in Japan.

### DIPTEROCARPEÆ.

An order of tropical trees. Two species of *Shorea* are infested by *Tachardia laeca*, Kerr, in India.

### MALVACEÆ.

A world-wide order, made familiar by such plants as cotton and *Hibiscus*. *Plagianthus* and *Hoheria* are antipodean genera: the former supports *Ctenochiton depressus*, Maskell, the latter, *Eriococcus hoheria*, Maskell, *Fiorinia stricta*, Maskell, and *Chionaspis dysoxylis*, Maskell. The species of the latter genus is *H. populnea*, A. Cunningham (syn. *angustifolia*, Raoul). The Indian *Kydia calycina*, Roxburgh, is one of the food plants of *Tachardia laeca*, Kerr. The forms of *Abutilon* in cultivation offer exogenetic coccids; thus Lounsbury reports *Orthezia insignis*, Douglas, Coquillett *Lecanium olea*, Bernard, and Gillette and Baker give a record of *Lecanium hesperidum*, Linnaeus. In England, Newstead found *Lecanium minimum*, Newstead. *Malva-viscus* also is infested by *Orthezia insignis*, Douglas; while in Mexico *M. arboreus*, Cavanilles, and *M. acerifolius*, Presl, support *Ceroplastes ceriferus*, Anderson (syn. or var. *dugesii*). The latter insect was found by Professor Townsend at Cuautla, Mexico, on *Hibiscus*.

The various varieties of cultivated *Hibiscus* are decidedly subject to coccid attacks. In the West Indies they suffer especially from *Lecanium depressum*, Targioni-Tozzetti; but also from *Chionaspis minor*, Maskell, of which there is a curious variety having the habit of burrowing under the epidermis; this was found by Mr. Barber in Antigua. The ordinary form of *C. minor* is sometimes excessively abundant on the plants. *Aspidiotus articulatus*, Morgan, occurred on an *Hibiscus* labeled *H. purpureus* forma *semiplena*; I am not clear whether this was *H. purpureus*, Forster, which is not cited in Nicholson's Dictionary of Gardening, or *H. syriacus*, Linnaeus forma *purpureus* Hortorum. According to Riley, *Asterolecanium pustulans*, Cockerell, is found on *Hibiscus* in

<sup>1</sup> Ind. Mus. Notes, 1895.

Florida. In Tampico, Mexico, Townsend found a variety of *Conchaspis auagræi*, Cockerell, on *Hibiscus*. There are, in addition, several quite problematical species reported from the same genus of plants: *Pulvinaria cestri*, Bouché, *Lecanium bromeliæ*, *Coccus erion*, Anderson, and *C. trichodes*, Anderson. The last two are from *H. rosa-sinensis*. *H. (Abelmoschus) esculentus*, Linnaeus, is a food plant of *Diaspis amygdali*. The unidentified *Coccus oogenes*, Anderson, lives on *Thespesia* (olim *Hibiscus*) *populæa*, Linnaeus. In Jamaica the cotton (*Gossypium barbadense*) grown about the town of Kingston becomes infested by *Dactylopius virgatus*, Cockerell, *Chionaspis minor*, Maskell, and *Diaspis amygdali*, Tryon. In China, on cotton, is the unrecognized *Diaspis* or rather *Chionaspis gossypii*, Fitch.

Professor C. H. T. Townsend wrote me from Brownsville, Texas, April 8, 1895:

I mail you herewith some scales I found on cotton the other day. They are all I have. Could find no more. It is the first scale I have ever found on cotton.

The material was very scanty, but with little doubt belonged to *Lecanium imbricatum*, Cockerell. Professor Townsend had the following note on the fresh specimens:

Liver-colored, very convex, oblong, with a broken longitudinal carina. Scale transversely and rather irregularly ribbed on sides. The broken keel shows a whiter surface than the rest. Length of large scale,  $4\frac{1}{2}$  mm.; width, 3 mm.; height 2 mm. or slightly over. Smallest scale is  $1\frac{1}{2}$  mm. long.

## STERCULIACEÆ.

A large order of tropical herbs and trees. The Indian *Eriolena hookeriana*, Wight and Arnot, is a food plant of *Tachardia luccæ*, Kerr. Comstock records *Lecanium oleæ*, Bernard, from "*Bruchaton*," meaning perhaps *Brachychiton*. Sasaki reports *Diaspis patelliformis*, Sasaki, from *Sterculia platanifolia*.

## TILIACEÆ.

A cosmopolitan order of over three hundred species. *Grewia excelsa*, Vahl (syn. *rothii*), a native of the oriental and Ethiopian tropics, exhibited some exogenetic *Ceroplastes floridensis* when cultivated in Jamaica. *Triumfetta rhomboidea*, Jacquin, also in Jamaica, nourished some *Ceroplastes ceriferus*, Anderson.<sup>1</sup>

The temperate-zone genus *Tilia* supports several coccids, namely *Aspidiotus aucylus*, Putnam, *A. tilia*, Signoret, *Mytilaspis pomorum*, Bouché, *Pulvinaria innumerabilis*, Rathvon, *Lecanium tilia*, Cook, *Xylococcus filiferus*, Loew, and the problematical *Lecanium vagabundum*, Kaltenbach. The species of *Tilia* infested is not in every case clear. *L. tilia* and *X. filiferus* are from *T. grandifolia*, more correctly called *T. platyphyllos*, Scopoli. *Aspidiotus tilia* and *Mytilaspis linearis* (pomo-

<sup>1</sup> Amer. Nat., 1895, p. 731.

rum) have occurred on the same, recorded by Signoret as *T. platyphylla*. Signoret also gives *M. linearis* as from *T. sylvestris* and *L. tilie* from *T. communis*, which is, I suppose, *T. vulgaris*, Hayne.

*Apciba tibourbon*. Aublet, a native of Guiana and Venezuela, exhibits a few *Aspidiotus personatus*, Comstock, and *A. articulatus*, Morgan, when cultivated in Jamaica.

The New Zealand *Elvocarpus dentatus* supports, according to Maskell, *Ctenochiton elvocarpi*, Maskell, *C. flavus*, Maskell, *Inglisia ornata*, Maskell, and *Eriococcus pallidus*, Maskell. The Australian *E. cyaneus*, Sims, in cultivation in this country, has yielded *Chionaspis biclaris*, Comstock, as reported by Comstock.

## ZYGOPHYLLÆ.

A small and diverse order of herbs, shrubs, and trees. In Jamaica *Dactylopius virgatus*, Cockerell, is found upon *Tribulus cistoides*. The *Larrea divaricata* or *mexicana* of the arid region of North America exhibits in Arizona *Tachardia larrea*, Comstock, and in the Mesilla Valley of New Mexico *Icerya rileyi*, Cockerell, and *Dactylopius townsendi* var. *steelii*, Cockerell. It is curious that I have never been able to find *T. larrea* in New Mexico, though the *Larrea* is so abundant.

In Jamaica the beautiful lignum-vitæ tree (*Guaiacum officinale*) is a food plant of *Ceroplastes cirripediformis*, Comstock, *C. floridensis*, Comstock, *C. depressus*, Cockerell, *Icerya rosa*, Riley and Howard (under the bark), *Lecanium olea*, Bernard (rarely), *Aspidiotus aurantii*, Maskell, and a *Lecanium* heretofore presumed to be *tessellatum* but probably distinct.

## GERANIACEÆ.

Cultivated Pelargoniums are especially liable to the attacks of *Diaspis amygdali*, Tryon, but may also be infested by *Pseudoparlatoria ostreata*. Lounsbury reports *Orthezia insignis*, Douglas, on *Pelargonium*, as also on *Oxalis*. Comstock records *Orthezia americana*, Walker, from *Impatiens*.

## RUTACEÆ.

A large order of shrubs and trees, most numerous in South Africa and Australia, best known by the orange.

The African genus *Diosma* has been found attacked by the exogenetic *Aspidiotus rapax*, Comstock, or *camellia*, Signoret.<sup>1</sup> *Diosma crenata* is reported as supporting the problematical *Coccus diosmatis*, Modeer; this plant, however, is not a *Diosma*, but a *Barosma*, *B. crenulata*, Linnaeus. The New Zealand *Melicope ternata*, Forster, furnishes *Eriochiton spinosus*, Maskell. The hop tree, *Ptelea trifoliata*, Linnaeus, is cited by Comstock as one of the various food plants of *Mytilaspis pomorum*, Bouché. *Murraya exotica*, when cultivated in Jamaica, is infested by

<sup>1</sup> Maskell, Tr. N. Z. Inst., XXVII, p. 39.

*Aspidiotus articulatus*, Morgan, and *Mytilaspis citricola*, Packard. The Indian *Feronia elephantum*, Correa, is a food plant of *Tachardia luca*, Kerr.

The Coccidae of *Citrus* trees are about to be treated in full by Mr. Hubbard, but a list of the species may be here given:

- (1) *Chionaspis citri*, Comstock. On lime (Amer. Nat., 1895, p. 728); on mandarin orange (Maskell, Tr. N. Z. Inst., XXV, p. 211.) Well known as a pest of *Citrus* trees in this country and some of the West Indian islands.
- (2) *Chionaspis latus*, Cockerell. On orange leaves, Tokyo, Japan (Takabashi). Allied to *C. aspidistra* and *C. braziliensis*.
- (3) *Howardia biclaris*, Comstock. On orange stem from Tahiti, found by Mr. Craw in his quarantine work; sent by Mr. Ehrhorn.
- (4) *Parlatoria pergandei*, Comstock. Well known in the south, and west to Matamoros, Mexico (Townsend).
- (5) *Parlatoria zizyphus*, Lucas. Found on lemons.
- (6) *Mytilaspis citricola*, Packard (*fulva*, Targioni-Tozzetti, *flavescens*, Targioni-Tozzetti). Perhaps the most widely spread and common of orange coccids. I am indebted to Mr. Hubbard for calling my attention to the identity of *M. flavescens* with *M. fulva*.
- (7) *Mytilaspis gloverii*, Packard. Frequent in the South, extending also to Tampico and Matamoros, Mexico (Townsend). Mr. Takahashi has found on orange at Tokyo, Japan, a form which seems to me to be only a rather broad variety of *gloverii*.
- (8) *Aspidiotus ficus*, Ashmead. Common on *Citrus* trees in the warm parts of America.
- (9) *Aspidiotus scutiformis*, Cockerell. On *Citrus* in Victoria and Monterey, Mexico (Townsend).
- (10) *Aspidiotus articulatus*, Morgan. On *Citrus* trees in the West Indies.
- (11) *Aspidiotus duplex*, Cockerell. Found by Mr. Craw on orange trees from Japan.
- (12) *Aspidiotus albopunctatus*, Cockerell. Found by Mr. Craw on orange seedlings from Japan. Hardly different from *A. perniciosus*.
- (13) *Aspidiotus aurantii*, Maskell. A well-known orange pest, especially in California. It has a variety *citrinus*, Coquillett.
- (14) *Aspidiotus nerii* var. *limonii*, Signoret. On lemons in the south of Europe. Specimens of *nerii* are often found on lemons exposed for sale in this country, but probably of European origin.
- (15) *Aspidiotus rapar*, Comstock. Recorded from orange by Coquillett, as also *A. convexus*.
- (16) *Aspidiotus longispinus*, Morgan. Maskell reports this on China orange from the Sandwich Islands. (Tr. N. Z. Inst., XXVII, p. 38.)
- (17) *Aspidiotus cydonia*, Comstock. According to Maskell, this is found on orange in Samoa.
- (18) *Pulvinaria teeta*, Maskell. On *Citrus*, etc., in Australia.
- (19) *Pulvinaria aurantii*, Cockerell. On orange, Tokyo, Japan (Takahashi).
- (20) *Lecanium punctatum*, Cockerell. On *Citrus medica* var. *acida* in Grenada.
- (21) *Lecanium olca*, Bernard. The well-known black scale. *L. citri*, Inzenga, appears to be the same.
- (22) *Lecanium hesperidum*, Linnaeus. Also a common species on *Citrus* trees, though not everywhere.
- (23) *Lecanium longulum*, Douglas. Maskell reports this from *Citrus*.
- (24) *Lecanium hemisphaericum*, Targioni-Tozzetti. Affects *Citrus* trees as well as many other plants. Coquillett records the variety *hibernaculorum*, Boisduval.
- (25) *Ceroplastes cirripediformis*, Comstock.
- (26) *Ceroplastes floridensis*, Comstock. This and the last are reported by Comstock.
- (27) *Orthezia insignis*, Douglas. On orange, see Amer. Nat., 1895, p. 727. Also on lime.



- (28) *Phenacoccus yuccæ*, Coquillett. Found by Professor Townsend in Mexico, on lime in San Luis Potosi, and on orange in Guadalajara.
- (29) *Phenacoccus barberi*, Cockerell. On orange, etc., representing *yuccæ* in some of the West Indian islands. It may be only a form of *yuccæ*.
- (30) *Dactylopius citri*, Risso. syn. *destructor*, Comstock.
- (31) *Dactylopius adonidum*, Linnaeus, syns. *longispinus*, Targioni-Tozzetti, *longifilis*, Comstock. For a full account of this and the last, see Berlese, *Revista di Patologia Vegetale*, 1893.
- (32) *Dactylopius rastator*, Maskell. On *Citrus* in Sandwich Islands. (Tr. N. Z. Inst., XXVII, p. 65.) A letter from Mr. J. Marsden, quoted by Mr. Craw in *Pacific Rural Press*, December 8, 1894, p. 358, probably refers to the same insect; but it is the restated that Mr. Maskell identified it as *D. albizziae*, while Doctor Riley said it was *Rhizococcus* (misprinted *Riggococcus*).
- (33) *Icerya purchasi*, Maskell. Too well known as a pest of *Citrus* trees.
- (34) *Icerya*, sp. On orange, Tokyo, Japan (Takahashi). Presumably new, but I have only seen immature examples.
- (35) *Coccus diacopeis*, Anderson, is a problematical species found on *Citrus aurantium* (syn. *siucensis*).
- (36) *Diaspis colvei* in Spain.

### SIMARUBEÆ.

The curious spiny shrub or small tree, *Holacantha emoryi*, Gray, is in Arizona the food plant of *Diaspis toumeyii*, Cockerell. Bentham and Hooker cite the plant as from New Mexico<sup>1</sup> but it does not appear to occur in that Territory. It was described from Mexico.

### BURSERACEÆ.

A small tropical order. *Garuga pinnata* is in India a food plant of *Tachardia lacea*, Kerr. *Bursera gummifera* in Antigua produces *Ceroplastes ceriferus*, Anderson.

### MELIACEÆ.

*Dysoxylum* (syn. *Dysoxylon*) is a rather large genus of the Malay Archipelago, Australia, New Zealand, and New Caledonia. The New Zealand *D. spectabile*, J. D. Hooker, is cited by Maskell as a food plant of *Aspidiotus dysoxylis*, Maskell, *Mytilaspis pyriformis*, Maskell, and *Chionuspis dysoxylis*, Maskell.

The so-called China tree, *Melia azedarach*, a native of the Himalayan region, is commonly cultivated in the United States, especially in the arid region. It is almost free from the attacks of insects in this country, but more than once it has been found infested by *Aspidiotus nerii*, Bouché.

### AQUIFOLIACEÆ.

A small order, best known by the holly. This shrub has long been known as a food plant of *Iccanium hesperidum*, Linnaeus, to which Coquillett, from his Californian experience, adds *I. oleæ*, Bernard, and

<sup>1</sup>Genera Plantarum I, p. 310.

*Aspidiotus rapax*, Comstock. In Europe, *Aspidiotus hederae*, Vallot, is recorded from holly. The American ink berry or gall berry (*Ilex glabra* (Linnaeus), Gray) is a plant of the same genus as the holly, but its berries are black instead of red. It has been found supporting *Ceroplastes floridensis*, Comstock, and *Rhizococcus quercus*, more properly *Eriococcus quercus*, Comstock.

### CELASTRINEÆ.

One genus of this large order, *Euonymus*, has often been noticed as infested by coccids. The European *E. latifolius* is affected by *Chionaspis euonymi*, Comstock, while *E. japonicus*, a native of China and Japan, has been found to support the doubtless exogenetic *Aspidiotus rapax*, Comstock. Maskell records a case of *Diaspis santali*, Maskell, usurping the place of *A. rapax*, Comstock, on *Euonymus*. From cultivated species of the genus, not specifically identified, Coquillett reports *Lecanium olea*, Bernard, and *L. hesperidum*, Linnaeus. Riley records *Pulvinaria innumerabilis*, Rathvon, and I have cited a *Pulvinaria* believed to be a variety of *P. simulans*, Cockerell.<sup>1</sup> There is, besides, a *Pulvinaria euonymi*, Goureaux, in Europe.

*Celastrus ceriferus* is known as a food plant of *Ceroplastes ceriferus*, Anderson. This plant is not in the Index Kewensis, and the specific name, cited by Signoret, is doubtless erroneous.<sup>2</sup>

### RHAMNEÆ.

Two species of *Zizyphus*, in India, afford *Tachardia lacca*, Kerr. *Parlatoria zizyphus*, Lucas, was described from *Z. pinnachristi* (rect. *spinachristi*?). The Californian *Rhamnus croceus* is infested, according to Coquillett, by *Lecanium olea*, Bernard, *L. hesperidum*, Linnaeus, and *Aspidiotus rapax*, Comstock. *Rhamnus alaternus* of the Mediterranean region supports *Dactylopius alaterni*, Signoret. Signoret reports *Tachardia lacca*, Kerr, from *Rhamnus jujuba*, but the plant intended is doubtless *Zizyphus jujuba*. Mr. Broadway found *Asterolecanium pustulans*, Cockerell, injuring *Z. jujuba* in Grenada. Coquillett records *Lecanium hibernaculorum*, Boisduval, from the Californian *Ceanothus divaricatus*, Nuttall.

### AMPELIDACEÆ.

Riley records *Pulvinaria innumerabilis*, Rathvon, from the cultivated *Ampelopsis reitchii*, the more correct name of which is *Vitis inconstans*.

The Coccidæ of the grapevine are as follows:

- (1) *Margarodes vitis* (*vitium*, Giard). In Chile.
- (2) *Dactylopius vitis*, Nieldski. In Europe, and a species, perhaps the same, in Chile.

<sup>1</sup> Can. Ent., 1865, p. 259.

<sup>2</sup> Signoret. Essai; Maskell, Tr. N. Z. Inst., XXV, p. 216.

- (3) *Pulvinaria vitis*, Linnaeus. In Europe.
- (4) *Pulvinaria innumerabilis*, Rathvon. In America, on both wild and cultivated vines.
- (5) *Lecanium oleæ*, Bernard. See Insect Life, 1893, p. 160.
- (6) *Lecanium pruinosum*, Coquillett. Riley, cited by Coquillett, Insect Life, III, p. 384.
- (7) *Lecanium hesperidum*, Linnaeus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26.
- (8) *Lecanium depressum*, Targioni-Tozzetti. Maskell, Tr. N. Z. Inst., XXV, p. 220. Maskell records it as on vine; I infer that he means grapevine.
- (9) *Lecanium*, sp. Some forms of *Eulecanium*, not yet sufficiently studied, have been found; Cockerell, Trans. Amer. Ent. Soc., 1893, p. 52; Maskell, Tr. N. Z. Inst., XXIV, p. 22.
- (10) *Aspidiotus vitis*, Signoret. On grapes in the Mediterranean region.
- (11) *Aspidiotus uræ*, Comstock. In the United States, and rarely in Jamaica.
- (12) *Aspidiotus articulatus*, Morgan. On *Vitis vinifera* in Nevis; Journ. Inst. Jamaica, 1893, p. 255.
- (13) *Aspidiotus aurantiæ*, Maskell. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 15.
- (14) *Chionaspis minor*, Maskell. Insect Life, V, p. 216.
- (15) *Diaspis amygdali*, Tryon (syn. *lanatus*). Townsend, Journ. Inst. Jamaica, 1893, pp. 283, 378.
- (16) *Coccus microgenes*, Anderson, is a problematical species from *Vitis vinifera*.

There should also be added to the *Vitis* coccids a new species, *Chionaspis vitis*, Green, found by Mr. E. E. Green in Ceylon.

## SAPINDACEÆ.

A large order, consisting almost entirely of trees. In Europe the horse-chestnut, *Æsculus hippocastanum*, is the food plant of *Aspidiotus hippocastani*, Signoret, *Lecanium æsculi*, Koelzer, and *Phenacoccus æsculi*, Signoret. In Palo Alto, California, *Aspidiotus æsculi*, W. G. Johnson, is found on *Æsculus californica*, Nuttall.

Theakee, *Cupania* or *Blighia sapida*, is cultivated in Jamaica, where it affords food to *Asterolecanium pustulans*, Cockerell, *Pulvinaria cupania*, Cockerell, *Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock. Another tree cultivated in Jamaica is the genip, *Melicocca bijuga*, a native of tropical America. On it are found *Ceroplastes floridensis*, Comstock, *Aspidiotus personatus*, Comstock, and *A. articulatus*, Morgan. *Schleichera trijuga* is cited by Watt as a food plant of *Tachardia lacca*, Kerr. Is not this the same as the *Melicocca*? Another food plant of *T. lacca* in India is *Nepelium lit-chi*, Camb., a native of China.

The box elder, *Negundo aceroides*, or more properly *Acer negundo*, is attacked by *Pulvinaria innumerabilis*, Rathvon, *Lecanium* (*Eulecanium*) sp., and *Aspidiotus anegylus*, Putnam. The *Lecanium* is a species similar to *L. quercifex*, Fitch, but it has not been sufficiently studied. The following species of *Acer* are recorded as host plants of coccids, in addition to the box elder:

- (1) *Acer campestre*, Linnaeus. European. *Acanthococcus* (more properly *Eriococcus*) *aceris*, Signoret.
- (2) *Acer pseudoplatanus*, Linnaeus. South European and Oriental. *Chionaspis aceris*, Signoret, *Lecanium aceris*, Sehrank, and *Phenacoccus aceris*, Signoret, all in Europe.

- (3) *Acer saccharinum*, Linnæus (syn. *dasycarpum*), North America. Riley records *Pulvinaria innumerabilis*, Rathvon; Coquillett *Lecanium olea*, Bernard, and *L. hesperidum*, Linnæus, these latter in California.
- (4) *Acer rubrum*, Linnæus. North America. Mundt (Can. Ent., 1884, p. 240) records *Pulvinaria innumerabilis*, Rathvon; *Mytilaspis pomorum*, Bonché, is cited in Country Gentleman, January 10, 1895, p. 27. Comstock records *Aspidiotus tenchricosus*, Comstock.
- (5) *Acer saccharum*, Marshall, syn. *saccharinum*, Wanzenheim. North America. *Pulvinaria innumerabilis*, Rathvon, and *Mytilaspis pomorum*, Bonché, are cited l. c. sub *A. rubrum*.
- (6) *Acer pennsylvanicum*, Linnæus. North America. *Mytilaspis pomorum*, Bonché, is mentioned in Country Gentleman, January 10, 1895, p. 27.

In addition to the above, *Aspidiotus aucylus*, Putnam, is a well-known maple species,<sup>1</sup> while Comstock reports *Aspidiotus verii*, Bonché, and Coquillett, *A. rapax*, Comstock. Mr. W. G. Johnson's *A. comstocki* is from sugar maple. From Sycamore, Maskell reports *Mytilaspis pomorum*, Bonché, Riley *Pulvinaria innumerabilis*, Rathvon, and Coquillett, *Lecanium olea*, Bernard. It is not certain, however, which of these records really refer to *A. pseudoplatanus*, and which to *Platanus occidentalis*.

*Dodonæa* is a large genus of trees and shrubs found in Australia for the most part. *D. bursariifolia*, F. Mueller, supports *Pulvinaria dodonææ*, Maskell. The bladder nut, *Staphylea*, is given by Comstock as a food plant of *Aspidiotus aucylus*, Putnam, and *Mytilaspis pomorum*, Bonché. This shrub, placed both by Bentham and Hooker and Gray in Sapindaceæ, appears in the recent check list of the Botanical Club under a distinct order, Staphyleaceæ. At the same time the maples are separated under Aceraceæ, and the horse chestnuts under Hippocastanaceæ, doubtless following Engler and Prantl, which I have not had an opportunity to consult.

### ANACARDIACEÆ.

A large order of trees and shrubs. *Rhus succedanea* produces *Eri-cerus pe-la*. Mundt reports *Pulvinaria innumerabilis*, Rathvon, from *Rhus toxicodendron* (or *radicans*); Riley cites the same insect from sumac. Coquillett cites *Lecanium olea*, Bernard, and *L. hesperidum*, Linnæus, from *Rhus integrifolia* in California.

The mastie tree, *Pistacia lentiscus*, Linnæus, of the Mediterranean region, supports *Aspidiotus lentisci*, Signoret. The mango, *Mangifera indica*, Linnæus, is a native of the oriental region, but is now abundant in the western tropics. In the east it is infested by *Lecanium mangifera*, Green, and *Tachardia lucca*, Kerr; in the Sandwich Islands, according to Maskell, by *Aspidiotus longispina*, Morgan. At Brisbane, Australia, again on Maskell's authority, there is found upon it *Ceroplastes rubens*, Maskell. In the West Indies, it is a host of *Dactylopius longifilis*, Comstock (more correctly *longispinus*). *Ceroplastes floridensis*, Comstock, *Lecanium mangifera*, Green, *L. olea*, Bernard, *L.*

<sup>1</sup>Comstock, Rept. Dept. Agric. for 1880; Cockerell, Can. Ent., 1894, p. 191.

*hesperidum*, Linnaeus, *Vinsonia stellifera*, Westwood, *Aspidiotus mangifera*, Cockerell, *A. destructor*, Signoret (syn. *fallax*, Cockerell), *A. articulatus*, Morgan, and *A. personatus*, Comstock. Thus, in all, thirteen coccids are recorded from the mango.

*Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock, are found on the West Indian *Anacardium occidentale*, Linnaeus. *Schinus molle*, in Mexico, supports the beautiful green *Lecanium schini*, Cockerell, but in California Coquillett found on it *L. olea*, Bernard, and *L. hesperidum* Linnaeus. *Ceroplastes albolineatus*, Cockerell, is recorded from *Schinus*.

*Aspidiotus nerii*, Bouché, is reported by Maskell, exogenetically of course, on the New Zealand *Corynocarpus laevigata*.

The Mexican *Llaveia arinus*, Llave, is found on *Spondias myrobalanus*. The Otaheite apple, *Spondias dulcis*, supports *Lecanium mangifera*, Green, in Jamaica.

### LEGUMINOSÆ.

*Poliaspis exocarpi*, Maskell, occurs on *Oxylobium trilobatum*.<sup>1</sup> *Daviesia* is a large Australian genus; on *D. corymbosa* are found *Chionaspis nitida*, Maskell, and *Pulvinaria tecta*, Maskell. *Dilwynia* has about a dozen species, exclusively Australian; on *D. juniperina*, Loddiges, occurs *Lecanium pingue*, Maskell; on an undetermined species, *Poliaspis exocarpi*, Maskell. *Bossia* is another Australian genus; Maskell cites *Aspidiotus bossiæ*, Maskell (should be *bossiæ*), from *B. procumbens*. The specific name of this plant is not in the Index Kewensis.

In Europe *Lecanium geniste* is found on *Genista anglica*, and *Aspidiotus geniste*, Signoret, on *Cytisus scoparius* (syn. *Genista scoparia*). Newstead<sup>2</sup> records *Mytilaspis pomorum*, Bouché, on *Cytisus scoparius* in Guernsey, and on *C. nubigenus* on the Peak of Teneriffe, at 7,000–8,000 feet. *Lecanium distinguendum*, Douglas, occurs on *C. scoparius* in Guernsey, as reported by Mr. Luff. Maskell records *Icerya purchasi*, Maskell, exogenetically upon gorse, *Ulex*. *Eriococcus insignis*, Newstead, is found on *Ulex*.<sup>3</sup> Douglas has described a *Mytilaspis ulieis*, but it is apparently a variety of *M. pomorum*.

*Aspidiotus nerii*, Bouché, was noticed by Comstock exogenetically upon clover, *Trifolium*. There are two clover mealy bugs, *Dactylopius arceæ*, Maskell, and *D. trifolii*, Forbes, both at roots of red clover, *Trifolium pratense*, but on opposite sides of the world.<sup>4</sup>

*Dalea* or *Parosela formosa* is in the Mesilla Valley, New Mexico, the food plant of *Ceroplastodes daleæ*, Cockerell.

According to Comstock, *Mytilaspis pomorum*, Bouché, has been found upon *Amorpha*. The problematical *Coccus microogenes*, Anderson, was

<sup>1</sup> Maskell, Tr. N. Z. Inst., XXVII, p. 52.

<sup>2</sup> Ent. Mo. Mag., June, 1893, p. 138.

<sup>3</sup> Ent. Mo. Mag., 1891, p. 165.

<sup>4</sup> Insect Life, VII, p. 171; Tr. N. Z. Inst., XXV, p. 231.

recorded from *Galega prostrata*, but the plant is now called *Tephrosia purpurea*.

The cultivated locust, *Robinia pseudacacia*, is quite subject to coccid attacks; the species being, in Europe, *Dactylopius robiniae*, Signoret, and *Lecanium robiniarum*, Douglas; in America, *Pulvinaria innumerabilis*, Rathvon, *Lecanium robiniarum*, Douglas, *L. hesperidum*, Linnaeus, *Mytilaspis pomorum*, Bonché, *Aspidiotus rapax*, Comstock, and *A. juglans-regia*, Comstock.

In New Mexico the native *Robinia neomexicana* is infested by *Lecanium quadrifasciatum*, Cockerell. *Robinia mitis* is recorded as supporting *Coccus erion*, Anderson, in India.

*Lecanium icistaria*, Signoret, was found by Signoret on *Wistaria chinensis* (syn. *sinensis*). This was in France, but the plant is a native of China.

Some species of *Sesbania* is supposed to be the food plant of *Tachardia fulgens*, Cockerell, in Arizona. *Asterolecanium jimbratum*, Fonscolombe, occurs, in Europe, on *Coronilla glauca*, a native of the Mediterranean region. *Ougenia dalbergioides*, Bentham, the only species of its genus, is in India a food plant of *Tachardia lacca*, Kerr. *Clitorca ternata* in the West Indies is sometimes infested by *Orthezia insignis*, Douglas.

*Kennedyia rubicunda*, Ventenat, a native of Australia, supports *Aspidiotus kennedyi*, Boisduval; and in California, according to Coquillett, *A. aurantii*, Maskell.

In the West Indies, *Aspidiotus personatus*, Comstock, *A. articulatus*, Morgan, and *Ceroplastes floridensis*, Comstock, occur upon *Erythrina* in cultivation. In India, *Erythrina indica*, Lambert, produces *Tachardia lacca*, Kerr, and *E. corallodendron*, Linnaeus, the problematical *Coccus erion*, Anderson. The first of these trees is a native of tropical Asia, but the other originated in the Western Hemisphere.

*Butea frondosa*, Roxburgh, and another species of the genus, produce *Tachardia lacca*, Kerr. The East Indian pigeon pea, *Cajanus indicus*, is decidedly subject to the attacks of coccids—in India *Eriochiton cajani*, Maskell, in the West Indies *Asterolecanium pustulans*, Cockerell, and *Lecanium longulum*, Douglas. *Tachardia lacca*, Kerr, is found, in India, on two species of *Dalbergia* and *Pterocarpus marsupium*. *Aspidiotus sophora*, Maskell, occurs on *Sophora tetraptera*. The honey locust, *Gleditschia triacanthos*, is given by Gillette and Baker as a food plant of *Pulvinaria innumerabilis*, Rathvon, and Johnson records from it his *Aspidiotus forbesi*. *Aspidiotus ancylus*, Putnam, has been found on the water locust, *G. monosperma*. On *Cassia fistula*, a native of tropical Asia, are found, in Jamaica, *Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock. *Ceratonia siliqua*, the only species of its genus, nourishes *Aspidiotus ceratoniae*, Signoret, and *Dactylopius ceratoniae*, Signoret, in Europe, and *Tachardia lacca*, Kerr, in India. *Anherstia nobilis*, the only species of its genus, and a native of Bur-

mah, is, in the West Indies, quite liable to be infested by *Icerya rosa*, Riley and Howard.

*Prosopis juliflora* is infested, in Jamaica, by *Icerya rosa*, Riley and Howard, and *Dactylopius virgatus*, Cockerell. Its variety *glandulosa* produces, in Arizona, *Aspidiotus prosopidis*, Cockerell, *Lecanium mirabile*, Cockerell, and *Lecaniodiaspis (Prosopophora) prosopidis*, Maskell. The same, in the Mesilla Valley of New Mexico, nourishes *Icerya rileyi*, Cockerell. The curious *Lecanium mirabile*, Cockerell, was supposed to be confined to Arizona, but on October 12, 1895, Professor C. H. T. Townsend found it on mesquite in Tularosa, New Mexico, where it is much attacked by a lepidopterous larva. Coquillett records *Icerya purchasi*, Maskell, from *Prosopis*, thus making the third *Icerya* found on this genus. *Tachardia lacea*, Kerr, is found on the Indian *Prosopis spicigera*, Linnaeus, and also on *Dichrostachys cinerea*, Wight and Arnot. The latter plant should, by the rule of priority, be called *Cailliea cinerea*, the genus *Cailliea* having one year priority, according to the dates given in Index Kewensis. There appears, however, to be some confusion, as *Dichrostachys* is in one place credited to Wight and Arnot, 1834, in another to De Candolle.

*Tachardia lacea*, Kerr, according to Signoret, occurs on *Mimosa cinerea*, and *M. corinda*. The former of these is a Brazilian species. The latter name is probably incorrect, as it is not in the Index Kewensis. In Mexico, *Lecanium imbricatum*, Cockerell, is found on *Mimosa*.

The Coccidæ found on *Acacia* are numerous, namely:

- (1) *Calostoma immauc*, Maskell. On the Australian *A. aneura*, F. Mueller. Maskell, Tr. N. Z. Inst., XXIV, p. 50.
- (2) *Icerya purchasi*, Maskell. On *Acacia*. Comstock, 2d Cornell Rept., p. 139.
- (3) *Eriococcus multispinus*, Maskell, var. *lavigatus*. On the Australian *A. armata*, Robert Brown. Maskell, Tr. N. Z. Inst., XXIII, p. 21.
- (4) *Rhizococcus grandis*, Maskell. On the roots of the Australian *A. longifolia*, Willdenow. Maskell, Tr. N. Z. Inst., XXIV, p. 30.
- (5) *R. grandis* var. *spiniosior*, Maskell. On the Australian *A. implexa*, Benthau. Maskell, Tr. N. Z. Inst., XXV, p. 230.
- (6) *Dactylopius globosus*, Maskell. On the Australian *A. decurrens*, Willdenow and *A. armata*. Maskell, Tr. N. Z. Inst., XXIV, p. 35.
- (7) *Dactylopius acacia*, Maskell. On the Australian *A. linearis*, Sims. Maskell, Tr. N. Z. Inst., XXIV, p. 33. *Acacia lophantha*, another food plant of this species, is properly an *Albizia*.
- (8) *Phenacoccus nivalis*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXV, p. 231.
- (9) *Spharococcus acacia*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXV, p. 237.
- (10) *Lecaniodiaspis (Prosopophora) acacia*, Maskell. On the Australian *A. calamifolia*, Sweet. Maskell, Tr. N. Z. Inst., XXV, p. 226.
- (11) *Asterolecanium (Planchonia) ventriosum*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXVII, p. 63.
- (12) *Kermes acaciæ*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXVI, p. 83.
- (13) *Tachardia lacea*, Kerr. On the Indian *A. catechu*, Willdenow, and another species. Watt Dict. Econ. Prod. India, II, p. 110.
- (14) *Tachardia larrea*, Comstock. On the North American *A. greggi*, A. Gray.
- (15) *Tachardia acaciæ*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXIV, p. 56.
- (16) *Ceroplastodes acaciæ*, Cockerell. On the North American *A. constricta*, Benthau Cockerell, Psyche Supp., 1895, p. 2.

- (17) *Ceroplastodes nirens*, Cockerell. Believed to occur on *Acacia*, but the species not determined.
- (18) *Ceroplastes mimosa*, Signoret. On *Mimosa nilotica*, the correct name of which is *Acacia arabica*, Willdenow. It is a native of Africa and Asia.
- (19) *Inglisia ritrea*, Cockerell. On *Acacia* sp. Cockerell, Journ. Trinidad Club, 1894, p. 308.
- (20) *Lecanium longulum*, Douglas. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXV, p. 221.
- (21) *Lecanium scrobiculatum*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXV, p. 222.
- (22) *Lecanium baccatum*, Maskell. On the Australian *A. armata*, *A. calamifolia*, and *A. longifolia*. Maskell, Tr. N. Z. Inst., XXIV, p. 21.
- (23) *Pulvinaria tecta*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXVI, p. 80.
- (24) *Fiorinia rubra*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXVI, p. 72.
- (25) *Fiorinia acacia*, Maskell. On the Australian *A. pycnantha*, Bentham. Maskell, Tr. N. Z. Inst., XXIV, p. 16.
- (26) *Mytilaspis convexa*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXVI, p. 70.
- (27) *Mytilaspis grisea*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXII, p. 134.
- (28) *Mytilaspis spinifera*, Maskell. On the Australian *A. pendula*, A. Cunningham. Maskell, Tr. N. Z. Inst., XXVI, p. 70.
- (29) *Aulacaspis boisduvalii*, Maskell. On wattle. Maskell, Scale Ins. N. Z., p. 114.
- (30) *Diaspis santali*, Maskell. On *Acacia*. Maskell, Tr. N. Z. Inst., XXII, p. 135.
- (31) *Aspidiotus aurantii*, Maskell. On *Acacia*. Coquillett, Bull. 26, Div. Ent. U. S. Dept. Agric., p. 15.
- (32) *Aspidiotus unilobis*, Maskell. On *Acacia* sp., called "tea tree." Maskell, Tr. N. Z. Inst., XXVII, p. 40.
- (33) *Aspidiotus ceratus*, Maskell. On the Australian *A. stenophylla*, A. Cunningham. Maskell, Tr. N. Z. Inst., XXVII, p. 39.
- (34) *Aspidiotus epidendri*, Maskell. On wattle. Maskell, Scale Ins. N. Z., p. 114.
- (35) *Aspidiotus ucrii*, Bouché. On *Acacia*. Comstock, 2d Cornell Rept., p. 139.
- (36) *Aspidiotus rapax*, Comstock. On *Acacia*. Comstock, 2d Cornell Rept., p. 139; also as *A. camellia*, Maskell, Tr. N. Z. Inst., XXII, p. 135.
- (37) *Aspidiotus fodiens*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXIV, p. 10.
- (38) *Aspidiotus acacia*, Morgan. On *Acacia pycnantha* in Tasmania.
- (39) *Aspidiotus acacia*, Morgan, var. *propinquus*, Maskell. On *Acacia* sp. Maskell, Tr. N. Z. Inst., XXV, p. 205.

On the Australian *Albizia lophantha*, Bentham, are found *Daetylopius albizia*, Maskell, and *D. acacia*, Maskell. *Tachardia laeca*, Kerr, occurs on the Indian *A. lucida*, Bentham, also on *Pithecolobium dulce*, Bentham, a native of tropical America.

## ROSACEÆ.

In Jamaica, *Tachardia gemmifera*, Cockerell, is found on *Chrysobalanus icaco*. The peach, *Prunus* or *Amygdalus persica*, is especially attacked by *Diaspis amygdali*, Tryon (syn. *lanatus*), but also by *Lecanium prunosum*, Coquillett, *L. persica*, Fabricius, *L. rotundum*, Signoret, *L. rugosum*, Signoret, *L. olea*, Bernard (see Olliff), *Pulvinaria persica*, Newstead, *Diaspis leperii* Signoret, *D. patelliformis*, Sasaki, *D. pentagona*, Targioni-Tozzetti, *Mytilaspis pomorum*, Bouché (see Maskell), *Aspidiotus ancylus*, Putnam, *A. ostreaformis*, Comstock, *A. perniciosus*, Comstock, *A. juglans-regia*, Comstock, *A. forbesi*, Johnson, and *Aonidia*



*fusca*, Maskell.<sup>1</sup> The *A. ostreaformis* was on peach from Isleworth, England, sent by Mr. George Manville Fenn. From the almond, *P.* or *A. communis*, Coquillett records *Lecanium oleæ*, Bernard, and *Aspidiotus perniciosus*, Comstock.

The eoccids recorded from the species of *Prunus* proper are as follows:

(A) From the apricot, *P. armeniaca*.

- (1) *Lecanium prunosum*, Coquillett. Coquillett, Insect Life, III, p. 383. It has been questioned whether *L. armeniacum* is a distinct species from this.
- (2) *L. hesperidum* Linnaeus. Coquillett, Bull. 26, Div. Ent. U. S. Dept. Agric., p. 26.
- (3) *L. oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent. U. S. Dept. Agric., p. 28; also Comstock, 2d Cornell Rept., p. 139; Olliff, Agric. Gaz. N. S. W., November, 1891, p. 668.
- (4) *Mytilaspis pomorum*, Bouché. Maskell, Scale Ins. N. Z., p. 111.
- (5) *Aspidiotus juglans-regiæ*, Comstock, var. *albus*, Cockerell. Cockerell, Southwestern Farm and Orchard, August, 1894, p. 6; Insect Life, VII, p. 211; Can. Ent., 1895, p. 260.

(B) From the garden plum, *P. domestica*.

- (1) *Phenacoccus mespili*, Geoffrey. Signoret, Essai.
- (2) *Lecanium juglandis*, Bouché. Cockerell, Ent., 1894, pp. 332-336. *L. variegatum*, also on plum, appears to be the same.
- (3) *L. prunosum*, Coquillett. On prune. Coquillett, Insect Life, III, p. 384.
- (4) *L. oleæ*, Bernard. Comstock, 2d Cornell Rept., p. 140.
- (5) *L. sp.*, perhaps *rosarum*, Snellen. Cockerell, Trans. Amer. Ent. Soc., 1893, p. 54.
- (6) *Mytilaspis pomorum* Bouché. Maskell, Scale Ins. N. Z., p. 113; see also Country Gentleman, January 10, 1895, p. 27.
- (7) *Diaspis santali*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (8) *Aspidiotus aurantii*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 206.
- (9) *A. nerii*, Bouché. Comstock, 2d Cornell Rept., p. 140.
- (10) *A. perniciosus*. Comstock. Comstock, 2d Cornell Rept., p. 140.
- (11) *A. ancylus*, Putnam. On plum in Santa Fe, New Mexico.
- (12) *A. juglans-regiæ*, Comstock. On prune. Cockerell, Can. Ent., 1895, p. 260; also var. *pruni*, Cockerell, Can. Ent., 1891, p. 131.
- (13) *A. howardi*, Cockerell. Cockerell, Can. Ent., 1895, p. 16. There recorded from Colorado; since found in Albuquerque, New Mexico.
- (14) *A. piricola*, Del Guercio. Cockerell, Can. Ent., 1895, p. 260.
- (15) *A. forbesi*, Johnson. W. G. Johnson, Ent. News, 1896, p. 151.

(C) From the blackthorn, *P. spinosa*.

- (1) *Lecanium prunastri*, Fonscolombe. Signoret, Essai.

(D) From the bird cherry, *P. padus*.

- (1) *Coccus padi*, Schrank. A species not now recognized.

(E) From the garden cherries, *P. cerasus*, etc.

- (1) *Lecanium cerasifer*, Fitch. Comstock, 2d Cornell Rept., p. 139; Signoret, Essai. On black cherry.
- (2) *L. prunosum*, Coquillett. Coquillett, Insect Life, III, p. 384.
- (3) *Aspidiotus nerii*, Bouché. Comstock, 2d Cornell Rept., p. 139.
- (4) *A. juglans-regiæ*, Comstock. Comstock, 2d Cornell Rept., p. 139.
- (5) *A. ancylus*, Putnam, var. Cockerell, Can. Ent., 1895, p. 261. Mr. W. G. Johnson, having given this form careful study, is assured that it is not true *ancylus*, but a new species closely allied, which he will describe, calling it *A. forbesi*.
- (6) *Chionaspis furfurus*, Fitch. Recorded as *Aspidiotus cerasi*.

<sup>1</sup>For a discussion of the resemblances between *A. perniciosus* and *Aon. fusca*, see Maskell, Can. Ent., 1896, p. 14.

- (7) *Diaspis amygdali*, Putnam. On dwarf cherry. Cockerell, Can. Ent., 1895, p. 260.  
 (8) *Aspidiotus (Diaspidiotus) patarimus*, Berlese. On the bark.  
 (F) From the wild red cherry, *P. pennsylvanica*.  
 (1) *Mytilaspis pomorum*, Bouché. Country Gentleman, January 10, 1895, p. 27.  
 (G) From the cherry laurel, *P. laurocerasus*.  
 (1) *Lecanium prunosum*, Coquillett. Coquillett, Insect Life, III, p. 381.  
 (2) *L. elongatum*, Signoret. Signoret, Essai. In France.  
 (3) *L. oleae*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 28.  
 (4) *Aspidiotus rapae*, Comstock. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 25.  
 (H) From the Japanese *P. paniculata*, syn. *pseudocerasus*.  
 (1) *Diaspis patelliformis*, Sasaki. Sasaki, Bull. Imperial Univ., Coll. of Agric., Tokyo, II, No. 3.

Maskell describes *Chionaspis prunicola*, found on Japanese plum in the Sandwich Islands.<sup>1</sup> Comstock reports *Ceroplastes floridensis*, Comstock, from Japan plum (*Biotrites*—this generic name is not in Index Kewensis or Genera Plantarum). *Aspidiotus juglansregia*, Comstock, is also recorded from Japan plum.<sup>2</sup> Professor L. H. Bailey says: "The so called Japan plum of the extreme south is the loquat." From *Spiraea* are recorded two exogenetic forms, *Icerya purchasi*, Maskell,<sup>3</sup> and *Lecanium*, apparently *persicæ*, Fabricius.<sup>4</sup>

The following occur on *Rubus*:

- (A) On the raspberries and blackberries.  
 (1) *Lecanium fitchii*, Signoret. On wild and cultivated blackberry. Insect Life, VII, p. 30; Can. Ent., 1895, p. 255. Signoret cites it as on *R. fruticosus*.  
 (2) *Mytilaspis pomorum*, Bouché. Comstock, 2d Cornell Rept., p. 139. On raspberry.  
 (3) *Aulacaspis rosa*, Bouché. Comstock, 2d Cornell Rept., p. 139. On raspberry and blackberry.  
 (4) *Icerya purchasi*, Maskell. Coquillett, Rept. Dept. Agric. for 1888, p. 81. A few on raspberry.

The above have been noticed in America; the two following in Europe:

- (5) *Lecanium rubi*, Schrank. Douglas, Ent. Mo. Mag., 1892, p. 165.  
 (6) *Tetrura rubi*, Lichtenstein. Lichtenstein, Bull. Soc. Ent., France, 1882. A Dactylopiine form, on *R. discolor*.  
 (B) On the bush lawyer, *Rubus australis*, in New Zealand.  
 (1) *Eriococcus multispinus*, Maskell. Maskell, Scale Ins. N. Z., p. 113.  
 (2) *Dactylopius glaucus*, Maskell. Maskell, Scale Ins. N. Z., p. 113.  
 (3) *Ctenochiton viridis*, Maskell. Maskell, Scale Ins. N. Z., p. 113.  
 (4) *C. perforatus*, Maskell. Maskell, Scale Ins. N. Z., p. 113.  
 (5) *Chionaspis dubia*, Maskell. Maskell, Scale Ins. N. Z., p. 113.

On species of *Rosa* the following have been found:

- (1) *Icerya rosa*, Riley and Howard. Riley and Howard, Insect Life; also Cockerell, Journ. Inst. Jamaica, 1892, p. 97.  
 (2) *I. purchasi*, Maskell. Maskell, Scale Ins. N. Z. p. 113; Comstock, 2d Cornell Rept., p. 110.  
 (3) *I. montserratensis*, Riley and Howard. At Colon. Insect Life, 1894, p. 327.

<sup>1</sup> Tr. N. Z. Inst., XXVII, p. 49.

<sup>2</sup> Cockerell, Can. Ent., 1891, p. 132.

<sup>3</sup> Coquillett, Rept. Dept. Agric. for 1888.

<sup>4</sup> Cockerell, Trans. Amer. Ent. Soc., 1893, p. 52.

- (4) *Pulvinaria innumerabilis*, Rathvon. Riley, Rept. Dept. Agric. for 1884.
- (5) *Lecanium hesperidum*, Linnaeus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26; Cockerell, Ann. Mag. Nat. Hist., July, 1893, p. 52.
- (6) *L. quercitronis*, Fitch, var. Cockerell, Can. Ent., 1895, p. 255.
- (7) *L. pruinosum*, Coquillett. Cockerell, Can. Ent., 1895, p. 255.
- (8) *L. rosarum*, Snellen. On *R. centifolia*. Cockerell, Trans. Amer. Ent. Soc., 1893, p. 54.
- (9) *L. olea*, Bernard. Comstock, 2d Cornell Rept., p. 140.
- (9a) *L. caprea*, Linnaeus. Douglas, Ent. Mo. Mag., 1892, p. 279. England.
- (10) *Aulacaspis rosa*, Bouché. On *R. canina*. Douglas, Ent. Mo. Mag., 1887, p. 24.
- (11) *Aspidiotus articulatus*, Morgan. Cockerell, Ann. Mag. Nat. Hist., July, 1893, p. 48.
- (12) *A. ficus*, Ashmead. Cockerell, Ann. Mag. Nat. Hist., July, 1893, p. 48; also Journ. Inst. Jamaica, 1892, p. 54.
- (13) *A. dictyospermi*, Morgan, var. *jamaicensis*, Cockerell. Cockerell, Can. Ent., 1891, p. 128.
- (14) *A. aurantii*, Maskell. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 15.
- (15) *A. perniciosus*, Comstock. Cockerell, Amer. Nat., 1895, p. 726.
- (16) *A. personatus*, Comstock. Cockerell, Amer. Nat., 1895, p. 726.

From *Pyrus* or *Mespilus germanica* are recorded *Phenacoccus mespili*, Geoffrey, by Signoret, and *Aspidiotus targionii*, by Del Guercio. The last is really a *Parlatoria*.

From the quince, *Pyrus cydonia* or *Cydonia vulgaris* (properly *Cydonia cydonia*, if the latter generic name be maintained) come *Ceroplastes cirripediformis*, Comstock, *C. floridensis*, Comstock, *Aspidiotus cydonia*, Comstock, *A. rapax*, Comstock, and *A. perniciosus*, Comstock. Gillette and Baker record *A. rapax* (as *camelliae*) from the Japanese quince, *C. japonica*.

On *Pyrus* proper are:

(A) On the apple, *P. malus*.

- (1) *Dactylopius glaucus*, Maskell. Maskell, Scale Ins., N. Z., p. 111.
- (2) *Lecanium pyri*, Schrank. Cockerell, Can. Ent., 1894, p. 35.
- (3) *L. pruinosum*, Coquillett. Coquillett, Insect Life, III, p. 384.
- (4) *L. olea*, Bernard. Comstock, 2d Cornell Rept., p. 139.
- (5) *Parlatoria protus*, Curtis. Maskell, Tr. N. Z. Inst., XXV, p. 213.
- (6) *Mytilaspis pomorum*, Bouché. Signoret, Essai, and most authors.
- (7) *Diaspis ostreaformis*, Comstock. Comstock, 2d Cornell Rept., p. 139.
- (8) *Chionaspis furfurus*, Fitch. Comstock, 2d Cornell Rept., p. 139.
- (9) *Aspidiotus perniciosus*, Comstock. Comstock, 2d Cornell Rept., p. 139.
- (10) *A. rapax*, Comstock. Olliff, Ent. Notes, Dept. Agric. N. S. W., September, 1892, p. 2.
- (11) *A. juglans-regia*, Comstock, var. *albus*, Cockerell. Cockerell, Can. Ent., 1895, p. 260.
- (12) *A. forbesi*, Johnson. W. G. Johnson, Ent. News, 1896, p. 151.

(B) On the pear, *P. communis*.

- (1) *Pulvinaria pyri*. Signoret, Essai; Comstock, 2d Cornell Rept., p. 140.
- (2) *Lecanium pyri*, Schrank. Comstock, 2d Cornell Rept., p. 140.
- (3) *L. pruinosum*, Coquillett. Coquillett, Insect Life, III, p. 384.
- (4) *L. hibernaculorum*, Boisduval. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 27.
- (5) *L. olea*, Bernard. Comstock, 2d Cornell Rept., p. 140.
- (6) *L. sp.* Cockerell, Ann. Mag. Nat. Hist., 1893, p. 406. In New Mexico.
- (7) *Mytilaspis pomorum*, Bouché. Country Gentleman, January 10, 1895, p. 27; Maskell, Scale Ins., N. Z., p. 113.

- (8) *Diaspis santali*, Maskell. Maskell, Scale Ins., N. Z., 113.  
 (9) *D. ostreaformis*, Comstock. Comstock 2d Cornell Rept., p. 140; Colvée, An. Soc. Ent. France, 1881, Bull., p. lii, described a form as *D. pyri*.  
 (10) *Chionaspis furfurus*, Fitch. Comstock, 2d Cornell Rept., p. 140; Colvée, An. Soc. Ent. France, 1881, Bull., p. lii, described a form as *D. pyri*.  
 (11) *Aspidiotus aurantii*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 206; Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.  
 (12) *A. perniciosus*, Comstock. Comstock, 2d Rept., p. 140; Olliff, Ent. Notes, Dept. Agric. N. S. W., September, 1892, p. 1.  
 (13) *A. juglans-regia*, Comstock. Comstock, 2d Rept., p. 140.  
 (14) *A. juglans-regia*, Comstock var. *albus*, Cockerell. Cockerell, Can. Ent., 1894, p. 132; Insect Life, VII, p. 211.  
 (15) *A. rapax*, Comstock. Olliff, Ent. Notes, Dept. Agric. N. S. W., September, 1892, p. 1; Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.  
 (16) *A. ancyllus*, Putnam. Gillette and Baker, Hemip. Colo., p. 128.  
 (17) *A. forbesi*, Johnson. W. G. Johnson, Ent. News, 1896, p. 151.

From the hawthorn, *Crataegus oxyacantha*, are recorded *Mytilaspis pomorum*, Bouché, *Aspidiotus oxyacantha*, Signoret, *Pulvinaria oxyacantha*, Linnaeus, *Lecanium bituberculatum*, Signoret, *L. generense*, Targioni Tozzetti, and the problematical *L. vulgare*, Forster.

On species of *Photinia* are found:

- (A) On *P.* or *Heteromeles arbutifolia*, a Californian shrub, *Lecanium olea*, Bernard, *L. hesperidum*, Linnaeus, and *L. hibernaculorum*, Boisduval. (Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.) All are, of course, exogenetic.  
 (B) On *P.* or *Eriobotrya japonica*, the loquat of Japan, *Ceroplastes vinsonii*, Signoret (Signoret, Essai), *Lecanium hesperidum*, Linnaeus (Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26), *Aspidiotus rapax*, Comstock (Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 25). One or two other species, recorded from "Japan plum" in the Southern United States, should perhaps be added.

On *Cotoneaster microphylla*, a native of the Himalayan region, Maskell found in New Zealand *Mytilaspis pomorum*, Bouché. On *Ame-lanchier canadensis* is also found *M. pomorum*.<sup>1</sup>

## SAXIFRAGACEÆ.

Signoret records *Lecanium testudo*, Curtis (= *olea* var.), from *Brexia madagascariensis* (syn. *spiuosa*), a native of Madagascar. He also records *L. hibernaculorum*, Boisduval, from *Brexia*. The genus *Carpodetus* is confined to New Zealand, with one species only, *C. serratus*. On it are found *Aspidiotus carpodeti*, Maskell, and *Diaspis santali*, Maskell. The Australian *Callicoma serratifolia* is attacked by the exogenetic *Aspidiotus rapax*, Comstock.<sup>2</sup>

The following occur on *Ribes*:

- (A) On the gooseberry, *R. grossularia*.  
 (1) *Dactylopius arcea*, Maskell. On the roots. Maskell, Tr. N. Z. Inst., XXV, p. 231.  
 (2) *Lecanium rosarum*, Snellen. Maskell, Tr. N. Z. Inst., XXIV, p. 22.  
 (3) *L. ribis*, Fitch. Maskell, Tr. N. Z. Inst., XXIV, p. 22; XXIII, p. 17.  
 (4) *Fiorinia grossularie*, Maskell. Maskell, scale Inst. N. Z., p. 112.

<sup>1</sup> Country Gentleman, January 10, 1895, p. 27.

<sup>2</sup> Olliff, Ent. Notes, Dept. Agric. N. S. W., September, 1892, p. 2.

- (B) On the wild gooseberry, presumably *R. cynosbati*.
- (1) *Lecanium cynosbati*, Fitch. Comstock, 2d Cornell Rept., p. 139. Signoret cites this from *R. sylvestris*, which, however, is a variety of the European *R. rubrum*, the coccid being American.
- (C) On the wild gooseberry, *R. hirtellum* = *oxyacanthoides*.
- (1) *Mytilaspis pomorum*, Bonché. Country Gentleman, January 10, 1895, p. 27.
- (D) On the mountain currant, *R. alpinum*, in cultivation in America.
- (1) *Mytilaspis pomorum*, Bouché. Comstock, 2d Cornell Rept., p. 139.
- (E) On the garden currants, *R. rubrum* and *nigrum*.
- (1) *Pulvinaria innumerabilis*, Rathvon. Riley, Rept. Dept. Agric. for 1884.
- (2) *P. ribesiae*, Signoret. On red currant. Ormerod, Man. Inj. Insects, p. 306.
- (3) *Lecanium ribis*, Fitch. On both black and red currants. Maskell, Tr. N. Z. Inst., XXIII, p. 17; Comstock, 2d Cornell Rept., p. 139; Cockerell, Trans. Amer. Ent., 1893, p. 54.
- (4) *Mytilaspis pomorum*, Bouché. Comstock, 2d Cornell Rept., p. 139; Country Gentleman, January 10, 1895, p. 27.
- (5) *Aspidiotus nerii*, Bonché. Comstock, 2d Cornell Rept., p. 139; Country Gentleman, January 10, 1895, p. 27.
- (6) *A. aequalis*, Putnam. On black currant. Cockerell, Amer. Nat., 1895, p. 731.
- (7) *A. forbesi*, Johnson. W. G. Johnson, Ent. News, 1896, p. 151.

### CRASSULACEÆ.

*Bryophyllum calycinum* has run wild extensively in Jamaica, and is there attacked by *Diaspis amygdali*, Tryon. *Coccus halophilus*, Hardy, which is doubtless really a *Ripersia*, was found on *Sedum roseum* (syn. *Rhodiola rosea*).

### RHIZOPHORACEÆ.

A comparatively small order of tropical trees and shrubs. *Ctenochiton rhizophoræ*, Maskell, occurs on *Rhizophora mangle*, the mangrove, in Queensland.<sup>1</sup>

### COMBRETACEÆ.

A rather large tropical order of trees and shrubs. In the West Indies there are found on *Terminalia catappa* several coccids, namely, *Lecanium terminaliæ*, Cockerell, *L. oleæ*, Bernard, *L. begoniæ*, Douglas, and *Aspidiotus destructor*, Signoret, var. *fallax*, Cockerell.<sup>2</sup> Watt cites *Tachardia lacea*, Kerr, from *Terminalia tomentosa*. *Croplastes ceriferus*, Anderson, occurs on *T. arjuna*.<sup>3</sup>

### MYRTACEÆ.

A very large order. On *Kunzea* is found *Eriococcus araucariæ* var. *minor*, Maskell.<sup>4</sup>

On the Australasian genus *Leptospermum* are numerous coccids, as follows:

- (A) On *Leptospermum*, species not identified.
- (1) *Fiorinia canelliar*, Comstock. Maskell, Tr. N. Z. Inst., XXV, p. 212.

<sup>1</sup>Maskell, Tr. N. Z. Inst., XXVII, p. 55.

<sup>2</sup>Cockerell, Journ. Inst. Jamaica, 1893, p. 255; Trans. Amer. Ent. Soc., 1893, p. 52; Insect Life, VI, p. 103.

<sup>3</sup>Spon's Encycl., II, p. 2045.

<sup>4</sup>Maskell, Tr. N. Z. Inst., XXVII, p. 64

(B) On the Australian *L. larigatum*, F. Mueller.

- (1) *Icerya koebeli*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 246.
- (2) *Eriococcus leptospermi*, Maskell. Maskell, Tr. N. Z. Inst., XXIII, p. 23.
- (3) *Spharococcus leptospermi*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 68.
- (4) *Tachardia melaleuca*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 31.
- (5) *Ripersia leptospermi*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 23.

(C) On the New Zealand *L. scoparium*, Forster.

- (1) *Chionaspis dubia*, Maskell, var. *minor*. Maskell, Tr. N. Z. Inst., XXVII, p. 9.
- (2) *Mytilaspis intermedia*, Maskell. Maskell, Tr. N. Z. Inst., XXIII, p. 7.
- (3) *M. leptospermi*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (4) *Asterolcanium (Planchonia) epacridis*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (5) *Corlostoma wairoense*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (6) *Ctenochiton flavus*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (7) *Inglisia leptospermi*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (8) *I. ornata*, Maskell. Maskell, Scale Ins. N. Z., p. 112.

(D) On the Australian *L. juniperinum*, J. E. Smith, which, according to the Index Kewensis, is not distinct from *L. scoparium*. In Nicholson, Diet. Gard., it is given as a variety.

- (1) *Asterolcanium (Planchonia) stypheliæ*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 25.

(E) On the Australian *L. flarescens*, J. E. Smith.

- (1) *Spharococcus pirogallis*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 95.

The species on the Australian genus *Melaleuca* are also numerous, namely:

(A) On *Melaleuca*, species not identified.

- (1) *Planchonia (=Asterolcanium) stypheliæ*, Maskell. On dwarf *Melaleuca*. Maskell, Tr. N. Z. Inst., XXVII, p. 62.
- (2) *Tessarobelus guerinii*, Montrouzier. Signoret, Essai.

(B) On *Melaleuca purpurea*, Hortorum. (=?, name not in Index Kewensis.)

- (1) *Lecanium oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 28.

(C) On *M. ericifolia*, J. E. Smith.

- (1) *Chionaspis eugeniæ*, Green. Maskell, Tr. N. Z. Inst., XXIV, p. 14.

(D) On *M. hypericifolia*, J. E. Smith.

- (1) *Ceroplastes ceriferus*, Anderson. Maskell, Tr. N. Z. Inst., XXV, p. 216.

(E) On *M. linariifolia*, Smith.

- (1) *Fiorinia expansa*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 51.
- (2) *Spharococcus froggatti*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 95.
- (3) *S. melaleuca*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 94.

(F) On *M. pustulata*, J. D. Hooker, and *M. uncinata*, Robert Brown.

- (1) *Tachardia melaleuca*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 55.

(G) On *M. nodosa*, Smith.

- (1) *Mytilaspis nivea*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 46.
- (2) *Aspidiotus rapax*, Comstock (syn. *camellia*, auctt.). Maskell, Tr. N. Z. Inst., XXVII, p. 39.

The Coccidae found on *Eucalyptus* are extremely numerous, including the extraordinary Australian gall-making genera.

(A) On *Eucalyptus* spp., species not identified.

<i>Mytilaspis grisea</i> , Maskell.	<i>Eriococcus coriaceus</i> , Maskell.
<i>M. cordylinidis</i> , Maskell.	
<i>Chionaspis assimilis</i> , Maskell.	<i>Gossyparia conflucus</i> , Maskell.
<i>C. eugeniæ</i> , Maskell.	
<i>Aspidiotus eucalypti</i> , Maskell.	<i>Prosopophora eucalypti</i> , Maskell.
<i>A. subrubescens</i> , Maskell.	
<i>A. rossi</i> , Maskell.	<i>Lecanium oleæ</i> , Bernard.

- (A) On *A. aurantii*, Maskell. *Carlostoma immane*, Maskell.  
*A. acacia*, Morgan. *Monophlebus fuscus*, Maskell.  
*A. rapax*, Coumstock. *Opisthoscelis globosa*, Rübssaamen.  
*Spharococcus inflatipes*, Maskell. *O. gracilis*, Schröder.  
*Tachardia melaleuca*, Maskell. *O. serrata*, Froggatt.  
*A. aspicareus eucalypti*, Newport. *O. verrucula*, Froggatt.  
*Apiomorpha similis*, Rübssaamen. *O. mammularis*, Froggatt.  
*A. karschi*, Rübssaamen. *O. fibularis*, Froggatt.  
*A. cornifer*, Rübssaamen. *Apiomorpha pedunculata*, Fuller.  
*A. dipsaciformis*, Froggatt. *A. schraderi*, Fuller, emend.  
*A. sessilis*, Froggatt. *A. fletcheri*, Fuller.  
*A. rosaformis*, Froggatt.  
*A. arnalis*, Tepper.  
*A. ellipsoidalis*, Tepper, nomen nudum.  
*A. haenerleni*, Froggatt.  
*A. citricola*, Schrader, nomen nudum.  
*A. crispa*, Fuller.  
*A. nux*, Olliv' ms., Fuller.  
*A. pomiformis*, Froggatt.  
*A. rugosa*, Froggatt.  
*A. thorntoni*, Froggatt.  
*A. umbellata*, Froggatt.
- (B) On *E. amygdalina*, Labill.  
*Dactylopius eucalypti*, Maskell.
- (C) On *E. capitellata*, J. E. Smith.  
*Aspidiotus extensus*, Maskell. *Opisthoscelis subrotunda*, Schrader.  
*Apiomorpha pharetrata*, Schrader.  
*A. pileata*, Schrader.
- (D) On *E. corynocalyx*, F. Mueller.  
*Mytilaspis formosa*, Maskell.
- (E) On *E. corymbosa*, J. E. Smith.  
*Apiomorpha pharetrata*, Schrader. *Ascelis pramollis*, Schrader.  
*A. schraderi*, Froggatt.
- (F) On *E. diversicolor*, F. Mueller.  
*Eriococcus eucalypti*, Maskell.
- (G) On *E. dumosa*, A. Cunningham.  
*Spharococcus cleans*, Maskell. *Apiomorpha calycina*, Tepper.  
*A. neumanni*, Tepper.
- (H) On *E. globulus*, Labillardiere.  
*Dactylopius lobulatus*, Maskell.  
*Eriococcus tepperi*, Maskell.
- (I) On *E. gonioralyx*, F. Mueller.  
*Eriococcus paradoxus*, Maskell.
- (J) On *E. gracilis*, F. Mueller.  
*Apiomorpha munita*, Schrader. *Opisthoscelis maculata*, Froggatt.  
*A. oricola*, Schrader.
- (K) On *E. inerassata*, Labillardiere.  
*Apiomorpha strombylosa*, Tepper.  
*A. oricoloides*, Tepper.
- (L) On *E. hemastoma*, Smith.  
*Apiomorpha duplex*, Schrader.  
*A. minor*, Froggatt.

- (L) On *A. oricola*, Schrader.  
*A. pileata*, Schrader.
- (M) On *E. leucozydon*, F. Mueller.  
*Apiomorpha munita*, Schrader. *Opisthoscelis maculata*, Froggatt.  
*A. oricola*, Schrader.
- (N) On *E. odorata*, Behr.  
*Apiomorpha oricoloides*, Tepper, is  
cited from this doubtfully.
- (O) On *E. oleosa*, F. Mueller.  
*Apiomorpha calycina*, Tepper.
- (P) On *E. orbifolia*, F. Mueller.  
*Mytilaspis formosa*, Maskell, is  
doubtfully cited from this.
- (Q) On *E. robusta*, Smith.  
*Dactylopius eucalypti*, Maskell. *Apiomorpha munita*, Schrader.  
*Opisthoscelis pisiformis*, Froggatt.
- (R) On *E. rostrata*, Schlecht.  
*Dactylopius eucalypti*, Maskell. *Apiomorpha regularis*, Tepper.  
*A. glabra*, Tepper.
- (S) On *E. uncinata*, Thuez.  
*Apiomorpha subconica*, Tepper.
- (T) On *E. riminalis*, Labillardiere.  
*Eriococcus confusus*, Maskell. *Apiomorpha conica*, Froggatt.
- (U) On *E. siderophloia*, Benthani.  
*Ctenorhizon eucalypti*, Maskell. *Apiomorpha tricornis*, Froggatt.  
*Dactylopius eucalypti*, Maskell. *Opisthoscelis maskelli*, Froggatt.  
*O. spinosa*, Froggatt.
- (V) On *E. sieberiana*, F. Mueller=*virgata*,  
Sieber.  
*Apiomorpha pharetrata*, Schrader.  
*A. pileata*, Schrader.
- (W) On *E. piperita*, Smith.  
*Apiomorpha pileata*, Schrader. *Opisthoscelis pisiformis*, Froggatt.  
*A. variabilis*, Froggatt. *Ascelis attenuata*, Froggatt.
- (X) On *E. melliodora*, A. Cunningham.  
*Opisthoscelis pisiformis*, Froggatt.
- (Y) On *E. resinifera*, Smith.  
*Opisthoscelis pisiformis*, Froggatt.

On *Syncarpia laurifolia* is found *Fiorinia syuearpiæ*, Maskell.<sup>1</sup>

On *Metrosideros robusta*, A. Cunningham, a native of New Zealand, four species occur, namely: *Mytilaspis metrosideri*, Maskell, *Eriococcus pallidus*, Maskell, *Lecanochiton minor*, Maskell, and *L. metrosideri*, Maskell. The last-mentioned is also found on *M. tomentosa*, A. Richard.

The guava, *Psidium guava*, supports many Coccidæ. On a single guava tree in Kingston, Jamaica, I found *Lecanium oleæ*, Bernard, *Pulvinaria eupaniæ*, Cockerell, *Lecanium hemispharicum*, Linnaeus, *Vinsonia stellifera*, Westwood, *Aspidiotus articulatus*, Morgan, *A. personatus*, Comstock, *A. ficus*, Ashmead, and *Ceroplastes floridensis*, Comstock. Coquillett has also recorded *L. oleæ*, Bernard, from the guava. Signoret, in his Essai, records *Ceroplastes vinsonii*, Signoret, *C. psidii*, Chavannes, and *Aspidiotus destructor*, Signoret. I have recorded,

<sup>1</sup> Maskell, Tr. N. Z. Inst., XXV, p. 213.



in addition to the eight species above cited, *Pulvinaria pyriformis*, Cockerell.<sup>1</sup> *Dactylopius longifilis*, Comstock,<sup>2</sup> and *Aspidiotus rapar* Comstock.<sup>3</sup> Comstock has reported *Ceroplastes floridensis*, Comstock. Maskell cites *Pulvinaria psidii*, Maskell;<sup>4</sup> *Lecanium acuminatum*, Signoret;<sup>5</sup> *L. longulum*, Douglas,<sup>6</sup> and *L. depressum*, Targioni-Tozzetti.<sup>7</sup> Finally, there is the unrecognizable *Coccus trichodes*, Anderson. Thus, all told, the guava coccids number nineteen.

The common myrtle, *Myrtus communis*, is attacked by *Lecanium hesperidum*, Linnaeus,<sup>8</sup> *Ceroplastes cirripediformis*, Comstock,<sup>9</sup> *C. floridensis*, Comstock,<sup>9</sup> *Chionapsis myrti*, Bouché (Signoret, Essai), and *Parlatoria myrtus*, Maskell.<sup>10</sup> *Lecanium nitens*, Cockerell, is found on *Myrtus tweediei* (*Blepharocalyx tweediei*, Berg) in Brazil. *Coccus erion*, Anderson, is reported from *Myrtus zeylanicus*, but the plant belongs properly to *Eugenia*.

*Eugenia* is a very large tropical genus. On it are found the following:

- (1) *Finsonia stellifera*, Westwood. On *E. (Jambosa) malaccensis* and *E. jambolana*. Cockerell, Journ. Inst. Jamaica, I, p. 373; Insect Life, 1893, p. 160.
- (2) *Lecanium mangifera*, Green. On *E. malaccensis*. Cockerell, Trans. Amer. Ent. Soc., 1893, p. 49.
- (3) *Aspidiotus ficus*, Ashmead. On *E. jambolana*. Cockerell, Journ. Inst. Jamaica, I, p. 373.
- (4) *A. fimbriatus*, Maskell. On *E. Smithii*, Poir. Maskell, Tr. N. Z. Inst., XXV, p. 208; Cockerell, Can. Ent., 1894, p. 128.
- (5) *Chionaspis eugenia*, Maskell. On *E. elliptica*, a native of South America. Maskell, Tr. N. Z. Inst., XXIV, p. 11.

## MELASTOMACEÆ.

*Miconia* is a very large neotropical genus. *Aspidiotus cyanophylli*, Signoret, is found on *M. magnifica* (syn. *Cyanophyllum magnificum*).

## LYTHRACEÆ.

Lounsbury reports the occurrence of *Orthezia insignis*, Douglas, on *Cuphea*. *Aspidiotus articulatus*, Morgan, *A. personatus*, Comstock, *A. ficus*, Ashmead, and *Ceroplastes* sp. have been found on *Lawsonia alba* (syn. *inermis*).<sup>11</sup> *Tachardia lucca*, Kerr, occurs on the Indian *Lagerstræmia parviflora*, Roxburgh. On the pomegranate, *Punica granatum*,

<sup>1</sup> Journ. Trinidad Club, 1894, p. 309.

<sup>2</sup> Bull. Bot. Dept. Jamaica, August, 1893, p. 3.

<sup>3</sup> Journ. Inst. Jamaica, 1893, p. 255.

<sup>4</sup> Tr. N. Z. Inst. XXV, p. 223.

<sup>5</sup> Ibid., p. 219.

<sup>6</sup> Ibid., p. 221.

<sup>7</sup> Ibid., p. 220.

<sup>8</sup> Maskell, Scale Ins. N. Z., p. 113.

<sup>9</sup> Comstock, 2d Cornell Rept., p. 140.

<sup>10</sup> Maskell, Tr. N. Z. Inst., XXIII, p. 12.

<sup>11</sup> Insect Life, V, p. 216.

are found *Ceroplastes floridensis*, Comstock, *Lecanium oleæ*, Bernard, *Aspidiotus punicea*, Cockerell, *A. articulatus*, Morgan, and *A. personatus*, Comstock.

### ONAGRACEÆ.

From *Fuchsia*, Coquillett reports *Aspidiotus aurantii*, Maskell, and *A. rapac.* Comstock, and Lounsbury. *Orthezia insignis*, Douglas. *Mytilaspis lactea*, Maskell, occurs on the New Zealand *F. excorticata*, Linnaeus.<sup>1</sup>

### PASSIFLORACEÆ.

Coquillett records *Aspidiotus aurantii*, Maskell, from passion flower. *Diaspis amygdali*, Tryon, has been found on the neotropical *Curica papaya*.

### CACTACEÆ.

On *Mamillaria* (Cactus) have been found *Diaspis calyptroides*, Costa, and *Dactylopius mamillariæ*, Bonché. These two also on *Echinocactus* (Signoret, Essai). *Dactylopius virgatus*, Cockerell, has been found on an undetermined cactus.<sup>2</sup> *Eriococcus coccineus*, Cockerell, is from a cactus in a Nebraska greenhouse.

The following are reported from *Opuntia*:

- (1) *Coccus cacti*, Linnaeus. Cockerell, Amer. Nat., 1893, p. 1044. On *O. coccinellifera*. Signoret, Essai.
- (2) *C. tomentosus*, Lamarek. Cockerell, Amer. Nat., 1893, p. 1044. On *O. tuna*, Miller.
- (3) *C. confusus*, Cockerell. Cockerell, Amer. Nat., 1893, p. 1044. On *O. versicolor* and *O. leptocaulis*. Cockerell, Amer. Nat., 1895, p. 728.
- (4) *Diaspis cacti*, Comstock. Found by Professor Toumey in Arizona on *O. fulgida* and *O. arborescens*. In New Mexico on *O. Engelmanni*, Garden and Forest, 1895.
- (5) *D. cacti* var. *opuntia*, Cockerell. Cockerell, Journ. Inst. Jamaica, 1893, p. 256.
- (6) *D. cacti* var. *opunticola*, Newstead. Ent. Mo. Mag., 1893. In Demerara.
- (7) *Mytilaspis philococcus*, Cockerell. Bull. Soc. Zool. France, 1893, p. 252. In Mexico.
- (8) *Dactylopius longispinus*, Targioni-Tozzetti (*longifilis*). On prickly pear cactus. Lintner, 2d N. Y. Rept., p. 56.

The *Opuntia coccinellifera* is more properly called *Nopalca coccinellifera*, Salm-Dyck. It is a native of Mexico.

### FICOIDACEÆ.

On *Mesembryanthemum* is found *Palviniaria mesembryanthemi*, Vallot;<sup>3</sup> *P. biplicata*, from *M. acinaciforme*, Linnaeus, is the same insect.

<sup>1</sup> Maskell, Tr. N. Z. Inst., XXVII, p. 48.

<sup>2</sup> Cockerell, Can. Ent., 1895, p. 259.

<sup>3</sup> Douglas, Ent. Mo. Mag., 1887, p. 24.

## UMBELLIFERÆ.

Concerning *Lecanium persica*, Fabricius, accidentally occurring on an umbellifer.<sup>1</sup> *Chionaspis bilobis*, Newstead, is found on *Pituranthos scoparius* (syn. *Dererra scoparia*, Cosson and Durand), in Algeria.<sup>2</sup> *Coccus pilosellæ*, Linnaeus, a species not now recognized, was said to be found on *Pimpinella* as well as *Hieracium*. *Coccus halophilus*, Hardy (believed to be a *Ripersia*), occurred on *Ligusticum scoticum*. A *Dactylopius* was found by Mr. W. Fawcett on wild carrot at Cinchona, Jamaica, and transmitted to me by Professor Townsend, but the material was insufficient for determination.

## ARALIACEÆ.

Gillette and Baker<sup>3</sup> report *Aspidiotus rapax*, Comstock (*camellia*), and *Lecanium hesperidum*, Linnaeus, from *Aralia*. *A. guilfoylei*, Cogniaux and Marchand, a native of the Pacific islands, when cultivated in Jamaica, was attacked by *Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock.<sup>4</sup> On the New Zealand *Panax arboreum*, Forster, are found *Fiorinia minima*, Maskell, *Ctenochiton flavus*, Maskell, *C. fuscus*, Maskell, *C. perforatus*, Maskell, *C. viridis*, Maskell, and *Dactylopius glaucus*, Maskell.<sup>5</sup>

For an account of the Coccidæ found on ivy (*Hedera helix*) see Cockerell.<sup>6</sup> The species are *Phenacoccus hedera*, Signoret, *Lichtensia riburni*, Signoret<sup>7</sup> *Lecanium maculatum*, Signoret, *L. hesperidum*, Linnaeus, and var. *lauri*, *Aspidiotus hedera*, Vallot (including *nerii*?), and *Asterolecanium hedera*, Lichtenstein (syn. *massalongianum*).

## CORNACEÆ.

*Corokia* is a genus of two species, confined to New Zealand. On *C. cotoneaster* are found, as reported by Maskell, *Solenophora corokia*, Maskell,<sup>8</sup> *Aspidiotus corokia*, Maskell,<sup>9</sup> and *Inglisia inconspicua*, Maskell.<sup>10</sup>

On *Cornus sanguinea* have been found *Lecanium corni*, Bouché, and *L. tarsale*, Signoret (Signoret, Essai); on *C. californicus* and other species, *Mytilaspis pomorum*, Bouché. Recently, Professor Harvey sent me *M. pomorum* on twigs of *Cornus* from Orono, Maine, with the remark

<sup>1</sup> Cockerell, Can. Ent., 1895, p. 256.

<sup>2</sup> Newstead, Ent. Mo. Mag., 1895, p. 233.

<sup>3</sup> Hemip. Colo., p. 128.

<sup>4</sup> Cockerell, Insect Life, V, p. 245.

<sup>5</sup> Maskell, Scale Ins. N. Z., p. 113.

<sup>6</sup> Ent. News, 1894, p. 210.

<sup>7</sup> Newstead, Ent. Mo. Mag., 1895, p. 166.

<sup>8</sup> Tr. N. Z. Inst., XXII, p. 142.

<sup>9</sup> Ibid., XXIII, p. 2.

<sup>10</sup> Ibid., XXIV, p. 20.

that it was abundant. Mr. C. F. Schaufuss sent *M. pomorum* on *Cornus alba, foliis variegatis*, from Meissen, Saxony.<sup>1</sup>

*Chionaspis nyssa*, Comstock, was found in North Carolina on *Nyssa multiflora*, Wangerheim.

### CAPRIFOLIACEÆ.

Signoret cites *Lichtensia viburni*, Signoret, and *Dactylopius viburni*, Signoret, from *Viburnum tinus*. From *Viburnum*, species not stated, Maskell records *Parlatoria myrtus*, Maskell,<sup>2</sup> and *Chionaspis eugenia*, Maskell.<sup>3</sup>

*Coccus xylostei*, Schrank, a species not now recognized, was found on *Lonicera xylosteum*, Linnaeus. Comstock reports *Mytilaspis pomorum*, Bouché, as found on *Lonicera*.

### RUBIACEÆ.

A large order. *Aspidiotus articulatus*, Morgan, is found on *Portlandia grandiflora*, Linnaeus, in Jamaica.<sup>4</sup> At Panduloya, Ceylon, Mr. E. E. Green found *Chionaspis aspidistra*, Signoret, var. *mussandu*, on *Mussanda frondosa*.

*Gardenia jasminoides*, Ellis (syn. *florida*, Linnaeus), although called Cape Jessamine, is a native of China. Comstock records *Lecanium olea*, Bernard, upon it, and I have recorded *Pulvinaria cupania*, Cockerell.<sup>5</sup>

In Jamaica, *Lecanium hemisphericum*, Linnaeus, is quite troublesome on *Ixora*.<sup>6</sup>

The species on coffee (*Coffea*) are as follows:

- (1) *Dactylopius citri*, Boisduval. Cockerell, Entomologist, 1893, p. 267.
- (2) *Lecanium viride*, Green. For full particulars about this insect see a pamphlet by Mr. E. E. Green, entitled Observations on the Green-scale Bug in connection with the Cultivation of Coffee, published in Ceylon, in 1886.
- (3) *L. nigrum*, Nietner. See Green, Observations on the Green-scale Bug in connection with the Cultivation of Coffee, Ceylon, 1886.
- (4) *L. coffea*, Walker. See Green, Observations on the Green-scale Bug in connection with the Cultivation of Coffee, Ceylon, 1886; Signoret, Essai. Also, for a discussion on the occurrence of this and *L. hemisphericum*, Linnaeus, on Coffee, and some remarks on their probable identity, see Cockerell, Bull. Bot. Dept., Jamaica, 1894, p. 71.
- (5) *Orthezia insignis*, Douglas. On Liberian Coffee. E. E. Green, Tropical Agric., January, 1895.
- (6) *Aspidiotus articulatus*, Morgan. Cockerell, Insect Life, V, p. 215.

<sup>1</sup> Can. Ent., 1895, p. 259.

<sup>2</sup> Tr. N. Z. Inst., XXIII, p. 12.

<sup>3</sup> Ibid., XXIV, p. 14.

<sup>4</sup> Cockerell, Insect Life, 1893, p. 160.

<sup>5</sup> Bull. Bot. Dept., Jamaica, 1895, p. 101.

<sup>6</sup> Insect Life, 1893, p. 160; Journ. Inst. Jamaica, 1895, p. 169.

On *Coprosma*, in New Zealand, Maskell finds:

<i>Aspidiotus nerii</i> , Bouché.	<i>Ctenochiton perforatus</i> , Maskell.
<i>Mytilaspis pyriformis</i> , Maskell.	<i>C. viridis</i> , Maskell.
<i>Chionaspis dubia</i> , Maskell.	<i>C. depressus</i> , var. <i>minor</i> , Maskell.
<i>Fiorinia astellii</i> , Maskell.	<i>Inglisia patella</i> , Maskell.
	<i>Dactylopius glaucus</i> , Maskell.

*Aspidiotus denticulatus*, Targioni-Tozzetti, occurs on *Rubia*, but there seems to be some confusion as to whether the plant is *R. peregrina* or *R. tinctorum*.

On *Asperula cynanchica*, Linnaeus, is found *Lecanopsis rhizophila*, Targioni-Tozzetti Maskell (Scale Ins. N. Z., p. 111) records *Lecanium maculatum*, Signoret, from "*Bavardia*," meaning, I suppose, *Bourardia*.

### COMPOSITÆ.

Lounsbury reports *Orthezia insignis*, Douglas, from *Ageratum*; also from *Sterea*. From *Eupatorium* are recorded *Ceroplastes cirripediformis*, Comstock, *Orthezia americana*, Walker, and *O. insignis*, Douglas; the first two by Comstock, the other by Lounsbury.

*Lecanium assimile*, Newstead, was found, exogenetically, upon *Grindelia*. On *Bigelovia* in Colorado is found *Pulvinaria bigeloviae*, Cockerell;<sup>1</sup> this same *Pulvinaria* was also sent to me by Doctor C. V. Riley, labeled as from *Bigelovia* in Los Angeles, California, (Div. Ent., 4757). Coquillett reports *Aspidiotus aurantii*, Maskell, exogenetically on *Solidago californica*. *Orthezia americana*, Walker, and *Icerya purchasi*, Maskell, have occurred on *Solidago*, the former doubtless normally, the latter accidentally.

Two species of *Olearia* have furnished coccids: *Eriochiton hispidus*, Maskell, was found on the New Zealand *O. haastii*, J. D. Hooker; *Tachardia melaleuca*, Maskell, on *O. axillaris* (syn. *Aster axillaris*). *Rhizococcus celmisiae*, Maskell, was found on *Celmisia*.<sup>2</sup>

On *Baccharis viminialis* (rect. *viminea*, De Candolle) Coquillett found *Lecanium olea*, Bernard. In Brazil, *Ceroplastes albolineatus*, Cockerell, and *Lecanium baccharidis* are found on *Baccharis*. The unrecognized *Coccus capensis* was found on *Metalasia muricata* (syn. *Gnaphalium muricatum*). *Lecanium cassiniæ*, Maskell, a species formerly confounded with *L. olea*, is found on the New Zealand *Cassinia leptophylla*. On *Parthenium incanum* in New Mexico there occur *Lecaniodiaspis yuccæ*, Townsend, and *Tachardia cornuta*, Cockerell.<sup>3</sup> *Icerya purchasi*, Maskell, has been noticed by Coquillett exogenetically upon *Xanthium*. Maskell found *Dactylopius affinis*, Maskell, on tubers of *Dahlia*.<sup>4</sup>

Coquillett records *Aspidiotus aurantii*, Maskell, from *Bidens*. The cultivated *Chrysanthemum* is quite badly infested at times by *Lecanium hemisphericum*, Targioni-Tozzetti and *Orthezia insignis*, Douglas.<sup>5</sup> *Cero-*

<sup>1</sup> Cockerell, Trans. Amer. Ent. Soc., XX, p. 366.

<sup>2</sup> Maskell, Scale Ins. N. Z., p. 111.

<sup>3</sup> Cockerell, Amer. Nat., 1895, p. 728.

<sup>4</sup> Tr. N. Z. Inst., XXVI, p. 90.

<sup>5</sup> Cockerell, Insect Life, 1892, p. 121; Trans. Amer. Ent. Soc., 1893, p. 55.

*plastes cystudiformis*, Cockerell, was found on *Chrysanthemum* in Mexico<sup>1</sup> Coquillett reports *Lecanium oleæ*, Bernard, from *Artemisia californica*, Lessing. *Ceroplastes artemesiae* (sic), of Riley's Manuscript, found on *Artemisia* in Silver City, New Mexico, has never been described. The European *C. artemesiae*, Rossi, is not the same, but is considered identical with *C. rusei*.

On the New Zealand *Brachyglottis repanda*, Maskell, was found *Fiorinia minima*, Maskell, *Utenochiton flavus*, Maskell, and *C. fuscus*, Maskell. Lounsbury records *Orthezia insignis*, Douglas, from *Cineraria*. *Aspidiotus signoreti*, Comstock (syn. *Targionia nigra*), was found on *Cineraria maritima*, more properly called *Senecio cineraria*. On burdock (*Arctium*) has been found *Orthezia americana*, Walker; *Guerinia serratula*, Fabricius, is from *Serratula tinctoria*. *Coccus pilosellæ*, Linnaeus, is from roots of *Hieracium pilosellæ*. Coquillett found *Lecanium oleæ*, Bernard, and *Icerya purchasi*, Maskell, exogenetically on *Sonchus oleraceus*.

### GOODENOVIACEÆ.

On the Australian *Goodenia ovata*, J. E. Smith, has been found *Icerya aegyptiaca*, Douglas.<sup>2</sup>

### VACCINIACEÆ.

*Chionaspis vaccinii*, Bouché, is found on *Vaccinium myrtillus* in Switzerland. Two other coccids on the same plant are the *Coccus myrtilli*, of Kalténbach, 1874, a species not known to Signoret, and *Lecanium distinguendum* of Douglas. R. Goethe has described a species as *Lecanium vaccinii-macrocarpum*, found in the botanical garden at Karlsruhe. Professor J. B. Smith records an *Aspidiotus*, either *A. ancyclus* Putnam, or a very closely allied form, from cranberry.

### ERICACEÆ.

Coquillett reports *Aspidiotus nerii*, Bouché, on *Arbutus menziesii*, Pursh. The unrecognized *Coccus uræ-ursi*, Linnaeus, was from roots of *Arctostaphylos uræ-ursi* (syn. *Arbutus uræ-ursi*). Comstock has recorded *Ceroplastes floridensis*, Comstock, from *Andromeda*, and *Lecanium oleæ*, Bernard, from heath. In Europe *Orthezia manuriensis*, Douglas, is found on *Erica arborea*, Linnaeus, and *Aspidiotus ericæ*, Boisduval, and *Eriococcus ericæ*, Signoret, on *E. mediterranea*, Linnaeus. Maskell describes *Dactylopius ericicola*, Maskell, from *Erica autumnalis*; this name is not in the Index Kewensis, however. *Eriococcus azalæ*, Comstock, is from *Azalea*. Maskell has reported *Aspidiotus rapax*, Comstock (*camellia*), from *Rhododendron*.<sup>3</sup>

<sup>1</sup> Cockerell, Zoc, 1893, p. 104.

<sup>2</sup> Maskell, Tr. N. Z. Inst., XXVI, p. 100.

<sup>3</sup> Tr. N. Z. Inst., XXVII, p. 39.

## EPACRIDEÆ.

*Asterolecanium stypheliae*, Maskell, is recorded by Maskell from *Styphelia richii*<sup>1</sup> and *Monotoca elliptica*.<sup>2</sup> On the Australian *Cyathodes accrosa* are found *Poliaspis media* and *Eriococcus multispinus*.<sup>3</sup> On *Leucopogon fraseri*, A. Cunningham, also a native of Australia, are *Poliaspis media*, Maskell, and *Asterolecanium epacridis*, Maskell.<sup>3</sup> On *Epacris longifolia* is *Eriococcus multispinus*, Maskell, var. *lavigatus*.<sup>4</sup> Is it not probable that the species found by Maskell on Australian Epacrideæ in New Zealand are really natives of Australia? If so, one or two apparent anomalies are removed.

## PLUMBAGINEÆ.

At roots of *Statice armeria* (*Armeria vulgaris*) Newstead found his *Dactylopius radicum*.<sup>5</sup> *Coccus halophilus*, Hardy, had much earlier been reported from the same plant. *Icerya purchasi*, Maskell, and *Ceroplastes plumbaginis*, Cockerell, have been found on *Plumbago*.

## MYRSINEÆ.

*Aspidiotus myrsinæ* was found on *Myrsine africana*, Linnaeus (syn. *retusa*). *Vinsonia stellifera*, Westwood, is recorded from *Ardisia polycephala*.<sup>6</sup>

## SAPOTACEÆ.

On the star apple, *Chrysophyllum cainito*, are found *Dactylopius longispinus*, Targioni-Tozzetti (syn. *longifilis*), *Ceroplastes floridensis*, Comstock, *Lecanium oleæ*, Bernard, *Pulvinaria eupania*, Cockerell, *Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock.<sup>7</sup> Comstock has reported *Chionaspis biclavis*, Comstock, from *Achras sapota*; and from the same plant I have recorded *Vinsonia stellifera*, Westwood.<sup>8</sup> Hart<sup>9</sup> reports *Aspidiotus destructor*, Signoret, and *Lecanium maugiferae*, Green, from *Bassia latifolia*, Roxburgh, an East Indian tree cultivated in Trinidad. It will be observed that the coccids are also East Indian species.

<sup>1</sup>Tr. N. Z. Inst., XXIV, p. 25.

<sup>2</sup>Tr. N. Z. Inst., XXVII, p. 67.

<sup>3</sup>Maskell, Scale Ins. N. Z., p. 112.

<sup>4</sup>Maskell, Tr. N. Z. Inst., XXVII, p. 64.

<sup>5</sup>Ent. Mo. Mag., 1895, p. 236.

<sup>6</sup>Cockerell, Ent. Mo. Mag., 1893, p. 17.

<sup>7</sup>Insect Life, VI, p. 103, also 1893, p. 159.

<sup>8</sup>Insect Life, 1893, p. 159.

<sup>9</sup>Bull. Misc. Inform. Bot. Gard., Trinidad, April, 1895, p. 38.

## EBENACEÆ.

On persimmon (*Diospyros*) *Diaspis amygdali*, Tryon, has been found.<sup>1</sup> Comstock records *Chionaspis biclavis*. Comstock, from *Diospyros ebenum*, Koenig.

## OLEACEÆ.

On *Jasminum* have been found:

- (1) *Lecanium mangifera*, Green. On *J. sambac*, Aiton, a native of tropical Asia, in cultivation in Jamaica. Cockerell, Insect Life, V, p. 246.
- (2) *Aspidiotus articulatus*, Morgan. On *J. sambac*. Cockerell, Insect Life, V, p. 246.
- (3) *A. personatus*, Comstock. On *J. pubescens*, Willdenow; also a native of tropical Asia, cultivated in Jamaica. Cockerell, Insect Life, V, p. 246.
- (4) *A. diffinis*, Newstead, var. *lateralis*, Cockerell. On *J. pubescens*. Cockerell, Can. Ent., 1894, p. 130.
- (5) *Diaspis amygdali*, Tryon, = *lanatus*. Cockerell, Journ. Inst., Jamaica, I, p. 373.

Coquillett records *Aspidiotus uerii*, Bouché, from *Syringa vulgaris*. From lilac Maskell also reports *Mytilaspis pomorum*, Bouché.

The species found on *Fraxinus* are rather numerous, thus:

- (1) *Pultrina fraxini*, Signoret. On *F. excelsior*. Signoret. Essai.
- (2) *P. innumerabilis*, Rathvon. On *F. nigra (sambucifolia)*. Mundt. Can. Ent., 1884, p. 240.
- (3) *Lecanium prunosum*, Coquillett. Coquillett, Insect Life, III, p. 384.
- (4) *L. olea*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 28. Comstock cites it from Oregon ash.
- (5) *L. hesperidum*, Linnæus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26.
- (6) *Coccus fraxini*, Chavannes, 1848. Said sometimes to produce manna. Not now recognized.
- (7) *Chionaspis fraxini*, Signoret. Signoret, Essai; Gillanders, Brit. Nat., 1894, p. 23. On *F. excelsior*. Comstock considers it identical with *C. salicis*.
- (8) *Mytilaspis pomorum*, Bouché. On *F. americana* and *F. nigra (sambucifolia)*. Country Gentleman, January 10, 1895, p. 27. Also reported from ash by Maskell.
- (9) *Aspidiotus ancylus*, Putnam. Comstock, 2d Cornell Rept., p. 139.
- (10) *A. juglans-regia*, Comstock, var. *albus*, Cockerell. Cockerell, Insect Life, VII, p. 211; Can. Ent., 1894, p. 287. Formerly recorded by Townsend as *A. convexus*.

On the olive (*Olea europea*, Linnæus, with syn. or var. *hispanica*) are found:

- (1) *Pollinia pollini*, Costa (syn. *costa*). Signoret, Essai.
- (2) *Lecanium olea*, Bernard. Signoret, Essai. In Jamaica, although *L. olea* is common, it does not attack the olive. Cockerell, Bull. Bot. Dept., Jamaica, 1894, p. 72.
- (3) *Mytilaspis flava*, Targioni-Tozzetti. Signoret, Essai; Comstock, 2d Cornell Rept., p. 140.
- (4) *Aspidiotus villosus*, Targioni-Tozzetti. Signoret, Essai; Comstock, 2d Cornell Rept., p. 140.
- (5) *A. articulatus*, Morgan. Cockerell, Insect Life, 1893, p. 160.
- (6) *A. personatus*, Comstock. Cockerell, Insect Life, 1893, p. 160.
- (7) *A. ficus*, Ashmead. Cockerell, Journ. Inst. Jamaica, I, p. 373.

<sup>1</sup> Cockerell, Can. Ent., 1895, p. 260.



- (8) *A. rapax*, Comstock. Comstock, 2d Cornell Rept., p. 140.  
 (9) *Lichtensia catoni*, Newstead. Newstead, Ent. Mo. Mag., 1895, p. 166.  
 (10) *Filippia olea*, Costa (syn. *follicularis*). Signoret, Essai. Lichtenstein described the male in 1881.

On *Ligustrum lucidum* (syn. *japonicum*) are found *Lecanium olea*, Bernard,<sup>1</sup> and *Ericerus pe-la*.<sup>2</sup>

### APOCYNACEÆ.

*Phenacoccus barberi*, Cockerell, has been noticed on *Allamanda*.<sup>3</sup> Watt<sup>4</sup> records *Tachardia lacea* from *Curissa carandas*, Linnæus. *Aspidiotus personatus*, Comstock, and *A. articulatus*, Morgan, have been found on *Thevetia neriiifolia*.<sup>5</sup> Lounsbury records *Orthezia insignis*, Douglas, from *Vinea*. *Lecanium hemisphæricum*, Targioni-Tozzetti, infests *Tabernaemontana*.<sup>6</sup> Maskell has reported *Chionaspis minor*, Maskell, from *Parsonia*.

The coccids of the oleander (*Nerium oleander*, Linnæus) are:

- (1) *Lecanium olea*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.; Cockerell, Insect Life, VI, p. 103.  
 (2) *L. hesperidum*, Linnæus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.; Cockerell, Insect Life, VII, p. 210. Also var. *lauri*. Ent. Mo. Mag., 1891, p. 245.  
 (3) *Ceroplastes floridensis*, Comstock. Comstock, 2d Cornell Rept., p. 140. Also a pink form, possibly *myrica*. Cockerell, Journ. Inst. Jamaica I, p. 373.  
 (4) *Asterolecanium pustulans*, Cockerell. Cockerell, Insect life, VI, p. 103. Quite troublesome on oleander. See also Sci. Gossip., 1893, p. 78; Ent. Mo. Mag., 1893, p. 17; Journ. Inst. Jamaica, 1892, p. 143; Can. Ent., 1895, p. 259.  
 (5) *Diaspis amygdali*, Tryon (= *lanatus*). Cockerell, Insect Life, VI, p. 103.  
 (6) *Chionaspis urii*, Newstead. Newstead, Ent. Mo. Mag., 1895, p. 235. In Algeria.  
 (7) *Aspidiotus rossi*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 12.  
 (8) *A. personatus*, Comstock. Cockerell, Insect Life, 1893, p. 160.  
 (9) *A. ficus*, Ashmead. Cockerell, Insect Life, 1893, p. 160; also Insect Life, VI, p. 103.  
 (10) *A. nerii*, Bouché. Signoret, Essai, and most other authors.  
 (11) *A. articulatus*, Morgan. Cockerell, Insect Life, VI, p. 103; Journ. Inst. Jamaica, 1892, p. 54.

An *Aspidiotus*, apparently not separable from *aurantii*, Maskell, is found on *Plumieria* in Kingston, Jamaica.

On *Trachelospermum* (or *Rhynchospermum*) *jasminoides* Gillette and Baker record *Lecanium hesperidum*, Linnæus.<sup>7</sup>

### ASCLEPIADACEÆ.

*Ripersia terrestris*, Newstead, was found on roots of *Stephanotis*.<sup>8</sup> *Aspidiotus personatus*, Comstock, and *Diaspis amygdali*, Tryon

<sup>1</sup> Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.

<sup>2</sup> Alex. Hosie, Insect Life, III, p. 424.

<sup>3</sup> Cockerell, Ann. Mag. Nat. Hist., 1895, p. 61.

<sup>4</sup> Dict. Ec. Prod. Ind., II, p. 410.

<sup>5</sup> Cockerell, Insect Life, V, p. 246.

<sup>6</sup> Cockerell, Bull. Bot. Dept., Jamaica, 1894, p. 71.

<sup>7</sup> Hemip. Colo., p. 127.

<sup>8</sup> Newstead, Ent. Mo. Mag., 1895, p. 214.

(=*lanatus*), have occurred on *Calotropis procera*.<sup>1</sup> On *Hoya carnos*, Robert Brown, a native of the Eastern tropics, Signoret records *Dactylopius hoyii*, Signoret (rect. *hoyæ*).

### LOGANIACEÆ.

On the New Zealand *Geniostoma ligustrifolium*, Maskell found *Ctenochiton elongatus*, Maskell. *Aspidiotus buddleia*, Signoret (rect. *buddleia*), is variously reported by Signoret, Comstock, and Maskell from *Buddleia globulosa* and *B. salicina*. These two specific names must be erroneous, as they are not in the Index Kewensis; there is a *globosa* and a *salicifolia*.

### BORAGINACEÆ.

On heliotrope (*Heliotropium*) Lounsbury reports *Orthezia insignis*, Douglas, while I have recorded *Chionaspis major*, Cockerell.<sup>2</sup> *Phenacoccus brunnitarsis*, Signoret, is recorded by Signoret from *Borago officinalis*, Linnaeus. I have recorded *Orthezia insignis*, Douglas, from *Myosotis*.<sup>3</sup>

### CONVOLVULACEÆ.

The Old World *Argyria speciosa*, when cultivated in Jamaica, is attacked by *Diaspis amygdali*, Tryon (= *lanatus*).<sup>3</sup> Lounsbury reports *Orthesia insignis*, Douglas, from *Ipomœa*. *Lecanium batate*, Cockerell, is found on roots of *Ipomœa batatas*.<sup>4</sup>

### SOLANACEÆ.

The coccids of *Solanum* are:

- (1) *Dactylopius solani*, Cockerell. On roots of *S. tuberosum* and *S. rostratum*. Cockerell, Amer. Nat., 1895, p. 729; Can. Ent., 1894, p. 286.
- (2) *Dactylopius* sp., on *S. melongena*. In Jamaica. Cockerell, Ent., 1893, p. 266.
- (3) *D. affinis*, Maskell. On tubers of potato. Maskell, Tr. N. Z. Inst., XXVI, p. 90.
- (4) *D. citri*, Boisduval. On *S. jasminoides*. Gillette and Baker, Hemip. Colo., p. 125.
- (5) *Ceroplastes cirripediformis*, Comstock. On soushumber. Cockerell, Journ. Inst. Jamaica, 1892, p. 54.
- (6) *Lecanium oleæ*, Bernard. On soushumber. Cockerell, Journ. Inst. Jamaica, 1892, p. 54. On bitter-sweet (Comstock); on *S. jasminoides* (Gillette and Baker, Hemip. Colo., p. 127); on *S. douglasii* (Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.).
- (7) *Orthesia insignis*, Douglas. On *S. tuberosum*. Cockerell, Insect Life, V, p. 247.
- (8) *Iverya purchasi*, Maskell. Coquillett, Rept. Dept. Agric. for 1888.
- (9) *Pseudoparlatoria ostreata*, Cockerell. On soushumber. Cockerell, Journ. Inst. Jamaica, 1892, p. 136.

<sup>1</sup> Cockerell, Insect Life, V, p. 246.

<sup>2</sup> Can. Ent., 1894, p. 127.

<sup>3</sup> Insect Life, V, p. 247.

<sup>4</sup> Cockerell, Ann. Mag. Nat. Hist., 1895, p. 62.

- (10) *Aspidiotus aurantii*, Maskell. On *S. douglasii*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.
- (11) *A. uerii*, Bouché. On *S. douglasii*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.
- (12) *Coccus koleos*, Anderson. On *S. melongena*. See Signoret, Essai.

Two species have been found on the tomato, *Lycopersicum lycopersicum* (*Solanum lycopersicum*, *Lycopersicum esculentum*). These are the unrecognizable *Coccus trichodes*, Anderson, and an undetermined *Dactylopius* on the roots.<sup>1</sup> It is quite probable that the *Dactylopius* was *D. solani*, Cockerell.

The following have been recorded from red pepper (*Capsicum*):

- (1) *Lecanium oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.
- (2) *Pulvinaria urbicola*, Cockerell. Cockerell, Trans. Ent. Soc. Lond., 1893, p. 160.
- (3) *Chionaspis minor*, Maskell. Cockerell, Ent. Mo. Mag., 1893, p. 17.
- (4) *Diaspis amygdali*, Tryon (= *laudus*). Cockerell, Journ. Inst. Jamaica, 1892, p. 137.

The following are recorded from *Cestrum* (including *Habrothamnus*):

- (1) *Dactylopius citri*, Boisduval. On *Habrothamnus*. Gillette and Baker, Hemip. Colo., p. 125.
- (2) *Lecanium oleæ*, Bernard. On *C. (H.) elegans*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric. See also Comstock, 2d Cornell Rept., p. 139.
- (3) *Pulvinaria cestri*, Signoret. Signoret Essai.
- (4) *Coccus tuberculatus*, Bouché. Signoret, Essai. A species of unknown relationships.

*Lecanium olla*, Bernard, is recorded<sup>2</sup> from *Meyenia alba*, but there is no such name in Index Kewensis. Is it *Cestrum album*?

Lounsbury records *Orthezia insignis*, Douglas, from *Petunia*. *Aspidiotus articulatus*, Morgan, has been observed on *Brunfelsia americana*.<sup>3</sup>

## SCROPHULARIACEÆ.

*Dactylopius calceolaria* of Maskell occurs on *Calceolaria*. Maskell records *Poliaspis media*, Maskell, and *Lecanium hesperidum*, Linnaeus, from *Veronica*; Gillette and Baker<sup>4</sup> cite *L. hesperidum*, Linnaeus, from *V. hendersonii*. *Coccus piloselle*, Linnaeus, a doubtful species, is found on *Melampyrum arrense*, Linnaeus, and *M. nemorosum*, Linnaeus.

## OROBANCHACEÆ.

*Dactylopius aphyllonis*, Cockerell, is from *Aphyllon fasciculatum*.<sup>5</sup>

## BIGNONIACEÆ.

On *Bignonia magnifica*, Bull, have occurred *Pulvinaria cupanie*, Cockerell, *Aspidiotus articulatus*, Morgan, and *A. ficus*, Ashmead<sup>6</sup>

<sup>1</sup> Insect Life, III, p. 413.

<sup>2</sup> Cockerell, Insect Life, 1893, p. 160.

<sup>3</sup> Cockerell, Insect Life, 1893, p. 159.

<sup>4</sup> Hemip. Colo., p. 127.

<sup>5</sup> Cockerell, Psyche Supp., 1895, p. 8.

<sup>6</sup> Cockerell, Insect Life, V, p. 246.

*Ceroplastes cistudiformis*, Cockerell, has been found on *Bignonia*.<sup>1</sup> Coquillett has reported *Icerya purchasi*, Maskell, from *Tecoma*. *Dolichandrone rheedii*, Seeman, is cited by Watt as a food plant of *Tachardia laeca*, Kerr.

### ACANTHACEÆ.

*Phenacoccus barberi*, Cockerell, has been observed on *Thunbergia grandiflora*.<sup>2</sup> *Diaspis amygdali*, Tryon (= *lanatus*), occurs on *Acanthus*.<sup>3</sup> *Eranthemum variegatum* (this name not in Index Kewensis) is freely attacked by *Lecanium hemisphaericum*, Targioni-Tozzetti, while *Orthezia insignis*, Douglas, also occurs upon it.<sup>4</sup> Lounsbury records *Orthezia insignis*, Douglas, from *Vacobinia* (syn. *Libonia*), also from *Peristrophe*. From *Hygrophila spinosa*, T. Anderson, Newstead describes his *Pulvinaria obscura* and *Dactylopius viridis*. *Orthezia praelonga*, Douglas, occurs on *Sanchezia*.<sup>5</sup>

### MYOPORACEÆ.

The following have been found on *Myoporum* (frequently misspelled *Myosporum*):

- (1) *Icerya purchasi*, Maskell. Coquillett, Rept. Dept. Agric. for 1888, p. 84.
- (2) *Eriococcus pallidus*, Maskell. On the New Zealand *M. latum*, Foster. Maskell, Tr. N. Z. Inst., XXIII, p. 21.
- (3) *Lecanium oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.
- (4) *Pulvinaria dodonææ*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 223.
- (5) *Aspidiotus rapax*, Comstock. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric.

### VERBENACEÆ.

Lounsbury records *Orthezia insignis*, Douglas, from *Lippia* (syn. *Aloysia*); the same insect is also found on *Lantana* and *Verbena*. *Tectona grandis* is a food plant of *Tachardia laeca*, Kerr. Maskell reports *Aspidiotus carpodeti*, Maskell, from *Vitex littoralis*; he also records *Diaspis santali*, Maskell, from *Vitex*.<sup>6</sup>

### LABIATÆ.

*Colens*, and according to Lounsbury especially *C. verschaffeltii*, is badly infested by *Orthezia insignis*, Douglas.<sup>7</sup> *Phenacoccus barberi*, Cockerell, has occurred on *Colens*.<sup>8</sup> *Dactylopius lavandulæ*, Signoret,

<sup>1</sup>Cockerell, Zool. Mag., 1893, p. 101.

<sup>2</sup>Cockerell, Ann. Mag. Nat. Hist., 1895, p. 61.

<sup>3</sup>Cockerell, Journ. Inst. Jamaica, I, p. 373.

<sup>4</sup>Cockerell, Journ. Trinidad Club, 1894, p. 307; Trans. Amer. Ent. Soc., 1893, p. 55; Maskell, Tr. N. Z. Inst., XXVII, p. 59.

<sup>5</sup>Ent. Mo. Mag., 1891, p. 247.

<sup>6</sup>Tr. N. Z. Inst., XXII, p. 135.

<sup>7</sup>Lounsbury, Ann. Rept. Mass. Coll. for 1894; Cockerell, Ent., 1892, p. 181; Ann. Mag. Nat. Hist., 1895, p. 60.

<sup>8</sup>Cockerell, Ann. Mag. Nat. Hist., 1895, p. 61.

occurs on *Lavandula stæchas*, Linnæus. From *Mentha* I have recorded *Orthezia insignis*, Douglas, and some juvenile Lecaniine.<sup>1</sup> *Eriococcus thymi*, Schrank, is found on *Thymus vulgaris*.

From *Salvia* are known:

- (1) *Icerya purchasi*, Maskell. Coquillett, Rept. Dept. Agric. for 1888.
- (2) *Lecanium hemispharicum*, Targioni-Tozzetti, var. Cockerell, Trans. Amer. Ent. Soc., 1893, p. 55.
- (3) *Orthezia insignis*, Douglas, Lounsbury, Ann. Rept. Mass. Coll. for 1894.

From *Rosmarinus officinalis* comes *Eriococcus rosmarinis*, Fonscolombe (rect. *rosmarini*). Coquillett has reported *Icerya purchasi*, Maskell, from *Rosmarinus* and also from *Nepeta*.

## PLANTAGINACEÆ.

Coquillett records *Icerya purchasi*, Maskell, from *Plantago*.<sup>2</sup>

## ILLECEBRACEÆ.

*Coccus pilosellæ*, Linnæus, is recorded from roots of *Herniaria*.

## AMARANTACEÆ.

*Orthezia insignis*, Douglas, is recorded by Lounsbury from *Celosia* and *Alternanthera*.

## CHENOPODIACEÆ.

Olliff reports his *Pulvinaria maskelli* from *Rhagodia hastata*.<sup>3</sup> *Orthezia annæ*, Cockerell, is recorded from *Chenopodium*.<sup>4</sup> *Signoretia atriplicis* of Maskell<sup>5</sup> was from an *Atriplex*, perhaps *A. halimus*, Linnæus. It afterwards proved that this insect was not a *Signoretia*, but a *Pulvinaria*, being in fact identical with *P. maskelli*, Olliff. Olliff has recorded *P. maskelli*, Olliff, from *A. vesicaria*, Hew, and *A. nummularia*, Lindley.<sup>6</sup> The following six species are found on *Atriplex canescens* in New Mexico:

- |   |  |
|---|--|
| 1. <i>Dactylopius solani</i> var. <i>atriplicis</i> , Cockerell.          | 4. <i>Lecaniodiaspis yuccæ</i> var. <i>rufescens</i> . |
| 2. <i>Orthezia annæ</i> , Cockerell.                                      | 5. <i>Ceroplastes irregularis</i> .                    |
| 3. <i>Mytilaspis albus</i> , Cockerell, var. <i>concolor</i> , Cockerell. | 6. <i>Eriococcus neglectus</i> .                       |

(See Amer. Nat., 1895, p. 730; Psyche Supp., 1895, p. 8; Ann. Mag. Nat. Hist., 1893, p. 403; Can. Ent., 1894, p. 285.)

<sup>1</sup> Insect Life, V, p. 247.

<sup>2</sup> Rept. Dept. Agric. for 1888.

<sup>3</sup> Agric. Gaz. of New South Wales, November, 1891, p. 667.

<sup>4</sup> Cockerell, Can. Ent., 1894, p. 285.

<sup>5</sup> Tr. N. Z. Inst., XXIV, p. 24; XXVI, p. 77.

<sup>6</sup> Agric. Gaz., N. S. W., November, 1891, p. 667; also Ill. p. 178.

On greasewood (*Sarcobatus vermiculatus*) are found *Lecaniodiaspis yuccæ*, Townsend, var. *rufescens*, Cockerell, and *Orthezia unnae*, Cockerell.<sup>1</sup>

### POLYGONACEÆ.

Coquillett has recorded *Icerya purchasi*, Maskell, from *Polygonum*. *Ripersia rumicis*, Maskell, was found at the roots of *Rumex acetosella*.<sup>2</sup> *Dactylopius arecæ*, Maskell, has occurred on dock.<sup>3</sup> Maskell<sup>4</sup> records *Fiorinia stricta*, Maskell, *Eriochiton spinosus*, Maskell, and *Celostoma calandicum*, Maskell, from *Muhlenbeckia adspersa*, but the species intended is doubtless *M. adpressa*; there is no *M. adspersa*.

### ARISTOLOCHIACEÆ.

The unrecognizable *Coccus asari*, Schrank, is from *Asarum europæum*, Linnaeus. Mr. Hart has sent me *Lecanium hemisphericum*, Targioni-Tozzetti, on *Aristolochia* from Trinidad.

### PIPERACEÆ.

From *Piper excelsum*, Forster, Maskell<sup>4</sup> records *Ctenochiton piperis*, Maskell, and *Dactylopius glaucus*, Maskell.

### MYRISTICACEÆ.

On the nutmeg (*Myristica fragrans*) there has been found *Vinsonia stellifera*, Westwood.<sup>5</sup>

### MONIMIACEÆ.

*Fiorinia stricta*, Maskell, occurs on *Hedycearya*. *Atherosperma* is a small genus, with a species in New Zealand, two in Australia, and one in Chile. On *A. novzeelandiæ*, Hooker, Maskell records the following seven species:

- |   |  |
|---|--|
| 1. <i>Aspidiotus atherosperma</i> , Maskell.            | 5. <i>Inglisia patella</i> , Maskell.    |
| 2. <i>Fiorinia gigas</i> , Maskell ( <i>asteliae</i> ). | 6. <i>Eriochiton spinosus</i> , Maskell. |
| 3. <i>Mytilaspis pyriformis</i> , Maskell.              | 7. <i>Eriococcus pallidus</i> , Maskell. |
| 4. <i>Ctenochiton viridis</i> , Maskell.                |  |

(For the first six, see *Scale Ins. N. Z.*, p. 111; for the seventh, *Tr. N. Z. Inst.*, XXIII, p. 21.)

<sup>1</sup> Gillette and Baker, *Hemip. Colo.*, p. 127.

<sup>2</sup> Maskell, *Tr. N. Z. Inst.*, XXIV, p. 37.

<sup>3</sup> Maskell, *Tr. N. Z. Inst.*, XXV, p. 231.

<sup>4</sup> *Scale Ins.*, N. Z., p. 113.

<sup>5</sup> Cockerell, *Bull. Bot. Dept., Jamaica*, 1895, p. 101.

## LAURINACEÆ.

From the camphor tree (*Cinnamomum camphora*) Coquillett records *Aspidiotus aurantii*, Maskell. *Pulvinaria pyriformis*, Cockerell, is found on cinnamon.<sup>1</sup> From *Persea borbonia* (syn. *carolinensis*) Comstock records *Aspidiotus perseæ*, Comstock, and *A. parlatorioides*, Comstock—the latter being really a *Pseudoparlatoria*. He also reports *Ceroplastes floridensis*, Comstock, from the same tree. From *Persea perseæ* I have recorded *Aspidiotus articulatus*, Morgan, and *A. personatus*, Comstock.<sup>2</sup> *Lecanium lintneri*, Cockerell and Bennett, is found on sassafras. *Aspidiotus rapax*, Comstock, occurs on *Umbellularia californica*. On *Laurus nobilis*, Linnaeus, of the Mediterranean region, are *Aonidia lauri*, Bouché, *Lecanium lauri*, Boissduval, and *Boissduvalia lauri*, as recorded by Signoret. Maskell records two other species from *L. nobilis*, namely, *Aspidiotus aurantii*, Maskell, and *Lecanium tessellatum*, Signoret.<sup>3</sup> He also reports *L. hesperidum*, Linnaeus, from laurel. *Dactylopius indicus*, Signoret, is from *Laurus indicus*, Linnaeus, but the plant is more properly called *Persea indica*.

## PROTEACEÆ.

Coquillett has reported *Lecanium oleæ*, Bernard, from *Grevillea robusta*, A. Cunningham, a native of Australia. He records *Aspidiotus rapax*, Comstock, from *Leucadendron argenteum*, Robert Brown. From *Hakea* are known:

- (1) *Icerya australis*, Maskell. On the Australian *H. gibbosa*, Cavanilles. Maskell, Tr. N. Z. Inst., XXVI, p. 101.
- (2) *Lecanium depressum*, Targioni-Tozzetti. Maskell, Tr. N. Z. Inst., XXV, p. 220.
- (3) *Aspidiotus acaciæ* var. *propinqua*, Maskell. On the Australian *A. saligna*, Knight. Maskell, Tr. N. Z. Inst., XXV, p. 206.

*Eriococcus multispinus*, Maskell, was found on the New Zealand *Knightia excelsa*, Robert Brown.

The following are from *Banksia*:

- (1) *Colostoma rubiginosum*, Maskell. On the Australian *B. integrifolia*. Maskell, Tr. N. Z. Inst., XXV, p. 243.
- (2) *Ceronema banksia*, Maskell. On *B. serrata*. Maskell, Tr. N. Z. Inst., XXVII, p. 57.
- (3) *Lecanium frenchii*. On *B. marginata*, Cavanilles (syn. *australis*). Maskell, Tr. N. Z. Inst., XVIII, p. 17.
- (4) *Aspidiotus subrubescens*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 207.
- (5) *Mytilaspis grandilobis*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 71.
- (6) *M. citricola*, Packard. On *B. integrifolia*. Maskell, Tr. N. Z. Inst., XXVII, p. 48.

## THYMELÆACEÆ.

Signoret cites *Aspidiotus caldesii*, Targioni-Tozzetti, from *Daphne collina*; and *A. guidii* and *Rhizococcus guidii*, Signoret, from *D. guidium*. These plants are European, as well as the coccids.

<sup>1</sup> Cockerell, Bull. Bot. Dept., Jamaica, 1895, p. 102.

<sup>2</sup> Insect Life, 1893, p. 160.

<sup>3</sup> Tr. N. Z. Inst., XXV, pp. 206, 219.

## ELÆAGNACEÆ.

Mr. E. E. Green, in the prospectus of his work on the Coccidæ of Ceylon, describes *Chionaspis elæagni* from *Elæagnus latifolia* in Ceylon. *Chionaspis difficilis*, Cockerell, and *Mytilaspis crawii*, Cockerell, are found on *Elæagnus* in Japan.<sup>1</sup>

## LORANTHACEÆ.

For a note on the coccids peculiar to Loranthaceæ, see Cockerell.<sup>2</sup> *Diaspis riscii*, Schrank, is from *Viscum album*. From *Phoradendron* comes *Lecanium phoradendri*, Cockerell. Mr. W. G. Johnson has sent me some *Phoradendron flarescens* from Palo Alto, California, on which are *Lecanium oleæ*, Bernard, and a form of *Aspidiotus rapax*, Comstock. On *Dendrophthora cupressoides*, Eichler, in Jamaica, have been found *Pulvinaria dendrophthoræ*, Cockerell, and *Lecanium hemispherium*, Targioni-Tozzetti.<sup>3</sup>

## SANTALACEÆ.

From *Santalum* are known:

- (1) *Rhizococcus fossor*, Maskell. On *S. cunninghamii*. Maskell, Scale Ins., N. Z., p. 114.
- (2) *Inglisia foraminifer*, Maskell. On *S. acuminatum*. Maskell, Tr. N. Z. Inst., XXV., p. 213.
- (3) *Diaspis santali*, Maskell. On *S. cunninghamii*. Maskell, Scale Ins., N. Z., p. 114.
- (4) *Poliaspis exocarpi*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 72.

From *Exocarpus cupressiformis*, a native of Australia, Maskell records *Poliaspis exocarpi*, Maskell.

## EUPHORBIACEÆ.

The unrecognizable *Coccus oogenes*, Anderson, was found on *Euphorbia pilulifera* (syn. *hirta*). *Lecanium longulum*, Douglas, and *Icerya rosa*, Riley and Howard, have occurred on *Euphorbia*—the latter on a caetoid species.<sup>4</sup> Coquillett records *Aspidiotus aurantii*, Maskell, and *Lecanium oleæ*, Bernard, from the castor-oil plant (*Ricinus*),—or castor bean, as he calls it. *Aspidiotus rossi*, Maskell, has been found on *Ricinocarpus*.<sup>5</sup> The very doubtful *Brachyscelis* (?) *beyeria*, Tepper, is from *Beyeria opara*, F. Mueller, in Australia.<sup>6</sup>

<sup>1</sup> Cockerell, Psyche Supp., 1896, p. 21.

<sup>2</sup> Ann. Mag. Nat. Hist., 1894, p. 15.

<sup>3</sup> Cockerell, Trans. Ent. Soc. Lond., 1893, p. 162; Trans. Amer. Ent. Soc., 1893, p. 55.

<sup>4</sup> Cockerell, Trans. Amer. Ent. Soc., 1893, p. 50; Bull. Bot. Dept., Jamaica, August, 1893, p. 2.

<sup>5</sup> Maskell, Tr. N. Z. Inst., XXIV, p. 12; XXIII, p. 7.

<sup>6</sup> Tepper, Trans. Roy. Soc., South Australia, XVII, p. 276.



The following are found on box (*Burus sempervirens*):

- (1) *Eriococcus buxi*, Signoret. Signoret, Essai sur les Cochenilles.
- (2) *Lecanium hesperidum*, Linnaeus. Maskell, Scale Ins. N. Z., p. 111.
- (3) *Aspidiotus aurantii*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 206.
- (4) *A. hederae*, Vallot. Signoret, Essai sur les Cochenilles.
- (5) *Pinnaspis buxi*, Bouché. Signoret, Essai. Formerly placed in *Mytilaspis*.

*Coccus oogenes*, Anderson, occurred upon *Phyllanthus emblica*, Linnaeus; *Llaveia arinus*, Llave, was found on *Jatropha curcas*, Linnaeus; *Tachardia lacca*, Kerr, has been found on *Aleurites moluccana*. From *Croton* the following are known:

- (1) *Tachardia lacca*, Kerr. On *C. draco*, Schlecht., a species of Mexican origin. Watt, Dict. Econ. Prod. India, II, p. 410.
- (2) *Phenacoccus barberi*, Cockerell. Cockerell, Ann. Mag. Nat. Hist., 1895, p. 61.
- (3) *Dactylopius virgatus*, Cockerell, var. *farinosus*, Cockerell. Cockerell, Can. Ent., 1895, p. 259.
- (4) *D. ceriferus*, Newstead. Newstead, Ind. Mus. Notes, III, No. 5, pp. 4, 5.
- (5) *D. citri*, Boisduval. Cockerell, Bull. Bot. Dept. Jamaica, Aug. 1893, p. 3.
- (6) *Lichtensiu lutea*, Cockerell. At Vera Cruz. Cockerell, Ann. Mag. Nat. Hist., 1893, p. 51.
- (7) *Diaspis pinnulifera*, Maskell. Maskell, Tr. N. Z., Inst., XXV, p. 208.
- (8) *Mytilaspis citricola*, Packard. Maskell, Tr. N. Z. Inst., XXVII, p. 48. I doubt if this is the real *citricola*.
- (9) *M. crotonis*, Cockerell. In Jamaica. Cockerell, Journ. Inst. Jamaica, 1893, p. 256.
- (10) *Parlatoria pergandei*, Comstock, var. *crotonis*. Cockerell, Ann. Mag. Nat. Hist., 1895, p. 62.

*Pseudoparlatoria ostreata*, Cockerell, is destructive to *Acalypha marginata*, Spreng.<sup>1</sup> *Dactylopius virgatus*, Cockerell, occurs upon *Acalypha*.<sup>2</sup> *Ceroplastes albolineatus*, Cockerell, was found on *Excoecaria bicolor*, Hasskarl, a native of the Malay region, cultivated in Jamaica.<sup>3</sup>

## URTICACEÆ.

The following are known from *Ulmus*:

- (1) *Gossyparia ulmi*, Geoffroy. On *U. campestris*. Signoret, Essai, and most other authors.
- (2) *Lecanium ulmi*, Linnaeus. Signoret, Essai. On *U. campestris*.
- (3) *L. carya*, Fitch, var. *canadense*, Cockerell. On *U. racemosa*. Cockerell, Can. Ent., 1895, p. 254.
- (4) *L. pruinatum*, Coquillett. On cork elm. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 33.
- (5) *Pulvinaria innumerabilis*, Rathvon. On *U. Americana* and *U. fulva*. Mundt, Can. Ent., 1884, p. 240.
- (6) *Mytilaspis pomorum*, Bouché (including *conchiformis*). On *U. campestris*. Comstock, 2d Cornell Rept., p. 140; Signoret, Essai sur les Cochenilles.
- (7) *Chionaspis americana*, Johnson. On *U. americana*. Champaign, Illinois (W. G. Johnson).

<sup>1</sup> Cockerell, Journ. Inst. Jamaica, 1892, p. 136; Insect Life, VI, p. 103.

<sup>2</sup> Cockerell, Bull. Bot. Dept. Jamaica, August, 1893, p. 3.

<sup>3</sup> Townsend, Journ. Inst. Jamaica, 1895, p. 169.

- (8) *C. furfurus*, Fitch, var. *ulmi*.<sup>1</sup> On elm, Brownsville, Texas (C. H. T. Townsend).  
 (9) *Aspidiotus* near *perniciosus*, Comstock. Brownsville, Texas, found by Professor C. H. T. Townsend, on ash. The specimens are so parasitized that their identification becomes difficult.  
 (10) *A. ulmi*, Johnson. On *U. americana*. W. G. Johnson, Ent. News, 1896, p. 152.

Comstock records *Mytilaspis pomorum*, Bouché, from *Platanus*. From hackberry (*Celtis*) the same author reports *M. pomorum*, Bouché, and *Aspidiotus ancyclus*, Putnam. From *Celtis occidentalis* are known *Pulvinaria innumerabilis*, Rathvon<sup>2</sup> and *Lecanodiaspis celtidis*. Cockerell<sup>3</sup> *Tachardia lacca*, Kerr, is found on *Celtis tetrandra* (syn. *roxburghii*). Coquillett records *Icerya purchasi*, Maskell, from *Humulus*. On the osage orange are found *Pulvinaria maclurae*, Fitch, and *Aspidiotus ancyclus*, Putnam, the latter on Comstock's authority. The *P. maclurae* is frequently called *P. innumerabilis*, but see Cockerell.<sup>4</sup> There is also on osage orange a species of *Eulecanium*.<sup>5</sup>

The following are found on mulberry (*Morus*):

- (1) *Dactylopius bromeliae*, Bouché. Maskell, Tr. N. Z. Inst., XXVI, p. 89.  
 (2) *Lecanium mori*, Signoret. On *M. alba*. Signoret, Essai.  
 (3) *L. ribis*, Fitch. Cockerell, Can. Ent., 1895, p. 255.  
 (4) *Pulvinaria innumerabilis*, Rathvon. On *M. rubra*. Mundt, Can. Ent., 1884, p. 240.  
 (5) *P. japonica*, Cockerell. In Japan. Cockerell, Psyche Supp., February, 1896, p. 20.  
 (6) *Diaspis patelliformis*, Sasaki. In Japan.  
 (7) *D. pentagona*, Targioni-Tozzetti. In Italy

On *Ficus* are found many species, as follows:

- (1) *Icerya purchasi*, Maskell. Recorded by Coquillett.  
 (2) *I. aegyptiacum*, Douglas. Insect Life, 1890, p. 105.  
 (3) *Tachardia lacca*, Kerr. On eight species of *Ficus*, including *F. religiosa*, Linnæus (Watt). On *F. indica*, Linnæus, and *F. religiosa* (Signoret).  
 (4) *Dactylopius longispinus*, Targioni-Tozzetti (*longifilis*). Cockerell, Ent., 1893, p. 266.

<sup>1</sup>New variety *ulmi*. Female: Scale white, about 2½ mm. long, moderately broad. exuviae yellowish brown. Male: Scale very small, obscurely tricarinate, exuvium pale yellowish. Female brown: Five groups of ventral glands, median 18, cephalolaterals 15, caudolaterals 16; median lobes contiguous, rounded at ends, obliquely truncate at sides, not notched. Second lobes much smaller, consisting of a larger notched portion, and beyond that a small separated portion, and between these a spine. Third lobes small and nearly obsolete. A spine laterad of each median lobe. A long spine-like plate laterad of third lobe, beyond which, at some little distance, is a notch, followed by a sort of rudimentary broad crenate fourth lobe, and beyond this a spine and then two very large spine-like plates, not branched, and still further a group of about five large spine-like plates. Anal orifice between posterior ends of cephalolateral groups of glands, round, slightly broader than long. Perhaps a distinct species.

*C. americana* differs by having the median lobes trilobed, though rather obscurely, and very large spine-like plates branched at tips; there are also more glands in the caudolateral groups.

<sup>2</sup>Mundt, Can. Ent., 1884, p. 240.

<sup>3</sup>Cockerell, Psyche, Supp., February, 1896, p. 19.

<sup>4</sup>Science, August 11, 1893, p. 78.

<sup>5</sup>Cockerell, Insect Life, VII, p. 209; Can. Ent., 1895, p. 257.

- (5) *D. ficus*, Signoret. On *F. carica*. Signoret, Essai sur les Cochenilles.
- (6) *Ceroplastes rusci*, Linnaeus. On *F. carica*. Signoret, Essai sur les Cochenilles.
- (7) *C. floridensis*, Comstock. Cockerell, Journ. Inst. Jamaica, 1892, p. 54.
- (8) *C. rubens*, Maskell. On *F.*, perhaps *macrophylla*, Desfontaines. Maskell, Tr. N. Z. Inst., XXV, p. 215.
- (9) *Lecanium depressum*, Targioni-Tozzetti. On *F. martinicensis* (? = *laurifolia*) and *F. elastica* (Signoret).
- (10) *L. oleæ*, Bernard. On *F. macrophylla* (Coquillett). On *F. carica* (Cockerell, Trans. Amer. Ent. Soc., 1893, p. 55).
- (11) *L. hesperidum*, Linnaeus. On *F. macrophylla* and on fig (Coquillett.) On *F. elastica* (Gillette and Baker).
- (12) *L. longulum*, Douglas. On rubber tree. Gillette and Baker, Hemip. Colo., p. 127.
- (13) *Coccus erion*, Anderson. On *F. indica*. An unrecognizable species.
- (14) *Aspidiotus personatus*, Comstock. On *F.* near *benjamina*. Cockerell, Amer. Nat., 1895, p. 726.
- (15) *A. rapax*, Comstock (*camellia*). On *F. elastica* (Gillette and Baker). Comstock, 2d Cornell Rept., p. 139.
- (16) *A. ficus*, Ashmead. Cockerell, Journ. Inst. Jamaica, 1892, p. 54.
- (17) *A. articulatus*, Morgan. Cockerell, Journ. Inst. Jamaica, 1892, p. 54.
- (18) *A. cyanophylli*, Signoret. Comstock, 2d Cornell Rept., p. 139. On *F. indica* and *F. laurifolia*, Lam.
- (19) *Mytilaspis ficus*, Signoret. Signoret, Essai sur les Cochenilles.
- (20) *Chionaspis biclaris*, Comstock. Comstock, 2d Cornell Rept. On *F. laurifolia*.

*Asterolecanium pustulans*, Cockerell, occurs upon *Castilloa*.<sup>1</sup>

*Aspidiotus articulatus*, Morgan, *A. personatus*, Comstock, and *A. ficus*, Ashmead, are found upon *Artocarpus incisa* in Jamaica.<sup>2</sup> Lounsbury records *Orthezia insignis*, Douglas, from *Pilea*.

## PLATANACEÆ.

*Phenacoccus platani*, Signoret, is from *Platanus orientalis*, Linnaeus. Coquillett records *Lecanium hibernaculorum*, Boisduval, from *P. racemosa*, Nuttall.

## JUGLANDACEÆ.

The following are known from *Juglans*:

- (1) *Pulvinaria innumerabilis*, Rathvon. On *J. cinerea* and *J. nigra*. Mundt, Can. Ent., 1894, p. 240.
- (2) *Lecanium pruinosum*, Coquillett. Coquillett, Insect Life, III, p. 384. On English walnut.
- (3) *L. juglandis* (syn. *juglandifex*). On *J. cinerea* and *J. regia*. Signoret, Essai; Cockerell, Ent., 1894, p. 335.
- (4) *Mytilaspis juglandis*, Bouché. Comstock, 2d Cornell Rept., p. 140. Hardly or not separable from *M. pomorum*.
- (5) *Aspidiotus rapax*, Comstock. On *Juglans californica* (Coquillett). Coquillett also reports *A. conveys*, from walnut.
- (6) *A. juglans-regia*, Comstock. On English walnut. Comstock, 2d Cornell Rept., p. 61.
- (7) *A. juglandis*, Colvée. Described by Colvée in 1881; perhaps not distinct from the last.

<sup>1</sup> Cockerell, Sci. Gossip, 1893, p. 78.

<sup>2</sup> Cockerell, Insect Life, 1893, p. 159.

- (8) *A. perniciosus*, Comstock. On English walnut. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 21.  
 (9) *A. aurantii*, Maskell. On English walnut. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 15.

*Lecanium carya*, Fitch, was found on *Hicoria ovata* (*Carya alba*).

### MYRICACEÆ.

*Ceroplastes myricæ*, Linnaeus, is from the South African *Myrica quercifolia*, Linnaeus. Both plant and insect are doubtful species. Maskell reports *Ceroplastes ceriferus*, Anderson, and *Tachardia decorella*, Maskell, from *Myrica cerifera*, Linnaeus, a native of North America.<sup>1</sup>

### FAGACEÆ.

On the birches (*Betula*) are found:

- (1) *Psyllidius betulae*, Linnaeus. On *B. alba*. Signoret Essai, sur les Cochenilles.  
 (2) *Lecanium douglasii* of Sulc. On *B. alba* in Bohemia. Ent. Mo. Mag., 1895, p. 37.  
 (3) *L. pruinosum*, Coquillett. Coquillett, Insect Life, III, p. 384.  
 (4) *Aspidiotus betulae*, Baerensprung. On *B. alba*. Signoret, Essai sur les Cochenilles. My specimens are from *B. alba* at Chuehle, near Prague, collected by Mr. Karel Sulc.  
 (5) *A. rapax*, Comstock. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 25.  
 (6) *Mytilaspis pomorum*, Bouché. Country Gentleman, January 10, 1895, p. 27.  
 (7) *Chionaspis linterni*, Comstock. On *B. papyrifera*. Prince Edward Island (Fletcher).

On the alders (*Alnus*) are:

- (1) *Chionaspis linterni*, Comstock. Comstock, 2d Cornell Rept., p. 139.  
 (2) *C. alni*, Signoret. On *A. glutinosa* (syn. *communis*). Signoret, Essai sur les Cochenilles.  
 (3) *Lecanium gibber*, Dalman. Signoret, Essai sur les Cochenilles. This is probably *L. caprea*, Linnaeus.

On *Carpinus* are found:

- (1) *Psyllidius carpini*, Linnaeus. Signoret, Essai sur les Cochenilles. Said to be on *C. stochas*, but no such name is in Index Kewensis.  
 (2) *Lecanium ribis*, Fitch. Cockerell, Amer. Nat., 1895, p. 731. Also on *Ostrya*.

*Lecanium quercitrionis*, Fitch, occurs on ironwood.<sup>2</sup>

*Lecanium coryli*, Linnaeus, is from *Corylus avellana*: *L. corylifex*, Fitch, is also from the hazel. The two are perhaps identical.

The following are found on various oaks (*Quercus*):

- (1) *Asterolecanium quercicola*, Bouché. On white oak. Comstock, 2d Cornell Rept., p. 130. On *Q. robur*. Signoret, Essai. Also reported on *Q. ilex*, but in error for the following.  
 (2) *A. ilicicola*, Targioni-Tozzetti. On *Q. ilex*. Bull. Soc. Ent. Ital., 1892, p. 311.  
 (3) *Lecanodiaspis quercus*, Cockerell. In Japan. Cockerell, Psyche Supp., 1896, p. 19.  
 (4) *Icerya purchasi*, Maskell. A few on *Q. douglasii* (Coquillett).  
 (5) *Phenacoccus quercus*, Douglas. See Ent. Mo. Mag., 1890, p. 155.

<sup>1</sup> Tr. N. Z. Inst., XXV, pp. 216, 249.

<sup>2</sup> Cockerell, Can. Ent., 1895, p. 255.

- (6) *Nidularia pulrinata*, Planchon. On *Q. ilex*. Signoret, Essai sur les Cochenilles.
- (7) *Gossyparia gramuntii*, Signoret. On *Q. ilex*. Signoret, Essai sur les Cochenilles.
- (8) *Cerococeus quercus*, Comstock. On white oak. Comstock, 2d Cornell Rept., p. 140.
- (9) *C. ehrhorni*, Cockerell. Cockerell, Psyche, 1895. On live oak in California.
- (10) *Eriococcus quercus*, Comstock (*Rhizococcus quercus*). Comstock, 2d Cornell Rept., p. 110.
- (11) *Kermes galliformis*, Riley. On white oak. Comstock, 2d Cornell Rept., p. 140. On *Q. undulata*. Gillette and Baker, Hemip. Colo., p. 126.
- (12) *K. gillettei*, Cockerell. On *Q. undulata* in Colorado. Gillette and Baker, Hemip. Colo., p. 126. I found this species at Monument Rock, Santa Fe Canyon, New Mexico, 8,000 feet, August 11, 1895.
- (13) *K. ballota*, Signoret. On *Q. ballota*. Signoret, Essai sur les Cochenilles.
- (14) *K. bahinii*, Planchon. On *Q. coccifera* and *Q. ilex*. Signoret, Essai sur les Cochenilles.
- (15) *K. cermilio*, Planchon. On *Q. coccifera*. Signoret, Essai sur les Cochenilles.
- (16) *K. gibbosus*, Signoret. On *Q. pedunculata*. Signoret, Essai sur les Cochenilles.
- (17) *K. pallidus*, Signoret. On *Q. pedunculata* (= *robur* subsp.). Signoret, Essai sur les Cochenilles.
- (18) *K. reniformis*, Signoret. On *Q. pedunculata*. Signoret, Essai sur les Cochenilles.
- (19) *K. variegatus*, Gmelin. Signoret, Essai sur les Cochenilles.
- (20) *K. quercus*, Newstead. I have seen no description of this.
- (21) *Physokermes hemeryphus*, Dalman. On *Q. robur*. Signoret, Essai sur les Cochenilles. This is now considered a synonym of *P. abietis*, Moeber.
- (22) *Lecanium emerici*, Planchon. On *Q. coccifera* and *Q. ilex*. Signoret, Essai sur les Cochenilles.
- (23) *L. fuscum*, Gmelin. On *Q. robur*. Signoret, Essai sur les Cochenilles.
- (24) *L. quercus*, Linnaeus. On *Q. pedunculata*. Signoret, Essai sur les Cochenilles.
- (25) *L. antennatum*, Signoret. On white oak. Comstock, 2d Cornell Rept., p. 140.
- (26) *L. quercifex*, Fitch. On white oak. Comstock, 2d Cornell Rept., p. 140.
- (27) *L. quercitrans*, Fitch. On black oak. Comstock, 2d Cornell Rept., p. 140. On *Q. undulata* in Colorado a variety is found. See Cockerell, Can. Ent., 1895, p. 255.
- (28) *L. ciliatum*, Douglas. England. Ent. Mo. Mag., 1891, p. 67.
- (29) *L. gigas*, Bremi. Supposed by Signoret to be a *Kermes*.
- (30) *Pulvinaria innumerabilis*, Rathvon. Riley, Rept. Dept. Agric. for 1884.
- (31) *Aspidiotus aencylus*, Putnam. Comstock, 2d Cornell Rept., p. 140.
- (32) *A. obscurus*, Comstock. On willow oak. Comstock, 2d Cornell Rept., p. 140. Mr. A. L. Quaintance finds *A. obscurus* at Lake City, Florida, very abundant on *Q. aquatica* and *Q. catesbeii*.
- (33) *A. nerii*, Bouché. On *Q. agrifolia*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 20.
- (34) *A. ilicis*, Signoret. On *Q. ilex*. Comstock, 2d Cornell Rept., p. 140.
- (35) *A. zonatus*, Frauenfeld (syn. *quercus*). On *Q. montana*. Comstock, 2d Cornell Rept., p. 140. Also on *Q. robur*.
- (36) *Chionaspis quercus*, Comstock. On *Q. lobata*. Comstock, 2d Cornell Rept., p. 140.
- (37) *C. planchonii*, Signoret. On *Q. ilex*. Comstock, 2d Cornell Rept., p. 140.
- (38) *Pseudopulvinaria sikkimensis*, Atkinson, 1889. See Insect Life, II, p. 55. Sikkim. Also on *Castanea*.
- (39) *Aspidiotus (Aspidites) minimus*, Leonardi. On leaves of *Q. ilex*.

The following occur on the species of beech (*Fagus*):

(A) On sect. *Eufagus*; boreal.

- (1) *Pulvinaria innumerabilis*, Rathvon. Riley, Rept. Dept. Agric. for 1884.

- (2) *P. fagi*, Hardy, 1864 (as *Coccus*). British. Very doubtful. Walker has also named a *Coccus fagi*, "flava, elliptica, albolarinosa; length, 2 lines." This is evidently something different.
- (3) *Lecanium oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 28.
- (4) *Aspidiotus ancyclus*, Putnam. Comstock, 2d Cornell Rept., p. 139.
- (B) On sect. *Nothofagus*: austral.
- (1) *Carlostoma pilosum*, Maskell. Maskell, Tr. N. Z. Inst., XXIII, p. 30.
- (2) *C. assimile*, Maskell. On *F. fusca*, J. D. Hooker, and *F. menziesii*, J. D. Hooker. Maskell, Tr. N. Z. Inst., XXII, p. 153; XXIII, p. 31.
- (3) *Palaeococcus zealandicus*, Maskell (*Leachia*, olim). Maskell, Tr. N. Z. Inst., XXIII, p. 27.
- (4) *Solenophora fagi*, Maskell. Maskell, Tr. N. Z. Inst., XXII, p. 111.
- (5) *Rhizococcus pulchellus*, Maskell. On *F. cliffortioides*, J. D. Hooker, *F. fusca* and *F. menziesii*. Maskell, Tr. N. Z. Inst., XXII, p. 144.
- (6) *R. maculatus*, Maskell. On *F. cliffortioides*. Maskell, Tr. N. Z. Inst., XXII, p. 115.
- (7) *R. intermedius*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXIII, p. 19.
- (8) *R. totaræ*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXII, p. 142.
- (9) *Eriococcus fagicoctis*, Maskell. On *F. fusca*. Maskell, Tr. N. Z. Inst., XXIV, p. 27.
- (10) *E. pallidus*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXIII, p. 21.
- (11) *E. rathbyi*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXII, p. 146.
- (12) *Gossyparia cavellii*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXII, p. 118.
- (13) *Ripersia fagi*, Maskell. On *F. menziesii*. Maskell, Tr. N. Z. Inst., XXIII, p. 24.
- (14) *Dactylopius iceryoides*, Maskell. On *F. fusca*. Maskell, Tr. N. Z. Inst., XXIV, p. 34.
- (15) *D. obtectus*, Maskell. On *F. fusca*. Maskell, Tr. N. Z. Inst., XXII, p. 153.
- (16) *Lecanium* new species. Maskell, Tr. N. Z. Inst., XXII, p. 149. A blue species on *F. cliffortioides*.
- (17) *Inglisia fagi*, Maskell. Maskell, Tr. N. Z. Inst., XXIII, p. 14.

## SALICINÆÆ.

On the willows (*Salix*) are found:

- (1) *Pulvinaria salicis*, Bouché. Signoret, Essai; Comstock, 2d Cornell Rept., p. 140. On *S. viminalis*.
- (2) *P. innumerabilis*, Rathvon. Riley, Rept. Dept. Agric. for 1881.
- (3) *Coccus cryptus*, Kawall. On *S. acutifolia*. Kawall, Stett. Ent. Zeit., 1867, p. 122. A doubtful species.
- (4) *C. hordeolum*, Dalman. Signoret suggests that this may have been founded on *Lecanium caprea*, male, and *Chionaspis salicis*.
- (5) *Lecanium hesperidum*, Linnæus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26.
- (6) *L. caprea*, Linnæus. On *S. alba*. Douglas, Ent. Mo. Mag., 1892, p. 279.
- (7) *Mytilaspis saliceti*, Schrank. Probably identical with *pomorum*, Bouché. See Morgan, Ent. Mo. Mag., 1890, p. 228. On *S. holosericea*.
- (8) *M. pomorum*, Bouché. Comstock, 2d Cornell Rept., p. 140. Country Gentleman, January 10, 1895, p. 27.
- (9) *Aspidiotus niger*, Signoret. On *S. alba*. Signoret, Essai sur les Cochenilles.
- (10) *A. conveus*, Comstock. Comstock, 2d Cornell Rept., p. 110.
- (11) *A. rapax*, Comstock. Comstock, 2d Cornell Rept., p. 110. See also Maskell, Scale Ins. N. Z., p. 114 (as *camellia*).
- (12) *Chionaspis salicis*, Linnæus. On *S. viminalis* and *S. alba* (Signoret).

- (13) *C. ortholobis*, Comstock. Comstock, 2d Cornell Rept., p. 140; Cockerell, Can. Ent., 1894, p. 189.
- (14) *C. salicis-nigræ*, Walsh. See Cockerell in Gillette and Baker, Hemip. Colo., p. 129.

On the poplars and cottonwoods (*Populus*) are:

- (1) *Icerya purchasi*, Maskell. Coquillett, Rept. Dept. Agric. for 1888.
- (2) *Lecanium capræ*, Linnæus. On *P. virginiana*. Signoret, Essai sur les Cochenilles.
- (3) *L. rajabundum*. Signoret, Essai. A very doubtful species of Kalténbach.
- (4) *L. hesperidum*, Linnæus. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26. On Lombardy poplar.
- (5) *L. oleæ*, Bernard. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26. On Lombardy poplar.
- (6) *Pulvinaria innumerabilis*, Rathvon. On *P. balsamifera*. Maudt, Can. Ent., 1884, p. 240.
- (7) *P. tremulæ*, Signoret. On *P. tremula*, Linnæus. Signoret, Essai sur les Cochenilles.
- (8) *P. populi*, Signoret. On *P. nigra*, Linnæus. Signoret, Essai sur les Cochenilles.
- (9) *Aspidiotus convexus*, Comstock. Comstock, 2d Cornell Rept. Coquillett reports it on cottonwood and Lombardy poplar.
- (10) *A. rapar*, Comstock. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 25. On cottonwood.
- (11) *A. spurcatus*, Signoret. On *P. virginiana* and *P. pyramidalis*. Signoret, Essai sur les Cochenilles.
- (12) *Chionaspis ortholobis*, Comstock, var. Cockerell, Can. Ent., 1894, p. 189; Gillette and Baker, Hemip. Colo., p. 129. An undescribed *Chionaspis* is also mentioned by Cockerell, Can. Ent., 1894, p. 190.
- (13) *C. populi*, Baerensprung. On *P. nigra* and *P. pyramidalis*. Signoret, Essai sur les Cochenilles.
- (14) *Mytilaspis pomorum*, Bouché. Country Gentleman, January 10, 1895, p. 27.

## CASUARINACEÆ.

In the Australian region, where it is native, the genus *Casuarina* supports many Coccidæ, as follows:

- (A) On *C. suberosa*. Native of Australia.
- (1) *Rhizococcus casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 231.
- (B) On *C. stricta* (= *quadrivalvis*). Native of Australia.
- (1) *Cylindrococcus amplior*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 240.
- (2) *Spharococcus casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 10.
- (3) *Frenchia casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 59.
- (4) *Cylindrococcus spiniferus*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 44.
- (5) *Cylindrococcus casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 43.
- (C) On *C. equisetifolia*. Native of Malaya and Pacific islands.
- (1) *Aspidiotus casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 67.
- (2) *Frenchia casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXIV, p. 59.
- (D) On *Casuarina*, species uncertain.
- (1) *Gossyparia casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 227.
- (2) *Phenacoccus casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 235. (As *Pseudococcus*.)
- (3) *Eriococcus turgipes*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 228.
- (4) *Eriococcus conspersus*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 230.
- (5) *Rhizococcus pustulatus*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 231.

- (6) *Crocidocysta froggatti*, Rübssaamen. Rübssaamen, Berl. Ent. Zeit., XXXIX (1894), p. 219. Maskell says this is a *Cylindrococcus*.
- (7) *Frenchia semioculta*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 72.
- (8) *Lecanium*, sp. Maskell, Tr. N. Z. Inst., XXVI, p. 72.
- (9) *Mytilaspis casuarina*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 209; XXVII, p. 45. Perhaps on *C. equisetifolia*.
- (10) *Mytilaspis striata*, Maskell. Maskell, Tr. N. Z. Inst., XXVII, p. 47.
- (11) *Aspidiotus eucalypti*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 206.

In Jamaica I never could find any Coccidæ on the cultivated *Casuarina*, but *Aspidiotus rapar*, Comstock, occurs on it in Antigua.<sup>1</sup>

## CONIFERÆ.

### I. CUPRESSINEÆ.

*Pulvinaria maskelli*, Olliff, var. *spiniosior*, Maskell, is found on *Freua* or *Callitris robusta*.<sup>2</sup>

On *Thuja* (arbor-vitæ) are the following:

- (1) *Aspidiotus nerii*, Bouché. On the cones of *T. occidentalis*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 20.
- (2) *Diaspis carueli*, Targioni-Tozzetti. Comstock, 2d Cornell Rept., p. 96. On *T. occidentalis*.
- (3) *D. minima*, Targioni-Tozzetti. Comstock, 2d Cornell Rept., p. 96; Signoret, Essai sur les Cochenilles. On *T. occidentalis*.
- (4) *Dactylopius ryani*, Coquillett. Coquillett, West Amer. Sci., 1889, p. 122. On *T. orientalis*.
- (5) *Lecanium fletcheri*, Cockerell. In Canada.

Comstock<sup>3</sup> reports *Diaspis carueli*, Targioni-Tozzetti, from "*Biota orientalis*;" this should be *Thuja* (*Biota*) *orientalis*.

Maskell records *Icerya purchasi*, Maskell, from cypress; and *Leachia zealandica*, Maskell, from *Cupressus dacrydioides*. This latter name is not in the Index Kewensis. *Dactylopius ryani*, Coquillett, occurs on *Cupressus macrocarpa*.

The following are found on *Juniperus* (Juniper):

- (1) *Diaspis carueli*, Targioni-Tozzetti. Signoret, Essai. On *J. communis*. Comstock reports it from *J. chinensis*, Linnaeus, *J. rigida*, Sieber and Zuccarini, *J. oxycedrus*, Linnæus, *J. japonica* (=syn. of *chinensis*), *J. communis*, Linnaeus, and "*J. revesii*" (perhaps meant for *revesiana*, which is *chinensis*).
- (2) *Diaspis juniperi*, Bouché. Signoret, Essai. On *J. communis*.
- (3) *Lecanium oleæ*, Bernard. On Irish Juniper. Coquillett Bull. 26, Div. Ent., U. S. Dept. Agric., p. 28.
- (4) *Lecanium fletcheri*, Cockerell. Pettit, Bull. 97, Cornell Univ. Exp. Sta., p. 311.

### II. TAXEÆ.

On the New Zealand *Phylloctadus trichomanoides*, D. Don, Maskell records *Eriococcus phyllocladi*, Maskell,<sup>4</sup> and *Calostoma assimile*,

<sup>1</sup> Cockerell, Ann. Mag. Nat. Hist., 1895, p. 62.

<sup>2</sup> Maskell, Tr. N. Z. Inst., XXVI, p. 78.

<sup>3</sup> Rept. Dept. Agric. for 1880, p. 311.

<sup>4</sup> Tr. N. Z. Inst., XXIV, p. 25.



Maskell.<sup>1</sup> *Ctenochiton dacrydii*, Maskell, occurs on the New Zealand *Dacrydium cupressinum*.<sup>2</sup>

### III. PODOCARPEÆ.

On the New Zealand *Podocarpus totara*, G. Benn., Maskell records:

- (1) *Calostoma pilosum*, Maskell. Tr. N. Z. Inst., XXIII, p. 30.
- (2) *Rhizococcus totara*, Maskell. Tr. N. Z. Inst., XXII, p. 142.
- (3) *Leachia zealandica*, Maskell. Tr. N. Z. Inst., XXIII, p. 27.
- (4) *Calostoma compressum*, Maskell. Tr. N. Z. Inst., XXIV, p. 46.

He also reports from *Podocarpus* sp. two Diaspinæ, *Aspidiotus aurantii*, Maskell,<sup>3</sup> and *Mytilaspis pallida*, Green, var.?<sup>4</sup>

### IV. ARAUCARIEÆ.

The following have been found on *Araucaria*:

- (1) *Dactylopius ryani*, Coquillett. On *A. excelsa* in California. Coquillett, West Amer. Sci., 1889, p. 122.
- (2) *D. aurilanatus*, Maskell. On *A. bidwillii*, Hooker, and *A. excelsa*. Maskell, Tr. N. Z. Inst., XXII, p. 152.
- (3) *Eriococcus araucaria*, Maskell. Maskell, Scale Ins. N. Z., p. 111; Comstock, 2d Cornell Rept., p. 137 (as *Rhizococcus*).

### V. ABIETINEÆ.

The Coccidæ of *Pinus* are:

- (1) *Physokermes insignicola*, Craw. On *P. insignis*. Cockerell, Can. Ent., 1895, p. 258.
- (2) *P. abietis*, Modeer (*Lecanium picæ*). Signoret, Essai. Newstead cites it only from *Abies*. (Ent. Mo. Mag., 1893, p. 209.)
- (3) *Icerya purchasi*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (4) *Puto antennata*, Signoret. On *P. cembra*, Linnæus. Signoret, Essai sur les Cochenilles.
- (5) *Monophlebus hellenicus*, Gennadius. On *P. halcyensis*, Miller. An orange species, 7 to 8 mm. long. legs and antennæ black.
- (6) *Leucaspis signoretii*, Targioni-Tozzetti. On *P. sylvestris*, L. Signoret, Essai sur les Cochenilles.
- (7) *L. pini*, Hartig. On *P. laricio*, Poirer. Signoret, Essai. According to Mr. Sulc the *Fiorinia sulci*, Newstead, formerly confounded with *L. pini*, is a distinct species, but nevertheless a *Leucaspis*.
- (8) *Chionaspis pinifolii*, Fitch. On *P. monophylla*, etc. Comstock, 1880; Signoret, Essai sur les Cochenilles (as *Mytilaspis pinifolia*).
- (9) *Mytilaspis newsteadii*, Sulc. On leaves of *P. sylvestris*. Bohemia. Female scale much like *pomorum*, but longer and with more parallel sides.
- (10) *Aspidiotus abietis*, Schrank. On *P. sylvestris*. Cockerell, Can. Ent., 1894, p. 190.

Coquillett<sup>5</sup> records *Lecanium oleæ*, Bernard, from the cedar of Lebanon and from Indian cedar.

<sup>1</sup> Tr. N. Z. Inst., XXIII, p. 31.

<sup>2</sup> Tr. N. Z. Inst., XXIV, p. 18.

<sup>3</sup> Tr. N. Z. Inst., XXVII, p. 41.

<sup>4</sup> Tr. N. Z. Inst., XXVII, p. 46.

<sup>5</sup> Bull. 26., Div. Ent., Dep. Agric., p. 29 (1892).

On various firs and spruces are found:

- (1) *Physokermes abietis*, Modeer. On *Abies excelsa* in Europe.
- (2) *P. coloradensis*, Cockerell. On spruce. Manitou, Colorado. Gillette and Baker, Hemip. Colo., p. 126.
- (3) *Icerya purchasi*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (4) *Coccus hystris*, Baerensprung. Signoret, Essai. A problematical species.
- (5) *Chionaspis pinifolia*, Fitch. Gillette and Baker, Hemip. Colo., p. 129; Comstock, 1880 Rept., p. 140.
- (6) *Mytilaspis abietis*, Signoret. Comstock, 2d Cornell Rept., p. 140; Signoret, Essai sur les Cochenilles. On *Abies excelsa*.
- (7) *Aspidiotus abietis*, Schrank. On *Abies canadensis*. Cockerell, Can. Ent., 1891, p. 190.
- (8) *Syngenaspis parlatoria*, Sule. On *Abies*. Bohemia (Sule.)

## CYCADACEÆ.

The following are found on *Cycas*:

- (1) *Lecanium cycadis*, Boisduval. On *C. revoluta*. Signoret, Essai sur les Cochenilles.
- (2) *L. oleæ*, Bernard. On *C. revoluta*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 29.
- (3) *L. hemisphericum*, Targioni-Tozzetti. Cockerell, Bull. Bot. Dept., Jamaica, 1894, p. 71; Journ. Inst. Jamaica, 1893, p. 254.
- (4) *Diaspis amygdali*, Tryon (*lanatus*). On *C. media*. Cockerell, Insect Life, V, p. 217.
- (5) *Howardia elegans*, Leonardi. On *C. revoluta*, at Portici, Italy.
- (6) *Ischnaspis filiformis*, Douglas. Cockerell, Can. Ent., 1895, p. 260. On *C. revoluta*.
- (7) *Fiorinia camellia*, Comstock. Comstock, 2d Cornell Rept., p. 1392. On *C. revoluta*.
- (8) *Poliaspis cycadis*, Comstock. Comstock, 2d Cornell Rept., p. 1392. On *C. revoluta*.
- (9) *Aspidiotus cycadicola*, Boisduval. On *C. revoluta*. Signoret, Essai sur les Cochenilles.
- (10) *A. dictyospermi*, Morgan, var. *Jamaicensis*, Cockerell. Cockerell, Can. Ent., 1894, p. 128.

*C. revoluta* is a Japanese species; *C. media* is Australian.

Olliff<sup>1</sup> refers to a coccid on *Macrozamia* attacked by *Thalpochares coccophaga*; but he alludes to the plant as a fern. Comstock<sup>2</sup> records *Parlatoria proteus*, Curtis, from *Microzamia*, but I suppose *Macrozamia* was intended.

"*Chermes*" *dianis* was from *Dion* (more properly *Dioon*) *edule*, and from the same plant Comstock reports *Poliaspis cycadis*, Comstock.

*Dactylopius zamia*, Lucas, is from *Zamia spiralis*.<sup>3</sup> *Diaspis zamia*, Morgan, was found on *Zamia*.<sup>4</sup>

## ORCHIDACEÆ.

In the Gardeners' Chronicle<sup>5</sup> will be found an account of eighteen species of Coccidæ living on orchids. The following have been recorded

<sup>1</sup> Agric. Gaz. N. S. W., November, 1891, p. 668.

<sup>2</sup> 2d Cornell Rept., p. 114.

<sup>3</sup> Signoret, Essai sur les Cochenilles.

<sup>4</sup> Ent. Mo. Mag., 1890, p. 45.

<sup>5</sup> May 6, 1893, p. 548.

from orchids, genus not stated: *Aspidiotus epidendri*, Bouché, *A. nerii*, Bouché, and *Dactylopius glaucus*, Maskell;<sup>1</sup> *Lecanium hemisphaericum*, Targioni-Tozzetti, and *Aspidiotus ficus*, Ashmead;<sup>2</sup> *Aspidiotus bififormis*, Cockerell,<sup>3</sup> and *Chionaspis braziliensis*, Signoret.<sup>4</sup>

The genera of orchids on which coccids have been found, and their coccids, are as follows:

(A) *Stelis*, Swartz.

(1) *Lecanium hesperidum*, Linnaeus. Cockerell, Trans. Amer. Ent. Soc., 1893, p. 49.

(B) *Dendrobium*, Swartz.

(1) *Aulacaspis boisduvalii*, Signoret. Maskell, Tr. N. Z. Inst., XXVII, p. 44 (as *Diaspis*).

(2) *Fiorinia stricta*, Maskell. Maskell, Scale Ins. N. Z., p. 112.

(3) *Ctenochiton elongatus*, Maskell. Maskell, Scale Ins. N. Z., p. 112.

(C) *Phaius*, Lour.

(1) *Lecanium hibernucolorum*, Boisduval. Signoret, Essai sur les Cochenilles.

(D) *Earina*, Lindley.

(1) *Ctenochiton elongatus*, Maskell. Maskell, Scale Ins. N. Z., p. 112.

(2) *Fiorinia stricta*, Maskell. Maskell, Scale Ins. N. Z., p. 112.

(E) *Epidendrum*, Linnaeus.

(1) *Aspidiotus epidendri*. Signoret, Essai sur les Cochenilles. On *E. hauburii*, Lindley (a Mexican species), and others.

(2) "*Lecanium*" *epidendri*, Bouché. Signoret, Essai. On *E. ciliare* (syn. *cuspidatum*). This is probably identical with *Asterolecanium oncidii*, Cockerell.

(3) *Asterolecanium oncidii*, Cockerell. Cockerell, Bull. Bot. Dept. Jamaica, 1896, p. 8.

(F) *Cattleya*, Lindley.

(1) *Aulacaspis boisduvalii*, Signoret. Maskell, Tr. N. Z. Inst., XXVII, p. 44 (as *Diaspis*).

(2) *Aspidiotus bififormis*, Cockerell, var. *cattleyae*, Cockerell. On *C. bowringiana*, Veitch, a native of Honduras. Cockerell, Gard. Chron., May 6, 1893, p. 584.

(3) *Lecanium pseudhesperidum*, Cockerell. In a greenhouse at Ottawa, Canada.

(G) *Broughtonia*, Robert Brown.

(1) *Asterolecanium oncidii*, Cockerell. On *B. sanguinea*, a West Indian species. Cockerell, Sei. Goss., 1893, p. 78 (as *Planchonia*).

(2) *Finsonia stellifera*, Westwood. On *B. sanguinea*. Cockerell, Bull. Bot. Dept. Jamaica, 1895, p. 101.

(3) *Aulacaspis boisduvalii*, Signoret. On *B. sanguinea*. Cockerell, Gard. Chron., May 6, 1893, p. 548.

(H) *Cymbidium*, Swartz.

(1) *Aulacaspis cymbidii*, Bouché. On *C. pendulum*, an East Indian species. Signoret, Essai (as *Diaspis*).

(2) *Mytilaspis pinnaformis*, Bouché. On *C. pendulum*. Signoret, Essai sur les Cochenilles.

(I) *Stanhopea*, Forster.

(1) *Finsonia stellifera*, Westwood. Cockerell, Amer. Nat., 1895, p. 727; Hart, Bull. Misc. Inform., Bot. Gardens, Trinidad, April, 1895, p. 38.

(J) *Odontoglossum*, Humboldt, Bonpland and Kunth.

(1) *Aspidiotus bififormis*, Cockerell, var. *odontoglossi*, Cockerell. On *O. grande*, Lindley, a native of Guatemala. Cockerell, Gard. Chron., May 6, 1893, p. 548.

(K) *Rodriguezia*, Ruiz and Pavon.

(1) *Couchaspis angraci*, Cockerell (= *Pseudinglisia rodrigueziana*, Newstead). On *R. secunda*. Newstead, Ent. Mo. Mag., 1893, p. 154.

<sup>1</sup> Maskell, Scale Ins. N. Z., p. 113.

<sup>2</sup> Cockerell, Insect Life, VI, p. 103.

<sup>3</sup> Cockerell, Journ. Trinidad Field Nat. Club, 1894, p. 307.

<sup>4</sup> Maskell, Tr. N. Z. Inst., XXV, p. 211.

(L) *Oncidium*, Swartz.

- (1) *Aspidiotus biformis*, Cockerell. On *O. sprucei*, Lindley, a native of Brazil. Cockerell, Gard. Chron., May 6, 1893, p. 548; Townsend, Journ. Inst. Jamaica, 1895, p. 169.
- (2) *Aulacaspis boisduvalii*, Signoret. On *O. quadripetalum*, Swartz (syn., *tetrapetalum*), a native of Mexico. Cockerell, Gard. Chron., May 6, 1893, p. 548.
- (3) *Asterolecanium oncidii*, Cockerell. Cockerell, Sci. Goss., 1893, p. 78 (as *Planchonina*). On *O. quadripetalum*. Targioni-Tozzetti, Bull. Soc. Ent. Ital., 1893, p. 311 (as *Asterolecanium aureum*).

(M) *Brassia*, Robert Brown.

- (1) *Pulvinaria brassia*, Cockerell. On *B. verrucosa*, Bateman, a native of Mexico. Cockerell, Can. Ent., 1895, p. 135.

(N) *Faula*, Robert Brown.

- (1) *Parlatoria proteus*, Curtis. Signoret, Essai sur les Cochenilles.

(O) *Angracum*, Thou.

- (1) *Lecanium ungraei*, Boisduval. Signoret, Essai. A problematical species. On *A. sesquipedale*, a native of Madagascar.
- (2) *Conchaspis ungraei*, Cockerell. On *A. sesquipedale* and *A. eburneum* var. *virens* (Lindley). Cockerell, Bull. Bot. Dept. Jamaica, February, 1893, p. 9; Journ. Inst. Jamaica, I, p. 373.
- (3) *Asterolecanium aureum*, Boisduval. On *A. sesquipedale*. Cockerell, Journ. Inst. Jamaica, I, p. 373.

(P) *Selenipedium*, H. G. Reichenbach.

- (1) *Parlatoria proteus*, Curtis. Signoret, Essai sur les Cochenilles.

## SCITAMINACEÆ.

*Curcuma longa*, Linnaeus, a native of tropical Asia, has been recorded as a food plant of *Aspidiotus ficus*, Ashmead.<sup>1</sup> *Calathea vittata* (syn. *Maranta vittata*) is the food plant of *Asterolecanium aureum*.

On *Musa* are found:

- (1) *Aspidiotus palma*, Morgan and Cockerell. On banana. Cockerell, Insect Life, V, p. 245; Journ. Trinidad Club, 1894, p. 306.
- (2) *A. destructor*, Signoret. On banana. Cockerell, Journ. Trinidad Club, 1894, p. 307.
- (3) *A. articulatus*, Morgan. Cockerell, Insect Life, 1893, p. 160.
- (4) *A. personatus*, Comstock. Cockerell, Insect Life, 1893, p. 160.
- (5) *A. ficus*, Ashmead. Cockerell, Insect Life, 1893, p. 160.

From *Heliconia bihai*, Linnaeus, a native of South America, is recorded *Pinnaspis pandani*, Comstock.<sup>2</sup> Comstock<sup>3</sup> records *Aulacaspis boisduvalii*, Signoret, from *Ravenala madagascariensis*.

## BROMELIACEÆ.

The pineapple, *Ananas ananas* (Linnaeus) = *sativus*, a native of tropical America, is not rarely attacked by *Diaspis bromelia*, Kerner, which is really an *Aulacaspis*. In Jamaica there is found upon it a small

<sup>1</sup> Townsend, Journ. Inst. Jamaica, 1895, p. 169.

<sup>2</sup> Cockerell, Journ. Trinidad Club, 1894, p. 307.

<sup>3</sup> 2d Cornell Rept., p. 86.

mealy bug, *Dactylopius brevipes*.<sup>1</sup> A different mealy bug, *D. bromeliæ*, Bouché, also occurs on pineapple; full particulars of it are given by Signoret, who received it from Zanzibar. There is also a problematical *Lecanium bromeliæ* on pineapple, said to resemble *L. hesperidum*, Linnaeus, very much.

*Aspidiotus vriesia*, Signoret,<sup>2</sup> is from *Tillandsia (Vriesia) splendens*.

### IRIDACEÆ.

*Lecanium patersonia*, Maskell, is from *Patersonia glabrata*, Robert Brown, a native of Australia.<sup>3</sup>

### AMARYLLIDACEÆ.

*Lecanium oleæ*, Bernard, and *L. hesperidum*, Linnaeus, have been found on *Hippeastrum equestre*, Herbert, a native of Mexico.<sup>4</sup> *Dactylopius liliacearum*, Bouché, occurs on *Crinum*;<sup>5</sup> it is also found on *Amaryllis*. *Lecanium assimile*, Newstead, var. *amaryllidis*, is from *Amaryllis*.<sup>6</sup> *Dactylopius liliacearum*, Bouché, is found on *Paneratium*. *D. simplex*, Cockerell, is from *Hymenocallis caribua (Paneratium caribuum)*.<sup>7</sup> *Asterolecanium aureum* was found by Mr. Hart on *Hippeastrum* in cultivation in Trinidad.

*Gymnococcus agarium* (Douglas) was found on *Agave*. *Aspidiotus boureyi*, Cockerell, is from *Agaverigida*.<sup>8</sup> Coquillett<sup>9</sup> reports *Aspidiotus nerii*, Bouché, from *Agave americana*.

### DIOSCOREACEÆ.

*Aspidiotus hartii*, Cockerell, occurs on yam.<sup>10</sup>

### LILIACEÆ.

Following is a list of the genera infested, with their coccids:

(A) *Smilax*, Linnaeus.

(1) *Aspidiotus smilacis*, Comstock. Comstock, 2d Cornell Rept.

(2) *Lecanium urichi*, Cockerell. On *S. campestris*, Grisebach, Rio Grande do Sul, Brazil (Von Ihering).

(B) *Rhipogonum*, Forster.

(1) *Chionaspis minor*, Maskell. On *R. scandens*. Maskell, Scale Ins. N. Z., p. 113.

<sup>1</sup> Cockerell, Ent., 1893, p. 267.

<sup>2</sup> Signoret, Essai sur les Cochenilles.

<sup>3</sup> Maskell, Tr. N. Z. Inst., XXVII, p. 58.

<sup>4</sup> Cockerell, Insect Life, V, p. 245; Bull. Bot. Dept., Jamaica, 1894, p. 18.

<sup>5</sup> Signoret, Essai sur les Cochenilles.

<sup>6</sup> Cockerell, Trans. Amer. Ent. Soc., 1893, p. 53.

<sup>7</sup> Cockerell, Ent., 1893, p. 267.

<sup>8</sup> Cockerell, Ent. News, 1894, p. 59.

<sup>9</sup> Bull. 26, Div. Ent., U. S. Dept. Agric., p. 20.

<sup>10</sup> Cockerell, Psyche Supp., 1895, p. 7.

(C) *Ruscus*, Linnaeus.

- (1) *Ceroplastes rusci*, Linnaeus. Signoret, Essai. On *R. aculeatus*.
- (2) *Aspidiotus affinis*, Targioni-Tozzetti. Signoret, Essai. On *R. aculeatus*.

(D) *Asparagus*, Linnaeus.

- (1) *Lecanium autharii*, Boisduval. Maskell, Tr. N. Z. Inst., XXV, p. 219.
- (2) *L. asparagi*, Giard, name only, 1893. On *A. horridus* in Algeria.
- (3) *Diaspis asparagi*, Giard, name only, 1893. On *A. horridus* in Algeria.

(E) *Aspidistra*, Kerr.

- (1) *Chionaspis aspidistra*, Signoret. On *A. elatior*, Blume (syn. *variegata*), a native of Japan. Signoret, Essai.

(F) *Phormium*, Forster.

The following are all on *P. tenax*, Forster, the New Zealand flax:

- (1) *Calostoma wairoense*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (2) *Dactylopius calcularia*, Maskell. Maskell, Scale Ins. N. Z., p. 113; also Tr. N. Z. Inst., XXII, p. 149.
- (3) *Mytilaspis cordylinidis*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (4) *Fiorinia stricta*, Maskell. Maskell, Scale Ins. N. Z., p. 113.
- (5) *Aspidiotus phormii*, De Brème. Signoret, Essai sur les Cochenilles.
- (6) *A. sphaerioides*, Cockerell. Cockerell, Psyche Supp., 1895, p. 7.
- (7) *A. ficus*, Ashmead. Gillette and Baker, Hemip. Colo., p. 128.

(G) *Aloe*, Linnaeus.

- (1) *Aspidiotus aloes*, Boisduval. On *A. variegata*, Linnaeus. Signoret, Essai. On *A. saponaria*, Haworth (= *A. umbellata*). Comstock, 2d Cornell Rept., p. 72. The plants are natives of South Africa.

(H) *Gasteria*, Duval.

- (1) *Aspidiotus aloes*, Boisduval. On *G. disticha* (= *Aloe angulata*), Signoret, Essai sur les Cochenilles.

(I) *Yucca*, Linnaeus.

- (1) *Lecanium olea*, Bernard. In Chile. Cockerell, Can. Ent., 1895, p. 257.
- (2) *Dactylopius olivaceus*, Cockerell. Cockerell, Psyche Supp., 1896, p. 18. Mexico.
- (3) *Phenacoccus yucca*, Coquillett. Mexico and California.
- (4) *Lecaniodiaspis yucca*, Townsend. New Mexico; Organ Mountains (Townsend).
- (5) *Aspidiotus yucca*, Cockerell. Psyche Supp., 1896, p. 20. Mexico.
- (6) *A. nerii*, Bouché. Comstock, 2d Cornell Rept., p. 140. Exogenetic.
- (7) *Mytilaspis pomorum*, Bouché. Comstock, 2d Cornell Rept., p. 140. Exogenetic.

(J) *Dracena*, Linnaeus.

- (1) *Pinnaspis pandani*, Comstock. Cockerell, Ent. Mo. Mag., 1893, p. 39 (as *Mytilaspis*).
- (2) *Aspidiotus nerii*, Bouché. Gillette and Baker, Hemip. Colo., p. 128.

(K) *Cordylina*, Commerson.

- (1) *Lecanium hemisphaericum*, Targioni-Tozzetti. Signoret, Essai. Recorded from *Dracena australis*, which is a *Cordylina*.
- (2) *Dactylopius calcularia*, Maskell. Maskell, Tr. N. Z. Inst., XXVI, p. 89. On the New Zealand *C. australis*.
- (3) *Leucaspis cordylinidis*, Maskell. Maskell, Tr. N. Z. Inst., XXV, p. 210.
- (4) *Fiorinia stricta*, Maskell. Maskell, Scale Ins. N. Z. On *C. australis* and *C. indivisa*.
- (5) *Mytilaspis cordylinidis*, Maskell. Maskell, Scale Ins. N. Z. On *C. australis* and *C. indivisa*.

(L) *Astelia*, Banks and Solander.

The following are all on the New Zealand *A. cunninghamii*, Hooker:

- (1) *Mytilaspis cordylinidis*, Maskell. Maskell, Scale Ins. N. Z., p. 111.
- (2) *M. epiphytidis*, Maskell. Maskell, Scale Ins. N. Z., p. 111.
- (3) *Fiorinia astelia*, Maskell. Maskell, Scale Ins. N. Z., p. 111.
- (4) *F. stricta*, Maskell. Maskell, Scale Ins. N. Z., p. 111.
- (5) *Phenacoccus astelia*, Maskell. Maskell, Scale Ins. N. Z., p. 111 (as *Pseudococcus*).

## JUNCACEÆ.

Maskell<sup>1</sup> records *Aspidiotus cladii*, Maskell, from *Xerotes*, sp., and *Chionaspis xerotidis*, Maskell, from *Xerotes longifolia*. *Aspidiotus rossi*, Maskell, is found on *Xanthorrhæa*.<sup>2</sup> *Signoretia luzulae*, Dufour, is found on *Luzula*.

## PALMACEÆ.

The following are from various palms, genus not specified: *Dactylopius longispinus* = *longifilis*,<sup>3</sup> *D. glaucus*,<sup>4</sup> *Asterolecanium urichi*,<sup>5</sup> *Tcerya montserratensis*,<sup>6</sup> *Lecanium hesperidum* and *L. hemisphericum*,<sup>3</sup> *L. oleæ*,<sup>7</sup> *Fiorinia camellia*,<sup>8</sup> *Pinuaspis pandani*,<sup>9</sup> *Ischnaspis filiformis*,<sup>10</sup> *Parlatoria proteus*,<sup>11</sup> *Mytilaspis pallens* (apparently on a fan palm),<sup>12</sup> *Chionaspis minor*,<sup>3</sup> *Aspidiotus epidendri* and *A. nerii*,<sup>4</sup> *A. personatus*,<sup>3</sup> *A. articulatus*,<sup>10</sup> *A. palmarum*,<sup>7</sup> *A. dictyospermi*.<sup>13</sup>

The following genera have been recorded as supporting Coccidæ:

(A) *Arca*, Linnaeus.

- (1) *Lecanium hemisphericum*, Targioni-Tozzetti. On *A. catechu*. Cockerell, Insect Life, 1893, p. 159.
- (2) *Aspidiotus ficus*, Ashmead. On *A. catechu*. Cockerell, Insect Life, 1893, p. 159.
- (3) *A. aurantii*, Maskell. On *A. catechu*. Cockerell, Insect Life, 1893, p. 159.
- (4) *A. destructor*, Signoret. Cockerell, Journ. Inst. Jamaica, 1893, p. 255, (as *A. nerii*, var.).
- (5) *Chionaspis aspidistra*, Maskell. On *A. catechu*. Maskell, Tr. N. Z. Inst., XXIV, p. 15.
- (6) *Ischnaspis filiformis*, Douglas. On *A. glandiformis*. Townsend, Journ. Inst. Jamaica, 1895, p. 169.

(B) *Rhopalostylis*, H. Wendland and Drude.

- (1) *Dactylopius arca*, Maskell. On roots of *R. sapida* (syn., *Arca sapida*). Maskell, Tr. N. Z. Inst., XXII, p. 150.

(C) *Howea*, Beccari.

- (1) *Fiorinia camellia*, Comstock. On *H. (olim Kentia) belmoreana*. Comstock, 2d Cornell Rept., p. 111.

(D) *Oreodora*, Willdenow.

- (1) *Aspidiotus ficus*, Ashmead. On *O. regia*. Cockerell, Can. Ent., 1895, p. 261.

<sup>1</sup> Tr. N. Z. Inst., XXVII.

<sup>2</sup> Maskell, Tr. N. Z. Inst., XXV, p. 207.

<sup>3</sup> Cockerell, Insect Life, VI, p. 103.

<sup>4</sup> Maskell, Scale Ins. N. Z., p. 113.

<sup>5</sup> Cockerell, Journ. Trinidad Club, 1894, p. 308.

<sup>6</sup> Cockerell, Bull. Bot. Dept. Jamaica, August, 1893, p. 2.

<sup>7</sup> Comstock, 2d Cornell Rept., p. 140.

<sup>8</sup> Maskell, Tr. N. Z. Inst., XXV, p. 211.

<sup>9</sup> Cockerell, Journ. Trinidad Club, 1894, p. 306.

<sup>10</sup> Cockerell, Journ. Inst. Jamaica, 1892, p. 54.

<sup>11</sup> Cockerell, Journ. Inst. Jamaica, 1893, p. 256.

<sup>12</sup> Maskell, Tr. N. Z. Inst., XXII, p. 134.

<sup>13</sup> Cockerell, Amer. Nat., 1895, p. 728.

(E) *Caryota*, Linnaeus.

(1) *Lecanium tessellatum*, Signoret. On *C. "ursus,"* doubtless = *urens*. Signoret, Essai.

(2) *L. perforatum*, Newstead.

(F) *Nipa*, Thunberg.

(1) *Dactylopius nipa*, Maskell. On *N. fruticans*, Thunberg, the only species, a native of the East Indies. Maskell, Tr. N. Z. Inst., XXV, p. 233.

(G) *Phytelephas*, Ruiz and Pavon.

(1) *Fiorinia pellucida*, Targioni-Tozzetti. On the South American *F. macrocarpa*, Ruiz and Pavon. Signoret, Essai.

(H) *Phoenix*, Linnaeus.

The following are from the date palm, *P. dactylifera*, Linnaeus, a native of North Africa and Arabia.

(1) *Anidia blanchardi*, Targioni-Tozzetti. Mém. Soc. Zool. France, V (1892), p. 69.

(2) *Parlatoria victrix*, Cockerell.

(3) *Aspidiotus palmarum*, Bouché. Signoret, Essai. Comstock cites *A. destructor*.

(4) *A. aurantii*, Maskell. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 15. See also, Cockerell, Insect Life, V, p. 246.

(I) *Sabal*, Adans.

(1) *Aspidiotus sabalis*, Comstock. On palmetto. Comstock, 2d Cornell Rept., p. 67.

(2) *A. destructor*, Signoret. Cockerell, Journ. Inst. Jamaica, 1893, p. 255 (as *nerii* var.).

(3) *A. articulatus*, Morgan. On *S. umbraculifolia*. Cockerell, Insect Life, V, p. 246.

(4) *A. personatus*, Comstock. On *S. umbraculifolia*. Cockerell, Insect Life, V, p. 246.

(5) *Ischnaspis filiformis*, Douglas. In Antigua. Cockerell, Ent. Mo. Mag., 1893, p. 17.

(J) *Washingtonia*, H. Wendland. Coquillett (Bull. 26, Div. Ent., U. S. Dept. Agric., p. 15) reports *Aspidiotus aurantii*, Maskell, from the California Palm.

(K) *Chamaerops*, Linnaeus.

(1) *Aspidiotus chamaeropsis*, Signoret (or *chamaeropsidis*). On "*C. Australis*," a name not in Index Kewensis. Signoret, Essai.

(2) *A. palmarum*, Targioni-Tozzetti. Mém. Soc. Zool. France, V (1892), p. 81.

(3) *A. dictyospermi*, Morgan.

It may be added, that Gillette and Baker<sup>1</sup> record *A. dictyospermi* from "*Chamaeropsis elegans*." What this is, I do not know.

(L) *Livistona*, Robert Brown.

(1) *Fiorinia camellia*, Comstock. Maskell, Tr. N. Z. Inst., XXIV, p. 16.

(M) *Raphia*, Beauvois.

(1) *Lecanium perforatum*, Newstead. Gillette and Baker, Hemip. Colo., p. 128.

(N) *Cocos*, Linnaeus.

The following are on the cocoanut, *C. nucifera*:

(1) *Dactylopius virgatus*, Cockerell. Bull. Bot. Dept. Jamaica, August, 1893, p. 3; Insect Life, VI, p. 103.

(2) *D. cocotis*, Maskell. Tr. N. Z. Inst., XXII, p. 149; and a variety, Maskell, Tr. N. Z. Inst., XXIV, p. 12. Fiji and Laccadive Islands.

(3) *Coccus crion*, Anderson, 1787. A problematical species, perhaps a *Dactylopius*.

(4) *Asterolecanium palma*, Cockerell. Sci. Goss., 1893, p. 77.

(5) *Vinsonia stellifera*, Westwood. Cockerell, Gard. Chron., May 6, 1893, p. 548.

(6) *Aulacaspis boisduvalii*, Signoret. Cockerell, Journ. Inst. Jamaica, 1893, p. 180. Mr. Morgan's *A. tentaculatus* appears to me to be the same species.

(7) *Chionaspis randaliensis*, Cockerell. A problematical species. See Cockerell, Journ. Inst. Jamaica, 1892, p. 51.

<sup>1</sup> Hemip. Colo., p. 128.



- (8) *C. minor*, Maskell. Cockerell, Ent. Mo. Mag., 1893, p. 38.
- (9) *Pinnaspis pandani*, Comstock. Cockerell, Insect Life, VI, p. 103; Ent. Mo. Mag., 1893, p. 38 (as *Mytilaspis buri*).
- (10) *Fiorinia fioriniae*, Targioni-Tozzetti (or *camelliae*). Cockerell, Ent. Mo. Mag., 1893, pp. 38-40; Journ. Inst. Jamaica, 1892, p. 54.
- (11) *Aspidiotus palmae*, Cockerell. Ent. Mo. Mag., 1893, pp. 38-40; Journ. Inst. Jamaica, 1892, p. 54 (as *rapax* var.).
- (12) *A. destructor*, Signoret. Cockerell, Journ. Inst. Jamaica, 1893, p. 255 (as *palmarum*); Journ. Trinidad Club, 1894, p. 307; Maskell, Tr. N. Z. Inst., XXIV, p. 12; Comstock, 2d Cornell Rept., p. 75 (in Bourbon).
- (13) *A. ficus*, Ashmead. Cockerell, Can. Ent., 1895, p. 261; Ent. Mo. Mag., 1893, pp. 38-40.
- (14) *A. articulatus*, Morgan. Cockerell, Ent. Mo. Mag., 1893, pp. 38-40.
- (15) *A. panica*, Cockerell. Cockerell, Journ. Inst. Jamaica, 1893, p. 255.
- (O) *Latania*, Commerson.
- (1) *Aspidiotus lataniae*, Signoret. On *L. aurca*, Duncan (syn. *verschaffeltii*), a native of Rodriguez. Signoret, Essai sur les Cochenilles.
- (2) *A. personatus*, Comstock. On *L. commersonii*, J. F. Gmelin (syn. *borbonica*). Cockerell, Insect Life, V, p. 245.

### PANDANEÆ.

The following occur on *Pandanus*:

- (1) *Dactylopius pandani*, Cockerell. In Marquesas Islands. Cockerell, Psyche Supp., 1895, p. 16.
- (2) *Ischuaspis filiformis*, Douglas. Cockerell, Journ. Trinidad Club, 1894, p. 306; Townsend, Journ. Inst. Jamaica, 1895, p. 169. On *P. vandermeeschii*, Balfour, and *P. "falcatus"* (? *furcatus*, Roxburg).
- (3) *Pinnaspis (olim Mytilaspis) pandani*, Comstock. Cockerell, Journ. Trinidad Club, 1894, p. 307; Comstock, 2d Cornell Rept., p. 140.
- (4) *Aspidiotus articulatus*, Morgan. Cockerell, Journ. Trinidad Club, 1894, p. 307.
- (5) *A. pandani*, Signoret. On *P. utilis*, Bory, a native of Madagascar. Signoret, Essai sur les Cochenilles.
- (6) *A. (Chrysomphalus) minor*, Berlese. On *P. graminifolius*.

### AROIDEÆ.

Coquillett<sup>1</sup> records *Lecanium hesperidum*, Linnaeus, from the so-called Calla lily, *Richardia africana*. *Colocasia antiquorum* (syn. *esculenta*) is a food plant of *Dactylopius virgatus*, Cockerell.<sup>2</sup> *Ceroplastes floridensis*, Comstock, has been found on *Anthurium lanceolatum*.<sup>3</sup> *Mytilaspis carinatus*, Cockerell, occurs on some Anthurium-like plant.<sup>4</sup>

### NAIADACEÆ.

The *Coccis zosteræ*, Fabricius, on *Zostera* is surely no coccid!

<sup>1</sup>Bull. 26, Div. Ent., U. S. Dept. Agric., p. 26.

<sup>2</sup>Bull. Bot. Dept., Jamaica, August, 1893, p. 3.

<sup>3</sup>Cockerell, Insect Life, 1893, p. 159.

<sup>4</sup>Cockerell, Psyche Supp., 1896, p. 21.

## CYPERACEÆ.

Signoret records *Lecanium angustatum*, Signoret, and *Dactylopius cyperi*, Signoret, from *Cyperus papyrus*. *Aspidiotus cladii*, Maskell, is found on *Lepidosperma*,<sup>1</sup> as well as on *Cladium*.<sup>2</sup> *Mytilaspis cordylinidis* occurs on *Gahnia*.<sup>3</sup> *Orthezia cataphracta*, Shaw, is found about the base of stems of *Carr.*<sup>4</sup>

## GRAMINEÆ.

The following are from grass, genus not stated:

- (1) *Dactylopius radicum*, Newstead. Ent. Mo. Mag., 1895, p. 235.
- (2) *D. hibernicus*, Newstead. Ent. Mo. Mag., 1895, p. 167.
- (3) *D. herbicola*, Maskell. Tr. N. Z. Inst., XXIV, p. 36.
- (4) *D. graminis*, Maskell. Tr. N. Z. Inst., XXIV, p. 36.
- (5) *D. segregatus*, Cockerell. Bull. Bot. Dept., Jamaica, August, 1893, p. 4; Journ. Inst. Jamaica, 1893, p. 251.
- (6) *D. poæ*, Maskell. Scale Ins. N. Z., p. 112. On roots of tussock grass. Maskell, Tr. N. Z. Inst., XXII, p. 150.
- (7) *D. areæ*, Maskell. On roots. Maskell, Tr. N. Z. Inst., XXV, p. 231.
- (8) *Rhizococcus quercus*, Comstock. 2d Cornell Rept., p. 139. It is really an *Eriococcus*.
- (9) *Signoretia luzula*, Dufour. Maskell, Tr. N. Z. Inst., XXV, p. 224. It is a distinct variety, *australis*.
- (10) *Icerya purchasi*, Maskell. Scale Ins. N. Z., p. 112.
- (11) *Orthezia normani*, Douglas. Among the stems. Douglas, Trans. Ent. Soc. Lond., 1881, p. 301. Now considered a synonym of *O. floccosa*.
- (12) *O. cataphracta*, Shaw. About base of stems. Douglas, Trans. Ent. Soc. Lond., 1881, p. 300.
- (13) *Aspidiotus nerii*, Bouché. Comstock, 2d Cornell Rept., p. 139.

The following genera have coccid records:

(A) *Spartina*, Schreber.

- (1) *Chionaspis spartina*, Comstock. On *S. stricta*. Comstock, 2d Cornell Rept., p. 140.
- (2) *Ripersia maritima*, Cockerell. Insect Life, VII, p. 43.

(B) *Saccharum*, Linnaeus.

The following are from the sugar cane, *S. officinarum*:

- (1) *Icerya sacchari*, Guérin. Signoret, Essai. Now considered identical with *I. seychellarum*.
- (2) *Dactylopius calceolaria*, Maskell. Tr. N. Z. Inst. XXII, p. 149; Cockerell, Bull. Bot. Dept., Jamaica, February, 1893, p. 6. In Jamaica.
- (3) *D. sacchari*, Guérin. Cockerell, Journ. Trinidad Club, 1895, p. 195.
- (1) *Pulvinaria gasteralpha*, Signoret. Signoret, Essai sur les Cochenilles.
- (5) *Aspidiotus sacchari*, Cockerell. Insect Life, VI, p. 103.

(C) *Calamagrostis*, Adans.

Signoret records *Eriopeltis lichtensteini*, Signoret, and *Westwoodia perrisii*, Signoret.

(D) *Aira*, Linnaeus.

<sup>1</sup>Maskell, Tr. N. Z. Inst., XXV, p. 205.

<sup>2</sup>Maskell, Tr. N. Z. Inst., XXIII, p. 3.

<sup>3</sup>Maskell, Scale Ins. N. Z., p. 112.

<sup>4</sup>Douglas, Trans. Ent. Soc. Lond., 1881, p. 300.

The problematical *Coccus chlavoua*, Anderson, is from *Aira spicata*, which, however, is not an *Aira*, but a *Panicum* or *Trisetum*.

(E) *Corynephorus*, Beauvois.

*Ripersia corynephorii*, Signoret, is from the south European *C. canescens*.

(F) *Danthonia*, De Candolle.

*Eriococcus danthonia*, Maskell, is from the New Zealand *D. cunninghamii*, J. D. Hooker.<sup>1</sup> *Dactylopius calceolaria*, Maskell, has been found on *Danthonia*.<sup>2</sup>

(G) *Poa*, Linnaeus.

(1) *Eriopeltis festuca*, Fonscolombe. Signoret, Essai sur les Cochenilles.

(2) *Porphyrophora hamelii*, Brandt. Signoret, Essai sur les Cochenilles. Recorded from *P. pungens*, but this is really an *Eluropus*, either *A. pubescens* or *A. larvis*.

(3) *Dactylopius poa*, Maskell. On *P. anceps*, Forster, known in New Zealand as tussock grass. Maskell, Scale Ins. N. Z., p. 113.

(H) *Eluropus*, Trin. See above under *Poa*.

(1) *Porphyrophora hamelii*, Brandt. On *E. larvis* (as *Aeluropus*). Signoret, Essai sur les Cochenilles.

(I) *Milium*, Linnaeus.

Signoret records *Aclerda subtenanea* and *Antonina purpurea*, Signoret.

(J) *Bromus*, Linnaeus.

Signoret records *Eriopeltis festuca*, Fonscolombe.

(K) *Agropyrum*, J. Gærtner (or *Agropyron*).

*Fairmairia bipartita*, Signoret, is found on the European *A. campestre*, Godron and Grenier.

(L) *Triticum*, Linnaeus.

*Porphyrophora radicum-graminis*, Baerensprung, has been found on wheat.<sup>3</sup>

(M) *Andropogon*, Linnaeus.

Mr. E. E. Green sends me a new species, *Chionaspis graminis*, Green, found on *Andropogon* (lemon grass).

(N) *Bambusa*, Schreber (bamboo).

(1) *Spharococcus bambusa*, Maskell. Tr. N. Z. Inst., XXV, p. 237.

(2) *S. (Pseudolecanium) tokionis*, Cockerell. In Japan. Cockerell, Psyche Supp., 1896, p. 19.

(3) *Asterolecanium bambusa*, Boisduval. Signoret, Essai; Cockerell, Sci. Goss., 1893, p. 77; Journ. Trinidad Club, 1891, p. 307. On *B. distorta*, Nees, according to Signoret.

(4) *A. miliaris*, Boisduval. Signoret, Essai; Cockerell, Journ. Trinidad Club, 1891, p. 307. On *B. distorta*, but also on *B. stricta*, which is a *Dendrocalamus* or *Oxytenanthera*.

(5) *Lecanium depressum*, Targioni. Maskell, Tr. N. Z. Inst., XXV, p. 220.

(6) *L. longulum*, Douglas. Maskell, Tr. N. Z. Inst., XXV, p. 221.

(7) *Chionaspis bambusa*, Cockerell. In Japan. Cockerell, Psyche Supp., 1896, p. 21.

(8) *Diaspis patelliformis*, Sasaki. According to C. Sasaki.

<sup>1</sup>Maskell, Tr. N. Z. Inst., XVIII, p. 22.

<sup>2</sup>Maskell, Scale Ins. N. Z., p. 112.

<sup>3</sup>F. Löw, see Zool. Record for 1866.

## FILICES.

The following are from ferns, genus not stated:

- (1) *Dactylopius glaucus*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (2) *Ctenochiton depressus*, Maskell. Maskell, Scale Ins. N. Z., p. 112.
- (3) *Lecanium mori*, Signoret. Maskell, Scale Ins. N. Z., p. 112; Tr. N. Z. Inst., XXVI, p. 75. See under *Nephrolepis*.
- (4) *L. platycerii*, Packard. Comstock, 2d Cornell Rept., p. 139. A problematical species, not defined. See under *Platyceirium*.
- (5) *L. filicum*, Boisduval. Comstock, 2d Cornell Rept., p. 139. Cockerell, Bull. Bot. Dept. Jamaica, 1891, p. 72; Trans. Amer. Ent. Soc., 1893, p. 55; Maskell, Tr. N. Z. Inst., XXV, p. 220 (? on *Lomaria*). See under *Davallia*.
- (6) *L. hemisphaericum*, Targioni-Tozzetti, var. *hibernaculorum*, Boisduval. Cockerell, Bull. Bot. Dept. Jamaica, 1891, p. 71.
- (7) *Vinsonia stellifera*, Westwood. Cockerell, Journ. Trinidad Club, 1894, p. 306.
- (8) *Chionaspis braziliensis*, Signoret. Cockerell, Journ. Trinidad Club, 1894, p. 306; Maskell, Tr. N. Z. Inst., XXV, p. 211.
- (9) *C. dubia*, Maskell. Scale Ins. N. Z., p. 112. See under *Pellaea* and *Asplenium*.
- (10) *Poliaspis media*, Maskell. Scale Ins. N. Z., p. 112.
- (11) *Ceroplastes floridensis*, Comstock. Cockerell, Amer. Nat., 1895, p. 727.
- (12) *C. rubens*, Maskell. Sent by Mr. Ehrhorn on fern from Honolulu. (Craw coll.)
- (13) *Palrinaria* sp. On fern from Honolulu. (Craw, through Ehrhorn.)

The following genera have coccid records:

(A) *Platyceirium*.

The unrecognized *Lecanium platycerii*, Packard, was found on this. *L. oleae*, Bernard, occurs on *P. aleicorne*.<sup>1</sup>

(B) *Pteris*.

- (1) *Eriococcus insignis*, Newstead. Ent. Mo. Mag., 1891, p. 165.
- (2) *Lecanium filicum*, Boisduval. Signoret, Essai. This and the next are found on *P. quadriaurita* var. *argyrea* (syn. *P. argyrea*).
- (3) *Dactylopius pteridis*, Signoret. Signoret, Essai sur les Cochenilles.

(C) *Polypodium*.

- (1) *Mytilaspis phymatodidis*, Maskell. Scale Ins. N. Z., p. 113. On *P. (Phymatodes) billardieri*.

(D) *Pellaea*.

- (1) *Chionaspis dubia*, Maskell. On *P. rotundifolia*, a fern of New Zealand and Norfolk Island. Maskell, Scale Ins. N. Z., p. 113.

(E) *Nephrolepis*.

- (1) *Lecanium mori*, Signoret. On *N. cordifolia*. Maskell, Tr. N. Z. Inst., XXVI, p. 76.
- (2) *L. hemisphaericum*, Targioni-Tozzetti. On *N. exaltata*. Gillette and Baker. Memip. Colo., p. 127.

(F) *Nephrodium*.

- (1) *Lecanium hemisphaericum*, Targioni-Tozzetti. Cockerell, Journ. Inst. Jamaica, 1, p. 373.

(G) *Davallia*.

- (1) *Lecanium filicum*, Boisduval. On *D. canariensis*. Coquillett, Bull. 26, Div. Ent., U. S. Dept. Agric., p. 27.

(H) *Alsophila* (tree ferns).

- (1) *Lecanium mori*, Signoret. On *A. colensoi*. Maskell, Tr. N. Z. Inst., XXVI, p. 75.

<sup>1</sup> Cockerell, Amer. Nat., 1895, p. 727.

- (I) *Adiantum* (maidenhair).
- (1) *Dactylopius longispinus*, Targioni-Tozzetti (*longifilis*). Cockerell, Journ. Inst. Jamaica, 1892, p. 97; Ent., 1893, p. 266; Ann. Mag. Nat. Hist., 1895, p. 61.
- (J) *Asplenium*.
- (1) *Lecanium mori*, Signoret. On *A. flaccidum*. Maskell, Tr. N. Z. Inst., XXVI, p. 76.
- (2) *Mytilaspis cordylioidis*, Maskell. Comstock, 2d Cornell Rept., p. 139.
- (3) *Chionaspis dubia*, Maskell. On *A. bulbiferum* and *A. obtusatum* var. *lucidum*. Maskell, Scale Ins. N. Z., p. 111; Tr. N. Z. Inst., XXIII, p. 8.
- (K) *Doodia*.
- (1) *Lecanopsis filicum*, Maskell. On *D. aspera*, an Australian species. Maskell, Tr. N. Z. Inst., XXVII, p. 17.
- (L) *Cyathea* (tree ferns).
- (1) *Ctenochiton depressus*, Maskell. On *C. Smithii*. Maskell, Scale Ins., N. Z., p. 112.

## MUSCI.

*Dactylopius pow*, Maskell, occurs among moss at base of trees.<sup>1</sup>  
*Ortheziola rejzlovskyi*, Sule, is found under leaves and moss (Sule).

<sup>1</sup> Maskell, Tr. N. Z. Inst., XXIII, p. 23.