

## NOTES ON THE GEOGRAPHICAL DISTRIBUTION OF SCALE INSECTS.

By T. D. A. COCKERELL.

IN THE preparation of a list of localities from which Coccidæ have been recorded it becomes so evident that our knowledge is not merely incomplete, but fragmentary, that further consideration of the matter at the present time might seem useless. I do not, however, take this view, but prefer to record the fragments of information so far accumulated, hoping that those who read these notes may be in some cases stimulated to assist in filling the gaps.

### PALEARCTIC REGION.

Although Europe has been apparently well searched, new things are turning up every few months, and I really believe that we do not know the Coccidæ of any European country so well as we do those of New Zealand. There are two or three reasons why the European list, as appearing in the books, must be considerably reduced. One is that there is doubtless a good deal of synonymy not yet clearly made out, owing to the formerly prevalent idea that it was safe to consider anything on a new food plant to be a new species. Another is the number of imperfect descriptions of older authors, which, in the absence of certainty as to what was intended, will have, eventually, to be dropped. The third reason is that very many species described from Europe have been found in hothouses on exotic plants, and certainly do not belong to the palearctic fauna. When Signoret wrote, these hothouse species already numbered 48, and they have been largely added to since by Douglas and Newstead.

Making as good an estimate as I am able to at present, I find the truly palearctic Coccidæ to be as follows:

*Porphyrophora*, 5; *Guerinia*, 1; *Palwoeoccus*, 2; *Nidularia*, 1; *Antonina*, 2; *Xylococcus*, 1; *Gossyparia*, 2; *Eriococcus*, 6; *Rhizococcus*, 1; *Bergrothia*, 1; *Oudablis*, 2; *Dactylopius*, 11; *Puto*, 1; *Phenacoccus*, 12; *Ripersia*, 4; *Tetrura*, 1; *Cryptococcus*, 1; *Kermes*, 9; *Orthezia*, 5; *Asterolecanium*, 5; *Pollinia*, 2; *Lecaniodiaspis*, 1; *Signoretia*, 1; *Filippia*, 1;

*Eriopeltis*, 3; *Lichtensia*, 1; *Pulvinaria*, 17; *Ceroplastes*, 2; *Physokermes*, 1; *Lecanium*, 32; *Lecanopsis*, 2; *Spermococcus*, 1; *Aclerda*, 1; *Exaretopus*, 1; *Fairmairia*, 1; *Aspidiotus*, 25; *Diaspis*, 8; *Aulacaspis*, 1; *Mytilaspis*, 9; *Pinnaspis*, 1; *Chionaspis*, 9; *Leucaspis*, 5; *Fiorinia*, 1; *Aonidia*, 2.

Thus the palearctic region has about 200 species (some of doubtful validity) which appear to be native to it. This is not a very good showing when we remember that even in the nearctic region, where we must have a lively sense of our ignorance, we recognize about 120, although, it must be confessed, many of these can not be claimed as native.

Turning, now, to the several portions of the palearctic region, the facts are still more striking. The great majority of the species is from France, the country of Signoret, Boisduval, Lichtenstein, and other coccidologists. In early times Bouché described species from Germany, and still earlier we have the "Fanna Boica" of Schrank. The species of Schrank, being found in Austria, were in later days elucidated by Loew. In Italy there was Targioni-Tozzetti, but this author frequently omitted to give the descriptive information necessary for the identification of names bestowed, these omissions, happily, being mostly supplied by Signoret. At the present time Berlese, in Italy, and Giard, in France, are publishing on Coccida.

In the Spanish peninsula, about ten years ago, some species were described by P. Colvée, and later than that Mr. A. C. F. Morgan, residing at Oporto, has studied the group, though not adding very much to the fauna of his locality.

In Greece some contributions have appeared from Gennadius, who also favors us with a record of *Aspidiotus curantii* (his *coccineus*) from the Island of Chios, off the coast of Asia Minor. The same insect has been reported by Shipley from Cyprus, and is stated to occur in Syria. The mainland of Asia Minor furnishes one species, *Dactylopius caricus*, described in 1883 by Gennadius.

From Egypt we know little, but Signoret described therefrom his *Ceroplastes mimosæ*; and more recently we have the *Icerya aegyptiaca* of Mr. Douglas, which may, however, be really a native of India.

Algeria has furnished two species of *Asterolecanium* on bamboo, but these doubtless belong really to the tropics, where they have since been found. *Guerinia serratula*, reported by Signoret, is more probably native there. Just lately M. Giard has named from Algeria two species, *Lecanium asparagi* and *Diaspis asparagi*, but I am not aware that the descriptions have yet appeared.

Madeira and the Canary Islands now furnish the imported *Coccus cacti*, but their native coccid fauna is unknown. If my recollection is correct, *Mytilaspis pomorum* was found apparently native in the Canaries by Mr. D. Morris recently.

Taking the more northern parts of Europe, there is the "scarlet

grain of Poland," but I do not recall any records of native species in Russia proper with the exception of *Gossyparia mammifera*. It is also reported from Egypt, Arabia, Armenia, and Algeria. Holland supplies *Eriopeltis lichtensteini*. The Scandinavian peninsula, since Linnaean time, has been neglected, though we have the *Chionaspis sorbi*, Douglas, from Finland.

Germany was alluded to above, but a paper by R. Goëthe on the Coccidæ of the Rhine district, published in 1884, should be mentioned. When I was in Jamaica, Mr. C. Schaufuss, of Neissen, Saxony, sent me a number of Coccidæ because, he said, there was no one in Germany who could identify them. Happily, since then, a new student has arisen in Bohemia, Mr. K. Sule, and from his energy and zeal we may look for great additions to our knowledge. Mr. Newstead has just described *Fiorinia sulci*, found by him, which is the first undoubtedly palearctic *Fiorinia*.

Finally, the British Isles have to be considered. Work done in earlier times by Westwood, Curtis, Hardy, and a few others, was only fragmentary in its nature, and did not afford a basis for a good knowledge of the insular coccid fauna. After the publication of Signoret's *Essai* in France, the way was clearly open for some student to elucidate the British species; but instead of a new writer, Mr. J. W. Douglas, already a veteran in entomology, came forward, and has for the last ten years produced papers in rapid succession on the subject. Still more recently, however, we have a new student in Mr. Newstead, and it is to him we must look for the first revisional monograph of British Coccidæ.

Passing eastward into the Asiatic portion of the palearctic region, we are met by a total absence of information, excepting the before mentioned records from Asia Minor and Syria, and a *Porphyrophora* long ago made known from Armenia. On the southern border, in a region perhaps rather Oriental than palearctic, we have the lately described *Pollinia grandis*, Newstead, from Beloochistan, where it was discovered by Lieut. R. Tomlin.

At this point it seems desirable to urge the importance of getting some knowledge of the Coccidæ of Japan. In California certain species are said to have been imported from Japan, but we have no knowledge, apparently, of the coccid fauna actually existing in that country. Japanese fruits are now often imported into the United States, and the possibility of importing Japanese Coccidæ must be carefully considered. Prof. Gillette recently sent me an *Aspidiotus* found on a plum at Canyon City, Colorado. I do not know the species, but think it may probably be Japanese.

#### · ETHIOPIAN REGION.

If, as seen above, our knowledge of palearctic Coccidæ is still small, how absurdly small is that of the coccid fauna of the Ethiopian region—a region which one might expect to teem with interesting

species. The known species are less than half the number of those found in Jamaica.

From Tangier to Cape Town, all down the west coast, I find no record by recent writers; only the *Monophlebus raddoni*, Westwood, described from a male.

At the north, perhaps better recorded in the palearctic list, is *Anidia blanchardi*, Targioni-Tozzetti, on the date palms of the Sahara.

At the Cape we have the old Linnean *Ceroplastes myricæ* and the *Coccus diosmotis*, neither of which are now positively recognized. R. Trimen, in 1886, wrote on a supposed species of *Margurodes* found with termites and ants. More lately there are signs of awakening interest from this part of the world, and new species are gradually falling into the hands of coccidologists. Thus we have *Ortonia natalensis*, Douglas, and *Dactylopius graminis*, Maskell, both from Natal.

On the eastern coast the same lack of information is found, although, indeed, *Dactylepius bromeliæ* comes from Zanzibar.

It need hardly be said, after this, that the central portions of the continent are virgin ground, as likewise is Madagascar, though there is a possibility that one or two of the hothouse species may really be from that island.

For Mauritius we have Leery's researches, dating from 1864, and made ever famous by the name *Leerya*. In 1868 Guérin-Méneville, taking up the same subject, treated the Coccidæ infesting sugar cane in Mauritius and Réunion. He recognized three Coccidæ and an *Aleyrodes*. In 1872 Signoret added *Ceroplastes vinsoni* to the Mauritius fauna.

*Leerya seychellarum*, Westwood, the *I. sacchari* of Signoret, is found in the Seychelles, Bourbon, Rodriguez, and Mauritius, and, it is said, also in Madeira, of course there introduced.

There is still one more record, Mr. Butler's *Coccus ceratiformis* from Rodriguez. Unfortunately, we do not know to what genus this insect belongs. It is no *Coccus* in the Signoretian sense. *Vinsonia stellifera* is recorded from Réunion.

#### ORIENTAL REGION.

Putting aside the species of which the generic position is unknown (that is, the last century of Coccidæ of Anderson), I find described from the Oriental region the following:

*Walkeriana*, 1; *Monophlebus*, 4; *Drosicha*, 1; *Dactylopius*, 3 (including two of Mr. Newstead's species, about to be published); *Coccus*, 1 (introduced); *Orthezia*, 1; *Tachardia*, 1; *Eriochiton*, 1; *Pulvinaria*, 1 (not published, described by Newstead); *Pseudopulvinaria*, 1; *Vinsonia*, 1 (*V. stellifera*, said to come from Siam, also Réunion); *Ceroplastes*, 1; *Ericerus*, 1; *Lecanium*, 4; *Aspidiotus*, 4 (1 of Mr. Newstead's waiting publication); *Chionaspis*, 2.

A total of 28, for such a region as the Oriental! It is less than half

of those known from Jamaica. Even adding eight unrecognizable species of "*Coccus*" (seven by Anderson, one by W. F. Kirby) the total is only 36; still only about half the total for Jamaica.

The Jamaican total, however, includes species believed to have been introduced; so, to make the comparison fair, we should add to the Oriental list *Diaspis lanatus* (in Ceylon), *Icerya aegyptiaca* (Madras, possibly native), *Dactylopius bromeliæ*, as identified by Maskell (in Bengal on mulberry), and *Chionaspis brasiliensis* (in Ceylon), as well as the long established *Coccus cacti*, which I had already included, thus bringing the Oriental list to a total of 40.

Coming now to the several faunæ, we may take first the islands. The Malay region is almost totally unexplored for Coccidæ, yet what a rich harvest it would surely yield! From Sumatra we have the old *Monophlebus dubius*, Fabricius (*fabricii*, Westwood), and from Java *Monophlebus atripennis*, Klug. We learn from Watt (Dictionary of Economic Products of India) that *Coccus cacti* has been introduced in Java, and are there referred for further information on this point to a work I have not seen. "Veth's Woordenboek von Nederlandsch Indie-Cochénille."

Beyond these records I can not recollect a single species as mentioned from any Malayan island; nothing from Borneo, Celebes, or the Philippine Islands.

For the Laccadive Islands we have Maskell's records of *Dactylopius cocotis* and *Aspidiotus destructor*; but for the Andamans, Nicobars, and Maldives I have seen no records.

For Ceylon we have several records. In addition to the two above mentioned, we may refer to *Walkeriana floriger*, Walker, "*Coccus*" *laniger*, Kirby, *Lecanium coffeæ*, Walker, *L. mangiferae*, Green, *L. viride*, Green, *Orthezia nucera*, Buckton, *Aspidiotus transparens*, Green (? = *A. nerii*, says Mr. Green), *Aspidiotus thew*, Green (which Mr. Green informs me consists of a female *Chionaspis bielaris*, Comstock, and a male *Chionaspis* sp.), and *Aspidiotus flarescens*, Green (which Mr. Green says in a recent letter is a *Diaspis*). The last three were figured in a little book on Insect Pests, by E. E. Green, published in 1890; they all infest the tea plant. It may be well here to mention, also, that in 1886 Mr. Green published a four-page pamphlet, with a colored plate, treating of the three species of *Lecanium* infesting coffee, namely, *L. nigrum*, *L. coffeæ*, and *L. viride*. It is to be remarked that this publication of *L. viride* considerably antedates that by Mr. Green in the Entomologists' Monthly Magazine (1889, p. 248), where it nevertheless appears as a new species.

It is most fortunate for Oriental coccidology that within the last year or so Mr. Green has commenced to work out the Coccidæ of Ceylon in earnest, so that inside of a reasonable time we may expect to be well informed regarding the species of that island. As might be expected, he has found many interesting new species, several of which he has

been so good as to send me. Such are a *Mytilaspis* with a bright lilac male; a bright reddish orange *Monophlebus* on *Antidesma*; a *Lecanium* in nests on *Cremastogaster dohrni*, Mayr; an omnivorous *Pulvinaria* resembling, but distinct from, *P. eupania*; a *Ceroplastes* on cocconut, and others. In a letter dated April 3, 1894, Mr. Green states that he has already collected, figured, and described (in manuscript) more than 60 species. These, he adds, include the following genera:

*Walkeriana*, *Monophlebus*, *Teeryu*, *Eriococcus*, *Dactylopius*, *Pseudococcus*, *Orthezia*, *Pulvinaria*, *Vinsonia*, *Ceroplastes*, *Lecanium*, *Carteria*, *Asterolecanium*, *Aspidiotus*, *Diaspis*, *Mytilaspis*, *Chionaspis*, *Fiorinia*, and *Aonidia*.

The mention of *Asterolecanium* reminds me that Mr. Green has sent me four species from Ceylon. Three are new and the fourth is *A. bambusa*, new to the Oriental region, but very probably really native there.

A *Ceroplastes*, which he finds on tea and other shrubs, is thought by Mr. Maskell to be *C. rusci*, but the identity is perhaps open to question.

From Ceylon we naturally pass to India. Here we have several records, as in Ceylon, but no approximately complete information. In the last century (1786-1789) Anderson, in his letters to Banks, described the Coccidæ of Madras, but unfortunately none of his species can now be recognized, except the *Ceroplastes ceriferus* described in 1791. Perhaps some may yet be identified when we know the Coccidæ of India better. For about a century the subject was allowed to drop in India, though we have Westwood's Malabar *Monophlebus leachi*, and references to the lac and wax producing species, and likewise to those infesting coffee. Mr. Atkinson, in 1889, gave us his *Pseudopulvinaria sikkimensis* from Sikkim, and most probably, had he lived, he would have by this time added considerably to our knowledge of Indian Coccidæ. From Mr. Atkinson and Mr. Cotes a few species have been sent to Mr. Maskell, who has described and figured them.

Finally, Mr. Newstead has been studying some Indian Coccidæ, and although his work has not, so far as I know, yet appeared, he has kindly sent me photographs of some very beautiful drawings which will accompany it.

In this summary of Indian coccidology I may have overlooked some publications which have appeared in that country and have not been seen by me, but I am fairly confident that nothing important, such as a new species, has been missed.

In Assam is found *Aspidiotus thew*, Maskell. This is not Green's Ceylon *A. thew*, but the name may remain, since the Ceylon insect is not an *Aspidiotus*.

In the Transactions of the New Zealand Institute for 1891, Maskell records *Chionaspis aspidistra*, Signoret from India (on *Areca*), a fact which I had overlooked when writing the above, and also gives *Chionaspis thew*, Maskell, as from "the Kangra Valley, Assam." It does not appear, however, that *C. thew* is found in Assam at all, but in the

Kangra Valley, which, to the best of my knowledge, is in Punjab. *Aspidiotus thea* is found both in Punjab and Assam.

Except the Beloochistan record previously alluded to, I find no other information regarding Coccidæ of the oriental mainland, save one or two from China.

Of course, the lac industry has quite a literature of its own, and it is well known that all the lac does not come from India proper. I have a copy of a manuscript written in 1840 by William Jones, the Jamaican entomologist, alluding to the lac from Siam and Pegu.

From China we have *Ericerus pe-la*, the Chinese wax insect; *Aspidiotus gossypii* of Fitch, from Ningpo, apparently a *Chionaspis*; *Drosicha contrahens* (Walker) Signoret, reported also as from Ceylon, and Walker's "*Aspidiotus bicarinatus*," which is a dried caterpillar!

#### AUSTRALIAN REGION.

Here we pass from darkness into light, thanks to the untiring and faithful labors of Mr. Maskell.

Putting aside Australia and New Zealand, we may commence with the smaller islands, concerning which very little is known. From New Guinea I find no records except that of *Myzolecanium kibara*, the description of which I have not yet had the good fortune to see. It dates from 1877.

For New Caledonia we have another monotypic form, the *Tessarobelus guerinii*.

From the Fiji Islands Maskell has received some species, and so records *Dactylopius cocotis*, *Lecanium chirimolia* (= *longulum*), *Diaspis pinnulifera*, *Dactylopius calceolaria*, and *Planchonia bryoides*. In Insect Life, III, p. 253, *Mytilaspis citrivola* is reported on oranges from Fiji. From Tonga, Mr. Maskell records *Chionaspis citri*, found by Mr. Koebele. From Samoa *Aspidiotus cyclonia* was received on oranges.

In Tahiti the Coccidæ are not known; nevertheless, *Chionaspis biclaris*, *Mytilaspis citrivola*, and *Aspidiotus aurantii* have been reported as found on trees received from that island.

The Sandwich Islands, though singularly poor in insects, may be found to yield a fair number of Coccidæ. Mr. Maskell has already given us some information about Sandwich Island species, and one or two other writers have alluded to the subject, so that we know of at least the following species: *Dactylopius citri*, on orange trees from the Sandwich Islands, *Lecanium hesperidum*, *L. depressum*, *L. oleæ*, *L. acuminatum*, *Asterolecanium pustulaus*, *Pulvinaria psidii*, and *Sphero-coccus bambusæ*. Only the last two were originally described from Sandwich Island specimens.

From Tasmania we know a few species in *Monophlebus illigeri*, *Aspidiotus acaciæ*, and *Mytilaspis pomorum*, the last, of course, introduced. There are probably some other Tasmanian records, as I have not so far made any great effort to distinguish them from those pertaining to Australia.

The number of known species from Australia and New Zealand, exclusive of those introduced from other countries, is shown in the following table:

Summary of native species from Australia and New Zealand.

Genus	Number of species.		Genus.	Number of species.	
	Austra- lia.	New Zealand.		Austra- lia.	New Zealand.
<i>Coelostoma</i> .....	3	5	<i>Teerya</i> .....	3	.....
<i>Paleococcus</i> .....	.....	1	<i>Eriococcus</i> .....	9	8
<i>Gossyparia</i> .....	2	1	<i>Callipappus</i> .....	1	.....
<i>Rhizococcus</i> .....	13	6	<i>Rhizocus</i> .....	<sup>3</sup> 1	.....
<i>Solenophora</i> .....	.....	2	<i>Phenacoccus</i> .....	2	1
<i>Dactylopius</i> .....	9	8	<i>Kermes</i> .....	1	.....
<i>Ripersia</i> .....	1	3	<i>Asterolecanium</i> .....	.....	1
<i>Prosopophora</i> .....	2	.....	<i>Brachysecelis</i> .....	13	.....
<i>Tachardia</i> .....	3	.....	<i>Ascelis</i> .....	<sup>4</sup> 1	.....
<i>Opiothoscelis</i> .....	2	.....	<i>Sphaerococcus</i> .....	7	.....
<i>Frenchia</i> .....	1	.....	<i>Signoretia</i> .....	1	.....
<i>Cylindrococcus</i> .....	3	.....	<i>Pulvinaria</i> .....	<sup>5</sup> 4	.....
<i>Eriochiton</i> .....	.....	2	<i>Lecanaochiton</i> .....	.....	2
<i>Ctenochiton</i> .....	.....	11	<i>Ceroplastes</i> .....	2	.....
<i>Inglisia</i> .....	1	5	<i>Aspidiotus</i> .....	9	4
<i>Lecanium</i> .....	3	1	<i>Parlatoria</i> .....	2	.....
<i>Diaspis</i> .....	1	1	<i>Chionaspis</i> .....	3	<sup>6</sup> 2
<i>Mytilaspis</i> .....	7	8	<i>Fiorinia</i> .....	3	4
<i>Lencaspis</i> .....	1	.....			
<i>Poliaspis</i> .....	1	1			
<i>Monophlebus</i> .....	<sup>2</sup> 2	.....	Total <sup>7</sup> .....	108	77

<sup>1</sup>One variety is recognized.

<sup>2</sup>Two additional varieties are recognized.

<sup>3</sup>On a palm introduced from New South Wales.

<sup>4</sup>Another described by Pepper, is really a psyllid.

<sup>5</sup>One variety is recognized.

<sup>6</sup>Counting *C. minor*, which may not be native of New Zealand, the number is increased to three.

<sup>7</sup>The native species of the two countries being in every case except one distinct, we have a total of 184 species for the two islands.

The description of the New Zealand species has been entirely the work of Mr. Maskell; and except in the *Brachysecelidæ*, which have been discussed by Schrader, Froggatt, and Tepper, he has described nearly all the Australian species. The exceptions are a *Diaspis* described by Tryon, a *Ceroplastes* (unrecognizable) by Walker, *Callipappus* of Guérin-Méneville, *Coccus blanchardi* (see Signoret's work), and *Pulvinaria maskelli* of Olliff. The *Rhizocus* was described in 1878 by Künckel d'Heroulais.

The late Mr. Frazer S. Crawford had collected a number of Australian Coccidæ, and had given them manuscript names, but his death came before he could attempt publication. These species were afterwards described by Mr. Maskell, who duly cited Crawford's manuscript names.

In this connection, Mr. Koebele's very successful second trip to Australia should not be forgotten, as showing what may be done by a good collector. In the Transactions of New Zealand Institute for 1892 Mr. Maskell describes the following new species, all collected in Australia by Mr. Koebele:

*Diaspis fimbriata*, *Mytilaspis casuarinarum*, *Fiorinia syncarpia*, *Ceroplastes rubens*, *Lecanium scrobiculatum*, *Prosopophora eucalypti*, *Gossyparia casuarinarum*, *G. confluens*, *Eriococcus turgipes*, *E. conspersus*, *Pseudococcus*



*nivalis*, *Celostoma rubiginosum* (also found by Mr. French), *Monophlebus fuscus*, *Icerya koebeli*, *Carteria decorella* (also found by Mr. Olliff). Total, 15 species.

#### NEOTROPICAL REGION.

I have given a list of the neotropical Coccidæ in the Journal of the Trinidad Field-Naturalists' Club for 1894. Previously, in the Journal of the Institute of Jamaica, a list of the West Indian species had appeared.

*Dactylopius calceolaria*, Maskell was accidentally omitted from the first-mentioned list: it is from Jamaica, not Mexico, as stated by Mr. Maskell.\* *Aspidiotus bowreyi*, Cockerell, *Ceroplastes albolineatus*, Cockerell, *Lecanium urichi*, Cockerell, *Margarodes vitium*, Giard (= *vitis*, Phillippi, sub. *Heterodera*), *Aspidiotus latastei*, Cockerell, and *Mytilaspis philococcus*, Cockerell, have been described since the list was written; the first two are from Jamaica, the third from Trinidad, the fourth and fifth from Chile, and the last from Mexico.

Thus, all told, the neotropical list now stands at 124.

Anyone consulting the above-mentioned lists will see how very few species are known from the mainland countries, with the exception of British Guiana and Mexico, and even for these the lists are extremely small in comparison to the presumably existing numbers. From Ecuador we know only the one (*Ortonia uhleri*) found by Prof. Orton when crossing the desert of Napo. This discovery was made on November 7, 1867, the locality being 6,600 feet above sea level.† From Guatemala we know only one; from Peru apparently none; from Colombia only *Icerya montserratensis* at Colon.‡

From the Argentine only *Palwococcus brasiliensis* (Walker), found at Buenos Ayres. From Uruguay a couple of species found at Montevideo. From Paraguay and Bolivia none; from Brazil about half a dozen.

From Chile we knew nothing except the now lost *Ceroplastes chilensis* of Gray, and a few introduced forms; but Mr. Lataste has become interested, with the resulting discovery of two new species, mentioned above.

From Trinidad we now know quite a number of species, mostly collected by Mr. Ulrich.

Regarding the West Indian Islands I have already made some remarks in Insect Life, VI, p. 100. From the Cayman Islands, we know *Diaspis lanatus* and *Chionaspis minor* from Grand Cayman, collected by H. MacDermot.

No addition has been made to the small list for Cuba, and Haiti is

\* Trans. New Zeal. Inst. for 1893, p. 89.

† I have not here entered upon the question of the vertical distribution of Coccidæ, the data being wholly insufficient. But I suppose that *Orthezia occidentalis* and *Pulvinaria bigelovii*, from about 7,800 feet in Colorado, represent the highest Coccidæ so far known.

‡ Insect Life, 1894, p. 327.

still without a record. In the Lesser Antilles we have one or two additional records due to Mr. Barber; thus Dominica now has two instead of one, Montserrat six instead of four. Martinique has a record of *Diaspis lanatus* (Insect Life, VII, p. 288). Puerto Rico still seems to be without a record.

The recent visits to the West Indies of Dr. Riley and of Mr. Hubbard who gave special attention to Coccidæ, will no doubt in due time lead to many new records, for which we must wait until the material can be worked over.

There now remains Mexico, which I will for convenience treat as a whole, although parts of it are hardly neotropical. Until recently (and now, so far as published records go) the Mexican list stood at 28, having gradually attained that figure in the following manner:

Species known before Signoret's "Essai" (1818-1868).....	
Species added by Signoret in his "Essai" (1869-1876).....	3
Species added by Comstock (1883).....	2
Species added by Riley and Howard in Insect Life.....	3
Species found by Dr. A. Dugès (1886-1894).....	5
Species found by the present writer on journey through Mexico in 1893.....	12
Total.....	28

Having in view this deplorable want of information as to Mexican Coccidæ, the Department of Agriculture lately sent Prof. C. H. T. Townsend into that country to collect these and other insects. I examined the Coccidæ collected, and may remark that they add considerably to our knowledge; but beyond this, I do not now feel at liberty to go, since they are the property of the Entomological Division, which has the right of first announcing the discoveries made.

#### NEARCTIC REGION.

A catalogue of the nearctic species has appeared in the Canadian Entomologist for February, 1894, and I understand that Mr. Ashmead has in press a complete bibliographical list of all nearctic Heteroptera and Homoptera, including also those of the northern portion of the neotropical region.

In the Canadian Entomologist's list, I was so unfortunate as to accidentally omit *Dactylopius ephedrae*, Coquillett, 1890, *Lecanium tarsale*, Signoret, 1873, and *Orthezia cataphracta*, Shaw (*Chiton*, Zetterstedt). The last mentioned has, according to Hart, been found in Greenland, as well as in Ireland and Scotland.

Furthermore, since my list appeared, it has been shown that *Aspidiotus convexus* is not a valid species, and that *A. abietis* and *A. pini* are synonyms of *A. abietis* (Schrank) of Europe. I do not think Mr. Pettit's manuscript *A. abietoides* can be any better distinguished from *abietis*, and until he sets forth some reasons for maintaining its validity, it had better be left out of account. Riley's manuscript *A. corticalis* must also be dropped until we are informed what specific characters it exhibits; likewise his *Ceroplastes artemisiae*. *Lecaniodiaspis yuccæ* can

stand on the basis of Prof. Townsend's description, which, though short and informal, serves to distinguish it from anything else yet known.

Since the Canadian Entomologist's list appeared, the following species have been added: *Eriococcus coccineus*, Cockerell (with form *lutescens*, Cockerell), from Nebraska, *Lecanium phoradendri*, Cockerell, from Arizona; *L. insignicola*, Crawford (should be *insignicola*), from California; *Ceroplastodes daleæ*, Cockerell, from New Mexico; *Tachardia cornuta*, Cockerell, from New Mexico; *Dactylopius solani*, Cockerell, from New Mexico; *Bergrothia steelii*, Cockerell, and Townsend, from New Mexico; *Diaspis lanatus*, Morgan and Cockerell, introduced in Florida and District of Columbia, also in Georgia; *Diaspis amygdali*, Tryon, introduced in California.\* There have also been added two varieties (var. *pruni*, Cockerell and var. *albus*, Cockerell) of *Aspidiotus juglans-regiæ*. The description of a very interesting *Ripersia*, the first of its genus for our region, awaits publication.

With the above changes and leaving out the fossil species, the neartic list now stands at 127. But if we exclude from it those species believed to have been introduced by man it is reduced to 94 or even less.

Examining the list from a historical standpoint, we see that practically nothing had been done up to the time of Fitch. About 10 of the Fitch species are now considered valid, but some of those in *Lecanium* are even now very imperfectly known. From Fitch to Comstock (1860-1880), that is, over a period of about twenty years, next to no progress was made, and the few descriptions that appeared were singularly imperfect. Prof. Comstock put the matter on a totally different basis. When he commenced his studies the coecidology of North America was in about as chaotic a condition as could be imagined; when he left off in 1883 our knowledge, at least of the Diaspinæ, had increased enormously. No less than 29 valid species are now credited to Comstock.

One might have supposed that after this revival many new students would have come forward; but from 1883 to 1893 was again a period of comparative stagnation, although we have isolated descriptions at the hands of Coquillett, Douglas, Riley and Howard, and Crawford. Nevertheless, during this period, the life histories and parasites of several species were elucidated, and almost every number of *Insect Life* has contained some new information.

At length in the present year, 1894, more is being done, and in many places work is going on, which should, soon lead to valuable results. Students have arisen in California, Illinois, Michigan, Massachusetts, and New York, while others in Colorado, Arizona, Nebraska, etc., have been on the lookout for material, though their studies did not include the Coccidæ.

NEW MEXICO AGRICULTURAL EXPERIMENT STATION,  
Las Cruces, New Mexico, Oct. 27, 1894.

\* *Insect Life*, vi, p. 290.