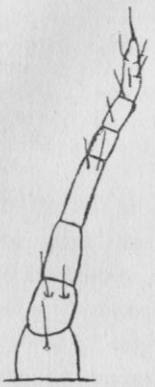
Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. i.

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ* (No. 18).

BY J. W. DOUGLAS, F.E.S.

LECANIUM ROBINIARUM, *n. sp.*



♀ adult. Scale short, round-oval, or in some examples almost circular, very convex, chestnut-brown, very shining, smooth, mostly with a few very slight punctures here and there, without any dorsal keel or tesselation. Antennæ (fig.) stout; of 7 joints, 1st stoutest, with one hair; 2nd scarcely so thick, in length subequal, with two hairs; the others thinner; 3rd longer than 2nd, without hairs; 4th much longer, the longest of all, with two hairs; 5th and 6th short, together scarcely longer than the 3rd; 7th as long as the 2nd, pointed, with several hairs, of which one (apical) is very long. Legs normal.

Length, 4·5—5; breadth, 4; height, 3 mm.

The scales were filled with white powdery matter, consisting of the exuviæ of the escaped larvæ, showing that they were quite mature. Sometimes, as the scales were greatly agglomerated on the shoots of the *Robinia*, the form is somewhat altered by the pressure, during the early stage of formation, of one scale impinging on another; in such cases the hollowed space is a little wrinkled on the margins thereof.

This species appears to approach *L. wistariæ*, Sign. (Ess. Cochen., p. 263) in its rounded form, and in having seven joints to the antennæ; but that species in the adult state is blackish, and almost rugose with punctures, while this is very smooth, as if polished; and the proportions of the joints of the antennæ are quite different. There is no other species with seven joints in the antennæ with which it can be compared.

On April 5th, 1890, I received from Dr. Horváth, of Budapest, some shoots of *Robinia pseudacacia* on which were clustered many scales of this species, which Dr. Horváth states is very injurious to the *Robinia* in Hungary. It appears to have immunity from the attack of Hymenopterous parasites, not one of the numerous scales I received having been perforated by them. There were no scales of the male.

The figure is by Mr. G. S. Saunders.

LECANIUM FUSCUM.

(*cf.* Ent. Mo. Mag., xxiv, p. 98).

♀ scale. *Immature form before oviposition.* Light reddish; broadly rounded oval, rather widest in front, with a wide base of attachment to the shoot, flat-convex, shining, smooth but with very small punctures all over; on the first third a white undulated line of irregular width extends entirely across the scale; close to this

posteriorly a large white blotch with dentate edges occupies the middle of the scale longitudinally, lying in a very slight depression, of which the margins are in the least degree obtusely raised; on each side of this and distinct from it is a broad, dentate, white patch, which does not extend to the lateral margin and reaches almost to the anal cleft. Length, 5; breadth, 4; height, 3 mm.

Larva. Ochreous, oval, rounded at both ends, margin with very short hairs; anal cleft wide and long, the two setiferous lobes within the cleft not extending beyond the circumference of the body; mentum entire, not articulated. Antennæ of 6 joints, with long hairs, one of them longer than the others on the 3rd, 4th and 5th joints, and one still longer on the 6th. Legs with long, slender, knobbed digitules, two longer than the others. These characters, which are quite those of a *Lecanium*, and not of *Kermes* as might have been suspected from the rotundity of the ♀ scale, have been verified by Mr. G. S. Saunders.

On May 12th, 1890, I received from Dr. Chapman, of Hereford, three examples, on last year's oak-shoots, of the immature form described above, which differ essentially from the perfect state, and it has not been noticed before. At the same time I also received some precisely similar scales on oak-shoots from Mr. R. Newstead, Chester. In a week all had become brown, the markings had disappeared, and the scales had collapsed.

On June 10th Dr. Chapman sent on oak-shoots some of the mature scales, a few of them containing eggs. These hatched on June 23rd, and the larvæ produced are described above. It is curious that none of the sound mature forms examined possessed antennæ or legs, these apparently having become atrophied when they had served their purpose, just as they always do in the *Diaspina*. This also was Signoret's experience with some species of *Lecanium* and *Kermes*, but was not so generally.

The male, bred by Mr. Newstead in May, from an ordinary glossy scale, is quite of the generic type, and presents no special specific characters, as indeed is often the case in this genus.

From mature ♀ scales received this year a quantity of Hymenopterous parasites emerged: some of these I sent to Mr. L. O. Howard, of the Entomological Division of the United States Department of Agriculture, and he writes respecting them:—

"I find two parasites. The larger ones are the females of a variety of *Blastothrix sericea*, Dalman. They differ from the normal form in that the last one or two funicle joints of the antennæ are brown instead of yellow-brown. The smaller specimens with the long hairy antennæ are males of the same species. There were 13 females and 24 males in the quill, and also two specimens of a species of *Pachyneuron* which I cannot determine specifically. The habits of *Pachyneuron* have been disputed, but the truth is that there seems to be little uniformity of habit in this genus. Species have unquestionably been bred from larvæ and puparia of Syrphid flies, whilst others have been bred from Aphids and Coccids."

153, Lewisham Road, S.E.:
October 17th, 1890.

NOTES ON
SOME BRITISH AND EXOTIC *COCCIDÆ*,
(No. 19),

BY J. W. DOUGLAS, F.E.S.

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. ii.

PLATE I.

LECANIUM SAROTHAMNI, *n. sp.*

♀ scale, adult; oval, very convex, chestnut-brown, shining, smooth, on the sides only and extending to the margin 8—9 short, transverse black lines, very slightly raised and not very perceptible (sometimes wanting entirely), amongst which are slight confluent punctures, sometimes also a few punctures on the disc. Eventually, when the scale becomes quite dry and empty, all the punctures become deeper, especially on each side of the smooth median line, which thus is sometimes rendered slightly but obtusely carinate. Anal cleft short, the point above it very small, not projecting. Antennæ (fig. 2a) very small, of 7 joints; 1st and 2nd widest, in length subequal; 3rd longest, nearly as long as the remaining four together, with two long hairs near the apex; 4th, 5th and 6th each successively shorter and narrower, the 5th with one very short hair; 7th very small, with several long hairs. Legs (fig. 2b) long, slender; tibiæ scarcely wider than the tarsi, but a trifle longer; tarsi with two long digitules very finely clubbed; claw short, obtusely pointed, with two short, dilated digitules. There are two hairs on the trochanter, and three on the femur, but none evident on the tibiæ and tarsi of the three specimens examined, thought it is possible they may have been rubbed off in the preparation for the microscope. Length, 4—5, breadth, 4, height, 3 mm.

Larvæ very small, pale yellowish, present no tangible features to distinguish them from those of other *Lecania*.

I am indebted to Mr. R. Newstead, Grosvenor Museum, Chester, for the great pains he has taken in preparing specimens and making drawings of the antennæ and legs.

In September, 1889, Dr. T. A. Chapman, Hereford, sent some scales which he had just then found on stems of broom (*Sarothamnus scoparius*). In some respects these seemed to be like *Lecanium genistæ*, Sign. (Ess. Cochen., p. 235), which Signoret found abundant in the pine forests on the coasts at Hyères and Cannes, on *Genista anglica*;

but in that species the scales are 8 mm. long by 4 broad, being, Signoret says, one of the largest species found in France. The scales I received were dry and empty, and the stems of broom to which they were attached were dead when found, so it seemed possible that the life of the insects had been arrested, and the length of the scale restricted to 5 mm. by the premature death of the food-plant, and I determined to wait a year for the solution of the question.

This season Dr. Chapman has sent several scales on three occasions; in all of them the *insect* was mature, and the scale full of very small white eggs, but the scale itself differed each time. On June 17th the insects were alive, and the scales (not yet firm) had attained nearly the full size, but were yellow-brown, smooth though very finely punctured, and had 8—9 narrow black lines extending across from margin to margin at equal distances apart, the lines strongest on the anterior part of the scale. On June 21st the scales were redder-brown, the transverse black lines a trifle raised, the punctures generally, especially on each side of the median line, deeper and more conspicuous. On July 10th the black lines had in most cases disappeared from the disc, and remained on the sides towards the margins only, or in some instances had quite vanished. This last consignment of scales was attached to vigorous living shoots of broom, and the maximum length of 5 mm. was not in any case exceeded, so that the full growth had been attained.

The male in any stage was not obtained.

This species on the broom differs materially from *L. genistæ* on the allied Petty-whin, inasmuch as that species, as described by Signoret, has scales nearly twice as long (8 mm.), and no mention is made of the very characteristic black lines; the antennæ also are described as of 8 joints; the 3rd, 4th and 5th longest and subequal, the 5th at the apex with three hairs, of which one is very long; 6th and 7th equal, the latter with three short hairs; 8th twice as long as the 7th, with eight to ten hairs; tibiæ and tarsi slender, the former one-fourth longer than the latter; claws broad at the base, with one of the digitules a little larger than the other.

Dr. Chapman informs me that the scales are gregarious on the under-side of last year's shoots of the broom, attached by preference to sloping or horizontal branches, and, curiously, to a great extent to such as were in a dying state. The death of the branches Dr. Chapman attributes to the attack of an Aphid with which they are infested. He sent some examples to Mr. Buckton, who says they are the common *Siphonophora pisi*, Kalt. (Brit. Aphides, vol. i, p. 134, pl. xiv), a general

feeder, but particularly attached to *Papilionaceæ*, and in some years very destructive to peas and other farm crops. I apprehend that the *Lecania* also helped to pump out the life of the broom.

The female *Lecania*, as a rule, fix themselves in early life, and remain attached to the same site for the remainder of their existence. "J'y suis, j'y reste," might be their family motto. But Dr. Chapman tells me that these on the broom were still on the move in May, the probable reason being, I think, that they found the supply of sap on which they depended for a living was getting short, or it may be deteriorated in consequence of the additional absorption of it by their fellow-squatters, the Aphids, and so they felt compelled to shift to "fresh *wood* and pasture new," a proceeding they would not otherwise have adopted. I once witnessed a similar migration of young, full-sized females of *Lecanium beaumontiæ*, which moved about freely on the withering stems of *Beaumontia grandiflora*, on which they had come to me (*cf.* Ent. Mo. Mag., vol. xxiv, p. 95).

Lecanium ciliatum, *n. sp.*

♀ scale, mature. Ochreous to light brown; outline variable, broad rounded oval (fig. 3a profile, fig. 3b front view), or at times irregular narrow oval, or transversely oval, broadly rounded at the sides, being then broader than long (length, 5, breadth, 6 mm.); in all cases the middle portion is occupied by a high, broad, smooth, fusiform swelling, of which one point is close above the small anal cleft, the other not extending to the anterior margin by a considerable space; the top with two distinct rows of deep, more or less large, punctures; the entire elevation resembling a convex, pointed scale, superimposed on a broader, flatter one; the remainder of the surface of the scale being comparatively flat, and covered with a reticulation of confused lines and confluent punctures; the entire margin with a fringe of fine concolorous hairs (Mr. Newstead says these are white and conspicuous to the naked eye in the living insect), which become more or less abrated in the dry scale. Antennæ (fig. 3c) of 7 joints; 1st stout, widest; 2nd not quite so long; 3rd as long as the 4th, 5th and 6th together, without hairs, these three latter in length subequal, the 4th a trifle the longest, the sides suddenly constricted in the middle, where there are one very long and one very short hair placed together on one side, and a still shorter one on the opposite side; a single long hair on the 1st, 2nd and 5th joints, two on the 6th, and about six on the 7th.

"Tibiæ about twice the length of the tarsi, constricted at about one-third of the distance from the apex. Tarsal digitules long, more than two-thirds the length of the tarsi"—(R. Newstead). Length, 5·5, breadth, 5 mm.

"♂ scale (fig. 3d), glossy white, elongated, convex, with one central and two lateral square, granular projections, some of the posterior ones double; margin with a rather strong, glassy fringe. The only specimen I possess has the posterior portion wanting, the imago having escaped before I discovered it."—(R. N.).

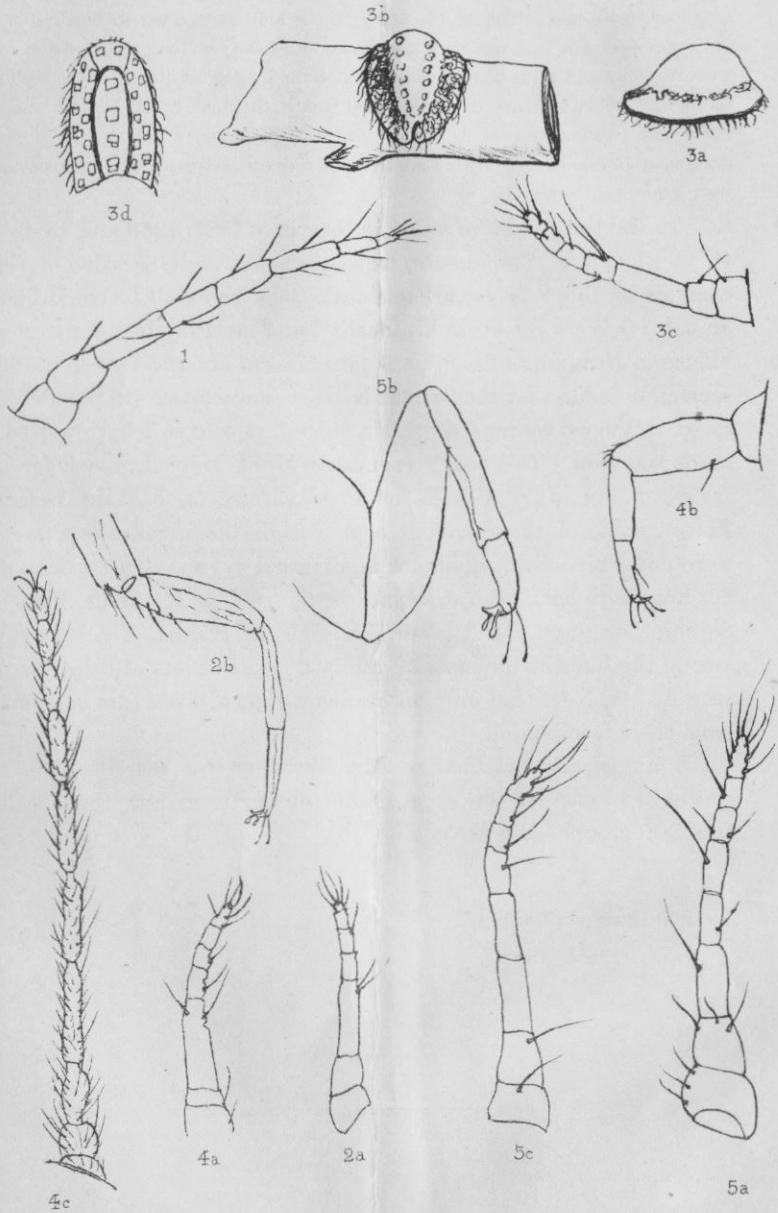
"Larvæ large, dark yellow; antennæ of 6 joints; 1st widest, oval, in length

equal to the 4th and 5th ; 2nd shortest, with one long hair ; 3rd longest, with two long hairs ; 4th and 5th equal, the 4th with one long hair on the under- and one on the upper-side, 5th with one very long hair ; 6th nearly as long as the 4th and 5th, with two long and three or four shorter hairs, the longest arising from the middle of the joint. Tibiæ and tarsi of nearly equal length, the former with several hairs, the latter with two long ones. Anal cleft deep. The larvæ, which appear a month later than *L. fuscum*, are larger than those of any other species of *Lecanium* that I have examined."—(R. N.).

In the third week of June in the years 1887, 1888 and 1889, Mr. G. C. Bignell, of Stonehouse, Devon, sent on each occasion a single example of this very remarkable scale, they being all he could find on an oak (*Quercus robur*) in his locality, and as they had some resemblance to Réaumur's fig. 8, pl. 6 (*Pulvinaria lanatus*, Gmel., Sign.), it seemed possible that they might be that species before the development of the ovisac represented in the figure, and so I have waited for more examples. This year I requested Mr. Newstead to look for such scales, and on July 26th he obtained several on oaks in Delamere Forest, some of them having eggs within them, proving that they were not *Pulvinaria*, which has an external ovisac. The species does not appear to have been described or figured by Réaumur, Planchon, Signoret, or any other author. Unlike *L. fuscum*, which is found among the buds at the ends of the last year's shoots of oaks, this was seen by Mr. Newstead only on branches four or five years old, and far from their termination.

I am greatly indebted to Mr. Newstead for searching for this species, and also for the notes of his observations and the excellent figures reproduced on the plate.

153, Lewisham Road, S.E. :
October, 1890.



R. Newstead Del et Lith

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. ii.]

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ* (No. 20).

BY J. W. DOUGLAS, F.E.S.

PLATE I.

LECANIUM NIGRUM.

Lecanium nigrum, Nietner, Enemies of Coffee Tree, p. 9 (1861); E. T. Atkinson, Journ. Asiatic Soc. of Bengal, vol. lv, p. 284 (1886); E. Ernest Green, Indian Museum Notes, vol. i, p. 117, pl. vii, figs. *a*—*k* (1889).

♀ adult. Scale long-oval, a little narrowed and produced in front, brown-black or black, smooth, shining, arcuate lengthwise, gibbous in the middle, slightly and very briefly carinate on the marginal area in front, on each side of the median portion a row of small foveæ (sometimes wanting), margin not produced, the sides next to it punctured. Under the microscope the whole surface is seen to be covered with tesselation of closely approximate, small, yellow dots and punctures. The scales full of pink eggs and larvæ of ordinary form. Antennæ of 8 joints (fig. 1 in margin); the first two broad, short, equal in length; 3rd longest of all; 4th and 5th equal, each half the length of 3rd; 6th and 7th equal, shorter than 4th and 5th; 8th gradate, pointed, as long as 6th and 7th together (in some specimens it is constricted and simulates two joints), with five or six long hairs, one of them (apical) much the longest; the other joints, except 3rd and 4th, with one or two hairs each. Legs (fig. 2 in margin) long, slender; coxæ with one very short hair; trochanters with one very long hair; femora with two very short hairs near the apex; tibiæ and tarsi in length subequal, their articulation distinct; digitules of tibiæ fine, ordinary; those of the claw long, broad, much dilated at base and apex as figured, less so in exceptional examples. Length, 3·5—4 mm.

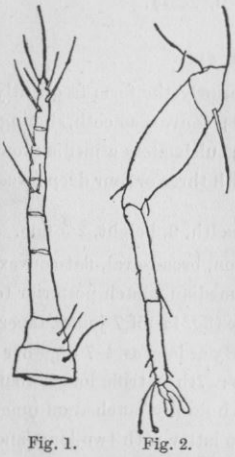


Fig. 1. Fig. 2.

On stems and midribs of the under-side of leaves of *Justicia Macdonaldi*, received by Mr. S. J. McIntire from the Botanic Gardens, George Town, Demerara, kindly forwarded to me on May 28th, 1889, and, subsequently, a greater number of empty scales on small stems of *Combretum Aubletii*. These agree fairly well with Mr. Atkinson's scanty description (*l. c.*) and Mr. Green's figures (*l. c.*) of the ♀ scales of *L. nigrum*; and they are identical with ♀ scales of that species sent to me in 1888 from Ceylon by Mr. Green, who states that they are numerous on and injurious to coffee trees, *Cinchona* and *Croton*. In the plate quoted he also figures the larva, the male and its scale, but no mention is made by either author of the antennæ and legs of the female, of which particulars are now supplied. The scales from Demerara, in nearly every instance, had been attacked by parasites, which had caused the antennæ and legs to be at least partially mal-

formed; fig. 1 on the plate represents an antenna of this character, the true condition is shown in the margin above.

The species belongs to Signoret's 4th section of the genus, which includes *L. hibernaculorum, coffeæ, hemisphæricum*, &c.

One of the stems of *Combretum* was closely covered with a tough, silky web which a Lepidopterous larva had formed over the adherent scales of *Lecania*; it had probably fed on the bodies of the insects, for the scales were reduced to small fragments. In a cocoon of the silky material was a pupa, but it was dead. Is this another coccophagous species? (*cf.* Ent. Mo. Mag., vol. xxiv, p. 225).

LECANIUM DISTINGUENDUM, *n. sp.*

♀ adult. Oval, slightly attenuated and pointed posteriorly, the form frequently irregular and the size less than the dimensions given below; convex, smooth, shining, brown, indistinctly and irregularly mottled with whitish; ultimately a median longitudinal carina is developed on the abdominal portion, with three or four deep foveæ on each side of it. Legs and antennæ atrophied.

Length, 5, breadth, 3, height, 2·5 mm.

In the immature state, that is just before oviposition, broad-oval, flat-convex, light reddish, a transverse line on the first third, a large median blotch posterior to it, and a long blotch on each side of this, white. Antennæ (fig. 4a) of 7 joints, tapering; 1st short and wide; 2nd shorter; 3rd very long, nearly as long as 4–7 together; 4th and 5th much shorter, subequal; 6th about the same; 7th a trifle longer than 6th, with a few stiff hairs at apex; the 3rd, 4th and 5th deeply notched on inner side. Legs (fig. 4b), tibiæ but little longer than tarsi, the latter with two long, and claws with two short, digitules. In a few days the scales collapsed, the colour became red-brown, and the light markings disappeared; yet the bodies were full of unextruded eggs. In a still earlier stage the form of the scale is more regularly and narrower oval, almost pointed at each end.

♂ adult. Scale white, glassy, of the ordinary *Lecanium* form. The imago of the ordinary character, bright piceous; wings pale, the apical half of the costa carmine. Legs fuscous, hairy. Antennæ (fig. 4c) of 10 joints, with short, stiff, pale hairs, on the last joint three of the apical ones clubbed. Length, 1·5 mm.

Larva ochreous; antennæ of 6 joints; the 3rd, 4th, 5th and 6th with one specially long hair, the 6th also with one more very much longer than any on it or the other joints; the tarsi and claws with the usual digitules.

A pale median dorsal blotch is usually to be seen on the young ♀ scales of several species of *Lecanium, e. g., L. pyri*, Schrk., *L. tiliæ*, Linn., *L. variegatum*, Goethe, &c., but I have not observed the other pale markings herein noted, nor seen them described, in any other species except *L. fuscum*. Yet, as I regard such evanescent markings as incidents and signs of immaturity, some or all of them may be of general occurrence, but not noticed, because the scales are not observed in the young state.

Found at Delamere Forest gregarious on last year's shoots of *Vaccinium myrtillus* by Mr. R. Newstead, of Chester, from whom I

received specimens of the ♂, and of the ♀ in different stages of development. He also sent drawings, now reproduced, and the following particulars :—

"On April 24th, 1890, in a sheltered portion of Delamere Forest, Cheshire, I found, on three or four plants of *Vaccinium myrtillus*, a quantity of both ♂ and ♀ scales (the latter immature) of this species. The males began to emerge on May 5th, and continued to do so for several days. I found males in the open air about the middle of May; they were very skittish, frequently taking short flights; they lived for several days, but did not readily copulate in confinement.

"Although I have searched the *Vaccinium* in many parts of the Forest I have failed to find another colony of this species, and as there are so many acres of *Vaccinium* it was merely by chance that I discovered the only known locality for the insects."

The adult ♀ scales when found some weeks afterwards were full of larvæ, but the mother insects had become entirely shrivelled, and could not be restored by boiling in caustic potash; thus it was fortunate the antennæ and legs had been obtained previously from younger forms; and this may give a serviceable hint for procedure with other species in future.

Kaltenbach, in his "Pflanzenfeinde," p. 420, has described a *Lecanium vaccinii*, but, as Signoret has stated (Ess. Cochen., p. 466), the description shows that it was no *Lecanium*, but a *Chionaspis*, so it does not count here. Goethe, in the "Jahrbuch d. nassauischen Verein für Naturkunde," 1884, p. 125, described, far too briefly, *Lecanium vaccinii macrocarpum* found on the small prickles of the American bilberry in the Botanic Garden at Karlsruhe. The ♀ scale is said to be "very small, light brown, and before impregnation is strongly fringed, with eye-points between the antennæ, which latter have small knobbed hairs. The ♂ was not seen." Such an imperfect description would not identify any species with precision, but it in no way points to our present species. No other *Lecanium* has been recorded as having been found on *Vaccinium*, and *L. distinguendum* appears not to have been obtained on any other plant, and to be undescribed.

In one of the ♀ scales of *L. distinguendum*, besides a number of living larvæ, was a single white pupa of a Hymenopterous parasite which occupied a large portion of the space; the presence of the larvæ showed that the parasite had attained its full development as a larva without destroying all the eggs of the *Lecanium*. This, when perfect, and one or two of other parasites issuing from these scales, I sent to Mr. L. O. Howard, Assistant Entomologist of the United States Department of Agriculture, Washington, who writes :—

"The single specimen is a new species of the genus *Encyrtus*. Many species of *Encyrtus* have been described from Europe, but this seems to differ from all. It comes closest to *Encyrtus lineola*, Mayr, but is separated by distinct characters. The other specimens were a *Pachyneuron* (of the same species as the two from *Lecanium fuscum*), which I cannot determine specifically."

Early in August Mr. Newstead found among some scales of *L. distinguendum* that he had collected two Rhyncophorous beetles, *Brachytarsus varius*, F., which species, as well as *B. scabrosus*, F., are well known to feed, when in the larva state, on various *Coccidæ*. Among other authors Dalman (K. Vetensk. Acad. Handl., f. 1825, p. 368), writing of his *Coccus cypræola*, says :—

"Besides several species of *Pteromalinæ* which infest this Coccid, another noxious parasite is found in it, viz., *Anthribus varius*, as I have often had occasion to observe. I have also since found in another *Coccus* a rarer species of *Anthribus*—*A. scabrosus*. These two species appear to form a true genus distinct from *Anthribus*."

PULVINARIA BETULÆ.

Coccus betulæ, Linn., F. S., 1017 ; S. N., 740, 7. Fab., Sp. Ins., 394, 8 ; Mantiss., ii, 319, 10 ; Ent. Syst., iv, 226, 12 ; Syst. Rhyng., 308. Modeer, Act. Goth., i, 23, 16 ; Gmel., Syst. Nat., i, 4, 2216, 7. De Villers, 560, 5. *Pulvinaria betulæ*, Sign., Ess. Cochen., p. 207.

♀ adult. Scale broad, obcordate, nearly as broad as long, slightly convex, shining, dark piceous-brown, the marginal area broadly (band-form) rufo-testaceous (this coloration probably not constant) ; the disc scarcely punctate, but with two or three slight transverse ridges ; the marginal band with several very slight equidistant transverse lines ; the posterior edge widely but shallowly emarginate, the sides of the notch divergently rounded off from the narrow, close, rather long anal cleft ; the white cottony ovisac ample, raising the scale, extending a little beyond it at the sides and very much behind. Antennæ of 8 joints (fig. 5a) ; 1st very broad, short, with a few hairs ; 2nd not so thick, a little longer ; the rest more slender ; 3rd longest of all, with one hair ; 4th and 5th much shorter, subequal, each with one hair ; 6th and 7th still shorter, subequal, with one or two hairs ; 8th about the same length, pointed, sides gradate, with several long hairs, of which one (apical) is longer than the others. Legs stout (fig. 5b) ; tibiæ with two hairs near the apex ; tarsi obtuse at apex, more than half the length of tibiæ, with two long finely capitate digitules ; claw long, strong, with two shorter digitules dilated at the extremity.

Length, 5, breadth, 5 mm.

Described from one of two examples found on birch trees (*Betula alba*) at Delamere Forest, July 20th, 1890, by Mr. R. Newstead, who has kindly furnished the figures.

Signoret (*l. c.*) cites the authorities given above, and describes *Pulvinaria betulæ* as the *Coccus betulæ* of Linné, but he gives only the characters of the ♀ scale, thus :—

"In the most advanced state this species much resembles *P. vitis*, which, for the sake of comparison, we take as the type of the genus. It is almost as long as

broad, rugose, of a dark brown colour and covered, especially on the median line, with small greyish tubercles of an elongate form, which are composed of a secretion soluble in ether. The anal emargination is very wide."

This agrees fairly well with the specimen before me except as to the tubercles, which do not exist; they probably pertain only to the young immature form, and are the same as designated by Modeer in his account of that stage of growth as "ögon" (eyes, buds, pips, points); or it may be that my specimen is abnormal, and the absence of tubercles has been caused by the enervating influence of the parasites that had evidently affected the insect; but as the other characters differ but very little, and only one species of *Pulvinaria* has been obtained from the birch, I conclude that this is the same as Signoret's. He gives no particulars of antennæ or legs of the adult, but only the characters of the larva. The male is unknown.

Linné, in the "Fauna Suecica" (*l. c.*) describes his *Coccus betulæ* very briefly, thus:—

"Habitat in *Betula alba* ramorum divaricationibus solitarius," and he adds nothing in the subsequent "Systema Naturæ."

Fabricius and De Villers merely refer to Linné. Gmelin, in his edition of the "Systema Naturæ," has:—

"Habitat in Europæ *Betula alba*, teres, spadiceus."

Modeer has:—

"Björk Fästflyet (*Betulæ albæ*), ♀ scale oval, cut out posteriorly, dark red-brown; when young pale rust-colour, with dark points.

"Found in angles of twigs of birch. Somewhat larger than a pea. Lays in the beginning of June a considerable quantity of eggs in a conspicuous white cottony nest, which becomes so much extended that the scale is raised up on it from behind perpendicular."

There is no reference to Linné, so that even with this description by Modeer (whose work, by the way, Signoret says [*l. c.* p. 5] he had not "analyzed") the identification of the *Coccus betulæ* of Linné was by its habitat on the birch, and by repute, more than by description; but Modeer's description points undoubtedly to a *Pulvinaria*, and Signoret's species appears to be the same; and so, in default of anything to the contrary, rather than by positive facts, the species described by these authors may be accepted as the *Coccus betulæ*, Linn.

Its recognition as a British species rests on the works of the authors quoted by Stephens in his "Catalogue of British Insects" (1829), ii, 368, viz., Berkenhout, Stewart, Samouelle, and Turton, none of whom (as indicated) gives a description or information when or where it has been found in Britain; nor can I trace any subsequent

record of its occurrence, and Walker omits it from his "List of British *Homoptera*" (1860), so that it is virtually now added to the British fauna.

On December 23rd, 1885, on the small branches of an alder (*Alnus glutinosa*), a near ally of the birch, at Lewisham, I found several scales of a *Pulvinaria*, but as they were then six months old, perforated by parasites, and (with the ovisacs also) black with the filmy grime of coal smoke that defiles every exposed thing within many miles of London, I could do nothing with them, and I have found none since, until on August 21st, 1890, on the same tree, there were half a dozen of the same sort of scales in better condition than on the former occasion, though evidently past their prime. Comparing them with *P. betulæ*, the scales conform very well to the foregoing description of that species from birch, the chief difference to be perceived being that in these the legs and antennæ are much more slender, and there is a very slight variation in the relative length of some of the joints of the antennæ, of which I give Mr. Newstead's figure for comparison (5c). As at present advised, I do not think there are sufficient grounds to do more than to call this "var. *P. alni*," but this remains an open question.

Adjacent to some of the ♀ scales were two or three of those of the ♂, from which the imago had not been developed.

EXPLANATION OF PLATE I.

Page 95—*Lecanium nigrum*, ♀, fig. 1, antenna (abnormal).
„ 65— „ *sarothamni*, ♀, fig. 2a, antenna, 2b, leg.
„ 67— „ *ciliatum*, ♀, fig. 3a, scale (profile), 3b, scale (front view), 3c, antenna, 3d, ♂ scale (broken).
„ 96— „ *distinguendum*, ♀, fig. 4a, antenna, 4b, leg, 4c, ♂ antenna.
„ 98—*Pulvinaria betulæ*, ♀, fig. 5a, antenna, 5b, leg.
„ 100— „ „ var. *alni*, ♀, fig. 5 c, antenna.

153, Lewisham Road, S.E.:

October, 1890.

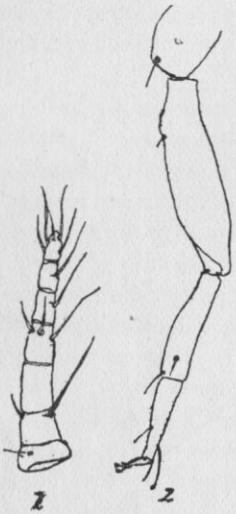
Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. iii.]

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ* (No. 22).

BY J. W. DOUGLAS, F.E.S.

LECANIUM RUBI.

Coccus rubi, Schrank, Fauna Boica, Bd., ii, i, p. 144, No. 1260; Sign., Ess. Cochen., p. 462.



♀ adult. Scale broad rounded-oval, very convex; in some cases considerably produced on the margin in front, and having also a furrow extending thence at one side of the median line towards the disc; but in the majority of cases the form is almost circular and hemispheric; always smooth and shining. The colour is red-brown, darker, almost blackish at the sides, the anal area light brown, as also are the up-turned sides of the anal cleft. The surface is covered with very small pale dots; under the microscope these appear as oval, clear, cellular spaces in series, forming a fine tesselation. There are also large, conspicuous, clear white markings, namely, on the first third a band, widest at the extremities, extends quite across from side to side; joined or close to this, posteriorly, a band of connected blotches lies on the sides, not far from the margin, but does not reach the apex; down the centre a series (4—5) of broad, connected blotches, with long, laterally divergent dentations, which decrease in succession, extends almost to the anal cleft; and anterior to the thoracic band are usually some small, irregularly shaped blotches. The width of the markings varies in different scales, and occasionally the points of the dorsal dentation are turned towards and meet each other, so that a dark space is enclosed between each two of them. This is the nuptial adornment, lasting until the oviposition is completed (at about the end of June); the white markings then disappear, the colour becomes uniform nut-brown, and the form quite or more than hemispheric. In the early stages the scales are also hemispheric; the colour clear red-brown, without markings, but the pale dots are very evident. Antennæ (fig. 1) short, stout, of seven joints consecutively narrower; the 1st very short; 2nd nearly twice as long; 3rd three times as long; 4th two and a half times as long; 5th and 6th each about as long as the 2nd; 7th nearly the same, gradate; one hair on the 1st; two on the 2nd, one of them very long and strong; none on the 3rd; three on the 4th; one on the 5th and 6th; and several on the 7th. Legs (fig. 2) very long and strong; tibiæ about one-fourth longer than the tarsi; digitules ordinary. Length, 5 mm., breadth, 4 mm.; or otherwise nearly circular.

♂ scale white, nearly smooth, the dorsal ring very slight. The imago dark chestnut-brown, the wings greyish-white, with the costal stripe faint carmine. A very ordinary form.

Schrank, in his "Fauna Boica," *l. c.*, describes a *Coccid* thus:—

"Brombeeren Schildlaus,—*C. rubi.* Wohnort: auf dem Brombeerenstrauche. Das ausgewachsene Weibchen nussbraun, gross, mehr als halb kugelförmig. Eyerzeit: Junius."

Signoret, *l. c.*, merely quotes the above, and adds "Inconnu," but in describing a *Lecanium* on bramble, sent from the United States

by Mr. A. Fitch under the name of *L. rubi*, he says that it is the smallest species known to him, and as it does not appear to be the same as Schrank's species, he changed the name to *L. Fitchii*. But as our newly acquired species in its ultimate state agrees well with Schrank's imperfect description, which certainly indicates a *Lecanium*, and, as no other *Lecanium* is known to live on *Rubus* in Europe, I do not think I err in the identification. In the structure of the antennæ and legs it is very distinct.

On May 30th, I received from Dr. T. A. Chapman some ♂ and ♀ scales of this species on bramble-stems (*Rubus*) of last year's growth, obtained about ten miles from Hereford, and as most of the females were immature, and Dr. J. H. Wood, of Ledbury, had assiduously hunted for more without success, I thought I would try to find some in this neighbourhood; so, on the 10th June, I went to a sheltered place where brambles grow in a hawthorn hedge. "The eye sees what it expects to see"—sometimes; and though I hardly expected, I yet hoped to see some scales of *L. rubi*. But it is no easy matter to see far into a bramble bush, which is a fortress with natural *chevaux de frise*, and in this instance was further fortified with the defensive armour of the hedge-thorns, and an outlying stockade of stinging nettles. My attention was first arrested by a troop of black ants (*Formica fuliginosa*) doing sentry duty up and down one of the few remaining stems of last year's growth, and judging by previous observation in other species that they were guarding a *Lecanium*, I determined to storm the fortification at all hazards. I was rewarded for the damage to my hands, for, on the under-side of the stem, at the place involuntarily indicated by the ants, I obtained a full grown ♀ *Lecanium rubi*. Thus encouraged, I made further assaults, always under the guidance of ants, and succeeded in finding six or seven more of the ♀ scales, and two empty scales of the ♂. But they were all on one bush, and I could not get another scale, though I hunted near and far on other bushes; so it seems that the species is at least localized, and this, and the difficulty of getting it out of its habitat, may be the sufficient reason why it has not been seen since it was described by Schrank in 1801. Truly, it is a protected race.

The pattern of the white markings on the ♀ scales is the same as on *Lecanium distinguendum* and *L. fuscum*; this season I have also seen it, but in a fainter white colour, on *L. pyri* and *L. genevense*, so that its occurrence at a certain age of the scales may prevail in many species, as I have surmised at p. 96, vol. ii, n. s.

With his usual kindness, Mr. R. Newstead has mounted and drawn to the same scale both the antennæ and legs.

153, Lewisham Road, S.E.:
July, 1891.

NOTES ON

SOME BRITISH AND EXOTIC *COCCIDÆ*,

(No. 23),

BY J. W. DOUGLAS, F.E.S.

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. iii.

PLATE III.

PROSOPOPHORA, *n. g.*

♀ adult. Scale wholly waxen, base closed; surface with granulose raised lines; no anal cleft or tubercles, anal orifice close to the margin; margin entire, no fringe. Antennæ of eight joints. Mentum monomerous. Legs atrophied. Anal ring with ten hairs. Last segment of the body deeply emarginate, with its lateral lobes not, or scarcely, extending beyond the line of the circumference.

♂ adult. Scale of the same material and pattern as the ♀; antennæ of ten joints.

PROSOPOPHORA DENDROBII, *n. sp.*

♀ adult. Scale (fig. 1) hard, dull, ashy-brown, broad-oval, slightly convex, disc with a large ring parallel to the margin, composed of large, connected granules, the space enclosed intersected lengthwise by a median carina, which extends from the anterior margin of the scale to the anal orifice, and is crossed by several (5—6) raised granulose lines, of which the posterior are often indistinct or obsolete; the wide area between the ring and the margin also crossed by similar, equidistant, straight lines (8—9 on each side of the scale). All the raised portions are whitish, and overlay pores through which the granulose matter was doubtless excreted in a spumous state; the edges of the oval anal orifice are also whitish. The waxen plate closing the base of the scale yellowish, very thin and delicate, is attached to the

margin all round, and anteriorly has an orifice for the extrusion of the rostrum. The insect when first restored was purplish-brown in colour; when alive it had doubtless filled the scale, but in its dry state it was entirely shrivelled, and lay in the anterior region, the rest of the scale was more or less occupied by withered larvæ. Antennæ nearly cylindrical, of eight joints (fig. 1b), the relative length of them not very constant, the 5th sometimes not so long as represented, and the 8th much smaller; all are hairless except the last, which has three strong curved hairs on the apex. In a few specimens there were but six or seven joints only (figs. 1bb), the result, probably, of parasitism of the insect. Eyes small, inconspicuous. Rostrum large, filaments very long. On the under-side (fig. 1a), the body has, on the abdomen, two rows of five perforated discs (fig. 1c), and, anteriorly, three similar ones in a triangle. The deep emargination of the last segment results in a wide lateral lobe on each side, terminated by a strong hair, and bearing several long, tubular spinnerets, with orifices shaped like deer's feet (fig. 1d), and also, near the margin, some blunt spines (fig. 1e). Anal ring large, with ten hairs, above it is a dark chitinous arch or loop, which in some specimens appears detached, but is really a part of the segment (figs. 1f and 1g).

Length of scale, 3—3·5 mm.; breadth, 2·5 mm.

♂ adult. Scale (fig. 2) of the same pattern as the ♀ (not thin and glossy, as in *Lecanium*), but the raised lines are stronger, and, posteriorly, without interruption of the pattern, the upper-side is developed in the form of an ovoid plate, which is free, except at its broad flexile base, evidently to permit the escape of the imago. The imago is too much dislocated to represent entire, the buccal ocelli are large. Antennæ (fig. 2a) of ten joints, thickly set with short, curved hairs, and three at the apex slightly clubbed. Wings ordinary; halteres (fig. 2b) terminated by a single curved hair. Legs ordinary. Fig. 2c represents the anal segment and genital armature.

Length of scale, 2 mm.

Larva. Antennæ of six joints, with long hairs (fig. 3). The bodies were so broken that they could not be restored or figured.

In October, 1891, Mr. S. J. McIntire sent, as just received from Mr. Jenman, Superintendent of the Botanic Garden, George Town, Demerara, some pieces of the stems of *Dendrobium calceolaria*, to which several of these *Coccids*, dead and dry, were tightly adherent. *Prima facie* they had the appearance of *Lecanium*, but this was deceptive, for on examination they proved to have such complex characters, that they would not enter any indicated genus, and for the same reason their relationship and position in any group of *Coccidæ* are not at present possible for me to assign. The ♂ scales were mostly empty, but in a few a dead imago, fully developed, remained.

The first lot of ♀ scales treated in the ordinary way, by boiling in solution of caustic potash, were entirely dissolved, showing that they were wholly cereous. Subsequent experiments with other scales, under the careful manipulation of Mr. Newstead, gave the very singular results above stated, which were constant in the many ex-

amples examined, and I am very greatly obliged to him for the pains he has taken to obtain them, all the more that circumstances have unfortunately precluded me from attempting the work; and I am also greatly indebted to him for transferring his figures to the plate.

LECANIUM BEGONIÆ, *n. sp.*

♀ adult. Scale jet-black, under a high power seen to be covered with contiguous, minute, oval, yellowish dots, shining, smooth, convex, broad-ovate, or in some instances oval, being more rounded anteriorly, sides straighter, and disc humped; the margin slightly extended, recurved, and finely punctured (up to the penultimate state the colour is brown); anal cleft closed, the point above it very small, yellowish. Antennæ of seven joints (fig. 4); the 1st broadest, short; 2nd one-third longer; 3rd twice the length of the 2nd; 4th one-third longer than the 3rd, with a constriction simulating a joint at two-thirds of the length, whence a long hair projects; 5th and 6th equal, each less than half as long as the 4th, and with one hair; 7th about as long as the 3rd, pointed, sides gradate, with several hairs. Legs (fig. 4a) long; trochanter with one long hair; tarsi three-fourths the length of the tibiæ; digitules normal. Length, 3—4 mm.

The oval examples, especially, very much resemble *L. nigrum*, but, as will be seen by reference to the description and figure, Ent. Mo. Mag., ii, n. s., p. 95, fig. i, there is great difference in the proportion of the joints of the antennæ, which character was noticed in all the specimens of each species that were examined; in the present species also there are but seven joints instead of eight.

Received in October, 1891, on the stems and under-side of leaves of a *Begonia*, from the Botanic Garden at George Town, Demerara.

EXPLANATION OF PLATE III.

Prosopophora dendrobii, ♀, fig. 1, scale; 1a, body, under-side; 1b, antenna, eight joints; 1bb, ditto, six and seven joints; 1c, perforated disc on ventral surface; 1d, tubular spinnerets; 1e, blunt spines; 1f, terminal emargination and anal ring; 1g, anal ring and arch, more enlarged.

" " ♂, fig. 2, scale; 2a, antenna; 2b, halter; 2c, anal segment and genital armature.

" " Larva, antenna, fig. 3.

Lecanium begoniæ, ♀, fig. 4, antenna; 4a, leg.

153, Lewisham Road, S.E.:
December, 1891.

Pros. dendrobii.

Postscript, *July*, 1892.—Although characters derivable from the larva are wanting, I am now inclined to believe that those of the adult state, in both sexes, indicate that this insect belongs to the Family *Lecanodiaspidæ*, Targ.-Tozzetti.


2a


2

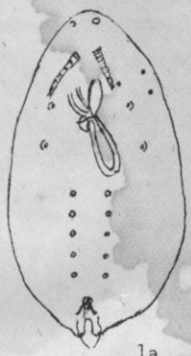

2b

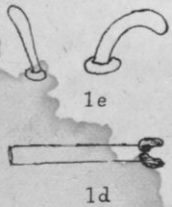

2c


4a

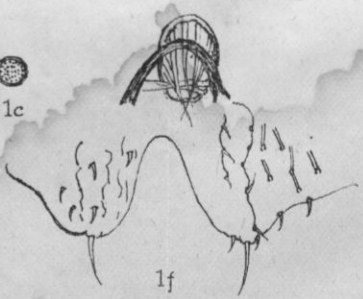

4


1.


1a


1e 1d

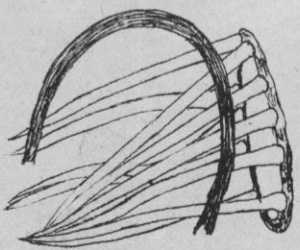

1c


1f

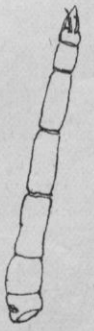

3


1b


1b


1g


1bb


1bb


1bb

R. Newstead, del. et lith.

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ*, (No. 24),

BY J. W. DOUGLAS, F.E.S.

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. iii.

Lecanium capreæ.

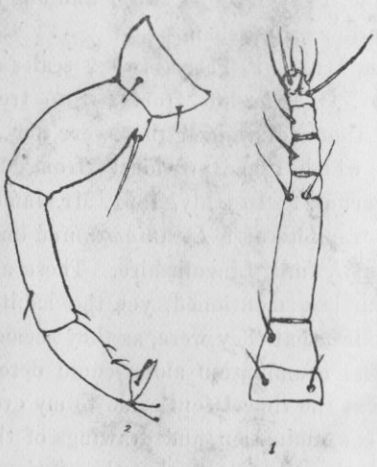
Coccus capreæ, Linn., S. N., ii, 741, 14; De Geer, Mém., vi, 440, 2, t. 28, figs. 13, 14; Modeer, Göth. Vet. Handl., i, 22, 15; Gmel., S. N., i, 2218, 14; ? Fonscol., Ann. Soc. Ent. France, iii, 213, 3.

Lecanium capreæ, Sign., Ess. Cochen., 245, 20, pl. xi, fig. 14.

Coccus cypræola, Dalm., K. Vet. Acad. Handl. för 1825, 367, 5, tab. iv, figs. 13—15.

Coccus gibber, Dalm., *id.*, 366, 4, t. iv, figs. 11, 12.

Lecanium salicis, Bouché, Stett. Ent. Zeit., 1851, 112, 3.



♀ adult. Scale chestnut-brown, sometimes lightly mottled with yellowish, smooth, shining, large, high, almost circular, highest and broadest anteriorly, but narrowed (at times constricted), and more or less briefly produced posteriorly, very tumid, overlapping and clasping half-round the small stem of the food-plant, nearly perpendicular in front, vertex at times slightly gibbous, the curve thence forwards abrupt, backwards declivous; scarcely punctured above the margin; anal cleft with parallel sides. Antennæ (fig. 1) stout, of six joints: the 1st short, with two hairs; 2nd twice as long, with one hair; 3rd much longer than all the remainder together, constricted and narrower near the apex, with two hairs at the constriction; 4th to 6th short, equal; 4th and 5th each with one hair; 6th with about six. Legs (fig. 2) stout, tibiæ about one-third longer than the tarsi, each with few short hairs; digitules short, ordinary.

Diameter and height, 6 mm.; or length, 7 mm., breadth, 6 mm.; height, 6 mm.

♂ scale grey-white, smooth, ordinary.

Larvæ ordinary, yellow; eyes piceous.

Almost all the authors that have described the Linnean species give some species of *Salix* as the food-plant. Fonscolombe, however, gives also as habitat, "Cytise des Alpes et sur l'Arbouzier," but it

may be doubted if his description applies to Linné's *C. capreæ*, and also if his observation refers always to one species, although he says: "Je ne doute pas que ce ne soit la même espèce, malgré la différence de l'habitation." Signoret had his one example from poplar. Dalman says his *C. cyprœola* lives on various trees, among others on *Salix caprea*, and although he was inclined to believe it was the Linnean *C. capreæ*, he did not adopt the name because it was applicable to other species living on that plant, including his *C. gibber*, which, in some of its stages, he says it much resembles!

Coccus capreæ, Linn., is in the old lists of British *Coccidæ* cited by Stephens (Syst. Cat. Brit. Ins., ii, 368), but until now it has not been described in England. Walker omits it from his "List of British Hemiptera," 1860. In June, 1885, I found two ♀ and one ♂ scale on *Salix alba* in Beaufort Gardens, Lewisham.

In April, 1889, I received from Mr. F. P. Pascoe two ♀ scales of a *Lecanium*, obtained by the Rev. G. Henslow from a rose tree, about which I could not at the time determine: they were not *L. rosarum*, Snellen von Vollenhoven, which I had previously from Mr. G. S. Saunders, off roses at Canterbury. In July, 1891, Mr. James Eardley Mason sent a good many examples of a *Lecanium* found on a rose tree growing up his house at Alford, Lincolnshire. These are evidently the same species as the last mentioned, yet the habitat rather made me hesitate in the belief that they were, as they seemed to be, *L. capreæ*, and a microscopical examination alone could determine. Being precluded from this at the time I sent some to my ever willing aid, Mr. Newstead; and his examination, and drawings of the antennæ and legs, here reproduced, show decisively that the species is identical with that described by Signoret, and except the one discrepancy noticed below, it is otherwise conformable to the characters of the Linnean species. The antennæ (remarkable in the 3rd joint) and the legs are now first figured; Signoret only described the antennæ, and could not obtain the legs.

Curiously, among the specimens from Mr. Mason's rose tree were a few of full size, with a large, prominent *mamelon* on each side of the dorsum, the two distinctly separated from each other, just like Dalman's figure of his *C. gibber*. I drew Mr. Newstead's special attention to these forms, with reference to observation of the antennæ and legs, and he reports that these members are quite identical in character with those of the normal form of the insects living on the same rose stems; I must, therefore, conclude that they are all of one species, and that the difference in the contour of the scales is solely

the result of the action of the enclosed parasites, as set forth by Mr. Newstead in his note on the subject (*cf.* vol. ii, n. s., p. 267).

Dalman's *C. gibber*, stated to live on poplar, birch, hazel, and other foliage-trees, has the scale represented (*l. c.*) of several forms, varying so much that Signoret deemed there was more than one species. He took one, Dalman's No. 8, which he obtained from an alder, as the type, and figured it, as also did Westwood in his Modern Classification of Insects, ii, fig. 118, 18. I have already adverted (Ent. Mo. Mag., xxiv, 101) to this form, of which I had two examples from an oak with *Lecanium fuscum*, and suggested that it is a variation of that species; I am now disposed to confirm this, and to believe that the gibbosity of the scale was caused by the action of parasites, and also that all the variations of the scale noted and figured by Dalman have been consequent on parasites, possibly of more than one kind, and are not of specific value; thus, his *Coccus gibber* cannot be maintained as a species.

Further, in his description of *Coccus capreæ* (*l. c.*), Linné has "antice obtusus et bifidus;" now, the latter word does not apply to the ordinary scale, but very well expresses the doubly-gibbous form; so it seems more than probable that he had at least some examples of this kind before him, perhaps all were so.

The identification of the parasites will be of much interest, and still more so the elucidation of the mode of life pursued by them to accomplish such peculiar results. I wonder if they are the larvæ of the Coleopterous *Brachytarsus*, which are known to live on *Coccids*; indeed, Dalman found two species of the genus in his *C. cyprœola* (*cf.* vol. ii, n. s., p. 98).

Lewisham: *August*, 1891.

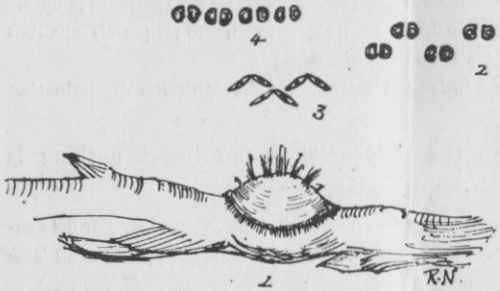
Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. iv.]

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ* (No. 25).

BY J. W. DOUGLAS, F.E.S.

POLLINIA THESII, *n. sp.*

♀ adult (Fig. 1). Scale pale yellow or dingy brown, smooth, slightly shining, very hard and convex, subovate, broadest in front, posteriorly more or less produced,



the prolongation flattened and narrowed to an obtuse or bifid end (this is more evident on the insect beneath); anal aperture situate at the margin small, round, emitting a tuft of delicate glassy filaments; surface shows traces of many effete double and a few single spinnerets; dorsum with a median longitudinal, mane-like row of upright or curled, delicate, flossy, white filaments of unequal height, disposed in 5—6 adjacent tufts, and arising out of the integument; margin with a projecting horizontal fringe of fine, distinct, glassy, hair-like filaments disposed in two series, those of the upper one not so close together as the lower. Antennæ rudimentary, apex rounded, bearing one long hair and four or five short ones. Mentum apparently biarticulate,* with two hairs at the apex; rostral filaments expanded, very long, nearly one-third the length of the body. Legs wanting. Marginal spinnerets double, somewhat like the muzzle of a double-barrel gun, disposed in two rows at front and sides, but placed alternately as to the respective rows (Fig. 2), profile (Fig. 3), posteriorly merging into one nearly straight row (Fig. 4). Anal ring recessed within a larger one, bearing six hairs; lobes wanting, in their place are two rather long, stiff hairs, and between them about twelve shorter, of various lengths. Dorsum with numerous long tubular spinnerets, and a few scattered circular orifices.

The under-side of the scale is closed by a thin pellicle. The sides of the scale are approximated in order that they may grasp the thin stem of the food-plant, to which they closely adhere. The closure of the scale causes the insect to be quite enveloped; after death it becomes shrivelled, but can be restored to its original form by boiling in caustic potash. There were no eggs or larvæ in the scales, but a brown one contained the larva of a parasite that quite filled the space. Length, 2 mm.

In the "Bulletino della Società Entomologica Italiana," i, 263, Targioni-Tozzetti founded his genus "*Pollinia*" on the *Coccus Pollini* of Costa, which lives on the olive, deriving the generic name from the specific, which he altered to "*Costæ*"—a mode of procedure that cannot be commended. He gives the following diagnosis of the genus:—

* The dimerous character of the mentum, though evident, cannot be figured, for unfortunately in each of the two preparations the mentum is tilted on its apex with the base towards the covering glass, and it cannot be shifted.

"Fœm. In fovea verruciformi crustacea arcte inclusa, paramorphosi inflata, apice incisa, squamisque caudalibus minimis prædita, acera, apoda.

"Labio postico articulato dimero; Chorio fusis geminatis tubularibus sparso."

The female is thus described, and it and the larva are also figured:—

"Fœm. In fovea crustacea crassiuscula, similibus congregata, ramisque simul adhærentibus, arcte clausa, globularis elliptica, crocea, lævi, nitens, postice bidentata.

"Os, rostro rhomboideo, labio cordiformi elongato dimero; squamis analibus triangularibus obtusis adpressis, apice spinulosis, minimis.

"Chorio densiusculo, nitido, fusis geminatis, crebris, subregulariter disseminatis.

"Mas adhue ignotus."

Of the spinnerets on the body of the *adult* insect nothing is said, but of those on the *larva* it is stated:—

"Delle grandi filiere, delle quali sembra doppio il lume, vedendosi l'orificio superficiale e profundo quasi in uno stesso piano, formano due serie parallele all 'asse del corpo di sopra, e per ogni lato."

Yet on the figure of the upper-side of the larva, besides the two dorsal rows of double spinnerets, only one row of them appears on each side.

Signoret, adopting the genus and describing the same species (Ess. Cochen., p. 162), says that "the *larva* in its lecanoid form has neither feet nor antennæ, only vestiges of the latter as a triangular tubercle with some hairs, fig. 1*d*." But at p. 472 he says that "fig. 1*d*" represents the atrophied antenna of the *adult*; the term "larva," therefore, is an error, in view of the fact that in his description and figure of the larva it is represented as having both the antennæ and the legs.

The character of double and single spinnerets on the integument is given the same as by Targ.-Tozzetti, and it is added that "the embryonic female has four series of tubes, each with a double opening—two on the median part and two on the lateral margins." Interpreted by the fig. "1*d*" this means two rows on the dorsum and one on each lateral margin, making up the number four. The spinnerets on the lateral margins of the body of the adult are not mentioned, but they have been understood to be as in the larva, and to give rise to only one row of fringe, for Maskell, in his "Account of the Insects of New Zealand," p. 87, says of the genus *Pollinia*, "Test hard, waxy, with a single fringe." Signoret also says of the adult female form that "the anal extremity has a very small opening with two very small lobes scarcely visible; the anal ring with eight hairs;" also that the mentum is biarticulate, and otherwise his description agrees with that of T. Tozzetti.

The present species is therefore not strictly conformable to the genus *Pollinia* of T. Tozzetti, nor yet clearly to that genus as defined by Signoret. In the double row of lateral spinnerets and fringe it is like *Planchonia*, but that genus has the mentum monomerous and no antennæ.

Though not satisfactory I place it, for the present, as a *Pollinia*. The dorsal row of free filaments is the most appreciable character, there are also the form of the rudiments of the antennæ (rounded, not triangular), the six instead of eight hairs on the anal ring, as well as the more ovate shape of the scale, and the nature of the habitat, to substantiate the distinctness of the species from *P. Costæ*. Of that species neither author mentions any marginal fringe, though, indeed, in the characters of the Family *Lecanodiaspidæ*, in which it is placed, Signoret gives a prominent position to the marginal fringe (p. 161).

On July 12th last Mr. Eustace R. Bankes, of Corfe Castle, sent me ten of these insects, with the following information :—

"While spending the day yesterday in the Isle of Purbeck, in searching for pupæ of *Chauliodus insecurellus* on the scarce, local and little known plant, *Thesium humifusum* (a parasite on other plants), I found the scale-insects I now send. They were in every case attached to the under-side of the twigs, sometimes in a little cluster, generally near the base of the plant, and not easily seen if the plant is examined from the under-side."

I am greatly indebted to Mr. R. Newstead for the pains he has taken to work out and figure the details of structure.

153, Lewisham Road, S.E.:
September, 1892.

NOTES ON
SOME BRITISH AND EXOTIC *COCCIDÆ*,
(No. 26),

BY J. W. DOUGLAS, F.E.S.

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. iv.

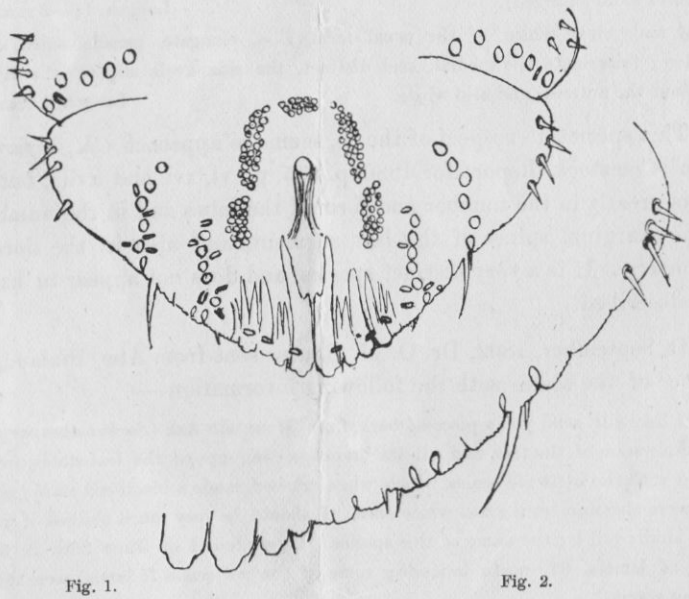


Fig. 1. Fig. 2.

CHIONASPIS SORBI, *n. sp.*

♀ adult. Scale whitish, irregular-oval, ham-shaped, being very narrow at the anterior end, where the larval exuviæ are; the insect beneath is red. Last segment of the body (Fig. 1) with five approximate dorsal groups of spinnerets, the anterior

having 13—15, the anterior laterals each 24–33, usually the latter, the posterior laterals 19—26. Of the posterior marginal lobes, the median two, lying close together, have parallel sides, are very much prolonged inwardly, but at little more than half their length are narrowed suddenly from the inner side, thence they are extended, somewhat divergently, each to a sharp point, the base of the prolongation having a short, sharply toothed, projection; the extensions of the two lobes resembling a two-pronged fork: exterior to the two median lobes are on each side of them four narrower ones, also similarly extending inwards; the first of these reaches nearly to the level of the base of the median furcation, and has a deep apical cleft, so that it presents two long acute points; the second is much longer, and has one acute point; the third is nearly as long, and has two very long sharp points; the fourth small, about the length of the first, and, like it, has a bifid termination; on each of the lobes posteriorly is an elongated pore; except the fourth lobe, which has its base on the margin, the external end of each lobe projects a little beyond the marginal line, is suddenly gradate on each side, and is then extended in a short rounded projection: beyond the lobes the margin is an almost regular curve, the limits of the marginal plates being scarcely indicated, but about half way along the curve is a long projecting marginal spine, and near the junction with the next segment are four short, stout, contiguous spines well within the margin, but extending beyond it. The ventral surface only has oval or rounded pores. (Fig. 2 represents the marginal structures more enlarged). Length, 1½—2 mm.

♂ scale clear white, of the usual form, *i. e.*, elongate, parallel sided, end rounded; tricarinate, the median keel distinct, the side keels slight; the larva exuviæ at the anterior end also white. Length, 1 mm.

This species, in respect of the ♀, seems to approach *Ch. furfurus* Fitch (Comstock, Report for 1880, p. 315, pl. vi, xvi and xvii), but it differs greatly in the number and form of the lobes and in the number of the marginal spines of the last segment, and also in the dorsal spinnerets. It is a very distinct species, and does not appear to have been described.

In September, 1892, Dr. O. M. Reuter sent from Abo, Finland, a number of the scales with the following information:—

"I herewith send you a piece of bark from Mountain Ash (*Sorbus aucuparia*). The whole stem of the tree and all its branches, even up to the leaf-stalks, were covered with the little red scales, which, when crushed, made a blood-red stain; and there were also numerous small white ones. I should be very much obliged if you would kindly tell me the name of this species. It was found on June 26th in the parish of Ilmola, 63° north latitude; some of the red scales (? larvæ) were then creeping about."

Mr. R. Newstead had the kindness to mount fourteen specimens of the ♀, all of which exhibited the foregoing characters, and also to make a drawing, which is here reproduced.

153, Lewisham Road, S.E.: 1892.

NOTES ON SOME BRITISH AND EXOTIC *COCCIDÆ*, (No. 27),

BY J. W. DOUGLAS, F.E.S.

Reprinted from "The Entomologist's Monthly Magazine," Second Series, Vol. v.

The Migration of Coccids.

On June 5th, 1891, I found, at the distance of a mile from here, on a small bush of hawthorn, several gravid females of *Pulvinaria oxyacanthæ*, Linn., with ovisacs full of eggs and larvæ, and transferred some of these masses to a hawthorn-bush growing in the boundary-hedge of my garden, on which no *Coccids* existed, hoping thus to establish the species here by the next year. In the spring of 1892, however, the terminal shoots of the bush, on which the *Coccids* would naturally be situate, were cut off, and so I feared ended my expectations, for subsequently I could not find any scales; but there must have been some undetected, for on the 2nd inst., that is, a month before the usual time of year, I saw two full-grown females on the bush, but I had not been on the alert early enough to notice their development. The transfer of a species from one plant to another of the same kind at a distance being quite practicable, some persons may possibly be induced to experiment with other species than that mentioned, with a view to watching the development of these singular insects, of which the life-history presents many interesting features. The female forms of the *Lecaniidæ*, it is true, are not attractive, but the males are wonderful in form and beautiful in appearance, in these respects rivalling the small *Lepidoptera*; they are so short-lived, and so rarely obtained, except by rearing, that those of many species have never been observed; indeed, it has been questioned if in some they exist at all in an external appreciable form. The rearing of *Lecaniidæ* in gardens on trees which are already there, or to be planted for the purpose, would doubtless bring to light the knowledge of many recondite points in the economy of several species. No harm to the trees would accrue, for it is only when *Coccids* are in excessive numbers that they are injurious, and in such experimental cases as these would be, they could easily be regulated.

The late A. Foerster had a theory, which was also supported by the late J. Lichtenstein, that certain similar forms of *Lecaniidæ*, which he enumerated (*cf.* Ent. Mo. Mag., xxiii, pp. 25, 26), found on different trees, and which have received distinctive specific names, are only one and the same species; but adverting to the structural discrepancies in the insects, especially in the antennæ and legs, which have been discovered in later time, this view is not tenable. Yet trial might be made in a home experimental station, constantly under the survey of an investigator to ascertain decisively whether all *Coccids* would live on trees totally different from those on which they usually feed. Some can, and do naturally, but they retain all their structural characters, and thus can be identified.

Lecanium hesperidum and L. lauri.

In *Lecanium lauri*, on which, with the assistance of Mr. Newstead, I gave a note in this Magazine, vol. ii, n. s., with a view to show that it is distinct from *L. hesperidum*, one special point of dissimilarity is in the structure of the digitules of the feet, and it is further noticed that, in this country, *L. hesperidum* is found only on orange and lemon trees under glass, and *L. lauri* only on bay trees. Mr. Maskell, however, has noticed (vol. iv, p. 103) a reverse order, inasmuch as in New Zealand *L. hesperidum* occurs on laurel, ivy, holly, and other plants, and in Australia *L. lauri* lives on citrus. This is very curious. The validity of the differences pointed out is admitted, yet the inference that there is a distinction of species is demurred to, and the belief is expressed that there is really but one. I do not wish to have a controversy with one who has had long and varied experience in the microscopical investigation of *Coccids*, but I hardly think that his reasons are conclusive. We come back to the doubt of how much or how little of structural character is sufficient to determine a difference of species. In *Coleoptera* and *Hemiptera*, for instance, a small variation in sculpture, striation, puncturation, hairiness or spinosity, form or length of the joints of antennæ or feet, are held to be good differential specific characters. Size and colour do not count for much, and in *Lepidoptera* especially, where they used to be greatly used to differentiate species, they have had to be abandoned as unavailable for that purpose; yet they still have at times a value subsidiary to considerations of structure of adult and larva. With regard to *L. hesperidum* and *lauri* there may be the hypothesis that they are representatives of divergence from one prior form, as yet not differentiated beyond the stage of "race," and hereafter destined to become more decidedly separate.

The Genus PROSOPOPHORA.

Mr. Maskell (vol. iv, p. 104) objects to "surface with granular raised lines" being considered to be a generic character of the scales (♂ and ♀), contending that it is only specific. In this case it may be so; I do not wish to argue, all the more that Mr. Maskell says he has two new species destitute of the raised lines which, *cæteris paribus*, will fit into the genus. It is very difficult in a new form to determine which of its characters are generic, and which are specific. Other species may exist in which, as in *P. dendrobii*, there may be raised lines yet in a different pattern; then the character would, I think, be generic. We see in other Orders of insects some one leading structural character admitted to be of value in estimating generic rank, while its variation in respect of pattern, density, complexity or other quality, exemplified in a group of forms is held to indicate specific difference, *i. e.*, fixity for the time being in departure from a primitive stem.

153, Lewisham Road:

1893.