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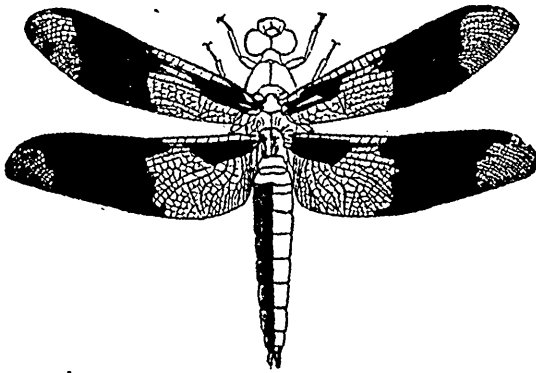
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The
Canadian Entomologist

VOLUME XXIX.

No. 11.



LIBELLULA TRIMACULATA.

EDITED BY

REV. C. J. S. BETHUNE,

HEAD MASTER OF TRINITY COLLEGE SCHOOL,

PORT HOPE, ONTARIO.



NOVEMBER, 1897.

LONDON:

LONDON PRINTING AND LITHOGRAPHING COMPANY.

1897.

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

Cynipidæ and Typhlocybinæ wanted, named or unnamed, from all quarters Will offer, in exchange, Colo. insects in any order. C. P. GILLETTE, Fort Collins, Col.

WANTED.—First An. Report on Nox. Insects of Illinois, by B. D. Walsh, 1868. I have for sale or exchange a complete set of Dr. Fitch's fourteen Repts. on the Insects of New York. Address, M. V. SLINGERLAND, Ithaca, N. Y.

LEPIDOPTERA.—I desire long series of Plusias from all parts of boreal North America. Will purchase or give liberal exchanges. Correspondence invited. R. OTTOLENGUI, 115 Madison Ave., New York.

N. A. LEPIDOPTERA.—Exchange desired. Also a lot of exotic Coleoptera, named and unnamed. What offers? Will collect in other orders.—E. V. RIPPON, 129 Hazleton Ave., Toronto.

KERMES.—Desired from North America. Will return identified material. E. E. BOGUE, Agr. Expt. Sta., Stillwater, Oklahoma.

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WILL COLLECT in many orders of Entomology and Herpetology of Arizona. Address DR R. E. KUNZE, Phoenix, Arizona.

I OFFER perfect specimens of named diurnals from Central America and Northern South America, in papers, for diurnals from Northwest, Western and Southwestern States. LEVI W. MENGEL, Reading, Pa.

WILL COLLECT any Aquatic insects to exchange for Odonata and Plecoptera, nymphs or imagoes; nymphs preferred. Will determine nymphs or imagoes in these orders for duplicates. JAMES G. NEEDHAM, Cornell University, Ithaca, N. Y.

COLLECTORS OF AQUATIC COLEOPTERA should save all the Aquatic Hemiptera taken with the beetles, dredging or at light. I will give exchange for all such Hemiptera in any order, or purchase. CARL F. BAKER, Auburn, Alabama.

COLEOPTERA.—Exchange desired; only perfect specimens given and received. Will also collect in other orders in exchange for Coleoptera of N. A. R. J. CREW, 105 Oak St., Toronto, Ont

N. A. LEPIDOPTERA not in my collection wanted; offer Manitoba Lepidoptera and Coleoptera. Send lists to A. W. HANHAM, Bank of B. N. A., Winnipeg, Man., Can.

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COLEOPTERA.—Wanted, Halipidæ, Gyrinidæ, and Rhynchitidæ, named or unnamed; also Attelabus genalis. Good returns of named N. American Coleoptera. RALPH HOPPING, Redstone Park, Kaweah, California.

Correspondents desired in any part of the world who will collect Hesperidæ (either named or unnamed) in exchange for N. H. Lepidoptera. W. F. FISKE, Mast Yard, N. H., U. S. A.

WANTED.—Diptera of the families Sarcophagidæ and Muscidæ (sensu stricto) from all localities. Will purchase or exchange for insects of any order. GARRY DEN. HOUGH, M. D., 542 County St., New Bedford, Mass.

HYMENOPTERA.—Fossors and Bees wanted from West and South (named or unnamed). Offer in return good American and European Col., Lep. or Hym. S. N. DUNNING, 43 Niles St., Hartford, Ct., U. S. A.

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VOL. XXIX.

LONDON, NOVEMBER, 1897.

No. 11.

NOTES ON THE LIFE HISTORY OF COLIAS INTERIOR, SCUD.

BY H. H. LYMAN, MONTREAL.

When in New York, towards the end of May, 1894, I paid a visit to Mr. B. Neumœgen, who, though suffering considerably from the fatal disease to which, after a brave fight, he finally succumbed, received me kindly, and after a short conversation sent me upstairs to Mr. Doll to get the names of certain species which I had brought for determination.

In one of the drawers which Mr. Doll showed me I found several specimens of *Colias Interior*, one being of a very rich shade of colouring, almost orange, in fact. Asking where they came from, I learned that they had been taken the previous season at Camp Lou, on Osgood Pond, in the Adirondacks, and I immediately determined, if possible, to get eggs. Early in July I wrote to Mr. Neumœgen to ascertain the best time to be on the happy hunting-grounds and for any suggestions, and received a post card, dated 9th July, written on a railway train, and the last communication I received from him, telling me that then was the right time. I was unable to go just then, but on the 20th I left by the evening train over the Adirondack and St. Lawrence Railway, and reached Paul Smith's hotel shortly after 9 o'clock. The 21st it rained all day till late in the afternoon, but the 22nd was fine, and I soon had 2 ♀♀ of *Interior* caged for eggs. For the cage I used a tomato can filled with such soil, chiefly sand, as I could find, and in it I placed two species of *Vaccinium*, two willows, *Kalmia Augustifolia*, *Trifolium Stoloniferum*. The following day I took five more females and two males. One ♂ *Philodice* was taken courting a ♀ *Interior*, and was confined with the ♀♀ to see if it would copulate with one of them, but it did not do so, so far as I observed. Three of the freshest ♀♀ were killed for the cabinet, but the remaining four with 1 ♂ *Interior* and the ♂ *Philodice* were kept caged. The 24th was again rainy, and in the afternoon I left for home, carrying my menagerie with me. On the 26th July the plants were changed to a flowerpot of larger size than the tomato can, and the following species of plants were added: *Melilotus Officinalis* and *Alba*, *Amphicarpæa Monoica*,

Vicia Cracca, *Desmodium Dellenii*. One ♀ was found dead, and one very feeble and apparently dying. The living ones were fed with sugar and water, and here I may be permitted to say that the only success I have ever had in feeding butterflies was when I uncoiled their tongues with a pin bent at the point, and then put a camel's-hair pencil dipped in the syrup to the tongue. They will then continue to feed as long as they are hungry; but holding the brush in front of them and blowing gently towards them, as the authorities tell us to do, I have found a failure, and putting a saturated sponge in a cage utterly useless. No eggs were observed at this time, but one at least must have been laid some time before, as a larva hatched on 30th. On the 29th I was ill in bed all day, but on the 30th I found that from 28 to 30 eggs had been laid, nearly all on the *Vaccinium*, and that one larva had hatched as above stated. One egg was laid on *Amphicarpæa Monoica*. One or two eggs were laid after the 30th. I divided about half of the eggs between Messrs. Fletcher and Scudder, sending eight to the former and six to the latter.

Of the eggs that I kept, one hatched on 30th July, four on 4th August, eight on 5th, and two on 6th. The egg period must therefore have been about six or possibly seven days in one or two instances.

The egg and first stage of the larva have been described by Mr. Scudder in his great work on butterflies, but as that work is unfortunately not available to all entomologists, it will do no harm if I give my notes, imperfect as they may be, in full.

Egg.—Length, $1\frac{1}{3}$ mm.; diameter, .48 mm. Similar to *Philodice* in shape. Number of ribs, about 20. At first, white tinged with greenish-yellow, soon turning reddish-orange. Just before hatching turning dark. The larva can then be seen through the shell, standing on its tail, with a clear, vacant space above the black head. The larva emerges a little below the top, just where the head is. One that was watched crawled slowly down the shell on to the leaf, moving its head from side to side on the leaf as though spinning a silken path, and as soon as it was all on the leaf, it turned round, climbed to the top of the shell, and began to devour it, and ate it all up, its meal taking 40 minutes. Most of the larvæ did not eat more than half of the shell, and some did not eat any.

Young larva.—Length, 1.91 mm.; width of head, .366 mm.; head black, the hairs pellucid. Body brownish-green, finely transversely striated, with about five striations to each segment. Skin faintly shagreened with yellowish-brown; the striations are of same colour; the raised points

are pale in colour, black at the summit. Hairs pellucid, club-shaped, especially on second segment, where they are considerably longer than on the other segments.

Tried the larvæ with *Vaccinium*, two or three species of birch, two or three species of willow, *Amphicarpæa Monoica*, *Epilobium Augustifolium*, and several other plants at a venture, but in all cases they crawled off the leaves on to the side of the jar. One that was afterwards placed upon a willow leaf just died and dried up where it was put. On 5th August found the leaves of *Vaccinium* eaten in several small patches, and a sprinkling of tiny frass in the bottom of the tumbler. All the larvæ behaved as though *Vaccinium* were not their proper food plant, leaving it and wandering around the glass, and only returning to it when they found that they could not get anything more to their taste. I have, however, since then, seen the same thing done by the larvæ of a Noctuid, the eggs of which were found on the leaves of a shrub, and I therefore judge that it is owing either to a desire to explore their surroundings or because they object to the confinement. The frass from the young larvæ must have been ejected with considerable force, as the jar was always sprinkled half way up the side. The mortality, through drying up apparently, was very heavy, and by the 15th of the month only five remained out of fifteen, and in my despair I wrote to Mr. Scudder for suggestions, and on the 17th received an answer from him describing his method of unconfined feeding. I then filled a homeopathic vial with water, bored a small hole in the cork, and inserted a small sprig of *Vaccinium*. The vial I placed in a wineglass, with earth around it to support it, in order that should the larvæ fall off the leaves they would be caught, and also to decrease the danger of their straying. The earth I watered, so as to render the air about the larvæ slightly moist. I then transferred all that remained alive, viz., three, as two had perished since the 15th, to the sprig. The following day I found that one had not moved from the spot where I placed it, and was apparently dead and drying up, but the two others were healthy, and thenceforward I had no trouble, and carried these two right through to imago. One of these larvæ passed first moult on 18th August, and the second on the 20th. Just before the moult the larva seems quite smooth.

After first moult: Length about 3.9 mm., rather plump, colour dull green, head same colour as body, head and body covered with very short, minute whitish hairs, giving a shagreened appearance; faint, darker green longitudinal lines are visible under a lens.

On the 20th I left for a short holiday at Murray Bay, carrying my menagerie with me, and my arrival with it caused a certain amount of curious interest among the guests at the hotel. The larva eats the parenchyma of the leaf in small round patches; mine fed on the upper side, and when resting, they rested along the midrib, head sometimes up and sometimes down. Mr. Scudder tried his larvæ with *Vaccinium Corymbosum* and *V. Vacillans*, and found that the one on the latter ate with twice the zest of that on the *Corymbosum*, and further, that the one on the latter fed on the upper surface of the leaf, while that on *Vacillans* fed on the lower surface.

About the end of August or first of September they ceased feeding and became lethargic, lying along the midrib of the leaf, near the petiole, upon a slight carpet of silk, and as they were plainly hibernating, and I feared they might dry up, I removed the leaves from the sprig, cut away the surplus space of the leaves, and secured them to the bottom of a pill-box with a touch of glue. When the pieces of leaf seemed perfectly dry, I put the pill-box in a bottle, corked it and placed it in the refrigerator. Some time afterwards I found that in some way water had got into the bottle, and the card pill-box was wet and mouldy. I took it out, removed the mould as well as possible with a camel's-hair pencil, and allowed the box to dry. The larvæ were apparently healthy, and I then put the box out of doors on a gallery, where the occupants would be as cool as possible and protected from sun and rain.

As soon as the snow came I got a small wooden box, cut several small pieces about an inch square out of the upper edge for ventilating purposes, put it on the ground, with a brick on the bottom inside, placed my box with hibernating larvæ on the brick, and covered the box with an inverted tin tray that I had had made, the tray projecting about an inch all around the box, and then covered it with snow. In the spring, as the snow gradually melted, I had more brought from the shady parts of the garden to pile over the box, and finally had the much-reduced heap covered with ashes to protect what little snow remained from the genial warmth of the end of April. I wrote to Mr. W. H. Edwards to try to secure some *Vaccinium* from the South, offering to pay a boy to get it, but Mr. Edwards wrote that he did not know where to get it, and advised me to try willow. I then appealed to Mr. Jack, at Jamaica Plain, and a few days later to Mr. Fletcher, at Ottawa. Both kindly responded promptly, and as a result I received a plentiful supply of shoots with the first tiny

leaves coming out. The snow and ashes were removed from the top of the box on 1st May, and the box opened. The card pill-boxes were found very damp and mouldy, but the two larvæ were sound and healthy in spite of the mould all about them, but were naturally somewhat shrunken in size from their long fast.

At midday, on 3rd May, as I found that they had moved from their positions, I placed them very carefully upon the open buds of a sprig of *Vaccinium*, arranged in water as previously. They soon crawled on to the stem and rested, one head down, the other up.

During the 4th they remained lethargic, in the same position, but by the morning of the 5th the one which previously had its head up had turned round and had its head down, and by the evening I found that they had eaten a little. They now eat the entire leaf, which is young and tender.

On 9th May they moulted for second time.

After 2nd moult. — Length, about 7 mm. Head green, slightly roughened with minute brown points. Body green, with many minute yellowish raised spots, each tipped with a minute brown hair or point. Along the spiracular space there is a raised band like a fold, mottled with white, pink and yellowish.

On 12th May one passed 3rd moult about 3.30 p.m. while under observation. When first seen the old face still adhered to the mouth-parts of the new, but the skin had been worked more than half way to the anal extremity. It only took a very few minutes to get clear of the old skin, and then it proceeded to divest itself of the old face, which it soon accomplished.

After 3rd moult. — Length at rest, 8.6 mm. Head bright green, roughened as before. Body darker green, shagreened with yellowish raised spots, with short brown hairs or points. Spiracular fold as before, whitish, with orange and yellowish patches and markings.

The weather turned cold and wet, and the second larva was two or three days later in moulting than the other, but the exact date was not recorded.

The species of *Vaccinium* that Mr. Fletcher supplied me with was *Canadense*, but I had also received *V. Vacillans* from Mr. Jack. On the 17th a careless servant threw away my supply of *V. Canadense*, so I gave the larvæ the *V. Vacillans*, but the following day I found they had refused it and had eaten nothing, so I offered them some of the sprigs that I had

first received with the opening buds which I had kept in a tin, and they then began to feed eagerly upon these. The arrival of a fresh supply of *V. Canadense* from Mr. Fletcher removed all cause for anxiety.

On 25th May both were observed to be apparently fixed for 4th moult. Length as contracted, 14 mm. The spiracular fold is pink, bordered with white and interrupted by the spiracles, which show as a green oval ring on the white band with a white centre. There is no trace of any pink or other stripe above or below the spiracular one. There is a dark green dorsal line, and the space on each side of it has a yellowish-green appearance from the minute yellowish warts, but the subdorsal or lateral region is of a bluish-green shade, and the warts are whitish. The region above the spiracular fold is thus about evenly divided between bluish and yellowish green.

One was found, about 10.45 a. m., on 26th May, to have passed 4th moult, and was described at 1 p m.

After 4th moult.—Length at rest, 16 mm. Head and second segment bright green, finely sprinkled with black points, from which arise minute hairs, blackish above, whitish below. Dorsal region green, with a brownish-yellow tinge, as before. Lateral and sub-spiracular regions bluish or whitish green, the minute hairs being whitish. Spiracular fold white, overlaid along the middle with coral-red. On following morning the other larva had passed 4th moult, and on 31st the former was apparently mature, as it left its food and crawled up to top of cage. I described it in the afternoon, but it was very restless, sometimes crawling very fast, and sometimes in a very funny, jerky manner.

Mature larva.—Length, 25 mm. Rich dark yellowish-green on head and above, with narrow dorsal dark stripe bluish-green on sides, with innumerable small papillæ and minute hairs of a dark brown or black colour above, partly white on sides, and white below spiracular fold. Spiracular fold white, with bright crimson stripe included. Head small; as finely dotted as the body. Below bright green; feet and prolegs the same.

Mr. Fletcher kindly gave me the following note on the general habits of the larva:

“Larva decidedly sluggish for the greater part of the time, but when feeding, which was generally twice a day, very nervously active, biting with great rapidity, and moving slowly with short, jerky steps.”

The following particulars are also taken from Mr. Fletcher's notes on the mature larva:

Length, 1.38 inches when extended feeding. Head, 2 mm. broad; narrower than segment 2. Segment 3 slightly the widest of all. Body cylindrical from 4 to 10 inclusive, then tapering slightly to end. Head concolorous with body, evenly reticulated all over with dark green, the interspaces yellowish and pubescent, the bristles on apex short and black, those toward the mouth much longer and white. Mandibles darkened at apex, process beneath the neck honey-coloured. Ocelli six, in two lines, the anterior of 4 slightly curved forward and lying on a yellowish-white stripe, the other two lying behind these, one above the other, smaller than those of the anterior row. In the anterior row the 2nd and 3rd are the largest, all blackened at base, vitreous at apex. No. 1 of posterior series is the smallest and least conspicuous."

On 1st June one fixed for pupation, and the other on 2nd. Pupation occurred on 3rd June.

Chrysalis very similar to that of *Philodice*. Green, vermiculate with yellowish-white markings over upper part of thorax and all the abdomen, giving a pea green effect. A green dorsal line extends the whole length. When first formed, there is a spiracular band, similar to that of the larva, running from the wing-case to the tail, but the crimson soon disappears, and the band becomes yellowish and inconspicuous. Half way between the band and the ventral surface there is a broken reddish-brown stripe on the first three abdominal segments, beyond the wing-covers. The head is marked with darker green, yellowish-white at apex. The girdle is rather long, and the chrysalis hangs loose from its support. Length of chrysalis, 18.7 mm.; greatest thickness, 6 mm.

On 12th June the antennæ cases were crimson, tipped with yellowish-green, and the outer and apical margins of the wing-covers were the same. All the parts between the antennæ cases were brownish-green, the eyes deep green, the ventral half of the abdomen yellowish, the wings greenish-yellow. While I was describing it, it bent itself from side to side, bending the abdominal joints as much as possible.

Both pupæ disclosed the imago on afternoon of 13th; the chrysalis stage being thus ten days. Both were males. I had intended sending away one larva to have a coloured drawing made of it when mature, and of the chrysalis when formed, but my ones matured so fast that I was too late for this, so appealed to Mr. Fletcher to send his one specimen, which had lagged a little behind mine in development. He very kindly acquiesced, but, unfortunately, the larva pupated in the mail, with fatal

result. From the length of the larva, 1.38 inches, he judged that it was a female. The form of the species which occurs in the Adirondacks is that with yellow female, but what that form should be called is a matter of some doubt. In Mr. Scudder's "Butterflies of New England," page 1107, he suggests that as this form was first described when the species was re-described by him, under the name *Eurymus Philodice*, var. *Laurentina*, it should be designated by the trinomial appellation, *Eurymus Interior Laurentina*, the pallid, or white, female being called *Eurymus Interior Interior*. But it seems to me that the doctrine of priority of description cannot govern the matter in the case of a variety, else we may have what is the normal form in nature labelled as the abnormal in our cabinets, and the abnormal variety of nature standing as the normal form in our cabinets. Clearly, where there is dimorphism in one sex of a species, the form which predominates in a marked degree must be considered the normal form, and the other the varietal, all original descriptions to the contrary notwithstanding. Priority must rule in regard to the species, but it must give way where it clashes with nature in regard to varieties.

The question, then, to be settled, is what is the predominating form of the female in this species? Possibly at present the material in cabinets may not be sufficient to settle the matter authoritatively, but I believe it will be found that the yellow or syngenic form is the normal form, and that the antigenic or pallid female is only an albinic form, as in *Philodice*.

Among the types of *Interior* there was only one female, and this happened to be of the pallid form described by Mr. Scudder as "white, with a very pale yellowish tinge"; but among the large number brought from Cape Breton Island by Mr. Roland Thaxter there were eight pallid females, and ten which Mr. Scudder called gynandromorphic females, by which not very happy term, I suppose he designated the yellow form.

Besides the seven females taken by me in the Adirondacks and the three from the same region that I saw in Mr. Neumøgen's collection, I have one from the *Godbout river, in the Gulf of St. Lawrence, and one from Nepigon, and all these are yellow, and I do not remember having ever seen a white one, though it is possible I may have done so. Dr. Bethune has informed me that he took a good many at Nepigon, and all were yellow. Mr. Fletcher wrote me that he had taken 18 ♀♀ at Nepigon, and of these 11 were of what he calls the pallid form, and 3 at

*The man who collected for Mr. Couper at this locality was named Comeau, not Corneau, as printed in the CAN. ENT.

Ottawa, of which one was pale, and that Prof. Macoun took 3 ♀ ♀, all yellow, in Prince Edward Island; but I do not think Mr. Fletcher has ever had a white female Interior. Mr. Fletcher has also one ♀ of the yellow form from British Columbia. If my belief in this matter should prove to be well founded, the species should simply be known as *Colias Interior* with an albinic variety of the female, and the name *Laurentina* should simply fall into the synonymy.

Mr. Scudder further says that "the males are very much more numerous than the females," and among his "desiderata" asks why this is so.

On general principles I should think such a condition of things extremely doubtful, and I believe Mr. Scudder's assertion to be founded on insufficient evidence, especially as in the collection which Mr. Roland Thaxter made in Cape Breton, and which furnished Mr. Scudder with his types of *C. Laurentina*, there were 18 females to 21 males, certainly no great discrepancy.

I have only twice met with this species in numbers, but neither experience would lead me to form such an opinion. The first occasion was on 8th July, 1890, along the line of the C. P. R. west of Sudbury, when travelling to Nepigon in company with Mr. Fletcher. Whenever the train stopped for a minute or two we jumped off with our nets, and I think we took a dozen between us, and I believe all were males, but it was evidently too early for the females, as the males were quite fresh, and the next day when we arrived at Nepigon, where the season is later, we found that the males had not yet appeared. I think it probable that a fortnight later plenty of females would have been flying near Sudbury.

I may say, however, that the evidence of Mr. John D. Evans, of Trenton, who collected for a number of years at Sudbury, is rather on the other side, as out of a series of 31 specimens in his collection only 4 are females. This is probably accounted for by the fact that out of the 31 no less than 19 were taken prior to July 5th, and for 4 others the date of capture is unknown, and I have already pointed out that the females probably appear later. Twenty-one out of the 31 were taken by Mr. Evans in 1886, who found this species comparatively scarce in later years.

In 1894, at Paul Smith's, I took seven females to two males, but, of course, the former are easier of capture. When this matter has been further investigated, I am confident it will be found that no serious

discrepancy in numbers exists between the sexes. In speaking of the probable or possible life history of the species, Mr. Scudder says (page 1110): "Mr. Fletcher obtained them (the eggs) July 16-24, and they hatch in seven days. This gives ample time for the caterpillars to attain maturity and pass into pupa for the winter; but what the creatures actually do, and how winter is passed, is unknown. There is, however, certainly but one brood anywhere." It seems to me, however, that it may be mathematically demonstrated that any species of which there is only one brood in the year and which does not appear on the wing till July or the very end of June must pass the winter in the larval condition not more than half-grown.

THE LIFE HISTORY OF *EPIRRANTHIS OBFIRMARIA*, HBN.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

Epirranthis obfirmaria is a swamp insect. I take it in "The Gomin" near Quebec, where, in ordinary seasons, it is on the wing from early in June till the close of that month. The following is a brief description of this beautiful insect:

♂. Expanse of wings one inch; length of body half an inch; length of antennæ three-tenths of an inch. Colour a rich, warm brown. The primaries have a broad ochreous band, widest at the costa, outlined with dark brown. In this band, not far from the costa, is a dark brown spot. The secondaries have the outer third of the same warm brown as the primaries, with an ochreous patch at the outer angle of it. The rest of the wing is ochreous, clouded towards the base. The marginal dark brown line of this ochreous portion is somewhat angulated. In the part of lightest colour in the wing is a conspicuous dark brown spot. The antennæ are pectinated.

♀. Expanse of wings an inch and one-fifth; length of body nine-twentieths of an inch; length of antennæ two-fifths of an inch. The marks in the wings are similar to those in the wings of the male, except that there are no brown dots in the primaries. The colours are much brighter: the darker portions are of a rich brick-red, and the lighter of a clearer yellow than in the male. The brown spots in the secondaries are small. The antennæ are filiform.

Eggs of E. obfirmaria.

The eggs of *E. obfirmaria* are laid dispersedly and unattached. They are pale greenish-yellow, small, and bluntly oval in outline. They

have minute granulations on the surface. A batch of the eggs, laid on the 14th of June in the present year, hatched on the 27th of the same month. The larvæ fed on *Vaccinium*, *Cassandra*, etc.

Newly-hatched larva.

A "looper," one-tenth of an inch long, suspended itself by a line. It was black with white patches on each segment, and presented a strangely checkered appearance. The head was large and black; the mouth-organs white. The feet also were white. The claspers were wide apart—beside them it had but one pair of prolegs. There were a few bristles at the anal extremity, and along the sides of the larva. It moulted July 3rd.

Larva after first moult.

One-fourth of an inch long; brownish-green in colour; had five conspicuous brown warts on each side of the body. The head was light brown, and the legs brownish-green.

[NOTE.—The habit the larva has of eating its *exuvie* makes it exceedingly difficult to follow its changes. The insect I am telling of, however, certainly moulted on July 16th.]

Larva after moult of July 16th.

Length three-fifths of an inch. Colour brownish-ash above, with fine paler lines. The fourth and terminal segments were somewhat lighter in colour. Underneath the larva was of an Indian yellow shade. The face was flat, outlined with brown, and had two white spots near the upper edge. The spiracles were dark brown and appeared in a line of folds or broken ridges. The larva moulted July 24th. After moulting it ate its old skin all but the mask.

Full-grown larva.

Length four-fifths of an inch. Colour brownish-ochreous. It had a dorsal line faintly outlined with brown, and on either side of this a row of dark brown spots. It had also a row of similar spots just above the spiracular line. This line was pale ochreous and warty. Below it was a row of oblong, dark brown patches. The spiracles were dark brown.

The larva ceased to feed in August, and towards the middle of that month gathered a few leaves together and spun a light cocoon somewhat after the manner of *Caterpa catenaria*.

DESCRIPTIONS OF FIVE NEW GENERA IN THE FAMILY
CYNIPIDÆ.BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DEPARTMENT OF INSECTS,
U. S. NATIONAL MUSEUM.

Subfamily VIII.—CYNIPINÆ.

Xystoteras, gen. nov.

This new genus somewhat resembles *Philonix*, Fitch (= *Acraspis*, Mayr), and agrees with it in having 14-jointed antennæ, but otherwise is quite different. The head, thorax and abdomen are highly polished, impunctate, the mesonotum being entirely without any trace of the parapsidal furrows, and in this character differing widely from all other of the agamous genera of the Cynipinæ. The absence of the parapsidal furrows being peculiar only to the sexual genera *Neuroterus* (*Ameristus*, Förster) and *Dolichostrophus*, Ashmead. The third joint of the antennæ is not quite as long as joints 1 and 2 or 3 and 4 united, joints 10-13 a little longer than thick, while the last joint is fusiform, a little longer than the penultimate. The scutellum has a depression across its base, but is without distinct foveæ, and is also not separated from the base of the mesonotum by a delicate grooved line; apically it is obtusely rounded, shagreened and somewhat densely pubescent. The mesopleura have a large, rather deep vertical femoral impression. The wings are represented by very short pads which do not extend beyond the apex of the metathorax or just reach to base of abdomen. The abdomen is about twice as long as the head and thorax united, polished, bare; the second segment dorsally occupies about half the whole surface; the third segment dorsally is not quite as long as segments 4 and 5 united; the segments 4-7 subequal; while the hypopygium terminates in a long, pubescent spine. The hind tarsi are as long as their tibiæ, the claws being simple.

Xystoteras volutellæ, sp. n.

Gall.—A conical, bluish-gray gall, from 3 to 3.5 mm. high, by 2.5 mm. in diameter at base; occurring singly or in great numbers on the under surface of the leaves of *Quercus macrocarpa* in Riley County, Kansas. The top of the gall is truncate and internally it is hollow, with the larval cell or kernel, resembling a minute nipple, situated at its base. The gall is attached to the leaf by a few fibres and may easily be detached. The colour of the gall is produced by a powdery or pruinose bloom which completely covers it when fresh.

Gall-wasp.—♀. Length 2 mm. Polished black, very sparsely pubescent. Antennæ 14-jointed, about two-thirds the length of the body, the first joint or scape obconical, slightly curved, swollen at tip, the second joint about $1\frac{1}{2}$ times as long as thick, both much stouter than the flagellum. Mesopleura smooth, shining, with a deep vertical femoral fovea. Legs, except knees or the extreme apices of the femora, which are dull honey-yellow, entirely black.

Hab.—Manhattan, Riley County, Kansas.

Described from a single specimen received nearly ten years ago from Mr. C. L. Marlatt. The wasp, according to Mr. Marlatt, issues from the gall early in January.

ZOPHEROTERAS, gen. nov.

This genus also comes very close to *Philonix*, Fitch, but is readily separated from it by the shape of the scutellum, by antennal characters, by bareness of abdomen, and by the claws of the hind tarsi being simple, not toothed.

The frons and mesonotum are alutaceous or feebly shagreened, the latter having distinct traces of the parapsidal furrows, or at least these are more or less distinct posteriorly. The scutellum is rounded or semi-circular, rounded off posteriorly and separated from the mesonotum by a delicate grooved line and carina. The antennæ are long, 14-jointed, the third joint as long or nearly as long as joints 4 and 5 united; joints 6–13 are a little more than twice as long as thick. Claws of hind tarsi simple. The abdomen is longer than the head and thorax united, bare, or at the most with only some sparse pubescence at sides towards the base; the second segment dorsally occupies fully half the whole surface; segments 3–5 short, subequal; segments 6 and 7 very short; while the hypopygium is armed with a hairy spine.

To this genus belongs *Acraspis vaccinii*, Ashm.

XANTHOTERAS, gen. nov.

Head shagreened, the frons without a distinct ridge or carina between the antennæ. Mesonotum polished, with deep, distinct parapsidal furrows. Scutellum with more or less distinct lateral margins or with a frenum, two indistinct shallow foveæ at base and the same separated from the base of the mesonotum by a delicate but distinct transverse grooved line and a carina. Antennæ 14-jointed, the third joint a little longer than the fourth, or the latter about two-thirds the length of the third; joints

7-14 a little stouter than joints 2 to 6, and much shorter, joints 11-13 being hardly longer than wide. Tarsi shorter than their tibiae, the claws with a tooth within.

This genus, although closely allied to *Biorrhiza*, Westw., is readily separated by the absence of the middle frontal ridge between the antennæ, by the shape of the scutellum and by the claws having a tooth within.

The type of the genus is *Biorrhiza forticornis*, Walsh.

PARATERAS, gen. nov.

Last joint of labial palpi somewhat enlarged, ovate. Antennæ 14-jointed, the third joint long, but much shorter than joints 4-5 united, joints 11-13 scarcely twice as long as thick, the last joint hardly so long as the two preceding united. Head and thorax alutaceous or finely shagreened, the mesopleura finely delicately sculptured, without a femoral fovea. Mesonotum with two distinct parapsidal furrows which converge and meet at base of the scutellum. Scutellum small, highly convex or elevated, with a distinct transverse fovea at base (in reality two foveæ united). The hind tarsi are longer than their tibiae, the claws with a distinct tooth at base beneath. Abdomen polished, bare. This genus comes nearest to *Spheroterus*, Ashm., but is readily separated by having 14-jointed, not 13-jointed, antennæ, by the scutellum having a fovea or foveæ at base, and by the hind tarsi being longer, not shorter, than their tibiae.

Parateras Hubbardi, sp. n.

Agamous ♀.—Length 2 mm. Head and thorax reddish-brown, the vertex and scutellum somewhat obfuscated. Abdomen black, piceous towards base. Antennæ with the first two joints ferruginous, dusky above, the flagellum black or brown-black, except first joint basally. Legs, including coxæ, pale ferruginous, with all the tibiae, or at least outwardly, dark fuscous or blackish, the tarsi more or less fuscous. Abdomen with the second segment not quite occupying half the whole surface, the third segment dorsally not quite as long as four and five united, the fifth about two-thirds the length of the fourth, the following segments retracted.

Hab.—Detroit, Michigan.

Described from two specimens received from Mr. H. G. Hubbard, to whom the species is dedicated.

ASCLEPIADIPHILA, gen. nov.

This new genus comes very close to *Antistrophus*, Walsh, and might easily be confused with it, since it agrees with it in all particulars except as follows :

The female antennæ are 13-jointed, not 14-jointed, the third joint being shorter than the fourth; in the male the antennæ are 14 jointed, not 15-jointed. The second abdominal segment occupies fully two-thirds the whole surface, while in *Antistrophus* the second segment is considerably shorter.

Asclepiadiphila stephanotidis, sp. n.

Gall.—A small, rounded or pea-like gall averaging from 6 to 8 mm. in diameter, growing from the stems of a species of *Stephanotis*. Externally it is opaque and varies from a gray to a brownish colour, while internally it is whitish and composed of a dense pithy substance with a single larval cell in the centre.

Gall-wasp.—♀. Length 3 mm. Head, thorax and legs reddish-brown, the sutures of the thorax dusky, the mesonotum with a dark streak down the middle, while the middle and hind tarsi are more or less obfuscated. Antennæ 13-jointed, brown. Abdomen black, highly polished. Wings hyaline, the veins pale yellowish; the first branch of the radius is straight or nearly so; areolet entirely wanting, the transverse cubitus about two-thirds the length of the first abscissa of the radius, the first branch of the cubitus very delicate, indistinct, and originating from about the basal third of the basal nervure.

♂.—Length 2.6 mm. Black; tips of femora and more or less of anterior and middle tibiæ basally dark honey-yellow, rest of legs black. Antennæ 14-jointed, the scape and pedicel black, the flagellum brown.

Hab.—Oregon, Missouri.

Types, No. 3737, U. S. N. M.

A NEW FOOD PLANT FOR PAPILIO ASTERIAS.

BY G. H. FRENCH, CARBONDALE, ILL.

A few days ago I received a letter from Mr. A. V. Thomsen, Chicago, giving a new food plant for *Papilio Asterias*. But I can give it best by quoting part of Mr. Thomsen's letter. He says :

"Having made a very interesting observation in my study of Lepidoptera, I herewith enclose the notes regarding the same. Aug. 26, '97, I received from Mr. Higgins, in charge of Dept. of Hardy Perennials

and Wild Flowers, Lincoln Park, four larvæ of *Papilio Asterias*, nearly full-fed. Found on *Ruta Graveolens* (English Rue). These larvæ pupated as follows: One on Sept. 4, three on Sept. 7. On Sept. 13, '97, I received from the same source eight larvæ of *P. Asterias* in third, fourth and full-fed stages. One pupated Sept. 16. Two of these were found on *Ruta Graveolens*, the balance on *Feniculum officinale* (common Fennel). Now, I have never seen nor heard of any previous records of *P. Asterias* being found on anything else than members of the Umbelliferae, and I consider it a very strange occurrence that they should choose a family so widely separated from the Umbelliferae as the Rutaceæ, of which *Ruta Graveolens* is the type.

"If it had been *Papilio Cresphontes* which I had found upon that plant I should not have wondered, as its food plants here are *Xanthoxylum* and *Ptelea*, two of the Rutaceæ, but *P. Asterias*!"

I should like to ask here if any one has found *Papilio Philenor* feeding on anything but *Aristolochia*? The species of this genus are rare here, but the butterfly is rather common.

ANOTHER NEW SPECIES OF PROTANDRENA, CKILL.

BY S. N. DUNNING, HARTFORD, CONN.

Protandrena Bancrofti, n. sp.

♀.—Length 9–11 mm.; not as stout as *Cockerelli*, Dun.; a few gray hairs on face and cheeks and on under side of thorax, hair bands on seg. 2–3–4, seg. 5–6 covered with hair growing rufous towards tip, legs and venter with sparse rather longer hairs; black except a T-shaped mark resting against upper edge of clypeus, spot on tegulae, tubercles, and four anterior knees which are pale yellow. Head subquadrate; broader than high, venter with fairly deep, not close, punctures; clypeal and sub-clypeal punctures larger and shallow, mandibles piceous; antennæ black at base, growing brownish towards tip, 1st jt. flagellum not as long as 2nd and 3rd combined. Mesothorax deeply and closely punctured; scutellum with large, coarse punctures; post-scutellum not smooth, shining; metathorax with a smooth, shining spot on upper lateral angles, closely and finely punctured, a narrow suture extending upwards. Abdomen finely and closely punctured; venter with large shallow punctures. Wings subhyaline, much darkened outwardly (very much more so than in *Cockerelli*); stigma and nervures ferruginous, a light spot before the stigma.

Two specimens (D. 1102, July 6, 1897, on *Solanum rostratum*; D. 1262, July 11, '97, on *Medicago sativa*, or alfalfa) taken on the Bancroft Farm, near Denver, Colo. One has been deposited with the American Entomological Society.

SOME NEW AND LITTLE-KNOWN COCCIDÆ COLLECTED
BY PROF. C. H. T. TOWNSEND IN MEXICO.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

The Coccidæ herein described were collected by Prof. Townsend in 1896, and kindly transmitted to me for study by Dr. L. O. Howard. The collection made by Prof. Townsend will be fully enumerated in a paper to be published by him elsewhere, so the present contribution is confined to descriptions of the new species and descriptive notes on one hitherto imperfectly known. I have also included the description of a new variety of *Comstockiella* from Mexico, not found by Townsend.

(1.) *Aspidiotus reniformis*, n. sp.—♀ scale circular, diam. 2 mm., flat, pale reddish-brown; exuvie concolorous or slightly darker, covered, but both skins very distinctly visible, large, laterad of the middle. First skin when rubbed shining coppery.

♀.—Reniform, yellow with a brown margin; the posterior portion large, pale yellow, projecting with the outline of a cone, unusually produced and narrow, the sides meeting at less than a right angle. Pygidium (so-called) minutely striate; anal orifice oval or subtriangular, a long distance from hind end. Four very small low broad inconspicuous lobes, the plates between them scarcely visible; these lobes are twice as broad as long, the second about or nearly as broad as the first. Immediately cephalad of the second lobe come, a pair of small diverging spinelike plates; then after an interval somewhat greater (sometimes less) than the distance from the hind end to the plates just mentioned, comes a depression in which is a larger, but still small, pair of diverging spinelike plates; beyond this the margin is distinctly but very minutely serrate, with three small pointed prominences at rather long intervals, and a small rounded notch about half way between the first of these and the largest plates.

There are long tubular glands opening at the bases of the lobes, and also at the place of the obsolete third lobe; these are three on each side, with others, shorter and smaller, between them. Caudolateral grouped glands a long distance cephalad of the anal orifice. Four groups of ventral glands, caudolaterals 4 to 7, cephalolaterals 8. The antennæ are represented by small tubercles, each emitting a bristle. On each side of the mouth, some distance from it, is a small reniform orifice, its convexity directed laterad.

Hab.—Numerous on under sides of entire, lanceolate leaves, about 60 mm. long. Tehuantepec City, Mexico, May 26th (Townsend; Div.

Ent., No. 7196). This is related to the subgenus *Chrysomphalus*, and comes nearest to *A. perseæ*, Comstock. It resembles *A. mimosæ* in some respects, but the tubular glands are much longer than in that species, or in *smilacis*. The scale might be taken, at a superficial glance, for *amantii*, *dictyospermi*, or one of the *uvæ* group, all of which are quite different structurally.

(2.) *Aspidiotus (Hemiberlesia) tricolor*, n. sp.—♀ scales 1½3 mm. diam., crowded on twig, approximately circular, very little convex, white with a brownish stain; exuviae central or sublateral, covered by a film of secretion, appearing as a blackish spot; first skin in many examples uncovered, black or dark brown; second skin rarely uncovered, deep orange. Removed from the twigs, the scales leave a whitish film, quite conspicuous.

♀.—Circular, orange-brown. Only a single pair of lobes, these very large, entire, broad and low, much broader than long, gently rounded at ends, shaped like the end of an axe-blade; separated by a pair of well-developed spinelike plates. On the margin cephalad of the lobes is a group of five more or less serrate spinelike plates; then come three very short spinelike plates, after which the margin is more or less, irregularly, crenate. Anal orifice large, oval, distant from bases of median lobes less (sometimes a little more) than its own length. No groups of ventral glands. A few oval glands marking the lines of the obsolete segments. Two small saccular incisions with thickened edges on each side, one immediately laterad of the median lobe, the other cephalad (or laterad) of the obsolete second lobe.

Hab.—Salina Cruz, Mexico, May 29th (Townsend: Div. Ent., No. 7193). Distinguished by its very broad entire lobes, and the orange second skin. It will form with *A. rapax*, Comstock, and *A. ulmi*, W. G. Johnson, a little group, to which the name *Aspidites* is applicable, thus:

Subg. *Aspidites*, Berlese and Leonardi, 1896, s. str.—Scale white or whitish, no groups of ventral glands, only one pair of lobes.

Exuviae black or at least very dark. *rapax*.

First skin black or very dark, second orange. *tricolor*.

Exuviae wholly orange-yellow. *ulmi*.

A. rapax is the type of *Aspidites*. *A. perniciosus*, *tenebricosus* and *smilacis*, included in it by Berlese and Leonardi, are not closely related to *rapax*, and should be placed elsewhere. [Since writing the above I have

found that *Aspidites* was proposed by Waagen in 1895 for a genus of Cephalopoda; *Aspidites*, Berl. & Leon., may therefore be changed to *Hemibertesia*.]

(3.) *Diaspis persimilis*, n. sp.—♀ scale about $1\frac{1}{2}$ mm. diam., snow white, slightly convex; exuviae sublateral, brownish-orange, first skin wholly on second. ♂ scale unknown.

♀.—Circular, orange-brown, hind end strongly striate. Five groups of ventral glands, median 25 or more, nearly touching cephalolateral, cephalolateral about 15, caudolateral 7 to 12. Anal orifice small, caudad of caudolateral glands, but some distance from hind end. Only one pair of distinct lobes, these rounded, not particularly large, very slightly inclined to be crenate on edges, nearly touching at base; at outer base of each lobe a spine; then a spinelike plate, the branching tips of which slightly exceed the lobe; then a pair of minute tubercles representing the second lobe, then a spine; then a very large and stout spinelike plate, branched at tip; then three minute tubercles, then a spine; then a spine-like plate resembling the second but not quite so stout; then a slight notch, followed by a minute tubercle, then on the margin at intervals twelve ordinary spinelike plates of moderate size, and a few spines. At the bases of the median lobes are short dark sacs, a pair to each; and smaller sacs mark the places of the obsolete lobes on the margin. The oval and elongate glands in rows marking the obsolete segments are comparatively few in number.

Hab.—Crowded on fruit of "Chico Sapote," Laguna, Carmen I., Mexico, April 24, 1896. (Townsend: Div. Ent., No. 7184.) Very near to *D. amygdali* (*lanatus*); it may be recognized by the small number of orifices in the caudolateral groups of glands, the form of the lobes, and other minor details.

(4.) *Comstockiella sabalis*, v. *mexicana*, v. nov.—♀ oval, orange-yellow. Grouped glands as follows: Caudolaterals 14-17 (6-10 in type); mediolaterals 11-15 (4-7 in type); cephalolaterals 7-10 (4 in type). Scale as in type.

Hab.—On palms which arrived at San Francisco from Mexico; found by Mr. Craw, who thinks the palms came from near Maratlan, and were growing wild about 75 or 100 miles inland. The genus is new to the Mexican fauna.

(5.) *Lecanium* (*Eulecanium*) *perditum*, n. sp.—♀. Long. 3, lat. 2 to $2\frac{1}{4}$, alt. $1\frac{1}{2}$ mm., general shape low-conical or hemispherical; very

dark brown, more or less shiny; sides with linear plications. Boiled in caustic soda turns the liquid yellowish-brown. Antennæ pale, well developed, tapering, ordinary, 7-jointed, formula 32 (17) 5 (46); 3 extremely long, considerably longer than 4 to 7 together; 2 about as long as 4 + 5; a faint false joint marks the basal $\frac{1}{4}$ of 3; 1, 2 and 3 each with a pair of bristles, on 1 and 2 about the middle, on 3 near the end; 7 with several hairs, an especially long one, longer than itself, springing from its base. Rostral loop short. Anal plates yellowish-brown, the caudolateral margin somewhat shorter than the cephalolateral. Legs well-developed, pale. Digitules filiform, with large knobs. Tarsus hardly half length of tibia. Derm not reticulated, with sparse small round or oval gland orifices; a broad marginal area with very large round or oval gland-pits, the derm between them exhibiting a faint tendency to minute reticulation. These large gland-pits are double or more often complex; they are often nearer together than the diameter of one.

Embryonic larva (after boiling) pale yellowish-brown; rostral filaments in two coils. Caudal tubercles not or little projecting beyond body margin, though well-developed. Anal ring with six hairs, its broad margin conspicuously striate. Claw long; digitules of claw filiform, distinctly knobbed, extending beyond tip of claw; tarsal digitules stouter, with very distinct knobs, not nearly twice as long as claw-digitules, their origin some distance basad of base of claw.

Hab.—Xcolak, near Izamal, Yucatan, México, March 10th, 1896. (Townsend: Div. Ent., No. 5663.) This is a most interesting species; the first *Eulecanium* ever found in the tropics. The antennæ are like those of *L. antennatum*, Signoret. The compound submarginal glands or pits remind one of the large double glands of *L. Fletcheri*. On the other hand, the large pits of the neotropical species *L. baccharidis* (from Brazil) and *L. batatae* (from Antigua) are at once suggested, and it seems that we have here an indication of the affinities of these two species, which had been heretofore wholly obscure. *L. perditum* presents some superficial resemblance to small examples of *L. depressum* or *begoniae*, but these belong to a quite different section.

(6.) *Lecanium chilaspidis*, n sp.—♀ very dark brown, shiny, but largely encrusted (especially at sides) with a dull dark grayish substance: strongly convex, long. $S\frac{1}{2}$, lat. 6, alt. 5 mm. Beneath, at the lateral (spiracular) incisions, are conspicuous patches of white secretion, only

visible after detaching the scale. Younger specimens are flatter, long. 6, lat. 4, alt. 2 mm. There is no waxy secretion on the surface.

♀. --Boiled in soda stains the liquid dark Vandyke-brown. No legs or antennæ found; probably they are rudimentary and easily deciduous. Anal plates small, pinkish-brown, together forming about a square. Derm pale reddish-brown after boiling, not reticulated, remarkable for an immense number of minute gland orifices, among which are interspersed a lesser number of larger, but still small, glands, which are circular and brown in colour. There are also large brownish patches. In places the tubular ducts of the minute glands are darkened, giving the derm a bristly appearance. The derm may be compared to the sky seen through a telescope, the minute glands being the fixed stars, the larger the planets, and the patches the nebulae, though of course the sky does not exhibit so many planets or nebulae.

Embryonic larva (after boiling) very pale pink, with very well-developed, stout, cylindrical caudal tubercles, which are the forerunners of the anal plates; each emits the usual long bristle, but these are easily broken off. Tarsus hardly or not over $\frac{2}{3}$ length of tibia, femur and tibia approximately of equal length. Digitules all filiform, the tarsal ones very long, twice as long as those of claw, and longer than the tarsus itself. Rostral loop extending considerably beyond the hindmost legs. Anal ring with apparently only six bristles. Last joint of antennæ long.

Hab.—On *Chilaspis linearis*, Tehuantepec City, Mexico, May 26th, 1896. (Townsend: Div. Ent., No. 7216.) On the *Chilaspis* at the same time and place were also taken species of *Aspidiotus* and *Mytilaspis*, but the material is inadequate for proper study. *L. chilaspidis* is a very distinct species, but more nearly allied to other neotropical forms than to anything else.

(7.) *Lecaniodiaspis (Prosopophora) radiatus*, n. sp.—♀. Long. 3, lat. 2 mm., often rounder, to long. $2\frac{2}{3}$, lat. $2\frac{3}{4}$ mm., more or less shiny, flattish, pale ochreous, with a longitudinal median keel, low but distinct, and well-defined radiating ribs, marking the segments. Removed from the bark, the scale leaves a whitish mark. Boiled in soda, it turns the liquid greenish. Antennæ pale brownish, apparently 8-jointed, but the joints obscure; 8 short, buttonlike; 3 longest, then 4, or these two about equal; 2 broader than long; 5 and 6 might be taken for one long joint, fully as long as 3; 7 very little smaller than 6. Dermis with numerous very small figure-of-8 glands, which under a low power look like

simple oval glands. Mouth-parts large, yellowish. Dermis not minutely wrinkled. Antennal formula (34) (12567) 8. 8 with some bristles, one longer than itself.

Hab.—On bark of branch of some woody plant, Salina Cruz, Mexico, May 29, 1896. (Townsend: Div. Ent., No. 7194.) *L. radiatus* is much more depressed than *quercus*, not marked like *dendrobii*, rounder than *acaciæ*, differently coloured from *eucalypti*, darker, rounder and smaller than *rufescens*, darker and more distinctly radiately ribbed than *yuccæ*. It seems to be very near to *Lecaniodiaspis atherospermæ* (Maskell), by its small size, 8-jointed antennæ, and very minute figure-of-8 orifices; yet it differs in some particulars, and is, I believe, not the same. *L. atherospermæ* is from Australia, but it may not be a native of that country. Mr. Maskell himself remarks that it is more like the neotropical *dendrobii* than the other Australian members of the genus.

(8.) *Conchaspis Newsteadi*, n. sp.—♀ scales crowded on the bark, overlapping; subcircular to oval, dirty white, low conical, diam. $2\frac{1}{2}$ mm. Apex sublateral, no radiating ridges.

♀ oval, orange-brown, similar to *C. angræci* in most respects. Antennæ 6-jointed, joints subequal, variable. Femur longer than tibio-tarsus, coxa about twice as broad as long. The round gland orifices with crenate edges (so strongly crenate as to appear moniliform) are very distinct; the hindmost segment that shows them is the fourth from the end, this has a pair, close together, on each side. The next segment has on each side four close together, one a little mesad of these, then two at considerable intervals mesad. The next has on each side five in an irregular row, and two pairs at considerable intervals mesad. The next has five and one mesad. The details of the arrangement will differ on the two sides of the same specimen. Long marginal hairs as usual in the genus. Lobes at end of body indistinct.

♂ scale similar to that of the ♀ in texture, but small and elongate.

♂ Pupa red-brown, antennæ stout, of about 7 joints, reaching beyond base of the large rounded wing-pads; end of abdomen with a short, stout caudal stylus, blunt at tip; on each side of the last abdominal segment, by the base of the stilus, are three bristles, two very small, one longer.

Hab.—On Zuchil tree (*Plumieria*), Vera Cruz, Mexico, Feb. 26th. (Townsend: Div. Ent., No. 7159.) I take the liberty of connecting with this insect the name of Mr. R. Newstead, who, under the name of

Pseudinglisia, has given us the best account of *Conchaspis* yet published. With Mr. Green's Ceylon *C. socialis*, this will make the third species of the genus so far discovered. The ♂ pupa, now described, is very interesting, as it is just like the pupa of a Diaspid.

(9.) *Llaveia axinus* (de la Llave).—Prof. Townsend found at Salina Cruz, on May 27th, specimens of a large monophlebid, which I believe is identical with the imperfectly described *Ll. axinus*. The specimens are red, with mealy powder, and are sparsely marked with small black spots; dried specimens appear more grayish, and look something like very large *Coccus cacti*. The legs and antennæ are red-brown, the inner side of tibia and tarsus presents a row of short spines, about 11 on anterior tibia, and six, very small, on anterior tarsus. There are two rows of longer spines on the under side of the femur. Dermis rather thickly beset with short hairs. The largest specimen sent to me is perhaps not adult, and has only nine-jointed antennæ. Its dimensions are, long. 13 mm., lat. $6\frac{1}{2}$, alt. $4\frac{1}{2}$ mm. It appears, however, that adults were certainly found by Townsend, as among the material received at Washington were both eggs and young larvæ. Dr. Howard has kindly lent me a mounted larva, from which I have made the following description:

Larva oval, bright red, beset with short, rather stout spines. Seven very long hairs on each side of hindmost half of body, one to each segment, each accompanied by a much shorter and more slender hair, the smaller hair on the penultimate segment longer than its representatives on those anterior to it, and about half as long as the long hair of the same segment. The long hairs of the caudal segment accompanied by two smaller hairs, of which the innermost are the longest. Legs long, femora moderately stout, those of front legs about as long as tibia, of hind legs shorter than tibia. Tibia and tarsus very slender; tarsus of front legs equal with tibia, of middle legs a little shorter, of hind legs conspicuously shorter than tibia. Claw long, little curved. Eyes very dark, subconical. Antennæ 6-jointed, last joint or club very large, much swollen, longer than 4 + 5, with three whorls of hairs. Second joint a little longer than third, 3 and 4 equal, 5 shortest. The joints from 1 to 4 might be called subequal, and the formula then written 6(2134)5.

I am inclined to suppose that *Llaveia* and *Ortonia* will prove to be the same genus, differing at any rate not more than do species now included under *Icerya*.

EARLY STAGES OF BREPHOS INFANS.

BY DWIGHT BRAINERD, MONTREAL.

Eggs laid April 25th, side by side, packed closely together on the twig at fork of leaf bud. The moth standing head downwards with half opened wings and "see-sawing" out a string of from three to twelve eggs. Between times it runs all over the twig as do the Tineids. Egg oblong, rounded at both ends, length .87 mm., width .46 mm. Slightly roughened and punctured like the skin of an orange. Colour at first a delicate pea-green turning yellowish. The number deposited at the base of each leaf varied considerably. Hatched May 3rd to 5th. At birth larva 1.6 mm., semi-transparent, light sap-green with evanescent purple shades. Body cylindrical, of same approximate size throughout, ending in a strongly bifurcate anal segment. Head light yellow-brown; 1st and 2nd epicranial and 1st clypeal setæ rudimentary, the remaining eleven primary setæ well-developed blunt bristles. Ocelli prominent, dark brown. Shield concolorous. True legs transparent, with dark claws; 4th prolegs fleshy, rimmed with brown; the others not showing.

Segments 3-winkled, tubercles uniform on the abdominal joints; a pair each side of dorsal line, a single one above, a pair below spiracles and one above leg plate. Caterpillar a semi-looper, suspending itself by a thread.

Second stage.—3.75 mm. Colour whitish-green, head yellow. Inter-segmental spaces white and much swollen.

Third stage.—Length 12 mm. Sap-green changing to apple-green. Head and appendages, except claws, transparent. Body marked with a double ad-dorsal and a stigmatal white line.

Fourth stage.—Length 30 mm. Colour on dorsum apple-green to blue-green, according to age. Head appendages and venter much lighter; almost yellowish. Tubercles simple, white, oval to round; setæ short and spinulate. Ad-dorsal line wavy, obscure, slightly broken. There is a narrow double white line through abdominal segments on lateral surface enclosing a darker area; and stigmatal band is broad, white to yellow-white. Spiracles red-brown edged with black, set in indistinct white blotches. Body cylindrical, tapering from 12th segment. Pupated June 12th. Food plant white birch. Pupa green at formation, changing to dark chestnut brown. 14 x 4 mm., smooth. Extremities short, rounded; medial portion cylindrical, of equi-width; the whole cocoon approximately oval. Prothorax strongly incised dorsally and pitted. Frontal headpiece convex, hyaline. Maxillæ reach nearly and antennæ fully to extremity of wing-covers. (4th a. s.) Abdominal segments slightly indented down the back. Cremaster with a single stout hook.

Mr. H. H. Lyman kindly measured the eggs, and I had the advantage of Rev. Mr. Fyles's notes on the caterpillar.