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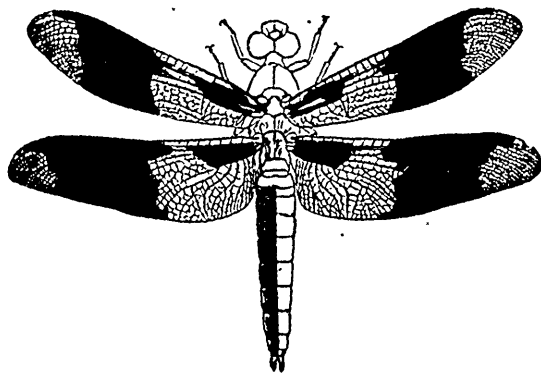
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VOLUME XXIX.

No. 12.



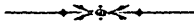
LIBELLULA TRIMACULATA.

EDITED BY

REV. C. J. S. BETHUNE,

HEAD MASTER OF TRINITY COLLEGE SCHOOL,

PORT HOPE, ONTARIO.



DECEMBER, 1897.

LONDON:

LONDON PRINTING AND LITHOGRAPHING COMPANY.

1897.

Lepidoptera for Sale and Exchange . . .

Lowest prices on Indian, South American and Australian Lepidoptera. Papilio, daksha tamalina, etc. Orn. minos, Morphoes cipria and amathonte. Papilio buddha and polymorestor \$25 per 100. Lot 100 mixed \$5. Send for list.
H. K. BURRISON, West Newton, Mass.

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.

COLEOPTERA.—I have fine specimens of *Cychrus vidurus*, *C. Andrewsii*, *C. Lecontei*, and others, to exchange for any new species of *Cychrus* to my cabinet. MR. GEO. A. EHRMANN, 2,314 Sarah Street, Pittsburgh, Pa.

VANCOUVER ISLAND.—I have many hundred Hymenoptera, Hemiptera (Jassidae) and Diptera, mounted but unnamed. Will exchange these for Cerambycidae from North, South, or Central America. CLERMONT LIVINGSTON, Cleveland's Co. Bldg, Vancouver Island, B. C.

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

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.

LEPIDOPTERA desired from all parts of N. America. Will collect in other orders in exchange. C. H. TYERS, 227 Front Street East, Toronto.

LEPIDOPTERA.—Exotic and native cocoons and pupae. Preserved larvae. Especially Rhopalocera. Correspondence invited. W. S. KEARFOTT, 24 South Water St., Cleveland, Ohio.

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.

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.

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.

COLEOPTERA.—Wanted, Halipilidae, Gyrinidae, and Rhynchitidae, 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 Hesperidae (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 Sarcophagidae and Muscidae (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.—Fossorial and Bees wanted from West and South (named or unnamed). Offer in return good American and European Col., Lep. or Hym. S. M. DUNNING, 43 Niles St., Hartford, Ct., U. S. A.

The Canadian Entomologist.

VOL. XXIX.

LONDON, DECEMBER, 1897.

No. 12.

NOTES ON GRAPTA INTER'LOGATIONIS, FABR.

BY H. H. LYMAN AND A. F. WINN, MONTREAL.

This species was unusually abundant in this, as in many other localities, during the season of 1896, and afforded an excellent opportunity for studying it, which we took advantage of by rearing it from the egg. The preparatory stages are well known, and a full account of the life history was given by Mr. W. H. Edwards in CAN. ENT. XIV., pp. 201-207. As noted by Mr. Edwards, the larvæ vary greatly, and this is true even in those raised from the same batch of eggs, and these variations seem to be in no way connected with the two forms of the imago.

In Mr. Caulfield's List of Diurnal Lepidoptera of the Island of Montreal, published in the CAN. ENT. in 1875, this species is called "rare," and its seasons are stated to be "May (hibernated); July to October."

The question as to the number of broods in the season is an interesting one and requires careful examination, but the majority of the authorities are not very clear upon this subject.

Dr. J. G. Morris made no attempt in his "Synopsis" to deal with seasons or broods.

Dr. Harris is not very clear, as he says that the butterfly "first appears in May and again in August and September," and that "the caterpillars come to their full growth in the latter part of August." From these statements it would seem as if he only recognized one annual brood, the individuals of which hibernated and appeared again in the spring; but he says further that "there is probably an early brood of caterpillars in June or July," though he had not seen any on the hop vines before August, but from his remarks on the duration of the pupa stage, viz., "the chrysalis state usually lasts from eleven to fourteen days, but the later broods are more tardy in their transformations, the butterfly sometimes not appearing in less than 26 days after the change to the chrysalis," would seem to indicate that he recognized more than two broods.

Dr. Packard in his "Guide" says of the butterfly: "It is found in May, August, and Autumn," which would not indicate more than two broods.

Mr. W. H. Edwards, who bred this species repeatedly at Coalburgh, says in the CAN. ENT., X., 71, and XIV., 204, that in West Virginia "there are three broods and a more or less successful effort for a fourth." "In Florida," he says, "there are at least four broods, and probably five," but that "in the Northern States, and probably in Canada, it is two-brooded."

Prof. Fernald in "Butterflies of Maine" says nothing of the number of broods, but mentions the dimorphic forms, so he must have recognized that there were at least two broods.

Mr. Scudder in his "Butterflies of New England" says it is double-brooded, the first brood in descent from the hibernators appearing in July, sometimes during the last days of June, and continuing into August, the second brood beginning to emerge towards the end of August and continuing to do so until at least the middle of October.

In regard to the dates at which the hibernators appear in this latitude, Mr. Winn records in his notes April 25, 1890; April 14, 1892; April 9, 1894; and found it quite common in New Brunswick the first week in May in 1896, the specimens seen there being of the form *Fabricii*. A few *Fabricii* were seen around Montreal during the latter half of May, but no particular attention was paid to them; but on the 6th June our Montreal Branch joined the Natural History Society in its annual field day, but separated from the party at Ste. Adele, at which point a number of *Interrogationis* were seen, and two were taken by one of our members, but both were of the form *Umbrosa*, though worn, and either hibernators or, perhaps, colonists from the South.

In this connection reference may be made to the experience of Mr. W. F. Fiske, of Mast Yard, N. H., as written to Mr. Lyman, and since then published in the CAN. ENT., XXIX., 26. In this case no specimens of *Interrogationis* were seen till the middle of May, when a badly worn *Umbrosa* was observed, and during the rest of the month this form was common, but no *Fabricii* were seen, and this certainly suggests the idea that these individuals were colonists from the South.

On 13th June our Branch had a little excursion to the Blue Bonnets Swamp, about half way to Lachine, and several *Umbrosa* were seen and

taken. Most of these were worn, but Mr. Winn saw a fresh specimen, and others were seen and one secured on the 14th.

These were evidently individuals of the first brood in descent from hibernators or colonists, and assuming that the eggs were laid during the first week of May, would allow about six weeks from egg to imago, which corresponds with the experience of Mr. Edwards with the first brood in West Virginia, which took 37 days—28th April to 4th June.

On 14th June Mr. Winn also observed two very much worn *Fabricii* ovipositing on the young leaves of an elm. This late laying of eggs causes the broods to overlap and makes it almost impossible to tell to what generation any captured specimen belongs.

From the 15th to the end of June *Umbrosa* was quite common, but no more *Fabricii* were seen. On 24th a number of larvæ, apparently not more than a day old and quite close to the empty egg-shells, were found, and on 25th about 40 eggs and seven young larvæ were found on a bunch of elm leaves plucked at random. These produced the imagos between 19th and 29th July and were 31 *Umbrosa* and two *Fabricii*, and were doubtless part of the second brood of the season.

On 1st July Mr. Lyman took at Lachine a ♀ *Umbrosa* and confined it over leaves of elm, but no eggs were laid for over a week.

On 12th July the butterfly was found to be dead, but had laid 101 eggs, some almost ready to hatch and some just recently laid.

The eggs began hatching that same evening and others continued to hatch during the 13th and 14th. Some of the earliest to hatch passed first moult on the 15th, the third day from the egg. The first chrysalis was formed on 5th Aug., and the first imago emerged on 13th Aug., giving a pupal period of eight days, a period from hatching of egg to imago of 32 days, and a probable period from oviposition to imago of 35, or, at the outside, 36 days.

Some, of course, took a few days longer than this, but all had emerged by the 21st August. Of nearly 60 butterflies which emerged, not more than five were *Fabricii*, all the others being *Umbrosa*.

Now it seems clear that the parent butterfly which was taken on 1st July, but would not lay till 8th or 9th, must have belonged to the first brood in descent from the hibernators or colonists, whichever the early ones were, and that the brood thus reared represented the second brood, and there would be abundance of time after the 21st August for a third brood to mature. That such a third brood must exist is practically

proved by the fact that the second brood as raised by us was almost entirely composed of the form *Umbrosa*, while it is well known that *Fabricii* largely predominates in the autumn, which would not be the case if there were no third brood.

On 26th July, while Mr. Winn's second brood was emerging, he confined a ♀ *Umbrosa* on elm and obtained eggs the same day, which hatched on 30th. Others were caged on 28th and five more on 2nd Aug. on hop, and many eggs were obtained. Some were left on the food plant, but the others were taken on a holiday trip to Metis, Q., the last hatching 7th Aug. On Aug. 24th the first chrysalis was formed, and imago emerged 4th Sept. and proved to be *Fabricii*, but at the same time a number of the larvæ were just past the third moult. While at Metis the larvæ were fed on hop, as elm trees were not found, and when brought back to Montreal were again fed on elm.

Either from this change of diet or from the colder climate of the lower St. Lawrence, the majority of this brood were greatly retarded and emerged at intervals all through September, and one as late as 18th Oct. Of nineteen individuals seventeen were *Fabricii* and two *Umbrosa*.

One fresh *Umbrosa* was also seen on 16th Sept., and *Fabricii* was common on the fine days of the early part of that month.

This makes the third brood, with a varying preparatory life duration of 40 to 77 days.

With Mr. Edwards the period of the third brood varied from 31 to probably over 50 days.

In nature the oviposition of the various broods would doubtless be extended over a longer time and the emergence of the imago similarly spread out, but when a species can go through all its changes in from 31 to 36 days it stands to reason that there must be at least three broods in the season in this latitude.

The third brood must certainly hibernate, and Mr. Winn found that those flying in September did not seem inclined to lay eggs, and careful search failed to produce a single one.

In CAN. ENT., X., p. 72, Mr. Edwards states his belief that the scarcity of hibernators in the spring compared with the abundance of the species in the summer is due to the existence of the species being dependent on the partial fourth brood, which he considers the only one that hibernates, and states that the species does not suffer from parasites to any extent.

This statement, published in April, 1878, is strikingly at variance with his former notes upon this species in part 9 of Butt. N. A., I., issued in January, 1872, pages 117-118 of the volume, where, after recounting the large number of enemies which prey upon it, he says, "It is doubtful if much more than two per cent. of the eggs laid produce butterflies."

Mr. Winn collected early in September from off the fence over which his hop vine grew 32 chrysalids, being the result of the eggs laid 3rd and 4th August, which he had left upon the vine. From these only two butterflies emerged, both on 18th September, and, curiously enough, one was a ♂ *Umbrosa* and the other a ♀ *Fabricii*. All the others were attacked by parasites, which Mr. W. H. Harrington determined as *Pteromalus puparum*, Linn.

The following notes upon the eggs were made by Mr. Lyman :

In regard to the colour, number of ribs, etc., of the eggs, there is considerable divergence among the authorities.

In regard to the colour, Scudder, quoting Riley, says that at first they are dull bluish-green, afterwards becoming grayish-green with silvery reflection. Edwards and Fernald call them "pale green," and this I consider correct, as I could see no trace of blue-green about them. Edwards says that the eggs have eight or nine vertical ribs, and is followed by Fernald. Edwards also says that the eggs laid in strings have always the same number of ribs, and hence Scudder deduces the theory that individual butterflies always lay eggs of the same number of ribs, but the latter author gives the number of ribs as "nine to eleven, commonly ten."

Of the 101 eggs laid by my butterfly in confinement, 24 were laid on the leaves, 3 being above and 21 below, and the rest, except 2, on the gauze.

There were ten strings of two, four strings of three, one pyramid formed of two below and one above, and another formed by one standing upright upon one on its side, and sixty-four singles. Some of the strings were very irregular, and some had apparently been laid at different times.

Of 52 eggs examined, 31 had 9 ribs and 21 had 10. One of 9 ribs, with larva nearly ready to hatch, had a green newly laid egg with 10 ribs on top of it.

In striking contrast to its abundance in 1896, only one specimen of this butterfly was seen during the season of 1897 by Mr. Winn.

NEW SPECIES OF CHIONASPIS.

BY R. A. COOLEY, B. S., AMHERST, MASS.

At the request of Prof. T. D. A. Cockerell, through correspondence with Prof. Fernald, I was induced to take up the study of the genus *Chionaspis*, and Prof. Lull the genus *Pulvinaria*. Prof. Fernald prepared and sent out a circular letter to all entomologists whose addresses could be obtained, in this and other countries, and personal letters were also sent to the leading coccidologists, asking for as many species as possible to aid in the preparation of monographs of these two genera. The result has been most gratifying, for already a very large amount of material has been received.

In the material before me the following new species of *Chionaspis* have been found, and are published now in preference to waiting till the monograph is issued. The studies on these insects are being made in Prof. Fernald's entomological laboratory connected with the Massachusetts Agricultural College, where every possible facility is afforded for breeding and studying insects, together with very complete literature of the subject.

Chionaspis Cockerelli, n. sp.

Scale of female.—The female scale is about 3.2 mm. long, straight or very slightly curved, moderately thick in texture, slightly convex, white, with the exuviae pale yellowish-brown, the second skin being covered with secretion.

Female.—The pygidium is distinctly notched at the end, the sides of the notch being formed by the divergent median lobes. These lobes are firmly united at the base and have serrate edges. Two distinct parallel spines arising from the bottom of the notch are about as long as the distance between the inner edges of the lobes at the base. Compared with the other lobes of the pygidium the median ones are larger and extend farther into the body. Each lobe of the second pair is composed of two well rounded and distinct lobules, the incision between them extending to the base of the lobe. The inner lobule is larger and extends posteriorly about even with the median lobes. The third pair of lobes may be present or aborted; when present they are broad and low, with an elongated pore anterior to the base of each. Between the median and second pair is a minute spine, followed by a plate which is about as long as the second pair of lobes, and following these is a conical projection bearing a marginal pore. Outside of the second lobe is a spine, a plate

and a marginal pore, this plate being a little larger than the first one. Following the third lobe, when it is present, or a space when it is absent, there are two spines, one above and one below. These are followed by a plate and a distinct marginal pore, and after an interval interrupted by one or two spines, another plate, and following this another interval, terminated by a group of about three plates.

The spinnerets are in five groups: median, 7-9; anterior laterals, 17-23; posterior laterals, 23-34.

Described from dead and shrunken specimens.

Scale of male.—Length, 1.2 mm.; feebly carinated, white, with the larval skin almost colourless.

Described from a single imperfect specimen.

Male.—Male insect unknown.

The specimens were taken by Mr. Alexander Craw, on palm imported from China to San Francisco, Cal., July 11, 1897.

I take pleasure in naming this insect after Prof. T. D. A. Cockerell, who has made extensive and valuable contributions to our knowledge of the Coccidæ, and has shown me many kindnesses in my work on this group of insects.

Chionaspis aucubæ, n. sp.

Scale of female.—The female scale somewhat resembles that of *Chionaspis Lintneri* in outline, being strongly broadened posteriorly and abruptly rounded at the extremity. It is moderately convex, about 3 mm. in length and about 2 mm. in width. The exuviae at the apex of the scale have the first skin very pale yellow, and the second yellowish or brownish. The second skin is covered with a slight secretion. The scale itself is white and very thick and strong. There is a partial ventral scale at the anterior end.

Female.—As I had only dead and dry specimens of this insect, I made no attempt to describe anything but the pygidium of the female. Median lobes moderate in size, divergent, united at the base, with their inner edges distinctly serrate. Each lobe of the second pair is composed of two rounded lobules, the incision between the two reaching nearly or quite to the base of the lobe. The inner lobule is larger and projects farther posteriorly than the outer, sometimes surpassing the median lobes. The third lobe is simple and sometimes rudimentary. Between the bases of the median lobes is a pair of minute convergent spines. On each side between the median and second lobes are a spine, a plate and a marginal

pore, and between the second and third lobes two spines, one above and one below, followed first by one or two plates, and then by a conical projection bearing a marginal pore. Outside of the third lobe are a spine and from one to three plates, then a slight notch, immediately followed by a marginal pore and after a space two unequal spines and about three plates. Following these plates are a notch and a marginal pore, then after a space a group of about five plates.

Spinnerets arranged in five groups: median, 8-14; anterior laterals, 19-28; posterior laterals, 19-33.

Scale of male.—The male scales are much more numerous than those of the female. They are white, delicate in texture, about 1.2 mm. in length, the larval skin at the anterior end being colourless or slightly yellowish. The scale itself may be parallel sided or slightly broadened posteriorly, and is indistinctly carinated.

Male.—Male insect unknown.

On Aucuba from Japan. Discovered by Mr. Craw in the course of his quarantine work at San Francisco. The scales are grouped together on one side of the leaf beneath, and the edge of the leaf is folded under, almost completely hiding them from view.

Chionaspis wistariæ, n. sp.

Scale of female.—The female scale is about 2 mm. in length, though some specimens are slightly longer, moderately broadened, dirty white in colour and delicate in texture, being a close imitation of the epidermis of the bark on which it rests. The scales usually occur in the longitudinal cracks of the bark, and are partially concealed under the epidermis. They are very often pressed out of the normal form. The exuviae are brownish, and the second skin is covered with secretion.

Female.—The following description of the female was made from dead and shriveled insects. The median pair of lobes is large and conspicuous, the second pair considerably smaller, and the third pair obsolete. The median lobes are darker in colour than any other part of the pygidium, firmly joined at the base, their inner edges parallel and nearly touching each other for about half their length, then diverging at about a right angle, with the exposed edges serrate. The second lobe is composed of two lobules, the inner one being the larger. Within the outer edge of each of the median lobes is a spine, and next to this a short blunt plate, followed by a marginal pore. Between the lobules of the second lobe is a spine, and outside of the second lobe are a plate and

two marginal pores, followed first by a spine and then by a plate, which is about as long as the median lobes, and often forked at the tip. Outside of this plate are two marginal pores, followed by a spine and one or two plates, then after another marginal pore a group of about four plates.

There are five groups of spinnerets : median, 8-15 ; anterior laterals, 19-31 ; posterior laterals, 13-23.

Scale of male.—The male scale, as in all other species of this genus, is elongated in form and white in colour. The sides are nearly parallel, and it is distinctly tri-carinated. Length, about 1 mm. The larval skin resembles the anterior or smaller one of the female scale.

Male.—Male insect unknown.

Discovered by Mr. Craw, July 8, 1897, at San Francisco, on the bark of Wistaria from Japan.

Chionaspis pinifoliae heterophyllæ, n var.

Scale of female.—The scale of the female is indistinguishable from that of *pinifoliae*, Fitch, having the same range of form and size, the colour of the scale and exuviae being the same. The scales vary in size from 2 mm. to 3.4 mm., the average length being about 2.5 mm. The scale is white, strongly convex, with the exuviae at the anterior extremity yellow, both skins being naked.

Female.—The description of the female is made from dead and shriveled specimens. At the anterior end of the body are two distinct, curved bristles, which may be the rudiments of the antennae ; these are found also in *pinifoliae*. The last segment terminates in a median notch, the sides of which are formed by the divergent median lobes. The lobes of the second pair are low and inconspicuous, and each one is composed of two lobules of about equal size. Two minute spines, one above and one below, arise from near each median lobe, though back from the edge of the segment. Contiguous to each median lobe is a simple plate, outside of which is a marginal pore. Between the lobules of the second lobe is a distinct spine, and outside of this lobe is a plate with a spine at its base, followed by a marginal pore. Outside of the rudimentary third lobe is a marginal pore, followed by a spine and a plate with a spine at its base. Then follows a pronounced marginal pore, a short interval, another space and a long interval, interrupted only by a spine, and terminated by the fourth and last plate.

There are five groups of spinnerets : median, 4-8 ; anterior laterals, 12-18 ; posterior laterals, 14-16. The chief characters by which *pinifoliae*

and the variety can be separated are the presence of the median notch in the variety and the larger size and more rounded form of the lobes in *pinifoliae*.

Scale of male.—The male scale cannot be distinguished from that of *pinifoliae*. It is slightly more than 1 mm. long and .4 mm. wide at the posterior end, where it attains its greatest width. The scale is white, with a moderately distinct median carina. The larval skin is like the first one of the female.

Male.—Male insect unknown.

On Cuban pine, *Pinus heterophylla*, from Florida. I am indebted to Prof. A. L. Quaintance for a bountiful supply of specimens, as well as to Prof. Cockerell, who first called my attention to this insect and sent me specimens.

The scales are found chiefly at the bases of the very long, slender leaves, and mostly on the inner surface. A few specimens occur also on the stems of the new growth. There were circular openings in a few of the female scales, from which parasites had emerged.

The following original description, which has never been published, was sent to me by Prof. Cockerell to be added to this paper:

Chionaspis latissima, Ckll.

C. latissima, Ckll., Calif. Fruit Grower, June 5, 1897, pp. 4-5. (Descriptive note; no full description.)

“Female scale circular, 2 mm. diam., white, semitransparent, with the light ocreous exuviae to one side, first skin half overlapping second, second skin oval. Eggs shining, pale pink.

“♂ scale linear, white, with a very feeble median keel.

“♀ when boiled in caustic soda turns yellow, marbled and suffused with bright blue-green; the mouth-parts remain a warm brown. Under pressure the ♀ becomes greatly elongated. Anal orifice level with the lower (caudad) edge of the cephalolateral glands. Five groups of ventral glands, median of 8, cephalolaterals of 18, caudolaterals of 20. Lateral dorsal rows of elongated pores. General characters of *chinensis*, *nyssae*, etc. Differs from *chinensis* by the median lobes being not or barely brownish, and being decidedly produced, and the second and third lobes each represented by three distinct lobules. The lobes are much more produced than in *nyssae*. The spinelike plates are large. The scale is very similar to *vitis*, Green, but is smaller than that or *varicosa*, Green.

“On under sides of leaves of *Distylium racemosum*, from Japan, found by Mr. Alex. Craw, April, 1897, in the course of his quarantine work at San Francisco.”

PREPARATORY STAGES OF PYRUS TESSELLATA, SCUD.

BY G. H. FRENCH, CARBONDALE, ILL.

Egg.—Diameter, .02 inch. Blunt conical, height about the same as the diameter; ridged with about 30 longitudinal striæ, with shallower cross striæ. Colour pale green. Duration of this period six days.

Young Larvæ.—Length, .08 inch; cylindrical; head somewhat cordate, two-thirds the width of the body; the anterior part of joint 2 about one-half the diameter of the head, the posterior part as wide as joint 3; each joint back of 2 with four low transverse folds besides the very narrow fold at each end of the joint. Colour pale greenish with a white sheen; piliferous spots concolorous; hairs erect, forked to about the middle, the forks curving back towards the body anteriorly and posteriorly. These are the hairs from the piliferous spots. Hairs on the body black, hairs on the head and joint 2 white and not furcate. Head jet black; joint 2 pale yellow-brown with a black transverse bar just back of the middle of the joint; dark along the sides; thoracic feet black. There are eight hairs in pairs on the dorsal bar of joint 2. Duration of this period two or three days.

After first Moul.—Length, .15 inch. Shape not materially changed. Head and joint 2 jet black; hairs all white, shorter than before, more numerous, the end capitate instead of bifid; head and neck corrugated. Duration of this period six days.

After second Moul.—Length, .40 inch. Marked as before; hairs still capitate, white; a dorsal and subdorsal line a little more plainly green; head and joint 2 profusely hairy, but the hairs are all short, surface corrugated. Previous to this moult the larvæ mostly lay coiled on the surface of the food plant, but now they straighten out under a thin silky covering. Duration of this period four days.

After third Moul.—Length, .50 inch. Cylindrical, head about the same width as the body; black, covered with white hairs, each of which has about six short side spurs from about the middle up; joint 2 black, with the dorsal bar red-brown with a whitish margin; hairs on this joint of two kinds, short and long, the long about one-sixth the width of the body in length and very shallowly trifid at the end; body, each joint with five folds, the anterior twice the width of the others; two forms of hairs, one very short and the other long, each long one about the length of those on joint 2 and arising from a white conical base, trifid at the outer end; the short ones arising from a shorter cone and capitate at

the end. Colour of the body pale yellowish-green, a more distinct dorsal and subdorsal stripe and the subdorsal space with mottlings of darker green; stigmata sordid white. Duration of this period four days.

After fourth Moulting.—Length, .85 to .95 inch. About the same as during preceding period, but the head hairs have a brown tinge, and joint 2 is brown, with a whitish dorsal line, and sometimes subdorsal also. Duration of this period seven days.

Pupa.—Length, .55 inch; diameter, .15 inch. Nearly cylindrical; from the head to the posterior part of the wing-cases .37 inch, these extending nearly to the posterior edge of joint 5; body pretty well covered with short, simple, white hairs; head rounded, eyes rather prominent, a prominent tuft of hairs between them (frontal hairs they might be called), another anterior tuft on the inner edge of margin of eye, more on the outer margin, while the space around the eye between these tufts is without hairs. Colour gray; head gray with a greenish tinge except on the eye-space; dorsal part of thorax gray with a slight green tinge, three transverse rows of small black spots, the first, one on each side, subdorsal; the second row six, one each side of a very slight green dorsal line and one on each side of what would be a subdorsal line if such were present, a little anterior to the others; third row six, one on each side of the dorsal line and one outside and a little anterior to this and one on the shoulder of hind wings. Spiracle just back of the eye large, elevated, dark or Vandyke brown, the outer portion pale. Wing-cases green, ribbed as usual, mottled slightly in two shades, but not strongly contrasting; abdomen with each joint gray (the gray of the whole pupa a more sordid white with a gray tint, as there is none of the dark gray about it), slightly green tinted, the incisures more distinctly pale green, each joint with its row of small black spots across the middle, supplemented back of the row with a less perfect row of smaller spots, the first row of six spots, of which the outer spot on each end of the row is the black spiracle; cremaster brown, elongated hooks at the end that fasten into a thin, loose button of silk. Duration of this period eight days.

The larvæ, when ready to pupate, folded a leaf together and loosely fastened it with silk, but there was no lining of silk except a small, thin button to which the cremaster was attached.

The eggs were sent me by Dr. C. Hoeg, of Decorah, Iowa. At first he sent me two eggs under date of July 31st, 1897, that he had found on

Malva rotundifolia. These did not hatch on account of injury in transit, and under date of August 6th he sent me fifteen more, found on the same plant. These hatched out August 12th. I fed them first on a species of *Abutilon*, but as they did not take to that readily, though eating it a little, I changed to *Althea rosea*. I think they will eat any of the rough-leaved Malvaceæ readily. On account of being away from home part of the time, the larvæ were somewhat neglected in the last stages, but notwithstanding this two passed through all their stages, producing the first imago September 12, 1897.

THREE INTERESTING STAPHYLINIDÆ FROM QUEEN CHARLOTTE ISLANDS.

BY REV. J. H. KEEN, MASSETT, B. C.

At the request of Dr. James Fletcher, I am writing a few notes to accompany the three figures which have been made at his instance, and kindly presented by him. They represent three *Staphylinide* taken by me at Massett, on the Queen Charlotte Islands, and were prepared under the direction of Mons. A. Fauvel, the well-known specialist in that order, to whom also I am indebted for the determination of the beetles themselves.

Haida Keeni, Fauvel. New gen. and new sp. (Fig. 34.)

For this interesting little *Homalium*, M. Fauvel found it necessary to construct a new genus, and his description will be given in full as soon as it comes to hand. The beetle is of a dark reddish-brown colour, much brighter on the elytra, which have a broad transverse band of black posteriorly. It varies a good deal in size and also in the depth of its coloration. It is found throughout the year, but is most abundant in September, when it frequents rotten leaves on the ground, and seems to have a preference for elder leaves. In winter it occurs in moss about the roots of spruce and other trees. It is somewhat sluggish in its movements and feigns death for a minute or more on being disturbed. I have not yet succeeded in taking it on the mainland, though it is fairly common at Massett.

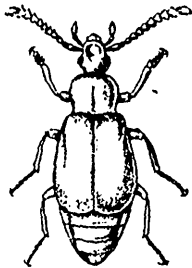


FIG. 34.

Liparocephalus brevipennis, Mökl. (Fig. 35.)

This submarine species is very abundant on the shores of the Q. C. Islands and not uncommon on the mainland opposite, though until I

took specimens of it at Massett it was known only, Dr. Fletcher says, by the type specimen at Washington. The insects are found crawling over barnacle-covered stones and boulders near low-water mark. Occasionally they occur congregated in a mass of several hundreds under a single stone, but for what purpose I have been unable to discover. It is most abundant in autumn.

From some experiments I made with several specimens in a dish of salt water in which was a half-submerged stone, I observed that they cannot swim under water, but merely crawl on the stones, their pubescence enabling them to surround themselves with minute bubbles of air. They could not be induced to enter the water from the top of the stone. If forced to leave the stone they would swim on the surface, but seemed incapable of diving. If touched while on the side of the stone under water, however, they feigned death, and had the power of sinking readily to the bottom. Some that were left all night swimming on the surface of the water were found dead in the morning, while others which had been submerged all night were still active.

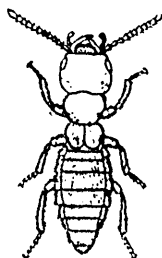


FIG. 35.

A question has been raised as to whether *L. cordicollis*, Lec. (exactly similar to the present species in form, but with the head and thorax brown), is anything more than a colour variety. I have watched both with this point in view, and speaking merely as a field observer, my belief is that they are separate species. *L. cordicollis* is the rarer of the two, but when it occurs it is in little colonies. I know, for instance, one large boulder where almost at any time I could take fifty specimens of *cordicollis*, but where I have never yet seen *brevipennis*. I have, moreover, never seen one of each *in coitu*, though pairs of one or the other are commonly met with. I may add that my view seems to receive slight confirmation from the fact that three other species of submarine beetles occur at Massett with black abdomen and limbs, but with brown head and thorax. On the other hand, however, I have noticed that the brown of *cordicollis* darkens considerably with keeping.

Tanyrhinus singularis, Mann. (Fig. 36.)

This curious insect seems to be rare in collections, for neither Mons. Fauvel nor the late Dr. Hamilton possessed a specimen till they received

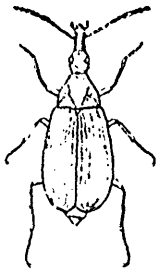


FIG. 36.

one from me. Mr. L. O. Howard, however, tells me he has a good series in the National Museum at Washington. It is by no means common at Massett, for I have only taken nine in seven years, and never more than three in one year. It has occurred always in the same spot — on the under side of a rotten spruce log on the ground. From positions I have taken it in I conclude that it feeds either on the rotten wood or on minute fungoid growths on the wood. On one occasion I obtained two specimens by pouring water into the log, which is now soft and fibrous with age, when they emerged from holes. The insect is slow and deliberate in its movements, and makes no attempt to fly when disturbed. It has occurred only in early spring; several of my specimens were taken in the middle of February when snow was on the ground.

ON THE GENERIC POSITION OF SOME BEES HITHERTO REFERRED TO PANURGUS AND CALLIOPSIS.

BY T. D. A. COCKERELL, MESILLA, N. MEX.

Having lately received from Mr. Friese, of Innsbruck, a number of European bees, I have been led to re-examine certain of our species, in order to determine their relationship to a number of old-world genera not supposed to occur in America. The result is extremely interesting, and seems to show that we have for many years been placing bees in genera to which they by no means belong. The following table may be used provisionally to separate the genera under discussion*:

- A. Tongue more or less short and broad, tapering at the end. (*Andreninæ*).
1. Basal nervure nearly or quite straight.
 - a. Three submarginal cells..... *Andrena*, Fabr.
 - b. Two submarginal cells..... *Parandrena*, Rob.
 2. Basal nervure strongly bent.
 - a. Three submarginal cells..... *Halictus*, Latr.
 - b. Two submarginal cells..... *Hemihalictus*, Ckll.

*Mr. Friese sends me also four examples of *Nomioides pulchellus*, Schenck, taken at Pest on the second of June. This bee is a *Perdita* with the venation of an *Halictus*! It is curious to see all the ornaments, sculpture, etc., of *Perdita*, with a long tapering marginal cell and three submarginals. It is evident from this, and from the absence of *Perdita* in the American tropics, that our genus is of boreal origin, not austral, as I formerly thought.

B. Tongue narrow and more or less elongated, usually quite long.
(Panurginæ).

1. Marginal cell produced, tapering to a point, not appendiculate.
 - a. Body *Colletes*-shaped, abdomen with hair-bands. *Rhophites*, Spin.
 - b. Body *Halictus*-shaped, abdomen without well-formed hair-bands. *Halictoides*, Nyl.
2. Marginal cell truncate at tip, usually appendiculate.
 - a. Body *Colletes*-shaped, abdomen usually with hair-bands *Calliopsis*, Sm.
 - b. Body *Halictus*-shaped, abdomen without well-formed hair-bands. *Panurginus*, Nyl.

The genera under B have but two submarginal cells ; those under A all have a marginal tapering to a point. I give the subfamilies as I find them, but it seems at least probable that the form of the tongue is an adaptive character, not to be relied upon for separating groups higher than genera. The Panurginæ, notwithstanding the tongue, appear to be certainly Andrenidæ.

Parandrena.

The type is *P. andreoides*, a spring-flying species. The smaller stigma of the autumnal "*Panurgus*" *pectidis*, *rhodoceratus* and *olivæ* is paralleled in *Andrena* by that of *A. pulchella*, also an autumnal insect. For the present I would place the three species of "*Panurgus*" named in *Parandrena*, with the reservation that they may hereafter need to be separated from it. They are much nearer to *Rhophites* than to *Panurgus*.

Hemihalictus.

The type is *H. lustrans*, described as *Panurgus*. This looks not unlike the European *Halictoides*, but differs in the tongue, which in *Halictoides* is very narrow, and by the strongly bent basal nervure and the third discoidal cell considerably narrowed above.

Rhophites.

Mr. Friese sends me *R. quinquespinosus*, Spin., and *R. canus*, Ev. These are what we should call *Panurgus*, and if there are in our fauna any "*Panurgus*" with the pointed marginal cell, of fairly robust shape, with abdominal hair-bands, these will belong to *Rhophites*, provided they have the narrow elongated tongue which separates them from *Parandrena*. The stigma of *Rhophites* is small, as in the autumnal species provisionally referred above to *Parandrena*.

Halictoides.

Many authors have confused this with *Rophites*, but it is fairly distinct. I have before me the following species :

H. paradoxus, Moraw.—Innsbruck, July 15th; Sept. 13th, at *Euphrasia*. Coll. Friese.

H. dentiventris, Nyl.—Andermatt, July 9th; "Weissnfls," Aug. 3rd; Sept. 2nd, at *Campanula*, Coll. Friese.

H. inermis, Nyl.—"Weissnfls," July 13th, at *Campanula*. Coll. Friese.

H. marginatus (Cress., as *Panurgus*).—My New Mexico insect has stood as *halictulus*, Cr., but according to Robertson that is identical with *marginatus*. It flies in August and September.

H. campanula, n. sp.—♂. Length, 9 to 10 mm. Black, shiny; pubescence sparse; pale cinereous, mixed with black, on head and thorax; black, with a little cinereous, on abdomen and legs. Hair on inner side of tarsi shining orange-fulvous. Head large, very broad, a little broader than thorax, subquadrate, facial quadrangle very much broader than long, anterior edge of clypeus with a hoary fringe, clypeus and front appearing rough from very close punctures, mandibles with a well-formed inner tooth, antennæ crenulate, flagellum feebly tinged with ferruginous beneath; mesothorax shiny, with distinct, rather close punctures; enclosure of metathorax coarsely rugose; tegulae piceous, with a hyaline band; wings smoky, nervures and stigma piceous, first recurrent nervure joining second submarginal cell considerably nearer its base than the second recurrent to its apex; second to fourth joints of hind tarsi broadened, triangular; abdomen shining, the surface appearing silky, hardly punctured; no hair- or colour-bands; sides of segments towards apex with tufts of black hair; apex conspicuously tufted with more or less shining sooty hair; a large tuft of sooty or black hair also arises from the sixth ventral segment, and is very conspicuous when the insect is viewed from the side. Tongue narrow.

Hab.—Four from Olympia, Washington State, June 30; all at flowers of *Campanula scouleri*. (T. Kincaid, coll.)

How many more of our so-called *Panurgus* will be found to belong to *Halictoides* I do not know, but it is probable that an examination of the types will show that we have at least as many *Halictoides* (six) as are known from the other side of the world.

Panurgus.

Taschenberg ("Die Gattungen der Bienen") separates *Panurgus* from *Rhophites* by its *truncate, appendiculate, marginal cell*. Three European species, now before me, all exhibit this character, which is generic. It therefore follows that none of the so-called *Panurgus* of Cresson's 1887 Catalogue belong to that genus. So far as known, we have no typical *Panurgus* in North America; two *Panurgus*-like forms may be referred to a new group, thus:

Pseudopanurgus, n. g.

Type *Ps. aethiops* (Cr., as *Panurgus*). Includes also *Ps. fraterculus* (Ckll., as *Calliopsis*). Black, nearly naked, strongly punctured, wings fuliginous, marginal cell distinctly but obliquely truncate at tip, two submarginals, *first recurrent nervure joining second submarginal cell no great distance before its middle, second recurrent joining it just before its tip, basal process of labrum large, subquadrate*. In some respects this seems to resemble Provancher's *Chelynia* (which I have not seen), but it is surely not the same thing.

Panurginus.

Mr. Friese sends me *P. montanus*, Gir., collected at Airolo, Andermatt, and Innsbruck. It flies at the end of June and beginning of July; one specimen is marked as from *Ranunculus*. The clypeus is yellow in the ♂, dark in ♀. To this genus belong *Panurginus clypeatus* (Cr.), *bidentis* (Ckll.), *margaritensis* (Fox), *compositarum* (Rob.), *albitarsis* (Cr.), *ornatipes* (Cr.), *rudbeckiae* (Rob.), etc., all now referred in our lists to *Calliopsis*. The European *P. montanus* has the venation of our *P. clypeatus*.

Calliopsis.

This name can be retained for such species as *C. andreniformis*, *coloradensis*, *obscurellus*, etc. There also remain some forms which must be left in *Calliopsis* until a better place is found for them, although they seem scarcely congeneric with *andreniformis*.

DR. HARRISON G. DYAR has removed from New York to Washington, D. C., where he has accepted the position of Honorary Curator of Lepidoptera in the United States National Museum.

MR. ARTHUR J. SNYDER, of Evanston, Ill., has recently been appointed Principal of the North Belvidere Schools. His address is now 521 East Madison street, Belvidere, Ill.

A LIST OF MANITOBA MOTHS.

BY A. W. HANHAM, WINNIPEG, MAN.

The following list of Manitoba species, it is hoped, will prove of interest to readers of the CANADIAN ENTOMOLOGIST :

With a few exceptions, the records are from my own observations and captures. The list covers the work or collecting of three whole seasons and the latter half of a fourth ; and it is to a great extent a local one, very little collecting having been done outside of the Winnipeg district.

Last season (1896), in July, and again this year, in August, I was fortunate in being able to visit Brandon, Man.—some 130 miles west of Winnipeg—where, especially during my first visit in July, I enjoyed some very successful collecting, and I am thus enabled to add a considerable number of things to my list, many of them very desirable species.

I believe a comparison of collections made at Brandon and at Winnipeg would show some striking differences, many of the Western forms occurring at Brandon not reaching so far east as Winnipeg. This district embraces some open "rolling" prairie, a good deal of swampy land covered with willow and other bushes, plenty of thick "bush" containing no trees of any size, a little fine timber, mostly elm, along the river "bottoms," and a gravel ridge many miles in extent, more or less wooded, with some sandy tracts, commencing at Bird's Hill, some eight miles from this city.

The last described locality much resembles the general run of country around Brandon, and after Elm Park, situated in a bend of the Red River, about three miles out of Winnipeg, is much the richest collecting ground within the district. The Province of Manitoba contains numerous lakes, some of vast area, as Lakes Winnipeg and Manitoba ; none, however, come within this district, nor have any yet been visited.

The list of Sphingidæ is but a meagre one, and I think hardly representative of the district ; certainly not of Manitoba as a whole. Nearly fifty per cent. of the Bombycidæ recorded were added this year, and they were, without exception, taken "at light," at the end of June and during July. But for this my list in these too would have been equally poor.

Mr. E. F. Heath, who lives near Cartwright, in Southern Manitoba a much better country than this, I believe, for the entomologist—could, I feel sure, supplement these records.

Most of the Bombycidae have been submitted to Dr. H. G. Dyar, to whom I am under special obligations for his generosity in returning nearly everything sent to him (a large proportion being "uniques"). The Sesiidae were very kindly determined for me by Mr. Beutenmüller, through Dr. Dyar. I have also received welcome assistance from both Dr. James Fletcher and the Rev. C. J. S. Bethune.

Hemaris thysbe, *Fabr.*, var. *ruficaudis*, *Kirby*.—In 1894 (June 17th) several were seen hovering over the blossoms of the Wild Pea, but only one was secured. Later a number were noticed (dead) in the windows of some empty shops.

Met with again this season.

Hemaris tenuis, *Grt.*—On April 19th (1897) a pupa was found in the soil under a log along the railway line at Brandon. The moth evolved on May 18th.

Deilephila gallii, *Rott.*, var. *chamenerii*, *Harr.*—In the collection of Mr. H. W. O. Boger, of Brandon.

Deilephila lineata, *Fabr.*—Mr. Boger reported this moth as being very abundant, on the wing, on August 25th (1896), in a market garden at Brandon, in the evening, as many as 20 or 30 being visible at the same time. It occurred here about the same date. On August 5th (1894), quite early in the afternoon, and in the bright sunshine, I noticed a *Deilephila* on the wing over some thistles on the prairie, but I failed to net it.

Sphinx drupiferarum, *S. & A.*—At Brandon (1897), by Mr. Boger.

Sphinx luscitiosa, *Cram.*—On July 1st (1895) I found a ♀ at rest under the loose bark of a fence post, and on June 11th (1896) a fresh ♂ was found "sitting" on a sidewalk in the heart of the city.

Sphinx chersis, *Hbn.*—July, one in a shop window, also at Brandon, in Mr. Boger's collection.

Sphinx albescens, *Tepper.*—July 1st, one at light; another taken at Rounthwaite, Man., by Mr. L. E. Marmont.

Ceratomia undulosa, *Walk.*—July 8th, one at light.

Smerinthus geminatus, Say.—Common at light, June 27th to July 10th. Only previous records, one at rest on a tree in Elm Park, June (1894), and July 2nd (1896) one in a spider's web on a fence near the same locality. It had, without doubt, furnished a sumptuous repast, or several.

Paonias excrucatus, S. & A.—At light, June 27th and July 1st. Four specimens.

Paonias myops, S. & A. An example in Mr. Boger's collection was taken at Prince Albert, N.-W.T. This species is likely to occur in Manitoba.

Cressonia juglandis, S. & A.—One at light, July 1st.

Albuna pyramidalis, Barnst.—One, July 8th (1896), Bird's Hill.

Sesia rubrofascia, Hy. Edw.—One, June 17th (1894).

Sesia albicornis, Hy. Edw.—Several, June 15th and 24th and July 13th.

Sesia sp.—July 26th, Brandon. One specimen spoilt in net, too rubbed to be determined.

All these Sesiidæ were taken when sweeping low herbage and flowers for Coleoptera, chiefly along railway tracks.

Alypia Langtonii, Coup.—Several at Rounthwaite, by Mr. Marmont.

Scepsis fulvicollis, Hbn.—One at light, middle of July.

Sarothripa Lintneriana, Speyer.—My first records, Sept. 1st and 13th, etc., show it to be a late species; but as I took it this year in July, at light, it may prove to be double-brooded. One of those captured is a very handsome variety.

Argyrophyes cilicoides, Grt. — According to Dr. Dyar, this is a rare species; it occurred at light from July 2nd to 20th.

Clemensia albata, Pack.—July 27th, etc., several at rest on trees in Elm Park, and one in the city.

Crambidia pallida, Pack.—A pupa found under a stone at Bird's Hill on July 21st (1895) produced the imago on Aug. 6th. Common this season at light, middle of July.

Crambidia casta, Sanb. (No. 988, Smith's List)—A pair evolved on Aug. 4th (1896). The larvæ were common under stones at Bird's Hill

on July 7th and 8th, and a number were boxed. A day or two later during or after a journey to Brandon, most of them escaped from my jar. These larvæ were small "woolly-bears," hairs dark brown. I think they were full-grown. Dr. Dyar states that the larva of this moth has never been described, so I regret not having made some notes on its appearance. A pair, having twice the expanse and somewhat lighter secondaries, were captured on the wing at dusk, on an open hillside at Brandon, on Aug. 27th this year.

Hypoprepia fucosa, *Hbn.* (*miniata*, *Kirby*)—One at light on July 10th (1896) at Brandon.

Euphanessa mendica, *Walk.*—July 3rd, etc., common in Elm Park.

Crocota ferruginosa, *Walk.*—One at Brandon, July 15th (1896).

Crocota immaculata, *Reak.*—Several July 15th, 21st, etc., at Bird's Hill, and on the prairies flying during the day. Very common this season during July at light. Pupæ found under boards, etc., on June 20th and July 1st.

Crocota quinaria, *Grt.*—Several in Elm Park and dark woods, July 3rd, etc., flying during the day; this species did not come to light.

Callimorpha clymene, *Brown.*

" *Lecontei*, *Bdv.*

" " var. *militaris*, *Harr.*

" *vestalis*, *Pack.*—One specimen only—a beauty.

All these *Callimorpha* were taken in Elm Park on July 1st and 3rd (1896).

Platarctia hyperborea, *Curt.* (*parthenos*, *Harr.*)—A specimen of this beautiful moth was captured this season at Brandon by Mr. Boger.

Arctia virgo, *Linn.*—Common this season at light, July 3rd to middle of month. Previous records: July 15th (1895) an imago hiding at the roots of weeds in my garden; a pupa found on July 1st, produced moth on 13th of month; a larva taken under a log on April 22nd (1894), produced the imago on July 3rd.

Arctia Saundersii, *Grt.*—Common at light, middle to end of July. One under a stone in gravel pit at Brandon on July 31st (1896).

Arctia virguncula, *Kirby.*—One at Rounthwaite, in Mr. Marmont's collection.

An Arctian in poor condition taken this year at Brandon, by Mr. Boger, may be *phalerata*, *Harr.*

Pyrrharctia isabella, S. & A.—Larvæ seen in 1894; moth not taken here.

Spilosoma virginica, *Fabr.*—This moth appears to be rare here; it did not come to light. A moth was taken July 26th (1895), and some larvæ were seen on Aug. 25th, and several pupæ were found this spring at Brandon.

Spilosoma prima, *Slosson.*—A moth evolved on May 9th (1897) from pupa found at Brandon in April.

Spilosoma antigone, *Strk.*—Several, Aug. 25th, etc.

Hyphantria cunea, *Dru.*—Several, June (1894).

Euchætës collaris, *Fitch.*—One at Brandon this season by Mr. Boger.

Halisdota maculata, *Harr.*—One, at light, July 1st. (This specimen differs considerably from my Hamilton, Ontario, examples.)

Orgyia antiqua, *Linn.*—One, Aug. 15th (1895), at rest on a window in the city.

Orgyia leucostigma, S. & A.—Common at light, middle to end of July, and examples taken (also at light) on Sept. 24th and 28th.

Parorgyia Clintonii, G. & R.—On July 23rd (1895) I found two cocoons of this species in the folds of an old newspaper in some open woods. A moth evolved from one about Aug. 1st. The other produced several handsome ichneumons.

Parorgyia plagiata, *Walk.*—Common at light, middle to end of July.

Tortricidia testacea, *Pack.*—Pairs by beating, June 10th and 14th (1894). Specimens taken at light, end of June and beginning of July, this year were all poor.

Ichthyura vau, *Fitch.*—Several, at light, middle to end of July.

Ichthyura albosigma, *Fitch.*—Common at light from July 9th to end of month.

Ichthyura Brucei, *Hy. Edw.*—One or two, at light, about 20th of July.

Datana ministra, *Dru.*—One, at light, July 2nd.

Nadata gibbosa, S. & A.—Several, at light, June 27th to July 6th.

Gluphisia trilineata, *Pack.*—Common at light during July.

Notodonta elegans, *Strk.* (No. 1273, Smith's List)—Four specimens at light, June 27th to July 2nd.

Lophodonta angulosa, S. & A.—A pair at light, beginning of July.
Macrurocampa Dorothea, Dyar.—One at light, beginning of July.
 This species was described and figured on page 176 of Vol. XXVIII. of the CANADIAN ENTOMOLOGIST. Dr. Dyar states that my capture is only the second known specimen of this new species, and that it differs from the type in being darker and more heavily marked with yellow.

Pheosia dimidiata, H.-S. (*rimosa*, Pack.)—A pair at light, one on June 27th, the other on July 26th.

Edema albifrons, S. & A.—Several, at light, at the end of June.

Seiroidonta bilineata, Pack.—July 8th (1894), one on a fence in the city.

Dasylophia anguina, S. & A.—One or two at light early in July.

Schizura ipomeæ, Doub.

“ var. *cinereofrons*, Pack.

Both these forms sparingly at light, July 2nd to 25th. But one specimen (*cinereofrons*) taken before in the district. July 14th (1895), at rest on a fence.

Schizura eximia, Grt. (No. 1300, Smith's List)—Several, at light, early in July.

Schizura badia, Pack. (No. 1302, Smith's List) — Taken at light from the end of June until nearly the end of July, but not common.

Schizura unicornis, S. & A.—Three at light early in July.

Ianassa lignicolor, Walk.—July 19th, three at light.

Cerura occidentalis, Lint.—New to me this season; took one at rest on side of house the first week in June; examples came to light on June 27th, July 15th, 18th and 19th.

Cerura cinerea, Walk.—One at light, middle of July.

Dryopteris rosea, Walk.—Common at light from July 3rd to end of month. On June 23rd (1894) one taken in Elm Park, at rest on a leaf. Not seen again until this season.

Dryopteris irrorata, Pack.—Two, at light, July 6th and 8th.

Attacus cecropia, Linn.—A specimen has been bred from the larva by Mr. Criddle, near Douglas, Man

Attacus columbia, Smith.—Recorded by Mr. E. F. Heath from Cartwright, and Mr. Marmont from Rounthwaite. Dr. Fletcher says that the food plant in the Northwest is *Elœagnus argentea*.

Actias Luna, *Linn.*—The Rev. W. Burman, of this city, reports the capture of a specimen in Elm Park, and last season in the same place I picked up a cocoon, most likely belonging to this species; it contained the decayed remains of the larva.

Telea polyphemus, *Cram.*—Winnipeg and Brandon, at light in June.

Anisota virginiana, *Dru.*—Recorded from Miami, Man., by Dr. Fletcher. The larvæ causing damage to oak trees.

Clisiocampa fragilis, *Stretch.*—July 10th (1896) and later at Brandon; several at light and on fences. Also this season at Winnipeg, at light, in July.

Clisiocampa americana, *Harr.*—A moth evolved on July 15th (1896) from full-grown larva taken on June 20th. Several at light this season in July.

Clisiocampa disstria, *Hbn.*—One, at light, towards end of July.

Phyllodesma americana, *Harr.* (No. 1414 Smith's List)—One, at light, on July 1st.

Hepialus argenteomaculatus, *Harr.*—This moth appeared to be abundant here in 1895. I took specimens on the wing in my garden about dusk on July 11th, 15th and 17th; they were all hovering (a most peculiar flight they have) over some high weeds. Specimens were taken at rest on July 13th and June 30th (1896). On the first mentioned occasion the moth was holding on to a tall stalk of grass within a yard or so of a railway track.

This is a very variable insect, no two of those captured agreeing in colour or markings. Mr. Marmont has one, taken at Rounthwaite, which is nearly white. The records of captures at light, where the year is not given, are all for 1897.

(To be continued.)

The readers of this magazine will deeply sympathize with PROFESSOR H. F. WICKHAM, of the State University of Iowa, who has found himself compelled, in consequence of serious trouble with his eyes, to give up the study of Entomology. He is now disposing of his splendid collection of North American Coleoptera. This is a rare opportunity for Entomologists to complete their representatives of various families of beetles. That his eyes may ere long be restored to their normal condition is the earnest wish of all his friends.

BOOK NOTICES.

THE BOOK OF BRITISH BUTTERFLIES.—A practical manual for Collectors and Naturalists: 1 vol., pp. 247. (3s. 6d.)

THE BOOK OF BRITISH HAWK-MOTHS.—A popular and practical Handbook for Lepidopterists: 1 vol., pp. 157. (3s. 6d.) By W. J. Lucas, B. A. London: L. Upcott Gill, 170 Strand, W. C.

Many excellent works on British Butterflies have been published during the last twenty-five years, and one would naturally suppose that there was little need of another book on the subject. Mr. Lucas, however, has succeeded in producing a very useful and excellent popular manual, which will be a welcome aid to those who wish to study the life-history of butterflies as well as to identify the specimens they may collect in the British Isles. As it is intended for those who have made no previous study of the subject, the author begins at the beginning, telling the reader what an insect is, what place the butterfly takes in nature, how to capture, set and care for specimens, and then describes each British species from the egg to the imago in clear and simple language, and in almost every instance gives admirable drawings of the caterpillar, chrysalis, and both surfaces of the imago. As there are no less than 266 figures in illustration of sixty-eight species, the collector should have no difficulty in determining any specimen of butterfly in any of its stages (except the egg) that he may chance to find. A book such as this should give a great impetus to the study of the preparatory stages of British butterflies, a section of entomology which is usually neglected in favour of the mere collection and arrangement of the perfect insects. A volume such as this on Canadian butterflies would be a very welcome aid to a large number of young people whose interest has been aroused by the beauty and variety of our species, but whose enthusiasm is soon dampened by the difficulty of obtaining any information about them.

“The Book of British Hawk-Moths,” by the same author, deals with a somewhat less familiar group, and gives much useful information that it would otherwise be hard to find. The plan of the work is similar to that of the Butterfly book, and it is written in the same clear and simple style. As there are only seventeen species to deal with, the writer is able to go more fully into details respecting them, and to make his work all the more complete and popular. He has also provided artificial keys to the larvæ and imagines, and tables for distinguishing the species where there is

more than one representative of the genus. The fifteen plates with which the volume is illustrated are very beautiful, and are admirably drawn by the author himself. Each species is represented life-size, and is shown as a caterpillar on its food-plant, chrysalis, and imago. There are also eighteen wood-cuts, for the most part illustrating details of structure. It is to be hoped that the author will continue his good work until he has completed the British Lepidoptera, or at any rate the more conspicuous and familiar families.

LIFE HISTORIES OF AMERICAN INSECTS.—By Clarence M. Weed: 1 vol., pp. 272. (\$1.5c.) New York: The Macmillan Company.

The publication of a popular book on insects is so rare an event on this side of the Atlantic that we heartily welcome an addition to the number, especially when it is so excellent and satisfactory as the volume before us. Dr. Weed has selected some five and twenty more or less familiar insects, and in a pleasant manner has given some account of their life histories. The chapters are quite independent of each other and arranged in no particular order; the book may therefore be opened at random, and the sketch that may be hit upon read without any detriment to the continuity of the work. Some of them which deal with such creatures as the leaf-miners are naturally very brief, since so little is known about these tiny foes to vegetation, but of other species which have been subjects of particular study on the part of the author we find long and full descriptions. Among the latter may be mentioned the interesting account of the hibernation of aphides, the chapters on "harvest spiders," the "army-worm," etc. Any one, young or old, who has any desire to read about the wonderful creatures that inhabit the world, and to know something about their modes of life, cannot fail to be pleased with this book, and to be led on, we should hope, to make his own observations of their curious habits and strange doings. The volume is handsomely illustrated with 21 full-page plates and nearly 100 figures in the text.

INSECTS AND SPIDERS: their Structure, Life Histories and Habits.—By J. W. Tutt: 1 vol., pp. 1:6. (1 shilling.) London: George Gill & Sons, Warwick Lane, E. C.

In the Annual Report of the Entomological Society of Ontario for 1896 much attention was paid to the subject of teaching natural history, and especially entomology, in schools, and the desire was expressed that

some handbook might be drawn up for the assistance of teachers in rural schools. The volume before us is the very book that is needed, if only it dealt with Canadian instead of British insects. In England "Object Lessons" are a compulsory part of the curriculum in elementary schools, and the teachers are required to give their pupils a series of simple lessons "adapted to cultivate habits of exact observation, statement, and reasoning." These lessons are to be "on objects and on the phenomena of nature and of common life," and a wide discretion is thus left in the hands of the teacher. In the country schools of Ontario no subject could be more useful than the study in this way of the commonest species of injurious and beneficial insects, and no subject is likely to compare with it in interesting the pupils. A further advantage is the ease with which specimens can be obtained and their life histories traced. Mr. Tutt's volume is admirably adapted for the use of teachers in providing lessons of this kind. After giving a general account of the external structure of insects, their internal organs and metamorphoses, he devotes the "Lessons" to typical common species of each order, giving similar particulars regarding the individuals and any general facts of interest that bear upon them. Each insect treated of is also illustrated with plates and wood-cuts. It is not, however, a text-book for pupils, but is meant for the instruction and equipment of the teachers, affording them an excellent foundation upon which to frame the instructions they are to give to those committed to their charge.

VANESSA MILBERTI.

In "The Butterflies of the Eastern Provinces of Canada," by Rev. C. J. S. Bethune (Ent. Soc. of Ont. Report, 1894), it is stated that individuals of this butterfly were seen as late as the 18th Oct. I saw two specimens on the 25th Oct., flying actively across a street near the Hotel Dieu, Montreal. This usually common butterfly is scarce within the range of my entomological field work, which is principally confined to the north-east slope of Mount Royal, and the streets of Montreal around that neighbourhood. Only one other specimen was seen by me this season, and that was also at a late date, the 19th Oct. My collection specimen was caught in 1894, and since then, I have not seen another in the same district until the above appeared.

This butterfly was common around St. Andrews East, Que., from the 1st to the 4th Aug., 1896. CHARLES STEVENSON, Montreal.

[A specimen was seen on the wing at Port Hope on the 5th of November last.—ED. C. E.]

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ERRATA.

Page 100, 5th line from bottom, for
"oratus" read "ovatus."

Page 168, 12th line from bottom, prefix
"7."

Page 168, 6th line from bottom, add
"Stylus"

Page 208, 12th line from bottom, for
"tæta" read "læta."

Page 254, 27th line from top, insert a
comma after "stripe."