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The Canadian Entomologist.

VOL. XV. LONDON, ONT., SEPTEMBER, 1883.

No. 9

THE TOWN AND THE FIELD—WITH SOME ACCOUNT OF THE COCOONS OF PARASITES.

BY FREDERICK CLARKSON, WALL STREET. NEW YORK CITY.

Here I am again imprisoned within the walls of the town, after enjoying all the liberty of the field. How unphilosophical and dissatisfying to a devotee at the shrine of Nature are the labors that attach to a locality like this! One must turn over a new leaf occasionally. To balance the ledger, even though it have golden results, is comparably but as the dust of the balance. The City is stupid, hot, and odoriferous—empty, and yet full. Wealth, with its polished exterior, has long since departed, and “poverty, a wrinkle of itself,” remains. The intensity of the heat brings the hidden life without, and the town is seemingly the more full. What a wretched place in midsummer is a great City! Ho! for the country, where the God of Day is awaked by

“The breezy call of incense breathing morn,

* * * * *
The cock’s shrill clarion and the echoing horn.”

And when he sinks to rest behind the everlasting hills, mark

* * * * *
“How still the evening is,
As hushed on purpose to grace harmony.”

While from every thicket, from tree top, and from meadow—Nature’s most glorious cathedral—comes forth the vesper sacrifice of song. The trees, like columns, reach up to the heavens, and canopied over all, the gorgeous beauty of a passing summer day. These are some of the inspirations that overtake a fellow who is ready to pack up and start.

Meanwhile, as a pleasing abstraction from my surroundings, I write for your journal a brief account of the cocoons of parasites. Much has been written concerning the transformation and habits of the parasitic Hymenoptera. Supposing it may be of interest, I give a few notes relating to the cocoons, and such other methods as these parasites adopt for a covering while in the pupa condition. The circumstance that a portion of my labor during the past season did not result as expected—many

of the caterpillars which I had fed up from the third and last moults developing into these parasites—gave me the opportunity of examining the mechanical skill of these insects and of noting some peculiarities of habit. From the cocoon of *T. Polyphemus* I have obtained *ጸ. Macrum* Linn. This parasite forms a very tough oval-shaped cocoon, occupying the larger portion of the cocoon of the moth. It is composed of very fine silk agglutinated by a dark secretion. The exterior is of a dark brown color, with a faint yellowish or golden band around the centre; the interior is lined with a thin transparent substance, possessing a brilliant metallic polish. Distinguished Entomologists have asserted that this parasite commonly deposits from eight to ten eggs on the *Polyphemus* caterpillar. I cannot reconcile this statement with the observations that I have made. Out of three cocoons of the *Polyphemus* caterpillar, I have in each case obtained but one of the parasite; indeed there is not sufficient space within the cocoon of the moth for more than two cocoons of the parasite. It is possible that some of the parasitic larvæ may escape from the cocoon of the moth, and undergo transformation without, yet in such cases as came under my observation no such evidence existed. From the chrysalid of *P. Troilus* I have obtained *T. Exesorius* Brullé, which transforms without other covering to serve as a cocoon beyond that supplied by the chrysalid. I note that the point of exit of this parasite from the chrysalid was the same in every case, viz., on the right or left side, about midway of the thorax, at the widest part. From a cocoon of *P. Cecropia* I am furnished with eight cocoons of *B. Flavator* Fabr. They are three quarters of an inch long, and very narrow. The outer covering is of loose silk; within it is rendered more dense, the threads being drawn together by a gummy secretion. They are grouped, side by side, lengthwise within the cocoon of the moth. I would state in this connection that one of my *Cecropia* cocoons contained a number of parasitic larvæ, apparently half fed, starved out, dry and hard. I make this note in view of the remarkable instinct that governs this family in commonly providing the necessary food for its progeny. The insufficiency in this case is possibly accounted for in that the caterpillar may not have been full fed at the time of spinning its cocoon, and that the parasite, with an instinct as to quality, but not quantity of food, and following the habit of many generations, makes a deposit of ova in correspondence with the ordinary size or common growth of the caterpillar. The pupa of *P. Achemon* gives me twelve cocoons of *Perilampus*; they are of a dark brown color, about a

quarter of an inch long, oval in shape, and were found in the earth close by the nearly consumed pupa of the Sphinx. From a cocoon of *S. Virginica* I have obtained those of a parasite, probably a *Chalcis*, the insects having escaped through an aperture in the jar in which I had placed the cocoons. They are about a quarter of an inch long, of a bright red color, and are attached to the outer surface of the cocoon of the moth. Judging from what has transpired among my collection of larvæ made at Oak Hill, New York, the past summer, I am led to believe that the parasitic visitation to that locality must have been numerous, promising to the agriculturist rather than to the entomologist a better reward for the industry of the present season.

A NEW CATOCALA.

BY G. H. FRENCH, CARBONDALE, ILL.

CATOCALA SARA, n. sp.

Expanse 3.10 inches. A form in size and general appearance resembling *C. Aspasia*, Streck., but having much darker colored fore wings, besides other points of difference. Primaries blackish gray from the base to the t. a. line, along the posterior margin to the subterminal line, and from this in a broad band to the costa, the inner part of this band running along the inner side of the reniform. This color is formed of a black or brownish black ground, sprinkled with white scales. This leaves a pale space between the stigmata from the median vein to the costa, and the whole end of the wing beyond the dark space spoken of. T. a. line indistinct, of the ground color, but with less white scales; t. p. line distinct anteriorly, one large and one small tooth opposite the reniform. Subterminal space scarcely tinged with brown, the subterminal line white with a sprinkling of black scales. Orbicular indistinct, black with a few white scales, reniform with a few white scales and an annulus of gray. Terminal space gray. Secondaries rosy red, the median band very much as in the form *Walshii*, not reaching the inner margin, a little constricted opposite the disc, beyond this a little enlarged, after which it narrows to less than half the costal width. Terminal line like *Walshii*, with an internal excavation before the anal angle that reaches half through the band. In *Aspasia* this excavation extends almost or quite through the band. Terminal fringe white, internal gray with a few blackish hairs at the base of

the wing. On the under side, the basal and medial band of the primaries are connected by a broad posterior band of black. Described from two specimens from Jamestown, Colorado, one in my own cabinet and one in the cabinet of Herman Strecker, Reading, Pa., the latter being a little lighter than the one in my cabinet.

LIST OF GEOMETRIDÆ TAKEN AT QUEBEC AND MONTREAL.

BY G. J. BOWLES, MONTREAL.

In order to make the following list as complete as possible, I have included the species in the cabinets of Messrs. H. H. Lyman and F. B. Caulfield, of Montreal, with those in my own collection, taken at Quebec, and also those credited to Mr. Belanger, of Quebec, in Packard's "Monograph." When a species is found both at Quebec and Montreal, no locality is given; when found only at either place, Quebec is indicated by a "Q," Montreal by an "M." The list comprises 115 species and 3 varieties. The names and arrangement are those of Packard's "Monograph."

- | | |
|-----------------------|--------------------------------------|
| Eupithecia. | Petrophora (Cidaria). |
| albicapitata, Q. | diversilineata. |
| absynthiata. | hersiliata, M. |
| miserulata, M. | Ochyria. |
| Glaucopteryx. | ferrugata. |
| caesiata, Q. | also var. <i>unidentaria</i> , black |
| magnoliata. | northern variety. |
| Plemyria. | designata. |
| multiferata. | Rheumaptera (Melanippe, &c.). |
| Epirrita. | ruficillata. |
| cambricaria. | lacustrata, M. |
| perlineata, Q. | unangulata, Q. |
| dilutata, Q. | intermediata, M. |
| Hydriomena. | lugubrata, Q. |
| trifasciata. | hastata, very common and |
| californiata, Q. | variable. |
| Petrophora (Cidaria). | Anticlea. |
| truncata, Q. | vasiliata. |
| albolineata, Q. | |

- Hydria.
 undulata.
- Phibalapteryx.
 latirupta, Q.
 intestinata, M.
- Triphosa.
 dubitata.
- Lobophora.
 montanata.
 viridata, M.
 vernata.
 geminata.
- Odezia.
 albovittata.
- Heterophelps.
 triguttata, M.
- Zerene.
 catenaria, M.
- Haematopis.
 grataria, M. [Is not this the
Pellonia successaria of Walk.,
 described in Can. Nat. vol. 5,
 1860, page 262?]
- Eufidonia.
 notataria.
- Fidonia.
 truncataria, Q.
- Enaturga.
 Faxonii, Q.
- Caripeta.
 divisaria.
- Lozogramma.
 disconventa.
 detersata.
 defuata. Common
- Eufitchia.
 ribearia. Common.
- Thamnonoma.
 subcessaria, Q.
 brunnearia, Q.
- Marmopteryx.
 strigularia, M.
- Phasiane.
 mellistrigata, M.
- Semiothisa.
 granitata, M.
 bisignata, M.
 enotata, Q.
 (Some not identified.)
- Corycia.
 vestaliata.
 semiclarata.
- Eudeilinia.
 herminiata, Q.
- Deilinia.
 variolaria.
 erythemaria.
- Gueneria.
 basiata, M.
- Stegania.
 pustularia.
- Callizzia.
 amorata.
- Acidalia.
 rotundopennata, Q.
 nivosata.
 enucleata, M.
 insulsaria, Q.
- Ephyra.
 pendulinaria.
- Dyspteris.
 abortivaria, M.
- Eucrostis.
 chloroleucaria, M.

- Nemoria.
 subcroceata, Q.
 var. incertata, Q.
 gratata, Q.
- Aplodes.
 rubromarginaria, M.
- Anisopteryx.
 vernata.
 autumnata, M.
- Hybernia.
 tiliaria.
- Amphidasys.
 cognataria.
- Biston.
 ursaria.
- Tephrosia.
 cognataria, Q.
 anticaria, Q.
 canadaria.
 cribrataria, Q.
- Cymatophora.
 crepuscularia.
 pampinaria, Q.
 humaria.
 larvaria.
 divisaria, Q. Walker. List.
 Lep. Het. Br. Mus. XXI.,
 489, 1860. [Not figured by
 Packard, but stated by him
 to be "apparently a valid
 species," and placed among
 his "Desiderata." Compared
 by me with Walker's type in
 Coll. Ent. Soc. of Ontario,
 and found to be identical.]
- Hemerophila.
 unitaria, M.
- Cleora.
 pulchraria.
- Hyperetis.
 nyssaria.
- Plagodis.
 phlogosaria, M.
 Keutzingaria, Q.
 alcoolaria, M.
- Nematocampa.
 filamentaria.
- Angerona.
 crocataria. Common.
- Sicya.
 macularia.
- Metrocampa.
 perlata.
- Therina.
 fervidaria, M.
 endropiaria, M.
 seminudaria, M.
- Epirranthis.
 obfirmaria, Q.
- Endropia.
 duaria, M.
 hypochraria.
 marginata, Q.
 armataria.
 bilinearia.
 effectaria, Q.
 obtusaria.
 serrataria, M.
- Azelina.
 Hubnerata.
- Eugonia.
 alniaria.
 subsignaria, Hub. M.
- Caberodes.
 confusaria.

Metanema.	Tetracis.
carnaria.	Coloradaria? Q.
inatomaria.	Eutrapela.
Tetracis.	transversata, M.
lorata.	Also, var. goniata, Q.
crocallata.	clematata.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The tenth annual meeting of this Branch was held at the residence of the President, H. H. Lyman, Esq., M. A., Montreal, on Tuesday, 8th May, 1883, at 8 o'clock, p. m.

President read the following report of the operations of the Society for the year :—

REPORT.

Your Council beg to submit the tenth annual report of the Branch.

Five regular meetings have been held during the year, and in addition to these, the members have had the pleasure of attending the annual meeting of the parent Society, which was held in the rooms of the Natural History Society, on the 24th August last, during the session of the American Association for the Advancement of Science. The opportunity of meeting with many of the entomologists of the United States, and the President and other officers of our Canadian Society, was highly appreciated by our members.

The following original papers have contributed to the interest of our meetings during the year :—

1. Description of a Dipterous Parasite on *Phylloxera vastatrix*, by the Rev. T. W. Fyles.
 2. Sir John Lubbock on Ants, by G. J. Bowles.
 3. Notes on the Genus *Callimorpha*, by H. H. Lyman.
 4. Preliminary list of the Geometridae of Quebec and Montreal, by G. J. Bowles.
 5. Notes on some Diurnal Lepidoptera occurring in Canada, by F. B. Caulfield.
 6. Causes of Rarity in some Species of Insects, by G. J. Bowles.
- The whole respectfully submitted.

H. H. LYMAN, President.

The report having been adopted, the election of officers took place, with the following result:—

G. J. Bowles, President; W. Couper, Vice-President; F. B. Caulfield, Secretary-Treasurer; J. G. Jack, H. H. Lyman, W. Shaw, H. Graves, Council.

A very pleasant hour was then spent in examining the President's collection of Lepidoptera, and the scarce and valuable illustrated entomological works in his library.

GEO. JNO. BOWLES, Secretary.

ORGYIA LEUCOSTIGMA, SMITH.

BY FREDERICK CLARKSON, NEW YORK CITY.

The foliage of the trees in this city is undergoing spoliation by the larvæ of this moth. Many of the trees are entirely denuded of their leaves, particularly the Silver-leaf Poplar, the Ailanthus alone escaping attack. The writer suggested to the authorities last spring that hand-picking of such cocoons as contained the deposit of ova was the only sure way of exterminating these insects. Had such service been rendered the trees at that time, this damaging visitation would have been prevented. There is good reason to believe, however, that what the authorities have failed to do, a young army of parasites, "Pimpla," which have put in an appearance during the last fortnight, are now actively attempting, and we shall probably be rid of this moth another year. The ova commenced to hatch out about the 25th of May, and the larvæ began to assume the pupa form about the 21st of June; ten days thereafter the imago was discovered depositing ova. Out of twelve cocoons gathered on the 15th of July, four yielded the parasite already referred to. I would note here in connection with this parasite a circumstance very commonly observed among the Lepidoptera. I discovered two ♂ parasites upon a cocoon containing the pupa of this moth. I drove them away several times, but they as frequently returned. I finally captured them, and placed them together with the cocoon in my collecting bottle. Before I had returned to my residence a ♀ Pimpla had emerged from the cocoon and was busily employed in expanding her wings. I also noticed that this parasite deposits its ova

through the cocoon on to the pupa, and that in every case that came under my observation the pupa selected was the ♀, doubtless from the fact that its plump condition provides the necessary food for the development of the parasite, which the ♂ pupa of the moth could not furnish.

MEETING OF THE ENTOMOLOGICAL CLUB OF THE
AMERICAN ASSOCIATION FOR THE ADVANCE-
MENT OF SCIENCE.

A meeting of entomologists was held, according to announcement, on the 15th of August, 1883, at Minneapolis, Minn., in the University Buildings. There were present during the meetings the following: Prof. S. A. Forbes, Normal, Illinois; Prof. C. V. Riley, Washington; D. S. Kellicott, Buffalo; Herbert Osborn, Ames, Iowa; O. S. Westcott, Chicago; Wm. Saunders, London, Ontario; Dr. and Jenny Hoy, Racine, Wisconsin; C. L. Herrick, E. W. Claypole, Prof. E. S. Morse, C. E. Bessey, E. H. Canfield; Miss Mary E. Murtfeldt, Kirkwood, Mo.; Mrs. M. B. Moody, Buffalo, N. Y.; Thomas S. Roberts, Minneapolis, Minn., and others.

S. A. Forbes read a letter from J. A. Lintner, regretting his inability to be present, and after some remarks by Mr. C. V. Riley as to the prevailing sentiment at the meeting of entomologists last year at Montreal, it was decided to reorganize the Entomological Club of the A. A. A. S., under the rules as hereinbefore recorded.

On motion, the following officers for the ensuing year were then elected:—

President, D. S. KELLICOTT.

Vice-President, HERBERT OSBORN.

Secretary, O. S. WESTCOTT.

A communication was read from Mr. W. H. Edwards, of Coalburgh, W. Va., giving interesting recent experience in the rearing of butterflies of the following species: *Papilio rutulus*, *P. zolicaon*, *Colias barbara*, *C. amorphæ*, *Melitæa chalcon*, *M. phaeton*, *Lycena melissa*, *Parnassius smintheus?* and *Argynnis coronis?* The author stated that he had bred *rutulus* and *zolicaon* from the egg, that *rutulus* is constantly distinguishable from *turnus*, at least after the first larval stage; and that *zolicaon* is closer to *asterias* than to *machaon*. He had also reared from the egg *Colias amorphæ*, and was inclined to the opinion that it was

distinct from *C. eurydice*. Opportunities had been afforded of studying all stages of *M. chalcon*, with *M. phacton* colonizing on the same plant, so that the habits of the two species could be compared.

Mr. Edwards has also raised *Lycaena melissa* from egg to chrysalis, and finds that the larva in the last stages has similar organs to those of *Pseudargiolus* on the 10th and 11th segments, and that ants are attracted in the same way by the sweet fluid they exude. Over 100 eggs of *Parnassius*, either *smintheus* or something close to it, have been obtained from West Montana. As to butterflies, the author stated that he had never seen them scarcer than during the past year. An interesting discussion followed this paper, in which several members took part.

Prof. Riley offered some "Notes on *Pædisca Scudderiana*," and exhibited plants of *Solidago* containing the larvæ of this species, and made some remarks on its habits which went to reconcile the published conclusions and differences between himself and Dr. Kellicott, and to show that while the insect is commonly a gall maker, it was also, exceptionally, an inquiline. The specimens showed that the habits of the insect were variable, and that the larva was either a leaf-crumpler, living in a bunch of curled terminal leaves held together by a silken gallery, a stem-borer, without causing any swelling, or the maker of a more or less perfect gall. He had also found it as an inquiline in the gall of *Gelechia gallæsolidaginis*, the gall of which was always distinguishable from that of the *Pædisca*; among other things by the burrow of the larva always being traceable from the blighted tip of the plant, whereas the *Pædisca* larva lived at first in the tip, and when making a gall always left the tip and bored in at the side. Mr. Kellicott's observations were accurate so far as they went, but did not take into account the variation in habit. Mr. Riley had watched these larval habits during the present year from the time of hatching, and had concluded that the insect combined, in varying degree, the four characteristics of gall-maker, leaf-crumpler, stem-borer and inquiline. The larva living in the crumpled leaves later in the season had not been reared to the imago, but he had made comparisons of the young larvæ and found that they were exactly alike, but they showed considerable modification as they developed, especially after the last moult. Several other micro-lepidopterous larvæ bored in the stems and lived among the leaves of *Solidago*; while another species, yet unbred, made a gall similar to that of *Pædisca*; but all the other larvæ known to him were easily distinguished from *Pædisca*.

Mr. D. S. Kellicott said he felt sure that his observations as reported in the paper referred to were correct, and he was glad to know that both his own conclusions and those of Mr. Riley could be thus harmonized. It would seem he had not carried his observations far enough to discover that all the larvæ of *Scudderiana* fed at first in the terminal leaves. Late in the fall he had often taken from the terminal leaves the mature larvæ referred to by Mr. Riley, but had so far failed to obtain the imago from them. He had some doubt still of its being identical with *P. Scudderiana*.

Prof. Riley also called attention to the life habits of *Helia americanis*, which he finds in the larval state to feed in the nests of *Formica rufa*. So far as he knows, this is the first Lepidopterous insect known to develop in ants' nests. He also gave his experience in rearing *Arsame obliquata* during the past two years, and exhibited specimens in different stages of development. The eggs are laid in curious broadly conical or plano-convex masses enveloped in hair, and a cream colored mucous secretion, which combined look much like spun silk on the inside, and on the outside like the glazed exudation of *Orgyia leucostigma*. The larva, which is pale at first, but dark in its later stages, bores into the stems of *Sagittaria* and *Nelumbium*, and is semi-aquatic, the last pair of spiracles being exceptionally large and dorsal. There are two annual broods, the second hibernating as larvæ in moss and decaying stumps near the water. The moth shows great variation and the summer brood is on the average not much more than half as large as the spring or hibernated generation, and generally much paler.

Mr. D. S. Kellicott said that he had bred this moth at Buffalo, N. Y., where it was very abundant, and he had found it associated with another species, an account of which he promised to give at some future session. The meeting then adjourned to meet at 2 p. m. the following day.

Wednesday, August 15th, 1883.

The members of the Club met at 2 p. m., the President in the chair.

A paper was presented by Prof. S. A. Forbes entitled "Memoranda with regard to the contagious diseases of caterpillars and the possibility of using the virus of the same for economic purposes." The writer had adopted the results of Pasteur's discoveries in relation to the disease affecting silk-worms as the foundation for his researches. M. Pasteur some time since demonstrated the constant presence of a parasite in the intestines of silk-worms affected by this disease, which has at times threatened the silk industry in Europe. This parasite was not only the

indispensable accompaniment of the disease, but is its originating cause and the means by which it can be and is conveyed to other individuals of the species.

By placing healthy silk-worms in contact with those suffering from the disease, by sprinkling them with the dust of excreta derived from the latter, or by moistening their food with an infusion of the fermented mulberry leaves upon which these had fed, he proved the possibility of conveying the disease from one subject to another.

In pursuance of this, Prof. Forbes has witnessed instances of epidemic disease in different species of insects, as for instance in the Chinch Bug and the Yellow-necked Caterpillar, which disease was invariably dependent upon some form of bacteria or micrococcus, possible of cultivation and reproduction, and by means of which the disease can be indefinitely conveyed. These facts give rise to the suggestion that the specific micrococcus or bacteria causative of these fatal diseases may be used for the infection and destruction of insect pests.

Prof. Osborn called attention to the fact that he had noticed *Bombus pensylvanicus* inhabiting a deserted wren's nest, situated under the roof of a porch, and at least twelve feet from the ground, it being the first instance he was aware of where they nested away from the surface of the ground.

Mr. D. S. Kellicott had noticed the same or some allied species of *Bombus* inhabiting a mouse's nest in the brace of a barn.

Miss Murtfeldt had also seen them domiciled in a martin's nest.

Dr. Hoy presented for inspection the larvæ, pupæ and imagines of *Plusiodonta compressipalpis*. He had watched the insect through its transformations and had noted that during its early larval stages its prevailing color was a pea green varied with uniformly placed black spots, which increased in number with each successive moult. Only during the last stage of its larval life was the insect usually noticeable by other than professional eyes; since then its color was reddish brown ornamented with creamy white. *Menispermum Canadense* was its usual food plant. The cocoon was formed by first building two nearly parallel walls and then uniting them at the top. Some larvæ which had been displaced after beginning to pupate, had apparently become exhausted, or their teeth had become loosened in anticipation of their approaching new condition, and they were willing to accept bits of paper held to them on a pin, with which they finished the cocoons already begun. The species in Racine cannot be more than two-brooded. The larvæ are not distinguishable

from those of Geometrid moths, as they are true loopers. Their transformations in some particulars were exceedingly prompt.

Prof. Riley stated that he had known certain moths, notably *Leucania unipuncta*, to go through their entire transformations in fourteen days, and in some instances in only ten days.

Prof. Herrick made enquiry as to what are sometimes known as frost-flies.

Mr. Kellicott called attention to a monograph by T. Rymer Jones and one by E. Ray Lankester, to be found in the Quarterly Journal of Microscopical Science, and stated that the species common at Buffalo was *Corethra plumicornis*.

Prof. Forbes had noticed the larvæ of *Corethra* abundant in the stomachs of fishes.

Adjourned to meet at the call of the President.

Friday, August 17th, 1883.

The Club met at the call of the President at 2 p. m., in the room in the University assigned to the use of Section F.

Prof. Osborn presented a paper on the Phytoptera, a group of insects formerly regarded as the larvæ of mites, the individuals of which are so small as to be invisible to the unaided eye. Reference was made to one form found on the soft maple, which occurs as a small swelling on the upper surface of the leaves, containing sometimes a number of these insects, at other times only two or three. One species affects the ash, occurring on both the upper and lower sides of the leaves, one on elm and one on box elder, that on the last named tree having a woolly structure beneath the surface. This paper was illustrated by a very interesting series of carefully mounted microscopic specimens.

Prof. Riley remarked that the species which occur in Europe had been well worked up there, and that in studying our species the work already done on this group should be carefully examined so as to avoid the making of synonyms. He considered that the hibernating habits of these mites was one of the most interesting discoveries which had been made in reference to them, and he hoped that the attention of investigators would be especially turned to this point. He referred also to additional species which occur on the plum, cherry and linden.

Mr. Osborn said that the Phytoptis on plum was not common in the

neighborhood of Ames, although he had found it occasionally ; that on the maple is particularly abundant.

Mr. Saunders referred to the unusual amount of black knot seen in Ontario this year, especially on the common red cherry trees, and stated that he had scarcely seen a specimen of this fungus on the cherry which had not one or more specimens of the plum curculio feeding on the interior.

Mr. Riley remarked that the black knot had been very common of late all through the northern portions of New England.

Mr. Kellicott had observed it as very common in Western New-York, and had also noticed that a large proportion contained larvæ.

Mr. Osborn stated that he had observed the larvæ of *Gortyna nitela* boring in young twigs of ash, and had noticed many dead twigs from this cause. He had failed to rear the imago from them on account of parasites ; had also observed the same species feeding externally upon the leaves of the common plantain.

Miss Murtfeldt had found the same insect in twigs of the maple, *Acer dasycarpum*.

Prof. Riley stated that it occurred also in peach twigs and in the stalks of wheat ; also in *Ambrosia artemisifolia*, where it enters from the sides.

Prof. D. S. Kellicott offered the following notes on three lepidopterous stem-borers.

1st, *Arzame obliquata*—Prof. Riley has referred to the habits of this species at a previous session of the Club, and I shall refer only to a few points. As I said yesterday, I feel sure that in Buffalo, N. Y., it is single-brooded. The eggs I have not found, but the recently hatched larvæ I have found feeding upon the flowers about the 12th of June. It occurs in *Typha latifolia*, rarely in *Sparganium*. I have not found it in *Sagittaria* or *Nuphar*. Mr. Riley has referred to the large posterior pair of spiracles placed dorsally. On account of this structure it may remain a long time swimming at the surface. I have had these larvæ confined in a pail of water for five or six hours without apparent injury. When removed from their galleries and dropped into the water, they sink to the bottom and remain there for a considerable time ; then rising to the surface, they swim about with a snake-like motion. In the autumn they leave their food plants and bury themselves in the earth, or crawl into old wood, &c. They pupate in May.

2nd—The second larva is that of a *Nonagria*, which I have called

Nonagria subcarnea. This species is also single-brooded; the larvæ are found boring the stems of *Typha* early in the summer, forming galleries in the stems; it may be readily distinguished from those of *A. obliquata* by the lighter color, often carneous, and by the fact that the last pair of spiracles is not sub-dorsal. I have found it rarely in *Scirpus*. It appears not to be so nearly aquatic, and probably does not pass from one plant to another through the water, or mud. When the time comes for pupation it prepares a pupa-cell above the water line and changes in the bottom of the same, with the head upwards. It leaves the epidermis closing the place of exit, and the freed moth breaks through this with its clypeal spine when it escapes, leaving the pupa skin in the cell. The elongate pupa has a very stout, blunt clypeal spine. The moth appears in August. It is known to abound throughout Western New York, Central Michigan and Eastern Wisconsin.

3rd—The larva of a *Chilo* (?) bores the stems of *Scirpus*. Its habits are similar to those of a *Nonagrian*. It passes the winter in the old stems, and after the new ones appear it bores into them, passes below the water line, and lives low down in the stem. It is mature late in June, when it forms a pupa cell with its place of exit above the water. The pupa breaks up the epidermis left by the larva, covering the place of escape, but does not force its way out before disclosing the moth, in a manner similar to that of the *Ægerians* and others. It is enabled to do this by means of clasps on the abdominal rings, and the sharp or pointed clypeus.

Mr. Riley, in commenting on Dr. Kellicott's communication, said that he had been greatly interested in the facts presented, and especially as to the pupation of the *Nonagria*. As to the difference in the clypeal projection in the two pupæ exhibited, he thought it might be sexual, as in all cases where the clypeus was produced sexual difference occurred, the greatest development being, so far as he had observed, not in the male but in the female. He had recently called attention in the *Naturalist* to the correlation between the produced clypeus and the horny, exsertile ovipositor, and the fact that they indicated *endophytous* larval habit. The various methods of imaginal exit in stem-boring Lepidoptera, and the structural modifications that resulted were most interesting to the philosophical entomologist. In some species, as in the *Nonagrian* here mentioned, the clypeal point on the pupa seemed merely a consequence of the necessary point in the imago, the pupa remaining in its burrow and the imago boring out. In others, as in *Prodoxus decipiens*, the similar

clypeal point on the pupa permitted it to partly bore out of the stem and thus release the imago, which had no homologous point, but an unarmed head. In some borers the larva prepared a little door which the imago easily pushed open, the pupa remaining inactive within its prison; while in others, closely related, the pupa did the work by forcing itself partly out. There could be no question of the digoneutic nature of *Arsame obliquata* at Washington, and none as to its variability as illustrated by his specimens, *vulnifica* and *melanopyga*, being doubtless but forms of it.

Some specimens of *Cantharis Nuttali* were exhibited by Prof. Riley, it being stated that in Dakota they were accused of devouring the growing wheat.

The meeting then adjourned, when the members spent some time in informal conversation and in examining the microscopic specimens illustrating Prof. Osborn's paper.

OBITUARY NOTICES.

PROF. P. C. ZELLER.

The death of this veteran lepidopterist has occurred, long expected and deeply regretted. Seven years younger than the century itself, Prof. Zeller was born on the 9th of April, 1808. Professor in the Prussian Real Schule at Meseritz, he was finally retired on a Government pension, and has lived since 1870 near Stettin, continuing his entomological labors in connection with the Entomological Society of Stettin. Commencing to write at an early age, Prof. Zeller has grown up with the modern science of lepidopterology. His earliest studies were upon the collections of Frau Lienig and the material brought by himself from a southern trip, which extended as far as Sicily. Zeller discovered the curious diurnal *Rhodocera Farinosa*, besides describing certain *Lycenidæ*, but his principal attention was given to the small moths of the families *Pyralidæ* to *Tineidæ*, the modern classification of which he may be said to have founded. He first cleared up the confusion as to the genera of *Phycidæ*, and by using natural characters, chiefly secondary sexual ones, he succeeded in disentangling our minds with regard to the order of nature in this obscure and neglected field of inquiry. His species and genera are very numerous and almost always valid. It is a misfortune that his valuable monograph on the

Crambidae was issued so nearly simultaneously with the worthless writings of Francis Walker on the same subject, so that some of our North American material has been twice named. The evidence seems to be that Zeller's paper may have been earlier. As a matter of justice it should have priority. In a series of articles, published since retirement from official duties, Prof. Zeller described a number of moths from North America. Rather more than the, unfortunately not to be avoided, proportion of synonyms mark the papers, which are otherwise models of what descriptive work ought to be. Still later, Prof. Zeller has published a beautifully illustrated volume on microlepidoptera, and has given a classification of *Chilo*. As I remember him, in 1867, Prof. Zeller was a white-haired gentleman of very kind manners and enthusiastic for his favorite science. He was moderately thin and tall, wearing a slight whisker, but otherwise with clean shaven mouth and face. His nose was large and well-shapen, his eyes bright and the whole expression of his face pleasing. He had high cheek bones, and his countenance was unmistakably German in its salient features. Loew, the celebrated dipterist, was then living in Meseritz, and an entomological excursion which I made with these two celebrities is among the most pleasant of my European reminiscences. Prof. Zeller's home relations were of the happiest, and the sympathy of an amiable and considerate wife was his through life. And it was a life devoted to science and learning. His accomplishments as a linguist and teacher were well known and appreciated in Germany. We know him chiefly as a biologist, the describer of the exterior structure of lepidoptera. He was fortunate enough to avoid much of the controversial spirit which accompanies descriptive entomology. Although he felt deeply the uselessness of the British Museum Lists and his own studies were impeded thereby, he has, on the whole, little to say in criticism of others. He was not only charitable, but had schooled all natural irritability. His assistance was freely given to others, and Mr. Stainton's work on the *Tineina* acknowledges its value. He was a type of a kindly German pedagogue and naturalist which hardly exists elsewhere.

A. R. G. in *Papilio*.

CHARLES ARNOLD,

of Paris, Ontario, died after a short illness on the 15th day of April, 1883. Although not an active worker in the Entomological field, he was a close observer of the habits of insects, especially such as are injurious to agri-

culture and horticulture, and in this way a most useful member of our Society. He was quiet and unobtrusive, but his work, especially as a hybridist, made him widely known. He originated many good varieties of fruits, cereals and other useful plants, some of which are much appreciated. Few men have done so much good in so quiet a way.

PROF. TOWNEND GLOVER,

long so well known as Entomologist of the Département of Agriculture in Washington, died on the 8th of September from an attack of appoplexy, at the house of his adopted daughter in Baltimore, in his 71st year. He was a most careful and painstaking observer, a good draughtsman and an excellent engraver, and employed his every spare moment in producing figures of American insects. In the preparation of these plates his industry was incessant, and the wonder is how, in one short life, he could have accomplished so much. The plates, with the accompanying notes, have been purchased by the United States Government, and it is hoped that they will be published in sufficient number to admit of their being available to educational institutions and students of Entomology throughout the country. A complete set of his beautiful works, of which only fifteen copies are extant, have been secured for the library of our Society. He was an honorary member of the Entomological Society of Ontario, and ever felt a deep interest in our work.

V. T. CHAMBERS,

A valued contributor to the pages of the CANADIAN ENTOMOLOGIST, died on the 7th of August, his fifty-second birthday, at his home in Covington, Kentucky. He labored long and ardently on the *Micro-Lepidoptera*, and in his numerous descriptions of species and careful notes on their habits, has left behind him an enduring monument. He began a series of papers on *Micros* in the third volume of our journal, published in 1871, publishing ten papers before the end of that year. These were followed by twelve papers in volume 4, nine in vol. 5, ten in vol. 6, nine in vol. 7, seven in vol. 8, ten in vol. 9, four in vol. 10, four in vol. 11, one in vol. 12, two in vol. 13, and one in vol. 14, seventy-eight papers in all, besides a few communications on other Entomological subjects. His writings have added much to the interest and value of our journal, and we shall miss him much.

DR. JAMES S. BAILEY,

Of Albany, N. Y., died at his residence, No. 95 Eagle St., on July 1st, after a protracted illness. He was an enthusiastic student of insects, who devoted most of his attention to the Lepidoptera, of which he possessed a fine collection. He has contributed a number of papers to the ENTOMOLOGIST, among others an illustrated one on the natural history of *Cossus Centerensis*, in No. I., vol. 11, and at the time of his death was engaged in preparing a paper on the tree-boring species of this genus for the Department of Agriculture.

CORRESPONDENCE.

Dear Sir,—While on a visit to the neighborhood of Brantford for a couple of weeks in the latter part of July, I came upon an elm stump with the bark curled loosely round it. On pulling back the bark I saw a *Calopteron reticulatum* fresh and bright. The form, with the front part of the wing covers, all yellow; the hind part, blue black. There was also one just emerged. It was a chalky white all over, the front part with a yellowish tinge, the hind part with a bluish tinge. On examining the stump and inside the bark I found clusters of pupæ, remarkable in the regular formation of the cluster. The pupæ were in straight rows, close, side by side, the row above half lapped over the row below it, each pupa of the upper row placed exactly between the two below it. One cluster was formed thus:—The lower row four; the second row four, one projecting to the left; the third row three; the fourth row two; the fifth row two, one projecting to the right. Another cluster had four in the lower row; five in the second, two projecting to the left; four in the third; three in the fourth, and finished there. Then there were twos and threes in different places, with one by itself. I visited them often to watch their appearance. Sluggishness seemed to be their principal characteristic. Slow in withdrawing from the pupa case; slow in obtaining color and consistency, and slow to go off on the wing. True, the weather was cool and showery, which would tend to increase their slowness. They did not come out in order of time according to the rows, but came from the upper and lower ones indiscriminately; but every one of them was the same

form, not a banded one amongst them—that form was abundant on the bushes at the time. There were still about half a dozen to mature when I left, but some of them were sufficiently advanced to give indications through the pupa skin what they were to be. On re-reading Mr. Coquillett's article in the May number of the CANADIAN ENTOMOLOGIST, I was quite startled on finding that he says his pupa was suspended by the hind end of its body; for the result of my observation was to leave the impression strong on my mind that they were suspended by the head, and I did not think it strange that they were, or that anyone had thought differently. My impression of the tinge of color through the pupa skin is that the yellow was up, and on one visit there was one that seemed as if the pupa skin had just burst on the back and left the insect exposed in exactly the position it was before it burst, and I was struck with the exact resemblance in form and size, even to the pupa on either side of it. But is not this the usual position for Coleopterous larvæ to suspend?

Hamilton, Sept., 1883.

J. ALSTON MOFFAT.

[We think that when our valued correspondent has an opportunity of examining pupæ of this insect more carefully, that he will find that they are suspended by the head downwards, as in the case of the *Coccinellidæ*.—
ED. C. E.]

Having occasion lately to refer to some back numbers of the Proceedings of the Boston Natural History Society, my eye accidentally fell on a paper by Professor Alexander Winchell, read before the Michigan Scientific Association on June 24th, 1863, and entitled, "Notes on *Selandria cerasi*, Harris, as it occurs at Ann Arbor, Michigan." (p. 325.)

Glancing over the paper, I saw the following passage: "As to the remedy for this horticultural pest, it may be added to what has been already published that the odor of coal-tar effectually drives away the fly. This can be smeared over a board and suspended in the tree, a resort which I have found effectual against the plum-weevil."

Can you or any of your readers tell me if this alleged means of driving off *Cenotrachelus nenuphar* has really any virtue? I never recollect seeing the plan suggested before this.

Yours faithfully,

E. W. CLAYPOLE.