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# The Canadian Entomologist.

VOL. XIII.

LONDON, ONT., SEPTEMBER, 1881.

No. 9

## NOTES ON THE PREPARATORY STAGES OF PAPILO CRESPHONTES, CRAM.

BY G. H. FRENCH, CARBONDALE, ILL.

Egg—Spherical, a little flattened at base,  $.06\frac{1}{4}$  inch in diameter, pale ochre with sometimes a greenish tinge, at others inclining to orange. Duration of this period six days.

Young Larva—Length .11 inch; the body covered with tubercles from which project small spines; color dark brown, the tubercles on all but the first of the anterior joints a little lighter, joints 6 and 11 straw color. Duration of this period three days.

After 1st Moulting—Length .31 inch. General color and shape the same, the body having a shining appearance, six tubercles on each of the first four joints, the upper four more prominent, two small tubercles on the back of each of the other joints, the posterior pair more prominent, joints 6 and 11 a little paler than before. Being busy, no notes were taken of the second moult, but the general appearance was much the same. From the first to the third moult was six days.

After the 3rd Moulting—Length .75 inch. Body shining, appearing more as though wet, the tubercles all disappeared except on joints 1 to 4, joint 3 the largest, from joint 4 to 5 an abrupt decrease to the size of the posterior joints; head olivaceous, the ridge on joint 1 pale olivaceous, parts of joints 5 and 6 creamy tinged with olivaceous, the terminal part of body somewhat enlarged and pearly whitish on the back, tinged with olivaceous round the edges, the rest of the body olivaceous brown. Duration of this period five days.

After 4th Moulting—Length 1.25 inches; the dark parts rich dark brown; a prominent ridge over the middle of joint 3 and over the back part of joint 4 a lighter shade of brown, each ridge containing several white rings, there also being a few on the dorsum in front of the ridge on joint 4; a white band above the head, this organ when the animal is at

rest being under joint 1, this white band reaching round the sides to the elevation on joint 4, the lateral portion mottled with olive and brown. The boundaries of the light spaces back of joint 4 varying slightly in different specimens, but in all the anterior one reaches on the sides to the first pro-leg. Each side of the dorsum on joints 8, 9, 10 is a dark brown patch with a bright elliptical violet spot in the centre, the patch more or less surrounded with mottlings of white, the last pair of patches nearly surrounded and often partly absorbed by the light that covers the rest of the body. Joints 2, 3, 4 have each four small dots of the same violet hue, while on each side of joints 8, 9 is a cluster of fine blue points. Each joint, except such as are light at this place, has a cluster of these little points below the stigmata. The light space in the middle of the body is more or less mottled with pale olive. Duration of this period to the time it suspended in its loop to change to chrysalis, five days.

Mature Larva—When full grown length 1.75 inches, width of widest part, or joint 4, .56 inch, narrowest part, or joint 10, .25 inch, of joint 11, .31 inch. The anterior part of body much thickened, a prominent ridge extending across joint 1, along the sides and over the back part of joint 4, the latter being the highest part. Inside of this space is somewhat flattened. Back of joint 4 it tapers rather abruptly to the posterior part of joint 5, after which the body is nearly cylindrical. The scent organs about .50 inch, bright dark red. From the time of suspension to casting the last larva skin one day, or more nearly thirty hours.

Chrysalis—Length 1.50 inches, some a little shorter; the ventral side strongly arched, the dorsal incurved but not very strongly; head case long, depressed, the sides parallel, scarcely wider at base, ocellar prominences long, subpyramidal, not divergent, two teeth on the inner edge of each, a dorsal tubercle at the base of each prominence; mesonotum rather low, edges slightly carinated, anterior elevation bilobed; abdomen with a subdorsal row of small tubercles. Surface granulated. Color variable. One form gray marked with dark gray and brown, another form pale green marked with gray and brown, the latter color mostly on the head case and down the ventral part of the thorax.

The pupal period varies. One of the two observed from which these notes were taken produced the imago fourteen days after pupating, making forty days from the time the butterfly was observed depositing the egg to the imago. The other one is at writing still in chrysalis. Fourteen days

is the shortest pupal period I have observed in rearing this species. From some former notes I have the following pupal periods of 15 specimens :

1	produced the imago in 16 days.
4	" " 17 "
2	" " 18 "
3	" " 19 "
1	" " 20 "
2	" " 21 "
1	" " 22 "
1	" " 24 "

These were the early brood producing the imagines in July, though I might say that about one-eighth of this brood, instead of hatching in July, pass the winter in this state to produce imagines in the following spring. The one that is mentioned above as having a pupal period of 14 days was deposited as an egg June 6th, and produced the imago July 16th. I can see no difference between either the larvæ or the butterflies of those fed on Prickly Ash and those fed on Orange leaves.

NOTE.—Since writing the above the second of the two from which notes were taken has produced the imago, its pupal period being 39 days. The time of hatching was August 10th, having a period of 65 days from the depositing of the egg to the imago. This is the longest period of any of the summer brood of which I have kept a record.

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#### MEETING OF THE SUB-SECTION OF ENTOMOLOGY OF THE AMERICAN ASSOCIATION FOR THE ADVANCE- MENT OF SCIENCE.

The meeting of the American Association for the Advancement of Science was held at Cincinnati, Ohio, commencing at 10 o'clock a. m. on Wednesday, the 17th of August, 1881. At the conclusion of the opening exercises the several Sections proceeded to organize, when the Sub-section of Entomology was called to order by the President, Rev. J. G. Morris. A large number of Entomologists were present, among others C. V. Riley, Washington ; Cyrus Thomas, Carbondale, Ill. ; Wm. H. Edwards, Coal-

burgh, W. Va.; J. A. Lintner, Albany, N. Y.; Rev. J. G. Morris, Baltimore, Md.; Wm. Saunders, London, Ontario; E. W. Claypole, Yellow Springs, Ohio; Miss M. W. Brooks, Salem, Mass.; B. Pickman Mann, Washington; C. D. Zimmermann, Buffalo, N. Y.; A. J. Cook, Lansing, Mich.; J. D. Putnam, Davenport, Iowa; S. H. Peabody, Champaign, Ill.; V. T. Chambers, Covington, Ky., and Chas. Drury, Avondale, Ohio.

On Thursday, August 18th, the Sub-section of Entomology met at 2.30 p. m.

The first paper read was by Prof. C. V. Riley, on Retarded Development in Insects. In this paper the author recorded several interesting cases of retarded development in insects, whether as summer coma, or dormancy of certain portions of a given brood of caterpillars, the belated issuing of certain imagines from the pupa, or the deferred hatching of eggs. One of the most remarkable cases of this last to which he called attention was the hatching this year of the eggs of the Rocky Mountain Locust or Western Grasshopper, *Caloptenus spretus*, that were laid in 1876 around the Agricultural College at Manhattan, Kansas. These eggs were buried some ten inches below the surface in the fall of 1876 in grading the ground around the chemical laboratory, the superincumbent material being clay, old mortar and bits of stone and a plank sidewalk above this.

In removing and regrading the soil last spring, Mr. J. D. Graham noticed that the eggs looked sound and fresh, and that they readily hatched when exposed to normal influences; the species being determined by Prof. Riley from specimens submitted by Mr. Graham. Remarkable as the facts are, there can be no question as to their accuracy, so that the eggs actually remained unhatched during nearly four years and a half, or four years longer than is their wont. This suggests the significant question: how much longer the eggs of this species could under favoring conditions of dryness and reduced temperature, retain their vitality and power of hatching.

Putting all the facts together, Prof. Riley concludes that we are yet unable to offer any satisfactory explanation of the causes which induce exceptional retardation in development among insects. The eggs of Crustaceans, as those of *Sepus* and *Cypris*, are known to have the power of resisting drouth for six, ten or more years without losing vitality, while in some cases they seem actually to require a certain amount of desiccation before they will hatch. Yet the fact remains that different species act differently in this respect, and that individuals of the same species under

like external conditions of existence act differently, that temperature, moisture, food, &c., do not influence them alike. We can understand how this great latitude in susceptibility to like conditions may and does in the case of exceptional seasons prove beneficial to the species by preserving the exceptional individuals that display the power to resist the unusual changes.

The next paper was by the same author, on New Insects Injurious to American Agriculture, in which attention was called to several insects hitherto unknown as injurious, which during the present year have proved very destructive to one crop or another. Such hitherto unknown and unreported injury is either caused by—1st, imported species; 2nd, native species previously known but without destructive habit; 3rd, unknown or undescribed species.

Mr. W. H. Edwards then read a paper on certain habits of *Heliconia charitonia*.

Some interesting discussions followed the reading of these papers, after which an informal discussion on Entomological subjects took place, in which many of the members joined. The meeting then adjourned.

On Friday, at 11.30 a. m., the Entomological Sub-section held another session.

The first paper, "On the Length of Life of Butterflies," was read by W. H. Edwards, followed by one on the Life Duration of the Heterocera, by J. A. Lintner, both of which will appear in the pages of the ENTOMOLOGIST.

A few remarks were made by C. V. Riley on his own extended observations on the duration of the lives of both butterflies and moths, indicating that they were as a rule of very short duration.

Cyrus Thomas stated that according to his observation the Army Worm, as a caterpillar, a chrysalis and a moth, existed in all seventy-seven days. Some observers had, however, made it seventy-six, others seventy-nine days. He contended that in confinement, in a proper temperature and with ample food, the Army Worm passed through its metamorphosis more quickly than in natural conditions.

B. P. Mann disagreed with Mr. Thomas on this latter; so also did C. V. Riley, it being contrary to their experience.

J. A. Lintner, State Entomologist of New York, then read a paper on "A Remarkable Invasion of Northern New York by a Pyralid Insect."

He said that about the middle of May, of the present year, a serious

invasion of St. Lawrence County, N. Y., and several of the adjoining counties by the "army worm" was announced. It was stated that many pastures had been completely ruined, and the entire destruction of the pastures and meadows was threatened. Not having witnessed the operations of the army worm, he at once visited the infested locality. The reports had not been exaggerated. The injury was widespread and serious, already extending over eight of the northern counties. Hundreds of acres of grass presented a brown appearance, as if they had been winter killed. A pasture lot of fifty acres, which, ten days before, offered good pasture, was burned so that in places not a blade of grass could be seen to the square yard. Numerous dead caterpillars were adhering to the dead stems of last year's grass, which it was believed had fallen victims to starvation. The upland pastures were first attacked. The progress was remarkably rapid; entire fields were laid waste in ten or twelve days. The secrecy of the depredations was remarkable. The larvæ had seldom been seen, and never observed in active feeding. It was believed by the farmers that they fed at night, or by drawing the blades of grass into their subterranean retreats. In two instances the larvæ were observed in immense numbers, collected on the trunks of trees so that they could have been scooped up by handfuls.

The tree trunks were enveloped by a firm web of silk, spun by the caterpillars, of so firm a consistence that it could be lifted up in a sheet like a piece of woven silk. The cause of the congregation at this point could only be conjectured. It was not for feeding on the foliage, for the grasses alone were eaten by the caterpillars.

The caterpillars observed and collected by Mr. Lintner were slender, cylindrical forms, sixteen footed, of an obscure greenish color, with a shining black head. They were destitute of lines or other ornamentation, except some warty spots on their upper side. Their average length was three-fourths of an inch. He was unable to identify them with the army worm, for they were quite unlike the mature form of that species, and their habits seemed to be quite different.

On the 6th of August the first moth emerged from some cocoons furnished by Mr. J. Q. Adams, of Watertown, N. Y., and it turned out to be a *Crambus vulgivagellus*.

The interesting question as to which of our insect depredators was chargeable with the ravages in Northern New York was decided. The new enemy was found to be an inconspicuous, hitherto unobtrusive litt:

*Crambus*. It had long been known in our cabinets, but had never before presented itself as an injurious insect.

It is probable that several accounts of injuries to pasture lands in New England States during the last three or four years, which have been ascribed either to the army worm or an unknown depredator, are due to this species. Its subsequent appearance may hereafter be recognized.

The Crambidæ are small moths with narrow front wings often marked with metallic spots and stripes, which are frequently driven up for short flights in our pastures and meadows during the fall months. Specimens of the larvæ, pupæ, cocoons and perfect insects were exhibited to the Section.

Following this three papers were read by A. J. Cook, of Lansing, Mich., "How Does the Bee Extend its Tongue?" "The Syrian Bees," "Carbolic Acid as a Preventive of Insect Ravages."

The author explained how the bee extends its tongue by means of a diagram; it is done, he believes, by forcing into the extremity of that member some of the fluid contained in the glands. In his paper on Syrian Bees he related how D. A. Jones, of Canada, and Frank Benton, of Michigan, went to Europe in search of new varieties of bees. They brought from Cyprus both the Cyprian bee and the Syrian bee, and Mr. Benton went to Ceylon and Java in search of other varieties. From the former place he brought two new species not very unlike our own, but in Java he failed to find the great Java bee. With the Syrian bees the author had Syrianized the apiaries of the Michigan Agricultural College. The Syrians are of a yellow type, closely allied to the Italian bee; they are indefatigable workers, but more irritable than other bees, especially when queenless. They are undoubtedly a valuable acquisition to American apiculture.

The next paper was by Mr. W. H. Edwards, on "The Alleged Abnormal Peculiarity in the History of *Argynnis myrina*," which was followed by one by E. W. Claypole, of Yellow Springs, Ohio, on the Buckeye Stem Borer. The writer remarked that during the spring months some of the leaves of the Buckeye tree droop and die without any obvious cause; indeed these dying leaves may be seen almost as soon as the foliage is expanded. On examination a small hole was discovered in every stalk on which a dying leaf was found, and in splitting this round stalk a living caterpillar was observed ensconced in the narrow tunnel evidently excavated by itself. The destruction of the central part of the leaf stalk



was clearly the cause of the death of the leaf. A number of leaves were collected and the larva reared in confinement, producing a small moth closely resembling *Scricoris instrutana*. When or where the egg is laid has not been discovered. The young larvæ may be found in the leaf stalks of the Buckeye tree from the 2nd to about the 8th of May. After spending a few days in this secure retreat, it comes out and dwells for the rest of its caterpillar life in the dying leaf at the top of the stem upon which it feeds; after thus feeding for about a fortnight it passes into the chrysalis state, from which in about ten days more it emerges a moth.

The President then read his annual address.

#### PRESIDENT'S ADDRESS.

GENTLEMEN,—I regret exceedingly that I am compelled to begin my address by the recital of a melancholy event in the history of our Section.

About ten days after our adjournment last year, and after probably we had all arrived at home and settled down to our autumn's work, the distressing intelligence reached us of the sudden death of one of our most honored and distinguished members. He had mingled with us at Boston and had taken part in our deliberations, and though cheerful and full of hope, yet his usually buoyant temperament was plainly mellowed by advancing years, the every-day anxieties of life, and the pressure of severe intellectual pursuits. He returned home after our adjournment and immediately resumed his linguistic studies with his usual incessant ardor, for he often said to me: "I never take exercise when I am at home, but work all day and sometimes late into the night," and on the 1st of Sept., 1880, Samuel Stehman Haldeman was suddenly stricken down. His lamented death has been noticed in most of the leading papers and scientific journals of the country, accompanied with some biographical facts, for he was widely known as a scholar and scientist, and no man was more highly esteemed as a companion and gentleman. We all are aware of the distinction he achieved in letters and science in our own and foreign countries, of the learned books and papers he has written, and of the titles and prizes which his works secured for him.

If this were the proper place, it would be pleasing to dwell, even at length, upon the many valuable traits of his character, the vast extent of his diversified acquirements, and his almost unparalleled qualities as a friend and scientific fellow-laborer. I feel as if I were announcing the death and reciting the admirable virtues of a brother. For forty years he

and I were what may properly be called "bosom friends." In early life we were engaged in similar scientific pursuits, and living but a few hours' distance from each other, our mutual visits were frequent and our warmest friendship and confiding intercourse continued uninterrupted to the end.

It is well known that in early life he devoted much of his time to our favorite science, to which he made some valuable contributions. His principal papers are: Materials toward a History of Coleopterous Longicornia of the U. S.; Corrections and Additions to this paper; Description of N. Am. Coleoptera; Cryptocephalinorum Borel. Am. Diagnosis. These papers give evidence of honest and painstaking research, patient analysis and sharp discrimination, and are profitably consulted by investigators at the present day.

Of late years he had turned his attention particularly to the study of Language, and became a distinguished member of the Philological Society. All readers know the celebrity he attained in that department and the ardor with which he pursued those studies, but notwithstanding their engrossing attractions, he never ceased to feel an interest in everything that concerned our department. It is hard for a man to forget his first love.

Thus much I thought it proper to say of the lamented Haldeman. He was no ordinary man whom you might compliment with a passing respectful obituary notice. In science and letters he was a great man. His memory will be long cherished by admiring friends. "*Idem extinctus amabitur.*" It may not be out of place to mention here one fact to me, at least, personally interesting. Less than two months ago the monument of Haldeman, chiseled out of enduring granite by Strecker, a brother Entomologist, was erected over his grave by the pious care of the skillful artist himself, who spends his days in cutting marble and granite into classic forms, and half of his nights in studying and figuring the butterflies of his own unequalled private collection.

Gentlemen, forty years ago I could count the known working Entomologists of our country with the first ten numerals. The older Melsheimer, who may properly be designated as the father of our science in this country, Say, Peck, Gould, Randall, Peale, and a few other pioneers, had died or retired, and the only workers then were Harris, of Cambridge; Major LeConte and his son John L., of the City of New York; Fitch, of the State of N. Y.; Haldeman, Melsheimer, jr., and Zeigler, of Penna., and a few others of no special note, were the only ones, as far as is at

present recollected, who prosecuted our science with any zeal and who contributed to its progress by the descriptions of species. There were others who collected insects, but they made no claim to be scientific Entomologists. I remember distinctly when Melsheimer, Haldeman, Zeigler and I used to meet several times a year at our respective homes to read papers, discuss questions, exhibit new species, recite our Entomological adventures and then adjourn to a well appointed table. We regretted that we had no collaborators within two hundred miles, for the LeContes, in New York, were our nearest neighbors. In that day there was not a man in Philadelphia who studied insects. We then established "The Entomological Society of Pennsylvania," and after electing all our confreres in this country as honorary members, we had the audacity to confer the same distinction upon some great men abroad, whose letters of grateful acceptance indicated that they thought that the Society was something more than a club of four comparatively unknown men meeting in Haldeman's study on the banks of the Susquehannah !

And now look at the mighty change. In the Naturalist's Directory for 1880 there are no less than 436 names reported as pursuing our science. Now, whilst it is true that many of these may be collectors only, still they are more or less useful. They all must be interested in it to a greater or less extent or they would not have reported themselves as such. Be this as it may, the increase is simply wonderful and very encouraging. Doubtless there are numerous others in the country engaged in the same delightful employment whose names do not appear in the Directory.

There is no other distinct branch of science that has so many representatives in that book as ours, excepting Botany and Geology, and in Zoology specially we are ahead of the Ornithologist by over 50; the Conchologists are fewer than 100 all told, and all other specialists in Zoology are behind us. All this is cheering, and we are sure that the number of collaborators is growing every year.

But there is a still more encouraging view of the subject, which is founded not only on names, but on facts, and I am sure it will gratify the Section to hear of the number of the published contributions of our fellow workmen. True, they are not all members of this Section, but they belong to the family and we hail them as brethren of the same household.

Most of us have, of course, kept our eyes upon the various journals and have been pleased to see so many papers, and yet perhaps few of us

have any proximate conception of their number and variety. Hence I have thought that probably the most acceptable contribution I could make at this meeting would be a complete list, as far as was possible, of all American Entomological writers since our meeting in August last, and this I have done and will present it at the proper time. Some names may have been inadvertently omitted, but these can be subsequently introduced. In order to insure perfect accuracy and fullness, I made the list of each author's writings as far as I could find them and sent it to him for correction, and I here desire to thank those gentlemen for the uniform courtesy with which they granted me their aid.

This paper will give us a better idea of the progress of our science during the past year than any other mere description possibly could.

A brief analysis of it gives 77 writers and 302 titles; 25 of these articles treat of Coleoptera; 19 of Lepidoptera; 15 of Orthoptera; 5 of Neuroptera; 10 of Diptera; 11 of Hymenoptera; 11 on Hemiptera; 8, or 10 describe larvæ of various orders; 5 or 6 are on fossil insects; a few on Myriopods and spiders, and 11 on Economic Entomology.

This brief exhibit will give an idea of what has been done as far as has been made public. Doubtless there are many other papers in preparation, and much efficient work has been privately done which may never be published.

It would be out of my province to specify any of these writings in this address, and much more to express any opinion of their relative value, or to indulge in any critical remarks. That must be left to the reviewers.

We now have four journals exclusively devoted to our science, and in several others considerable space is allotted to it. In connection with these must be mentioned the annual reports of the State Entomologists. The Proceedings and Transactions of all Natural History Societies also contain frequent articles upon the subject.

The Canadian Entomologist, Psyche, The Bulletin of the Brooklyn Ent. Society, and Papilio, should be supported by every one of us. Indeed, no man can know how our cause is advancing without them, and as it is likely that none but Entomologists read them, so much the more general should be our patronage that they may be maintained.

Each of these four seems to occupy its peculiar field. The Canadian is general and the organ of a special association. Although it is geographically *extra limitis*, yet it is very near to us and a large share of its

original papers come from this side of the Niagara. We claim it as one of our own, and being the oldest and admirably conducted, we hope that its present efficient editor may long continue to conduct it and render it still more interesting and instructive.

The next oldest is *Psyche*, and in relation to it I may quote what our first President said in his opening address: "*Psyche*, though small, is indispensable to every one occupied with the insects of North America." It covers a ground not occupied by any other periodical in the world, and is very creditable to the disinterested labors of American Entomologists. Its accuracy has never been questioned, and it is extremely desirable to secure its continuous publication. You know that it was begun by the Cambridge Entomological Club, which is really the parent of the Club of the A. A. A. S., which has now been elevated to the dignity of a Sub-Section. The Cambridge Club differs from some others in the country in freely granting the use of its library to Entomologists throughout the whole country, and hence it is very desirable that the library should be enriched and the Club thus enabled to extend its benefits still more widely.

The Bulletin of the Brooklyn Entomological Society is a spirited publication, displaying much zeal, correct diagnosis and careful description.

*Papilio*, the youngest of the family, is entirely devoted to Lepidoptera and thus occupies an exclusive field and cultivates it successfully. The necessity for it arose, I apprehend, from the fact that our investigators had so much that was new to publish, that room could not be found in the other journals, and when we consider that the number of our writers is increasing every year and new discoveries are constantly made, it is plain that all the journals now in existence among us could not publish all the communications unless the journals were greatly enlarged. As it is likely that all these editors render their valuable services gratuitously, and that the present patronage would not justify an enlargement, we shall have to be content for some time to come with their present size.

In conclusion, I will make bold to throw out one or two suggestions.

1. In view of the wonderful progress which our science has made in this country, has not the time come for condensed, complete, systematic books on each of the Orders, after the style of many German books that might be mentioned? Every one of us is often asked by beginners: What book would you recommend on beetles? And our answer is: there is none which contains descriptions of all our known species in

systematic order, but you must gather them from various monographs, journals and proceedings, which are not easy to procure. This disheartens the young student. The same is to a great extent also true of butterflies, especially of Noctuidæ, and of other orders of insects, although the want is supplied in Lepidoptera more fully than in any other. But even this order, beyond the Diurnals, although hundreds of species are described, has not been brought together in systematic arrangement. The material is at hand, and nothing is wanting but a competent editor and an accommodating publisher to bring out a series of works which would contribute immeasurably to our progress.

My second suggestion is, that it would be interesting to know the extent, character and condition of the larger public and private collections in the country, with a mention of the varieties they contain. This might embrace two sections, those of our own species and those of foreign countries. A paper on this subject for next meeting would be an interesting contribution, and I hope some gentleman will furnish it; or let some member be appointed, so that there may be no conflict, and the whole field be open to him. No doubt the owners of private collections and the curators of public ones would cheerfully render him their counsel and aid.

And now, gentlemen, congratulating you upon our meeting again, let us proceed to our business and prosecute it with vigor, patience and order.

JOHN G. MORRIS.

At the conclusion of the address a vote of thanks was tendered to the President, coupled with the request that the copy be sent to the CANADIAN ENTOMOLOGIST for publication, which was kindly assented to.

(To be Continued.)

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## CARBOLIC ACID AS A PREVENTIVE OF INSECT RAVAGES.

(Read before the Sub-Section of Entomology of the A. A. A. S.)

BY A. J. COOK, LANSING, MICH.

One year ago I gave at the Boston meeting of the Association for the Advancement of Science the results of some experiments in the use of London purple to destroy the codling moth larva, and bisulphide of carbon in fighting the cabbage maggot and squash borer. These experi-

ments have been repeated the present season, and with results no less favorable than those reported one year ago. I think it is an established fact that the methods recommended are valuable. They not only seem reliable, but they promise to be the cheapest and most desirable modes that can be made practicable on all occasions.

As stated last year, the bisulphide of carbon will also destroy the radish maggot (*Anthomyia raphani*), but owing to the great number of plants to be treated, the amount of the liquid necessary to do thorough work is large, and so the expense is perhaps too great to warrant its use in case of this insect. The present season I tried to see if we might not make the application in a few places about the bed, at some distance apart, and still effect our purpose to destroy the maggots. The result does not recommend this liquid for the destruction of the radish *Anthomyia* with the same emphasis that we may safely give in advising its use for the cabbage *Anthomyia* and the squash *Ægeria*. This fact led me to cast about for some more desirable agent to be used against the radish fly, and it occurred to me that carbolic acid, which is not only very repellant to insects, but also quite as remarkable in retaining its obnoxious odor for a long time, might be made most serviceable in this warfare.

I prepared some of this material as follows: To two quarts of soft soap I added two gallons of water. This was then heated to a boiling temperature, when one pint of carbolic acid (in a crude state) was added. This mixture is then set away in a barrel or other vessel, and is ready for use as occasion may require. I mixed one part of this liquid to fifty parts of water, to be used on the radish plants. It was used by three parties in three places. Mr. Lee used it in the College garden, a student—Mr. E. Hale—used it on a bed specially prepared, and I used it in my own garden. Mr. Lee sprinkled it on the plants and poured it into a trench made close beside the row of plants. Mr. Hale and myself sprinkled it directly on the plants. Messrs. Lee and Hale made but one application and found that it kept the insects at bay for about two weeks. Even this proved of no little service. I made the application once every week, and the radishes were almost entirely free from the maggots. My bed was seventy or eighty rods from the other beds. But I caught the flies about my garden, and plants near by, not treated, were badly injured by the maggots. Two cautions should be urged; first, sprinkle the plants as soon as they are up, and thereafter every week or ten days; secondly, the mixture, if sprinkled directly upon the plants, must not be so concentrated

as to injure the plants. My experiments this season make me feel certain that this will prove a valuable remedy, and if cheaper, it may even replace the explosive bisulphide of carbon in fighting the cabbage maggot and the squash *Ægerian*.

About my house at the Michigan Agricultural College I have planted a little apple orchard of eight trees. The trunks and larger branches of these trees have been thoroughly washed twice each spring, the last week of May and the last week of June, with soft soap. A neighbor but a stone's throw distant set out some fine primates about the same time that I set out my trees. He does not believe in the use of soft soap, practically at least, and his trees are sorely disfigured and greatly injured by the *Saperda candida* and the *S. cretata*, while my trees are smooth and admired by all. I have some pear trees in the same orchard which were not treated with the soap, one of which has been much injured by the borers.

This year I used the undiluted carbolic mixture instead of the soft soap. I fully believe this to be an improvement on the soap alone, as in some cases, if but one or even two applications of the soap are made, the effect is not so long continued as to entirely prevent the borers from egg laying. The carbolic acid will tend to extend the period so that I believe two applications will in every case repel the beetles.

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“ON SOME NORTH AMERICAN TINEIDÆ, BY THOMAS,  
LORD WALSINGHAM, F. Z. S.”

BY V. T. CHAMBERS, COVINGTON, KY.

The above is the title of a paper received from the author, and published in the Proceedings of the Zoological Society of London (February 15th, 1881), in which his Lordship characterizes three new genera: PHRYGANEOPSIS—one species, *P. brunnea*; ARÆOLEPIA—one species, *subfasciella*; and EUCERATIA—two species, *castella* and *securella*. He also describes as new *Calantica polita*, *Plutella interrupta*, *P. albidorsella* and *P. vanella*; *Cerostoma falciferella*, *C. cervella*, *C. sublulella*, *C. dentiferella*, *C. canariella* and *C. frustella*; *Depressaria sabulella*, *D. argillacea*, *D. arnicella*, *D. klamathiana*, *D. posticella*, *D. nubiferella*, *D. parilella*



and *D. umbraticostella*; *Menestia rubescens*; *Glyphipteryx regalis*, *G. californica*, *G. bifasciata*, *G. unifasciata* and *G. quinqueferella*, and *Heliodines extraneella*. *Plutella cruciferarum* Schrank, is mentioned as found on Mount Shasta, California (as indeed it is found, as Mr. Stainton says, wherever man eats cabbage, and perhaps wherever *cruciferae* grow), and is identified probably with "*Tinea spilotella*" mentioned in a note in the American Naturalist, v. 8, p. 194. *Plutella porrectella* Linn. was taken also on Mt. Shasta, and on the authority of Mr. Stainton (Tin. Nor. Amer. p. 90) is identified with *P. vigilaciella* Clem.

*Cerostoma instabiliella* Mann. was also taken on Mt. Shasta. *Cerostoma radiatella* Donovan was taken in Oregon. *Depressaria citiella* Stn. was taken in Oregon, but its common European form, *D. aplanata* Fabr., "was conspicuously absent, nor have I met with it in any American collection," says Lord Walsingham. *D. yeatiana* was taken in Oregon, and has been received also from Texas. *D. nervosa* Haw. found in Oregon. *D. parilella* Treitschke: one specimen from the Eastern States agrees fairly with the European descriptions, whilst the Western specimens differ among themselves somewhat, and from the European species still more, so that Lord Walsingham is left in some doubt as to whether they really belong to the same species, and in case an investigation of its habits should show it to be distinct, he suggests for it the specific name of *novi-mundi*. *D. emeritella* Stn. found in Oregon on *Artemisia*. *Gelechia liturella* Walk. identified with *Menestra tortriciformella* Clem. The locality of Lord Walsingham's specimens is not mentioned, nor is that of *Calantica polita*; the other species, except as above indicated, are from California and Oregon.

Lord Walsingham has also favored me with specimens of many of the above-mentioned species and some others. All of the species described as new are I think undoubtedly so, and some of the species previously known are new to America. *Phryganeopsis* "should be placed near the genus *Incurvaria*." *Calantica polita* is the first species of the genus found in America. The genus *Arcolepia* is near *Plutella* Schrank and *Plutelloptera* Cham. *Plutella interrupta* is the American representative of the European *P. annulata* Curtis. Lord W. thinks (and no doubt he is right) there is scarcely sufficient evidence of the existence of *Cerostoma xylostella* Linn. in America, and as *C. brassicella* Fitch has already been identified with *Plutella cruciferarum*, the eight species found by his Lordship on the Pacific Coast are the first that have been found in North

America, and two of these (*instabiliella* and *radiatella*) were already known in Europe. The genus thus seems to be confined to the Pacific Coast in this country.

His Lordship gives some valuable notes upon the genus *Depressaria*. Thus he thinks that *D. georgiella* Walker belongs to the genus *Trichotaphe* Clem., and would more properly be included in *Gelechia* than in *Depressaria*. *D. clausella* Walker is *D. cinereocostella* Clem., and *D. confertella* Walker is *Cryptolechia* (*Machimia*) *teutoriferella* Clem. "It has since been described by Mr. Chambers under the name of *Depressaria fernaldella*. I am assured by Prof. Fernald that he is well acquainted with the species" (*feraldella*?) "and that it agrees with a specimen of the true *C. teutoriferella* which I received from him for comparison with Mr. Walker's *D. confertella*. But I am aware that Mr. Chambers himself still doubts their identity." I have never had an opportunity to compare *feraldella* with *teutoriferella*, but as stated in the U. S. Geol. & Geog. Survey, I described *feraldella* as distinct from *teutoriferella* because I could not recognise it in Dr. Clemens' description of the latter, though there admitting the fact that they might nevertheless be the same. Lord Walsingham mentions that *D. ? pallidochrella* Cham., *D. ? rileyella* Cham. and *D. ? versicolorella* Cham. are by me doubtfully referred to *Gelechia*. I now think that whether these species are properly referable to *Gelechia* or not, they do not belong to *Depressaria*, and after eliminating these, "we have then eleven unquestioned species of *Depressaria*, viz., *D. atrodorsella* Clem., *cinereocostella* Clem., *clausella* Walker, *eupatoriella* Cham., *grotella* Robinson, *helactina* De G., *hitarella* Zell., *nebulosa* Zell., *putvipennella* Clem. (*putvipumella* in Lord W.'s paper is no doubt a misprint), *robiniella* Pack. and *scabiella* Zell." So says Lord Walsingham, and probably he is right, though I have some doubts about *robiniella*, which, however, I have not seen.

Passing on to the genus *Glyphipteryx*, the species are all undoubtedly new except perhaps *G. Californiæ*, which will probably prove to be identical with that described by me as *G. montisella* from Colorado. There are specimens of *montisella* in my collection in Cambridge Museum and in some other collections, but I have none now at hand for comparison. I think it highly probable, however, from my recollection and notes of that species, which is very variable, that *Californiæ* will prove to be the same species. I will state here that I described *G. exoptatella* as new because I was unable to recognise it in Dr. Clemens' description of his *G. impigritella*. Neither yet now am I able to do so. Recently,

however, I have seen an authentic specimen of *impigritella* without the means of comparing it with *exoptatella*; and I now think it not improbable that *exoptatella* will prove to be that species. *G. montisella*, however, is something quite different.

After describing *Heliodines extraneella*, Lord Walsingham proceeds to discuss the question whether the genus *Aetole* Cham. is the same with *Heliodines*. I suspected as much when I described *Aetole bella*, but my knowledge of *Heliodines* was then and is now too imperfect to me to feel certain about it. Lord W. gives my brief account of *Aetole* and Mr. Stainton's still briefer account of *Heliodines* in Ins. Brit. v. 3, with copies of Mr. Stainton's and my figures of the neuriation of the genera, and alludes to the discrepancy between my printed account of the neuriation of the fore wings of *Aetole bella* and my figure. The discrepancy exists, and in my original pencil sketch of the neuriation I find this endorsement made by me just after the figures were published: "the published figure is incorrect in that it does not represent the apical vein as being furcate," and the original figure represents it as being furcate. This being supplied, the neuriation of the fore wings is the same in the two species, and not as Lord Walsingham thinks, simply corresponding "very closely with the exception of the absence of a short vein in *Aetole*, which in *Heliodines* runs from the lower edge of the cell to the dorsal margin, and which may possibly have been overlooked." In other words, the apical vein of my figure being made furcate, the neuriation of the fore wings is identical with that of *Heliodines* as represented in Mr. Stainton's figure. But the form of the wing of *Aetole* is narrower and it is more distinctly caudate. The hind wing in Mr. Stainton's figure is also wider and the median gives off a branch which is wanting in *Aetole*. These small differences, however, are perhaps unimportant, and it is more than likely that *Aetole* Cham. is the equivalent or American form of *Heliodines* Stainton; and this view is supported by the ornamentation.

Lord Walsingham's descriptions are accompanied by two plates containing twenty-eight beautiful figures of the species described, with illustrations also of the neuriation of the wings and form of the head and its appendages, of *Phryganeopsis brunnea* and *Eucrotia securella*, and is a most valuable addition to our knowledge of the American *Tineida*. Every one interested in the group owes him "a vote of thanks," and hopes that he will persevere in so good a work, and not abandon it as the writer of this has reluctantly been compelled to do.

## NOTE ON BASILARCHIA.

BY A. R. GROTE.

Some time ago, in speaking of the discovery of Mr. Gray of intermediate specimens showing a connection between the species of *Basilarchia* (published in the CAN. ENT.) I suggested that *arthemis* was the older form, a view which I have recently been glad to know is held by Mr. Scudder. In examining Southern specimens of *ursula* or *astyanax* and *Eros* (the latter the Southern form mimetic of *Danais*) I think it possible that *Eros* stands in a nearer relation to *astyanax* than to *archippus*, although the latter is a prevalent form in Alabama. In studying this group we seem really to have to do with series of individuals scarcely hardened into species. It will I think be the most profitable genus to take up in connection with developmental studies. We have here a group which seems to exhibit the effect of various outside forces upon a comparatively plastic organization, and can thus measure perhaps the extent of the different influences brought to bear in moulding external characters in our butterflies. How much climate, selection and mimicry can effect may be here determined, and which works quicker or at the shorter distance in succession. It will be very interesting if the facts bear out the offspring of *Eros* from *astyanax* as well as *archippus*, and not the two "mimetic" forms from each other.

## ENTOMOLOGICAL NOTES.

LACHNOSTERNA FUSCA.

At the last meeting of the Entom. Soc. of Ontario, Mr. J. M. Denton reported that he had seen near Delaware, Co. Middlesex, Ont., a ten-acre pasture field almost destroyed by the larvæ of this beetle, and he exhibited some specimens he had brought. The roots of the grass were completely eaten through, and the sod on being lifted came away easily in large patches, showing the larvæ underneath at their work of destruction. The owner of the land said that this spring the beetles were hovering in dense swarms over the pasture.

*Melitaea phacton*, generally very rare here, was more abundant this spring. I found the larvæ feeding on *Gerardia pedicularis*; afterwards I obtained eggs from confined females and found eggs out doors on same plant. The eggs hatched. The larvæ therefrom, and additional larvæ found out doors, feed on the above-named plant, and developed and spun up as Mr. W. H. Edwards has it in his Butterflies of N. A., vol. ii., part 4.

There grows another *Gerardia* here, the *G. purpurea*, on which the larvæ of *Funonia coenia* feed.

*Callidryas eubule* is found here in a few specimens every year; last year fresh specimens were in great abundance.

*Terias mexicana* (worn) --I have captured a small and a large specimen of this species during several years collecting.

AUG. W. HOFFMEISTER.

Ft. Madison, Lee Co., Iowa, Sept. 7, 1881.

#### BOOK NOTICE.

*The Canadian Sportsman and Naturalist*, Vol. 1, Nos. 1 to 8.

This is a monthly journal published in Montreal, and edited by Wm. Couper, a well known naturalist and sportsman. Each number contains eight pages of matter arranged in double columns, printed in first-class style and on good paper. The articles are short and interesting, treating mainly of matters pertaining to hunting and fishing, with brief descriptions of Canadian wild animals, birds, etc.

The editor's extensive experience and travels in the Lower St. Lawrence is manifest in his articles on the rivers of that district and their products. Entomology also comes in for a share of attention. The fifth number contains a valuable contribution from Dr. J. H. Garnier, of Lucknow, Ont., on the reptiles of Canada, a subject to which but little attention has yet been given in this country, but one in which there is a large and promising field for the enterprising investigator. To all lovers of sport, either with the rod or gun, this journal will commend itself. It should also be of value to all who are fond of natural history in general. We hope to see it liberally supported. The subscription price is one dollar per annum.