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The Canadian Entomologist.

VOL. XVIII. LONDON, OCTOBER, 1886. No. 10

EDITORIAL.

It will be with deep regret, we are sure, that the readers of THE CANADIAN ENTOMOLOGIST will receive the information that MR. SAUNDERS, who has for so many years so ably filled the position of Editor of this magazine, has felt himself obliged to resign for the present all active connection with it. His resignation has been occasioned by his appointment to the important and arduous office of Director of the Experimental Farm Stations of the Dominion.

For some time last year Mr. Saunders was engaged in visiting many of the Agricultural Colleges and Experimental Farms in the United States, and prepared an exhaustive report upon his observations, which was laid before the Dominion Parliament at its last session, and received the highest commendation. During the present year he visited England in charge of the Canadian fruit display at the Colonial and Indian Exhibition in London, and since his return he undertook and carried out successfully the experiment of shipping to England a large variety of fruits and vegetables in special refrigerators, constructed under his direction in two of the principal ocean steamships sailing from Montreal. These multiform occupations, involving almost constant absence from home, while they attest the versatility of Mr. Saunders' powers, will account to our readers for the occasional want of punctuality in the issues of this magazine during the last twelve-month.

With regard to his fitness for his new position, we may quote an extract from the Ottawa correspondence of the London *Free Press*:

"Mr. Saunders is a gentleman singularly well qualified for the position to which the Government has appointed him. He was for years President of the Ontario Fruit Growers' Association—a position which he held by reason of his superior knowledge of all that appertains to the cultivation of fruit. He is recognized as one of the leading chemists of the Dominion, and was at one time one of the chief officers of the American Association for the Advancement of Science. He has been for years the

leading entomologist of the Dominion, and to that branch of natural science has made many valuable literary contributions. He is a member of the Executive Board in charge of the Provincial Agricultural College at Guelph—a position which shows in some degree the extent to which his knowledge of scientific agriculture is recognized by the Ontario Government. He has, to an extent more generally perhaps than any other man in the Dominion, conducted delicate experiments of an agricultural character, and in assuming the directorship of the new farm stations will be following in the groove to which his efforts and education have for years tended. He also combines with rare executive ability the faculty of intelligently communicating his ideas to others. Just such a man was wanted."

Having enjoyed the privilege of Mr. Saunders' friendship for close upon five and twenty years, we feel that the above description does not express one half his merits. Taking him all round, we know of no one who possesses such an accurate knowledge of various departments of science, for instance, Entomology, Botany, practical Chemistry, etc.—of fruit culture, embracing the scientific work of hybridization—of finance,—in fact, in all that he takes up he speedily becomes *facile princeps;* and with it all he has a geniality of character and a kindness of heart that win for him hosts of affectionate friends wherever he goes. While we regret his loss to our Entomological Society—a temporary one, we trust—we cannot but congratulate the Dominion upon the possession of a man who is so well qualified in every way for the important work of organizing and directing its Experimental Farm Stations.

At the request of Mr. Saunders, as well as of other members of our Society, we have consented, with much hesitation, to endeavor to fill the vacant chair of Editor of THE CANADIAN ENTOMOLOGIST. We only venture to resume this work, after a lapse of thirteen years, in full reliance upon the kind consideration and the hearty co-operation of all our old friends—of all, indeed, who are interested in the welfare of this magazine, and in the extension of a knowledge of our special department of science. We have already received so many cheering letters and so many valuable and interesting contributions from leading entomologists in this country and the United States, that we feel very hopefully confident that the reputation and usefulness of our journal will be sustained in the future as in the past.

Not to trespass further upon the patience of our readers, we have now to request that all communications for THE CANADIAN ENTOMOLOGIST should be addressed to the Editor,

REV. C. J. S. BETHUNE,
Trinity College School, Port Hope, Ontario.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Society was held pursuant to notice at the Society's rooms, London, Ontario, on Wednesday, October 20, 1886, at 8 o'clock.

The Vice-President, Rev. C. J. S. Bethune, M. A., of Port Hope, in the chair.

Present: Mr. James Fletcher, Ottawa; Mr. J. Alston Moffatt, Hamilton; Rev. Thos. W. Fyles, South Quebec; Mr. A. W. Hanham, Hamilton; Capt. Gamble Geddes, Toronto; Dr. J. R. White, Toronto; Mr. J. M. Denton, Mr. J. Bowman, Dr. Burgess, Dr. Arnott, Dr. Woolverton, Mr. H. P. Bock, Mr. Laurence Reed, Mr. Werner, Dr. Wishart, Dr. Mitchell, of London, and the Secretary-Treasurer, Mr. E. Baynes Reed.

The minutes of the previous meeting having been printed and circulated among the members, their reading was dispensed with, and they were duly confirmed.

The Secretary read a letter from the President, Professor Saunders, regretting his inability to be present at the meeting, and stating that he would be unable to continue in active participation in the work of the Society, or to act as Editor of THE CANADIAN ENTOMOLOGIST, inasmuch as he had accepted the Government appointment of Director of the Experimental Farm Stations, and consequently the whole of his time would necessarily be fully occupied.

The report of the Council, the audited financial statement of the Secretary-Treasurer, the report of the Librarian, the report of the Delegate to the Royal Society of Canada, and the report of the Delegates to the American Association for the Advancement of Science, were laid before the meeting, and on motion duly received, discussed and adopted.

These reports will appear as usual in the Society's Annual Report to the Ontario Government.

The report of the Montreal Branch was read by the Secretary, and was ordered to be printed in the Annual Report.

In the absence of the President, his annual address was read by the Secretary.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

GENTLEMEN,—

It is seldom that a season passes in Canada with so little to record in reference to the injuries caused by destructive insects. Not only have we been favored by a kind Providence with a bountiful harvest, but our farmers have been free in great measure from the losses which usually occur from insect pests.

The Colorado Potato Beetle, *Doryphora decem-lineata*, has proved destructive to potato vines in a few localities, and where the application of the usual remedies has been neglected or too long delayed, they have destroyed the foliage to such an extent as to injure the crop; but where the use of Paris green has been promptly resorted to, no difficulty has been experienced in keeping this pernicious insect within due limits.

The Plum Curculio, *Conotrachelus nenuphar*, has been far less prevalent than usual, so that in many instances good crops of plums have been secured even where no efforts have been made to keep the insect in subjection. The plum crop generally has been a good one, and plum culture has consequently received a considerable impetus.

The worm of the Cabbage Butterfly, *Pieris rapæ*, although still plentiful, is no longer the terror to cabbage growers it formerly was, its natural enemies having multiplied to an extent sufficient to keep it within some reasonable degree of subjection. The general immunity which has of late prevailed regarding the Pea Weevil, *Bruchus pisi*, still continues, and pea culture has become more general. Even the Codling Worm, that perennial plague to the apple grower, has been less injurious than usual, so that our apple and pear crops have been freer than common from this obnoxious insect. Indeed there seems to have been a general scarcity of insect life during the past season of which collectors in this department of natural history in Canada generally complain.

Our large and important crops of cereals have been almost entirely free from insect pests, but this experience has not by any means been universal. In the mother country much consternation has been caused of late by the sudden appearance of the Hessian Fly in the wheat fields in considerable force, so that very serious injury has occurred in many quarters. When first noticed, specimens of the infested grain were submitted to Miss Eleanor A. Ormerod, Consulting Entomologist to the Royal Agricultural Society, who at once divined the cause, found the linseed-like chrysalis in the wheat stalks, and promptly suggested the usual remedies for this trouble, advice which, if persistently followed, will no doubt soon reduce the numbers of the insect to about their normal proportion. Mr. Whitehead also has been actively engaged in investigating this important subject and in disseminating information among farmers.

Having been absent in Europe during the spring and early summer months, I have been unable to give the usual attention to Entomological subjects. While in England I had the privilege of seeing several fine collections of insects, but none gave me more pleasure in inspection than that of the immortal Linnæus, the result of whose painstaking work is carefully preserved in the library of the Linnæan Society. Through the kindness of Dr. James Murie, the librarian, I was permitted to inspect this interesting cabinet, where every specimen bears evidence of having been mounted and named by this great master in Natural History. One could not help dwelling in thought on the marvellous progress which has attended the study of natural science since the master mind of this wonderful genius was brought to bear on the simplification of its nomenclature.

Every facility was also afforded me for examining the marvellously complete collections of insects in the natural history department of the British Museum, in Kensington, under the kind guidance of Messrs. Butler and Kirby. Both these gentlemen did all in their power to make my visits to that institution both pleasant and profitable, and showed me many kindnesses which will never be forgotten. The collections of Butterflies here are especially wonderful in their completeness. Take for instance the species composing the genera Pieris and Colias, and beginning with the plain ground color of white or yellow, one can trace the black bordering of the wings through all the different gradations from the faintest marginal outline to the heaviest and widest bands, and the transi-

tion is so gradual that it is extremely difficult to say where one species ends and another begins.

While passing through the extensive grape-growing regions in the south of France, a sharp eye was kept on the vineyards with the view of detecting evidences of Phylloxera. I am pleased to report that I saw but few indications of its presence, and from inquiries made the conclusion was reached, that this insect pest, which a short time ago was so exceedingly destructive to the vine-growing interests, is now doing comparatively little harm. It was the occasion of much regret that the limited time at my disposal would not permit me to visit any of the noted collections of insects to be found in most of the large cities of Europe.

While in London an opportunity was afforded me which I gladly availed myself of, that of visiting the South Kensington Museum in company with Miss Ormerod, and of inspecting the work of that talented lady as displayed in the cases of insects mounted, and the preparations made by her to illustrate the life history of injurious insects and to depict their ravages, forming a most interesting and complete series of object lessons in this important economic department of entomological science. I was also present at one of the monthly meetings of the Entomological Society of London, where I had the good fortune to meet many entomologists of note, including the venerable Professor Westwood, H. T. Stainton, Esq., Mr. McLachlin and others. All treated the stranger with the greatest possible courtesy and kindness, and at the same time manifested the warmest interest in everything relating to the progress of entomology in Canada.

During the past year there have appeared several important works on economic entomology, prominent among which may be mentioned the reports from the Entomological Bureau of the Department of Agriculture at Washington, under the direction of Prof. C. V. Riley, and the report of Prof. J. A. Lintner, State Entomologist of New York. In both these publications are recorded a number of useful observations and many new facts relating to the life history and habits of the species treated of. Among other important works on entomology may be mentioned the continuation of that magnificent work on the Butterflies of North America by W. H. Edwards, and a volume on the Butterflies of the Eastern States by G. H. French, of Carbondale, Illinois.

At the recent meeting of the Entomological Club of the American

Association for the Advancement of Science, held in Buffalo, New York, our Society was represented by the President, Vice-President, Secretary and Mr. J. Alston Moffat. Our Society was honored in the election of our Secretary, Mr. E. Baynes Reed, to be Secretary of the Club. The local members did all in their power to make the gathering a pleasant one, and, in addition to the ordinary meetings, special entomological excursions took place which were much enjoyed by all. The collections of the several members residing in Buffalo, and the fine library belonging to the Society of Natural Science, were freely opened to the visiting members.

The entomological collections in the American National Museum at Washington, are being rapidly augmented under the energetic direction of the curator, Mr. John B. Smith. The valuable private collections which have been acquired, added to the large amount of material constantly accumulating and being rapidly arranged, have already made it a most valuable collection of reference. In accordance with a request made by the Minister of Agriculture for the Dominion, the valuable collection of our Society was specially prepared for exhibition during last winter, and forwarded early in the spring to the Colonial and Indian Exhibition, in London, where it has been an attractive object to visitors throughout the summer. In the work of preparation, most valuable aid was rendered by one of our esteemed fellow members, Mr. J. Alston Moffat, who devoted many weeks of consecutive labor to this end. Mention should also be made of the valuable aid rendered by our esteemed Secretary-Treasurer, Mr. E. Baynes Reed, and of his son Lawrence, also of a member of our Council, Mr. J. M. Denton, for it is to the combined efforts of these several individuals that our great success has been mainly due.

In bringing these brief remarks to a close, I desire to refer to the pleasure it has given me during many years past to fill, to the best of my ability, the post of honor in which, year after year, you have been pleased to place me. Public duties of an important character which I have recently undertaken, will, from this time forward, necessarily engross all my time, and in case my name should be mentioned again in connection with the position of President, I beg to state frankly that I shall be no longer able to serve you in this capacity. I regret also that I shall be compelled to relinquish the work of editing THE CANADIAN ENTOMOLO-

GIST, a position which I have long filled with much pleasure to myself and, I trust, with some acceptance to the Society. In taking leave of the many kind friends who have rendered so much assistance to our journal by their valued contributions, I would, while sincerely thanking them for past favors, bespeak for my successor a continuance of their kind services.

With many thanks for all past kindnesses, I have the honor to be

Your obedient servant,

WM. SAUNDERS.

Moved by Mr. Fletcher, seconded by Rev. Thos. W. Fyles,

That the Society learns with regret that their esteemed friend, Prof. Saunders, has found it necessary to withdraw from the Presidency of their body, and also from the Editorship of their organ, THE CANADIAN ENTOMOLOGIST; but recognizing the importance of the work Prof. Saunders has been called upon to superintend, and the wisdom of the choice made in him by the Government, it congratulates the Professor upon this recognition of his abilities and zeal in the public service, and respectfully tenders to him a Life Membership in the Society.

The resolution was carried unanimously by a standing vote.

ELECTION OF OFFICERS.

The following named gentlemen were duly elected as officers of the Society for the ensuing year:

President—James Fletcher, Ottawa, Ont.

Vice-President—Rev. C. J. S. Bethune, M. A., Port Hope, Ont.

Sec.-Treas. and Librarian—E. Baynes Reed, London, Ont.

Council—W. H. Harrington, Ottawa; Rev. T. W. Fyles, Quebec; J. Alston Moffat, Hamilton, Ont.; G. J. Bowles, Montreal; J. M. Denton, London, Ont.

Editor CANADIAN ENTOMOLOGIST—Rev. C. J. S. Bethune, Port Hope.

Editing Committee—Wm. Saunders, Ottawa; J. M. Denton, E. Baynes Reed, London, Ont.; Capt. Gamble Geddes and Dr. White, Toronto.

Auditors—W. E. Saunders, H. P. Bock, London.

Delegate to Royal Society—W. H. Harrington, Ottawa.

On motion of Mr. E. B. Reed, seconded by Mr. A. W. Hanham, the Society resolved that all ex-Presidents of the Society be ex-officio members of the Council.

Papers were read on the following subjects:

1. Note on Sawfly Larva, *Hylotoma dulciaria;* by Rev. T. W. Fyles.
2. On the Stridulation of *Geotrupes Blackburnii;* by Mr. A. W. Hanham.
3. Notes on the Genus *Colias;* by Capt. G. Geddes.
4. The Home of *Chionobas jutta;* by Rev. T. W Fyles.
5. Notes on Larva of *Mallota posticata;* by Mr. Laurence Reed.
6. On Destruction of Insects by Electric Light; by Professor E. W. Claypole.

An interesting letter was also read from Miss Eleanor A. Ormerod, Consulting Entomologist of the Royal Agricultural Society, with information on the recent occurrence of the Hessian Fly in England.

NOTE ON WESTERN SPHINGIDÆ.

BY A. R. GROTE, A. M.

It is one of the pleasures which we older Entomologists alone feel to its full extent, when a well written paper, full of matter, falls under our notice on a favorite subject. Such a pleasure I experienced on receiving the June No. of the "old reliable" CANADIAN ENTOMOLOGIST, and the Rev. W. J. Holland's paper on our Sphingidæ opened before me. Supplementing, as it does in various points, Professor Fernald's valuable pamphlet, it will be welcome to all interested in the beautiful study of our Hawk Moths. Upon these I need not further dwell. I wish here to point out, in reference to the interesting remarks on our Western Sphingidæ, that on page 8 of my "New Check List" I say that I am indebted to Mr. Henry Edwards for various assistance, and that "I have received from the same Entomologist information as to the synonymy of certain Western Sphingidæ." Now the only two which have any synonymy beyond the original name are *Occidentalis* and *Vancouverensis*, and these are the ones meant. In fact the only Western form I ever possessed in my own collection was a specimen of *S. perelegans*, which seemed to me undoubtedly a distinct species, nor have I ever made any study of our Western forms. In my "New Check List" I omitted the use of the dash (—), which I have generally used (following Leconte) in my shorter

lists after species unknown to me in nature. In my paper in July No., the locality, "West Coast," belongs to the preceding species *perelegans*, and a dash should follow *Vancouverensis*, as to the synonymy of which, as well as its validity as a species, I was indebted to Mr. Hy. Edwards for information. As will be seen by the absence of the dash after *perelegans*, as well as the wrong position given by me to *Vancouverensis*, the locality has been misplaced, as I give no locality to species unknown to me in this last list. Mr. Edwards quite naturally was our authority as to the Californian species. Since Mr. Butler considers the various Asiatic forms of *Triptogon* as *local*, rather than *true* species, I thought it might be so with *occidentalis;* but it may well be a mere variety, as Mr. Holland considers it. If I remember, Mr. Edwards originally described it as a geographical variety of *modesta*, which may be true if no typical *modesta* occur in California, and although this var. *occidentalis* may also be found in the East. This species will have then received four names (two applied to varieties) since *Cablei* from Louisiana, the larva on water plants, seems nothing but *modesta*, which its author did not know.

Mr. Holland's note on *Hemaris uniformis* is exceedingly opportune; from the data it may well be that it is a more northern form. But, if so, what are we to make of Mr. Hulst's assertion (for he had no material) that *Floridensis* is a *large* variety of *Thysbe?*—naturally, of course, of *uniformis*, for the band is not dentate in the Florida species. And why do we not find dentate *Buffaloensis?* if this is only a "small" variety, naturally, also, of *uniformis*. That Prof. Lintner describes the larva of *Buffaloensis* and appears to regard it as distinct (in letters Prof. Lintner kindly informed me he considered the imagos distinguishable) does not seem to have had any weight with Mr. Hulst, whose discovery of the relationship between *uniformis* and *thysbe* seems to have affected his proper study of these forms. I believe we may find that these are distinct species.

In view of this paper of Mr. Holland's, my list in July No. must be amended by referring *occidentalis*, No. 54, as a var. to *modesta*, No. 53. Further, No. 79, *oreodaphne* Hy. Ed., may be referred as a *var. min.* to No. 78, *chersis;* while the position of No. 82 must be changed to follow No. 76, *drupiferarum*, the name followed by a dash, as I do not know the species of which *Vashti* may well be a synonym, as Strecker's figure of *Imperialis* does not also quite agree with specimens of *occidentalis*, yet

is that species, and the synonyms of this author are unusually numerous in this family.

This reduces the number of our Sphingidæ to 95, which is an ample allowance, since I have my doubts as to one or two other species not studied by me. I refer to my paper, *Papilio*, 2, 172, for notes on unidentified species of Clemens, Kirby and Boisduval. I may also refer here to my pamphlet on "The Sphingidæ of the Middle States," issued separately, which may, I hope, be of value in view of my continuous studies on this group of Lepidoptera.

NOTES ON FENESICA TARQUINIUS, FABR.

BY PROF. C. V. RILEY.

In his interesting article "On the History and the Preparatory Stages of *Fenesica tarquinius*" (CANADIAN ENTOMOLOGIST, xviii., pp. 141–153) Mr. Wm. H. Edwards makes some comments upon my article in *Science* of last April (30th), in which I announced the carnivorous habit of the larva of this species. He has been led to do so in part by the incorrect report in *Entomologica Americana* of the Proceedings of the Entomological Society of Washington for January 6th last. In that report "Mr. C. L. Johnson" is said to have observed "a lepidopterous larva feeding on a species of Aphid," but the report is incorrect both as to the fact and as to the name. Judge Lawrence C. Johnson, an old-time correspondent and for a while one of my assistants in Mississippi, was the correspondent intended, and his communication, which I was familiar with, particularly states that "he thought he saw the larva eating the plant-lice, but failed to convince himself of the fact." Mr. Lugger, in the very report quoted by Mr. Edwards (CAN. ENT., xviii., 142, lines 2 and 3) expressly states that "he had never actually seen them (*Fenesica* larvæ) feeding upon the Aphids," and as he previously remarked that he had "made the same observations" as Mr. Johnson, the report in *Entomologica Americana* is inaccurate and contradictory on its face. Mr. Lugger is one of my assistants here and I knew of his observations. Mr. Edwards' statement that "all the gentlemen named had seen the larva feeding upon Aphides" is, therefore, neither justified by the facts nor by his own quotations, and whatever

obscurity he may have labored under through the careless report in *Ent. Am.* will, I hope, be hereby dissipated.

Proof of the carnivorous habit is what I was aiming at, and it is one thing to presume a probable fact; it is another thing to establish it. The presumptive fact had been recorded here for four years, but the positive fact was only obtained by Mr. Pergande at the time stated by me.

Again, in another place *(loc. cit.* p. 152, paragraph 4) Mr. Edwards's language would indicate, to one not familiar with my article, that I had said something to the effect that no other butterfly had, or could have, a carnivorous larva. He makes me say in fact that "this is the only butterfly known whose larva is carnivorous"; whereas my language was, "so far as I can find, there is not another recorded carnivorous butterfly larva." No one could justly use his language who was not familiar with the larva of every butterfly known; whereas my remark simply emphasizes mine as the first record of such a carnivorous butterfly larva and leaves the implication that others may be found.

I was much interested in the experience of Mr. Edwards and Miss Morton, not only because it confirms the carnivorous habit of the species announced in my paper, but because it adds so many interesting observations which tend to prove the carnivorous habit normal and not exceptional.

Mr. Edwards has asked me to publish the facts we have recorded here in the C. E.

Mr. Pergande's notes were merely chronological and colorational, connected with the preserved egg-shells and about 30 larvæ of all sizes. I did not use them last spring because I had not time to go over the material and draw up full descriptions that should combine structure as well as coloration. Ill health has since prevented, and with Mr. Edwards's very full descriptions there is no longer the necessity. In brief I may state, however, that Mr. Pergande's notes show that:

July 8, 1880, the larvæ were found in the leaf curls of *Pemphigus (fraxinifolii)* on Ash, and that the larvæ died without feeding on the leaves that were placed with them.

In 1881 search was again made for the larvæ on the same tree without finding any.

Aug. 23rd, 1882, three larvæ were found on a twig of Witch Hazel;

they were not feeding when seen and attempts to feed them upon leaves, with which they were placed in a jar, failed. The larvæ died.

Oct. 2, 1882, several larvæ were noticed with *Schizoneura tessellata*. They were intermixed with the plant-lice and not readily observed, but seemed to hide among the mass of plant-lice. They were brought home with some of the Aphids for experiment, and while the butterfly larvæ were actively crawling about for some days, they all died without its being noticed that they fed upon the *Schizoneura*.

Sept. 18, 1884, again a few larvæ were found among the same *Schizoneura*. They were placed in a jar with the branch containing some of the plant-lice. Subsequently the larvæ were found crawling about and the lice had disappeared, some of them having apparently been eaten. This gave rise to a conviction that the butterfly larvæ feed upon the lice, but they all died without the fact being proven.

Aug. 8, 1885, the larvæ were again found of all sizes among *Pemphigus imbricator*. They were quite active, crawling over the plant-lice, and stopped as soon as the twig was touched.

The egg-shells were at the same time observed and the actual fact of feeding upon the lice was proven by direct observation.

August 12th several had changed to pupæ, and by Aug. 20th four imagos of *tarquinius* had issued.

I have already sent the substance of this communication to Mr. Edwards, but believe that it will have interest, in connection with his article, for the readers of THE CANADIAN ENTOMOLOGIST.

Washington, D. C., Nov. 10, 1886.

NOTE ON FENESICA TARQUINIUS FABR.

BY GEORGE HALEY, BROWNFIELD, MAINE.

I have seen this butterfly light on a species of Aphis, *Schizoneura tessellata*, found on Alnus in crowds on the bark, and from the position of its abdomen it seemed to be going to lay an egg among the plant-lice, but seeing me, she did not. Afterwards I scraped some of these larvæ off a twig of Alder and found a couple of larvæ; I sent them to Mr. W. H. Edwards, and he said that they were *F. tarquinius*, as I thought. The

larvæ were under the bodies of the plant-lice, covered with a thin network of silk to keep the woolly secretion of the Aphides away from them. They were only half grown. On another occasion I found two full-grown larvæ among the plant-lice in the same position as the first. One of these changed to a chrysalis and I have it now. It is hung up like other chrysalids of the family Lycænidæ, and has a peculiar humped back. This butterfly is always wandering round Alder bushes with a peculiar flopping motion, as though its wings were too large for its body. After I sent the larvæ to Mr. Edwards, saying that I thought they fed on the plant-lice, as there were many dead bodies, or skins, of the lice where I found the larvæ; I saw in the June (1886) number of the *American Naturalist* that the larvæ probably fed on this species of Aphis, also on *Pemphigus fraxinifolii*, found on the twigs of beech trees. Next summer I intend to observe the habits of this butterfly and its larvæ more closely.

THE OPERATIONS OF A PREHISTORIC BEETLE.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Some years ago, I received from Prof. G. J. Hinde, of Toronto, a twig of juniper about as thick as, and a little longer than, one's finger, which he had taken from interglacial deposits at Scarboro', near Toronto, and which showed the marks where beetles had bored the surface just beneath where the bark had been. From the same locality a number of remains of beetles have also been found, mostly Carabidæ, two of which I described at the time as new species of Loricera and Loxandrus. The others still remain unpublished, but there are none among them which could have made these borings, as these are evidently the peculiar work of some species of Scolytidæ, and apparently one of the Hylurgini, though in our very imperfect knowledge of the characteristics of the mines made by existing forms of this family, it is difficult to pronounce on its relations.

There are parts of at least six different sets of borings on this small twig, and all are evidently the work of one species. The mating-chamber is more or less triangular, generally equiangular or tridentate, one angle

upward. From two of these chambers no main galleries arise; there may be some special reason for this, since they are much narrower and much more deeply excavated than the ordinary chambers; they were perhaps unsatisfactory to the constructor and left unfinished.

From the other mating-chambers, which are about three millimetres in diameter, the main galleries generally run obliquely, but more nearly transversely than longitudinally to the stem; they are subequal and take their rise one on each side of the mating-chamber at the lateral angles, and run in exactly or almost exactly opposite directions. In one case, however, there is but one main gallery, and in another they are at right angles to each other, one being perpendicular; in this latter case, the mating-chamber is reversed, the apex being downward. These main galleries vary from one and a half to eight millimetres long, and are slightly more than a millimetre wide, with dentate edges, where the eggs were probably laid by the parent.

At least this is the general custom with the Scolytidæ; but here, as in some other rare cases, the young larvæ do not commence to mine, each at right angles to the main gallery, but collect together and all start from one spot, the summit of the mating-chamber or the extremity of one of the galleries, and thence burrow in irregular and somewhat interlacing mines along the stem, and all apparently either upward or else downward, not, as is usually the case, in both directions; apparently they may often turn upon their course again and again, or they may mine in an almost perfectly straight line, or in a tortuous line, for half a decimeter. In that whole distance the mine will scarcely have doubled in width with the growth of the larva, and in many cases it is difficult to tell in which direction the larva moved. The greatest width of these larval mines is scarcely more than half a millimetre, and they vary greatly in depth. The connection between the main gallery and the mines is often obscure, owing doubtless to the larvæ burrowing, while young, more in the bark than in the wood. In one case there is a mating-chamber and a pair of short galleries, but nothing more; here, apparently, the mother fell a prey to some enemy before accomplishing her purpose.

This mode of origin of the larval mines seems to be different from anything described hitherto, and therefore it is difficult to decide to what group the insect making the mine belonged. In the Museum of Comparative Zoology at Cambridge is a mine of the European *Scolytus rugu-*

losus on cherry, which shows a somewhat similar distribution of the larval mines, which emerge and diverge from one point of the mating-chamber; but the main galleries are reduced to almost nothing, and the normal mine of this species, as figured by Ratzeburg, shows nothing of the kind.

Of course it is entirely possible that the species which constructed these mines is still living and doing similar work. If so, it is probably a northern species, and my object in publishing this account is to ask if any one in Canada can produce similar borings on juniper or some allied conifer, made by existing beetles. I have for years searched for such in vain, on every occasion which offered. The nearest approach to it that I can find is in the mines of *Phlœosinus dentatus* (Say), figured by Packard.

NOTE ON DICERCA DIVARICATA, SAY.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On the 12th of last June I observed a female of this species on a dead Maple. She was creeping down the tree, feeling the interstices of the bark with her ovipositor, but apparently without finding a suitable place, as no eggs were deposited so far as I could perceive. On the 19th, I observed another female, also on Maple. She was resting head downwards with the terminal segments of the abdomen slightly inclined, the ovipositor extended at a right angle with the body and placed in an old hole of some borer. She remained in this position for several minutes, the ovipositor being alternately dilated and contracted as if eggs were passing through. After she had gone away, I examined the place and found that, at a little distance from the surface, the hole was stopped with a smooth grayish substance. Not having a knife about me, I tried to remove it with a stalk of grass, but only succeeded in breaking it up into a yellowish fluid. I have no doubt that the creature deposited an egg, or eggs, and covered them with a kind of cement. Whether this is the usual manner in which the species oviposits I cannot say. The only reference that I have seen is in Packard's Insects Injurious to Forest and Shade Trees," where he says, speaking of insects attacking beech :— " Observed by Mr. George Hunt laying its eggs in the bark in July."

ON THE GEOGRAPHICAL DISTRIBUTION OF NORTH AMERICAN LEPIDOPTERA.

BY AUG. R. GROTE, A. M.

(Continued.)

The study of the forms referable to the first or European element in the North American Moths, is complicated by the circumstance of the great range in the character and amount of the differences separating the related species now living so widely apart. These related species are found, in fact, to offer also difficulties as to their correct nomenclature. We have seen that the term "representative species," like that of "prophetic types," hides the real significance of the inter-resemblance which is that of a common descent. In naming these "representative" forms we must be guided by the rule that where the differences are such that the species would be considered distinct if members of a common fauna, a different specific title must be given them, but where these differences are slight, and what, under the same supposition, would be considered only varietal, the species must be considered as still identical, though separated so long in time and by so wide a space. The study of those forms which are practically identical is, as we have seen, further complicated by the difficulty of deciding as to whether they may have been introduced since the discovery of the New World by the Spaniards, or whether the species have continued unaltered since the Tertiary in both America and Europe. While certain species such as *Scoliopteryx* are undoubtedly in this latter case, it is less easy to feel so sure with regard to this in instances like *Dipterygia Pinastri* and the various identical forms of *Agrotis*, but on the whole I am inclined to believe that the number of species artificially exchanged is very small, and that these identical species have simply proved more constant and are of an older type than the rest. An agent which, however, must not be omitted in the interchange of species of insects is the voluntary importation by collectors for purposes of acclimatization, deception, or from a desire to destroy, through the introduction of injurious species, the crops of another country. It seems quite clear that the Natural History of most insects precludes the idea of their importation in an accidental way by commerce. It seems certain that the Colorado Potato Beetle never found its way to Europe in cargoes of vegetable provisions. Where it was found on the Continent it was evi-

dently sown by mischievous persons receiving live specimens through the mails. In the Moths, the wood-boring species may be introduced by accident, but, unless in such cases as the Currant Clear Wing *(Aegeria)*, such an introduction would be usually futile for the establishment of the species. Specimens of the Wood Leopard, *Zeuzera Aesculi*, are said thus to have been found about New York, and even the Goat Moth, *Cossus Ligniperda*, is stated to have been so found. Again, in Wood's "Index Entomologicus," are figures of one or two of our Noctuidæ, the originals of which, if authentic, must have been accidentally introduced into England, and disappeared again without leaving progeny behind them. One or two cases have fallen under my notice where deception has evidently been intended, but the naturalist, from his knowledge of the habits of the insect, will quickly detect such frauds. One case of reported identity I regret not to have been able to verify. It is that of the European *Catocala Nupta*, said to have been found on Long Island. Now the genus *Catocala* is peculiar to the Northern Hemisphere, and our species and the European have undoubtedly a common ancestry. But the remarkable fact is that our forms have differentiated widely and multiplied exceedingly, so that we have fresh Groups and a much greater number of species compared with Europe. That, therefore, one form of *Catocala* should have remained constant is, to me, incredible, and I shall prefer to believe that the reported American specimens of *C. Nupta* are the result of recent importation or of deception. We have witnessed the acclimatization of the Chinese Silk Worm, *Philosamia Cynthia*, on the Ailanthus trees in the vicinity of New York and Philadelphia, and, in the case of the Spinners, cocoon-making species, it seems likely that the wholesale transference of such species in the pupal state would result in the permanence of the form in the wild state in the new locality. But the very difficulty which generally attends the introduction of new species into a fresh locality, suggests that most of the species common to America and Europe have simply remained unaltered since prehistoric ages. The pattern of ornamentation has remained constant, while Dr. Speyer has noticed a shading or quality in the colors which renders the specimens still distinguishable by the practised eye, and which is evidently due to the differences in light and humidity. But, as in the case of *Catocala Nupta*, the naturalist will have to take into consideration the whole range of special facts to decide any one case where historic evidence is totally wanting.

The Moths are unequally represented, both as to the number of species and that of individuals, over our territory. The barren and hot lands of the South-west nourish few species, while the lands along the Eastern coast, from Massachusetts to Virginia, seem to be among the most prolific in the variety of kinds. Certain species swarm in certain localities, as one or two kinds of *Cataclysta* on the islands in the Niagara River and elsewhere in the North. In Alabama, aside from the Cotton Moth, it was at certain times hardly possible for me to read at night by light for the swarms of *Acrolophus agrotipennella* and *mortipennella*, which fluttered over the table and the page. Colorado is a rich field for Moths, as also certain portions of Texas, judging from the collections of Belfrage (Bosque County) and Boll. The pine lands of the Southern States are on the whole poor in species, and, in parts of North and South Carolina, I found the collecting poor, without, however, preventing the occurrence of many interesting Moths. Practically we have one common fauna, broken by the Alleghanies and other mountain ranges, until we get as far South as the tropical colony in Florida, while in Texas we meet South Californian species, besides the first indications of the tropical Mexican fauna of the low lands, which extends its range along the coast so far north as Louisiana. The Moths go hand in hand with the vegetation and the flowers, so that rich botanical districts are also rich entomologically. Swampy or boggy spots yield many peculiar moths; the different species of *Sarracenia*, the Pitcher-plants, both at the North and in the South, yield several curious Moths, among which the species of *Exyra*, a genus of Owlet Moths, the larvæ of which feed on the folded leaves, are the most noteworthy and the prettiest in color.

In a final consideration of the second, or South American element, in our fauna of Moths, we must distinguish, as we have seen, between those forms which have effected a more or less precarious lodgment in our territory and those which, through distinct species, have become thoroughly amalgamated with the North American fauna. The occurrence of such species as *Syllectra mirandalis* or *erycata*, or *Thysamia Zenobia*, is undoubtedly accidental and may not occur again for years. On the other hand, there is a stream of certain species which yearly reach points in our territory, such as *Argeus Labruscæ*, without leaving progeny; there are then other species which have attained a more or less extended foothold, such as the Owlet Moths belonging to the genera *Anomis*, *Aletia*,

etc. With these may be reckoned the members of the South Florida colony of Moths, species like *Cautethia Grotei*, also found in Cuba, and many others. Finally, the thoroughly domiciled Southern element is seen in such genera as *Hyperchiria*, of which we have four or five species, the most widely disseminated of which is *H. Io*, a form not reaching the tropics and becoming somewhat variable in the Southern States. This genus is numerous in South and Central American species. Our prettiest species of *Hyperchiria* is, perhaps, *H. Zephyria*, from New Mexico and Arizona, in which the dark primaries have a white stripe running from apex to middle of internal margin. The hind wings are yellow with a large central ocellus and pink hairs at base; the thorax is fuscous, marked with white on the sides, and the abdomen is fawn color shaded above with red.

(To be Continued.)

NOTICE OF DR. WILH. MULLER'S WORK ON THE SOUTH AMERICAN LARVÆ OF THE NYMPHALIDÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

Readers of THE CANADIAN ENTOMOLOGIST have, no doubt, through the papers of W. H. Edwards, followed with interest the discovery of so many facts bearing on the evolution of species in the Butterflies. We have now a work by a German writer of remarkable industry and ability, on the larval peculiarities of the Nymphalidæ, which deserves the study of all interested in Lepidopterology in America. The work is adorned by four plain lithographic plates of the caterpillars and their peculiar structure, of such fineness and softness of execution that, with all my experience, I hardly know where to find their equal. The work itself is a separate part of my friend Prof. Spengel's very useful "Jahrbücher," a zoological publication which deserves to be largely encouraged. The publication may be obtained at the office of Gustav Fischer, Jena, Germany, and this work on the Nymphalidæ costs about three dollars (11 marks). The book itself (252 pp.) is too lengthy to be adequately reviewed here. It is a minute study, throwing light on the genealogy of the family from the structure of the caterpillars, and it is conducted with an ability which is simply marvellous. Only in this way can we become acquainted with the ancestry of our present Lepidoptera, a study which is perhaps the most fascinating suggested by these insects, and which has only become possible since Mr. Wallace and Mr. Darwin opened the doors to this field of speculative inquiry.