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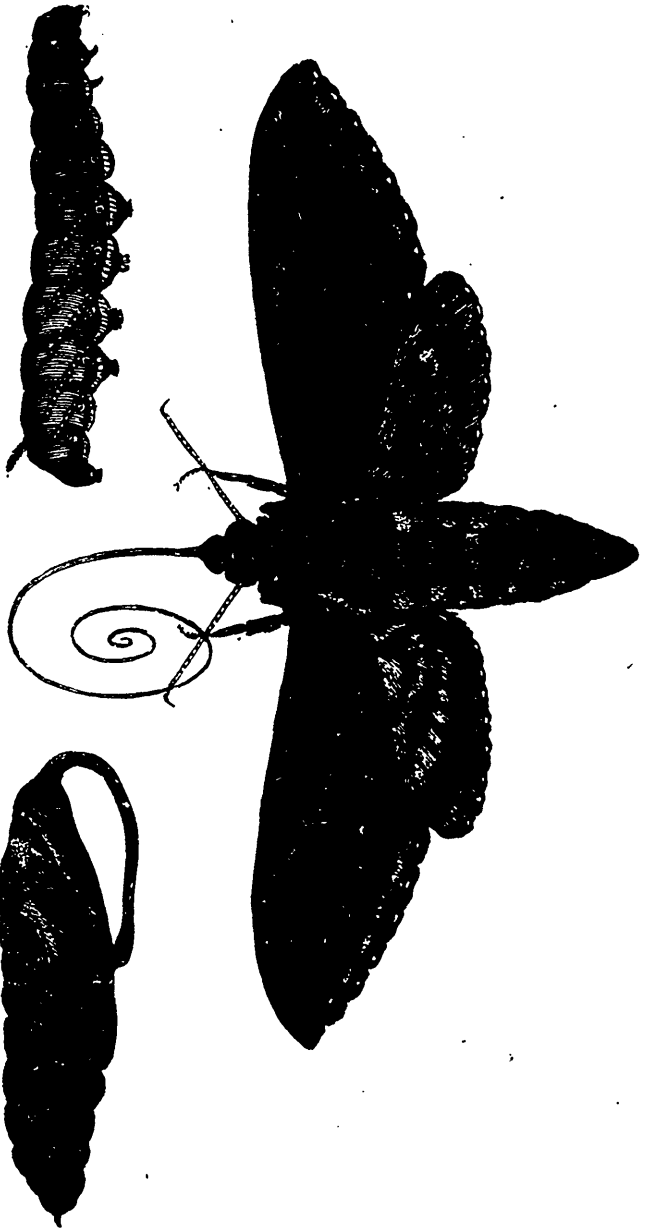
No. 6

ENTOMOLOGY FOR BEGINNERS.

THE TOMATO WORM (*Sphinx quinque-maculata* Hawthorn).

BY THE REV. C. J. S. BETHUNE, PORT HOPE, ONT.

Almost everyone, I imagine, has had at some time or other his wonder and curiosity excited by the strange-looking pupa of the Tomato Worm, as it is familiarly termed. It is frequently discovered when digging potatoes in the autumn, or disturbing the soil where tomatoes have been grown. This singular object, which is very correctly represented in the figure, is about two and a half inches long and half an inch in diameter, of a chestnut brown color, and round in shape, tapering towards both ends; from one end, which is the head of the specimen, there proceeds a long curved proboscis like the handle of a jug; the other end is divided into broad rings and terminates in a point. To one who had never seen anything of the kind before this object must at first prove a great puzzle; but a little careful examination will remove some of the mystery. It must be alive, for the tail end moves; but it cannot walk or crawl, and is quite helpless. If we examine it more closely, we find that the rings that move when the creature is touched are very like the rings of a large caterpillar, while at the other end we can trace the eyes, antennæ, and even the short wings of a moth, but all enclosed in a hard brown shell. These things show us that it is an insect in its helpless pupa state; the long jug-handle is the case which contains its tongue for sucking out the nectar from flowers. If we keep it in some damp earth till the next year, there will emerge from it a large handsome moth, of an ashen-grey color, relieved by five bright orange-yellow spots on each side of its body; its wings expand fully five inches in length, and its body is about the same length as the pupa or chrysalis; its tongue is of immense length, about double that of the body—when at rest it is coiled up like a watch-spring beneath the head of the insect. The name of the creature is the Five-spotted Sphinx [*Sphinx (Macrosila) quinque-maculata* Hawthorn].



The larva or caterpillar of this insect, when fully grown, is larger than it is shown in the figure, being as thick as a man's little finger, and over three inches in length. It feeds on the leaves of both the Tomato and Potato plants. It varies so much in color that people often suppose that a number of different species of "worms" are attacking their plants. It is frequently of a bright green marked with white, and having along each side a series of seven oblique greenish-yellow stripes; again it may be found with its general color dark green, dark brown, blackish green, and other shades, even to deep black. On the last segment of the body there is a curved horn or tail. The accompanying wood-cut affords so satisfactory a representation of the three stages of the insect that it is unnecessary to enter into a minute detailed description.

The larva is found feeding during July and August. It often so closely resembles the foliage on which it reposes, the bands on its sides mimicking the ribs of the leaves, that it cannot always be detected; its presence, however, may usually be traced by the singularly marked cylindrical pellets of excrement on the ground and the stripped leaf-stalks of the plant. When fully grown the larva descends into the earth, and there makes a chamber for itself in which to change to its pupa state. Fortunately the insect is not a very common one, its numbers being kept in check by a small Ichneumon-fly; otherwise from its size and voracity it would prove most destructive. Very rarely are more than a few specimens seen in a tomato or potato patch. In the summer of 1878, however, as I recorded in the CANADIAN ENTOMOLOGIST (vol. x., p. 218), it was so abundant that a market-gardener who lives near me gathered four bushels of the caterpillars off an acre and a quarter of tomatoes in one day! That year some of the insects attained to the moth or imago state in October, but generally the pupa remains quiescent in the ground till the following season and the moth appears in June or July. I have now in my possession a living chrysalis of this insect that belonged to the abundant brood of 1878. It was given to me by Mr. David Smart, of Port Hope, who found it, with a large number of others, in his garden. He kept the chrysalids in a box of earth in his cellar all last year; no doubt the coolness prevented the development of the imago. He and I are now both watching with much interest for the appearance of the moths from our specimens, as two years in the pupa state is by no means a common occurrence. That the pupæ are still alive is shown by the readiness with which they move the segments of the abdomen when handled or

disturbed.* Notwithstanding the extraordinary abundance of the larvæ in 1878, there were but few to be seen last year in this neighborhood.

An account of the "Tomato Worm" will hardly be complete without some reference to the supposed poisonous character of the larva. Some ten years ago, when in charge of the Entomological department of the *Canada Farmer*, I took the trouble to trace up some of the stories then very common in the newspapers about cases of poisoning and death from the effects of the bite or sting or venomous spittle of this insect! The result of my enquiries in many instances proved to be exceedingly amusing. In every case I found that no one could give any information whatever as to even the name of the person who was supposed to have died from the effects of this insect, nor could I obtain a single authentic instance of injury from it. This was, of course, what was to be expected, as the caterpillar is physically incapable of injuring anyone with its bite—much less with its tail or horn, or imaginary sting. In all probability these stories have originated in the fact that persons have been severely affected by getting some of the juices of the tomato plant into an open cut or sore, and then ignorantly have attributed their trouble to the venom of the ugly but innocent caterpillar.

ANNUAL MEETING OF ENTOMOLOGICAL CLUB, A. A. A. S.

The annual meeting of the Entomological Club of the American Association for the Advancement of Science will be held at the Museum of the Boston Society of Natural History, corner of Berkeley and Boylston Sts., Boston, commencing at 2 p. m., Tuesday, Aug. 24, 1880. It is proposed to send to every member of the American Association, and to all others who may favor the undersigned with their address for that purpose, a circular announcing the special subjects which will be presented at this meeting of the Club; and therefore all entomologists who desire to read communications at that time are requested to notify one of the undersigned before August 1st. This will ensure a fuller discussion of the topics presented, and, it is hoped, a larger attendance.

B. PICKMAN MANN, *Sec'y*, SAMUEL H. SCUDDER, *Pres.*,
 Cambridge, Mass. Cambridge, Mass.

* The imago emerged from the pupa referred to on the 27th of May, after being nearly two years in that state.

LARVAL HABITS OF A GOLDEN-ROD BORING PLUME.

BY D. S. KELLCOTT, BUFFALO, N. Y.

The Golden-rods in the vicinity of Buffalo—especially observed on Squaw Island—harbor the larvæ of two plume moths, one boring the branches, stem and root, the other using the foliage. I have sent the moths to Mr. Charles Fish, of Old Town, Maine, for determination; he concludes that they are both unnamed, and he will describe and name them in a general paper in preparation on the American species. As a somewhat more detailed account of their habits than a technical paper will allow seems to be desirable, I have prepared these notes, relating mostly to the borer.

For several years successively I have observed that during the latter half of August the ends of many branches and stems of the Golden-rods in the locality mentioned above began to wither and finally die; on examination I have repeatedly found the cause to be a slender, dull yellow moth's larva. It appears to enter the twig a few inches below the apex, or, as it has grown somewhat after the destroyer began its work, pretty near the end where the tissues are tender. I have not seen the eggs, but should suspect their presence during first two weeks of July, at the growing point. It ordinarily moves outwards, pushing its dust-like fragments out at the point of entrance. The larva, when first examined, August 22nd, was .3 of an inch long; color light yellow, head and shield darker, the oblique anal plate almost black, bearing hairs and hooks, dorsal and subdorsal lines pinkish. By the middle of September it abandons the branches, being then .45 of an inch in length, and bores into the stock a few inches above the ground; it makes its way down the pith into the roots, well under ground, where it passes the winter. I fetched several examples from the fields in January for examination; they were then .58 to .6 of an inch in length, lighter in color, with the longitudinal lines of pink brighter than in autumn, the eighth segment conspicuously marked on the back by pink. There are few hairs over their smooth bodies; on the last ring, however, there is a brown or black chitinous disc, with a circle of long, brown hairs about its circumference; in the centre of this disc there is a small papilla with two stout, straight, black teeth pointing rearwards. These teeth are hooked upwards in the autumn stage. The hairs render the plate sensitive to touch, and help to brush fragments from

their long narrow galleries, while the teeth assist in backward motion in them. The mature larvæ obtained in May differ but slightly from these, except that they are then .7 of an inch long and the pink stripes and marks are brownish. The fourth, fifth and sixth segments are smaller than those preceding or following them. They are quite active, moving up and down their burrows rapidly.

By the middle of May the caterpillar has worked its way back to the place of entrance in autumn, enlarging its way to accommodate its increased size, and after loosely stopping the upper part with a few chips, retires and changes to the pupa. It is then .6 of an inch in length, slender, cylindrical. Color white, except the oblique disc or plate terminating the head, which is made dark by many teeth-like elevations on its surface. The abdominal segments are clothed with hairs, and the last four segments have each a transverse row of teeth on the dorsal part, reminding one of a Tortrix or Cossus pupa. The conical tip of the abdomen has many teeth; these teeth, together with the roughness upon the head, enable the pupa to worm its way up and down the burrow with readiness. When removed from the stem to the table it travels about, rolling and worming its way very much as do the pupæ of certain stem-boring beetles. The wing and limb covers are free for a considerable distance from their tips.

The moth appears from the 1st to the 15th of July; the largest measured expanded 1.2 inches.

This moth has a peculiarly interesting history, increasing much the known diversity of form and habits of the preparatory forms of the Pterophoridae.

Concerning the smaller one which feeds upon the leaves, I will say that the larva and its habits are too imperfectly known to me to detail; that the pupa is found during the first days of July fastened to the under side of the leaf parallel to the mid-rib. Its appearance is quite like that of the pupa of the best known forms of the group.

ENTOMOLOGICAL NOTES.

BY A. S. MCBRIDE, FREELAND, DE KALB CO., ILL.

I find *Dorytomus mucidus* Say running on and flying about Cottonwood trees early in April and again in August. In October it is found under dead bark of trees, in winter quarters. Common.

Eros coccinatus Say is found in April in the Cotton wood under logs in the woods.

Sphenophorus 13-punctatus H., common on Rag-weed (*Ambrosia bidentata*) in August. Common.

I have taken *Eburia quadrigeminata* Say in the act of coming out of Hickory trees in July; they fly in the dusk of evening, and are quite common.

Dinoderus punctatus is found early in the spring on fences and buildings near the wood-pile, and I have taken them in great numbers in the stumps of trees that had been grubbed out; sometimes the small roots would be almost entirely reduced to powder.

Bostrichus bicornis Web. is found under the dead bark of White Oak posts in August. I think the larva bores in the wood.

Plectrodera scalator Fab. is found on small swamp Willows in August.

Toxotus cylindricollis Say is found on wild flowers in July; not common.

Epicauta convolvuli Mels. is found on May-weed (*Maruta cotula*) in August, but not common.

NATURAL HISTORY SOCIETY OF ILLINOIS.

The Illinois State Natural History Society met at the Opera House, in Bloomington, Tuesday evening, Feb'y 24th. After an address of welcome from the citizens of Bloomington, and an address by Prof. A. H. Worthen, of Springfield, Ill., the retiring President, the original officers were re-elected. Various papers and lectures were read before the Society, which adjourned on Thursday, the 26th, having provided for a summer meeting on the grounds of the Lake George Sportsmen's Association, near Chicago, in July. This Society was organized at the Palmer House, in Chicago, in January, 1879, and the Bloomington was its third semi-annual meeting, but it still lacks somewhat in effectiveness for want of the full support that should be accorded by the naturalists of Illinois, its aim being to embrace in its membership every person in the State of Illinois interested in natural science. The officers elected at Bloomington were: A. H. Worthen, Springfield, President; T. J. Burrell, Champaign, Vice-President; S. A. Forbes, Normal, Secretary, and H. N. Hibbard, Chicago, Treasurer.

THE EXCEEDINGLY NUMEROUS APPEARANCE OF A
PHRYGANID.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

I received, May 8th, 1880, the following notice from Mr. W. F. Bassett, of Waterbury, Conn. :

“The insects are just now so abundant at Birmingham, on the Housatonic River, that the inhabitants are forced to keep their houses closed as far as possible. Birmingham is at the head of tide water, and the flies are there called shad flies.”

The species is *Brachycentrus fuliginosus*, and I can add that its European relative, *B. subnubilus*, has the same habits, and is sometimes very obnoxious in Russia. The cases of the larvæ are very interesting from their quadrangular shape.

ON DESCRIBING LARVÆ.

BY D. W. COUILLETT, WOODSTOCK, ILL.

In order to secure a greater uniformity in the descriptions of Lepidopterous larvæ taken by different authors, I would suggest the general adoption of the following terms for the various markings and parts of a caterpillar's body : The line in the middle of the back is the *Dorsal* line ; that which includes the spiracles is the *Stigmatal* line ; and the line midway between the dorsal and stigmatal lines is the *Subdorsal* line. That part of the body which lies between the dorsal and subdorsal lines is the *Subdorsal space* ; and that part which lies between the subdorsal and stigmatal lines is the *Stigmatal space*. The under part of the body is the *Venter* ; and that part of the body which lies between the spiracles and base of the legs is the *Subventer*.

If these terms were adopted by every person who describes a larva, his description would be of greater value to economic entomologists than if he were to use terms of his own proposing.

ON CERTAIN SPECIES OF SATYRUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

(Continued from Page 94.)

Conclusion.—The North American species of this genus may be divided into three Groups, with several sub-groups. Group 1 comprises *Pegala* and all the larger species. Group 2 *Silvestris* and others, characterized by their small size, and the peculiar outline of the discal band on under side of hind wings, there being two long serrations against end of cell. This division will throw *Meadii* into Group 1, in which the band has a rounded prominence against cell. Group 3 comprises *Sthenela* only.

It seems to me probable that the species forming the first sub-group of Group 1 have originated with a form either identical with *Pegala*, or very near it, characterized by a rufous band on which was a single ocellus, by an ocellus at anal angle, and six complete ocelli on under side of hind wing. And it may have occupied a considerable territory, at least including what is now the southern tier of States. At present, *Pegala* is restricted pretty much to the vicinity of the Gulf of Mexico, and a strip along the Atlantic coast, at least as far to the north as Charleston, S. C. This is but a small area when compared with that occupied by *Alope* and its co-form *Nephele*. The two species, *Alope* and *Pegala*, are separated by a sandy zone, which the former does not penetrate, and the latter at most but occasionally.

It will be noticed that *Pegala* possesses in perfection many points which are found in one or other or all the members of the sub-group. It is considerably the largest, though occasionally an *Alope Texana* fully equals it. Its peculiar brown color on upper side and gray-brown on lower side passes into *Alope*, which gradually changes into the darker shade of *Nephele*. The rufous band becomes yellow in *Alope*, but breaks out in that species in certain localities, as seen in var. *maritima*. After the band has become suppressed in *Nephele*, every now and then it reappears in greater or less degree, even in *Olympus* and *Boopis*. If the original form presented a single ocellus, that is now a prominent characteristic of *Pegala*, but there has come to be a certain modification, so that in some cases, in the female, there are two complete ocelli, but in many more of both sexes there are dots and small spots in place of a second ocellus. In

Alope and the rest there are two ocelli, not always complete or equal, and occasionally one is suppressed. When this happens *it is always the lower one*, which is wanting in *Pegala*. There is a tendency to variation in the number of these ocelli, a second one sometimes appearing in *Pegala*, but a third one sometimes in *Alope*, and in the last named species and the rest of its sub-group, there are not unfrequently one or two small spots on the fore wings, as of incipient ocelli. The single ocellus invariably seen at anal angle in *Pegala* is often wanting or incomplete in the other forms; and the six ocelli of under hind wing, almost invariably present (but sometimes six on one wing, five on the other—never less, so far as observed), vary from six to nil in all the others.

The fact that the area now occupied by *Pegala* is so restricted shows that the present conditions are not favorable to it. One can understand that in former times, since these Satyrids had possession, the conditions geologic and climatic may have been quite different from what they now are, and that *Pegala* may have occupied a much enlarged area, while *Alope* inhabited parts of the same, or indeed originated with *Pegala*, precisely as *Nephele* has originated with *Alope*. In this last case there would have been a series of intergrades between *Pegala* and *Alope*, caused by the interbreeding of the variety and the parent form.

If in the northern belt the conditions were to become unsuited to the support of any *Satyrus*, and the forms which now occupy it were suddenly to become extinct, we should have to the south *Alope*, and to the north *Nephele*, two good species. The intergrades would have wholly disappeared, or there would be a wide gap in the series, and nothing would be left to show how one form could have originated with the other. *Alope* and *Nephele* would then occupy a position similar to that of *Pegala* and *Alope* now. What might happen by some sudden change of conditions might also happen gradually and come to the same end. If a certain variety, *Alope*, thrown off by *Pegala*, flourished in its larval state on meadow grasses rather than coarse saw grass or sea-side grass, then its tendency would be towards the country which produced the former, and there would be a movement to the north and north-west. At the same time there would be a withdrawing of the parent form from the borders of the original territory, because there the food plant was not in perfection, and so a belt would come to intervene between the parent and the variety. The former would flourish where its food plant flourished, which in this case would be the sea-board. The intergrades which had arisen from

crossing would follow one form or the other, and tend to revert to the parent or to become merged in the variety. Favorable conditions might render one or more of them permanent, as with *Alope Texana*, which seems to possess a territory of its own to the south-west. Certainly the parent form would be more or less modified by the absorption of the intergrades, if not permanently, yet so that now and then sports would be thrown out in the direction of *Alope*. Hence the two-eyed *Pegala*. That, on the other hand, the intergrades nearest the strong variety would tend to merge in it also, when cross breeding had ceased by the disappearance of the parent form, we may infer from the fact that when *Alope* is suppressed the tendency of the species is to the pure type *Nephele*. Wherever *Nephele* is alone found there appear variations in the direction of *Alope*, but they are very infrequent as compared with the typical form.

Alope and *Nephele* are dimorphic in a certain belt of latitude which embraces part of New York and New England, but as I have before intimated, there is a longitudinal limit to the dimorphism also. Somewhere between New York and Indiana *Alope* disappears. There would seem to be a longitudinal belt of considerable width passing through western Ohio and eastern Indiana, in which both forms are either unknown or of extremely rare occurrence, while to the west of it *Nephele Olympus* emerges in Illinois, Wisconsin, Iowa, &c. As before stated, *Alope* is reported to be very rare at Cleveland (eastern Ohio), and unknown at Toledo (north-western Ohio). In the region from Columbus (middle), Dayton and Cincinnati (south-west), *Alope* and *Nephele* are unknown. A line drawn from Toledo through Columbus to Cincinnati would embrace about one third of the State. Dr. Landis kindly undertook to obtain information for me from the collectors in eastern Indiana, and so far as Indianapolis (a little to the east of the middle of the State) he reports both forms unknown. It is true, collectors of butterflies are not numerous, but they are usually very zealous, and each is likely to be well acquainted with his own neighborhood and for a considerable distance around.

I have recently had several letters calling my attention to published lists of butterflies of different western States, in which *Alope* is mentioned as present, and usually both *Alope* and *Nephele*. Such as Mr. Scudder's list of butterflies taken by Mr. J. H. Allen, in Iowa, 1870; Mr. J. Duncan Putnam's list of butterflies found about Davenport, Iowa; Mr. Herbert Osborn's recent list of butterflies about Ames, Iowa; Prof. H. W. Parker's

list of those taken at Grinnell, Ia., 1870, in Am. Ent., 2, 175; also a recent list of butterflies of Illinois by Mr. C. E. Worthington, in Can. Ent. Manuscript lists of butterflies of Illinois and Nebraska have been in my possession for some years, made by Mr. G. M. Dodge. Prof. S. H. Peabody also wrote me of the occurrence of *Alope* in Wisconsin, and sent me examples so labelled, which were taken by him at Madison. I have written to the authors of these lists and had replies from each one, and in most cases examples of the butterflies called *Alope* were sent me. And in every instance what had passed as *Alope* was what I call *Nephele*, nearly always female, a little off type, in some cases considerably so, but never closely approaching the typical *Alope*. There has in no case been a clear colored yellow band, but always either a slight discoloration about the ocelli on fore wing, or a more or less hazy, ill-defined, obscure yellow area, such as appears frequently in the dimorphic belt in New York, and which there represents the intergrades between *Alope* and *Nephele*. In the west, they are not intergrades, because there is no *Alope* to intergrade with, but what I should call examples of reversion. I limit the name *Alope* to the typical form. These intergrades, or what would be so characterized in the dimorphic belt, are never found where *Alope* flies alone, or before it has entered the belt; but they appear in greater or less degree wherever *Nephele* flies, whether in Canada or Illinois and westward. Even in California, in *Boopis*, we find occasional examples of same character.

Dr. J. P. Hoy, of Racine, Wisconsin, writes thus: "*Nephele* is the most abundant butterfly on the prairies four miles west of Racine. I have taken many hundreds and never saw a single *Alope*. I took a number of *Alope* in Berkshire Co., Mass., some years ago, and they are all I have. The Wisconsin specimens correspond precisely with those in Ills. When Professors Kirtland and Baird visited me in 1859, we travelled over a considerable portion of the State, taking specimens of natural history. Prof. Kirtland was greatly interested in our species of *Satyrus*. He first thought it was *Alope*, but under a peculiar form. But when we found a lot of the larvæ he said it was not *Alope*. After, he wrote me that it was *Nephele*, Kirby. You may say that *Alope* is unknown in Wisconsin, and that the form *Nephele* is greatly abundant on the prairies, the most common species in midsummer."

I asked Mr. Putnam whether he had ever seen a typical *Alope* in Iowa, and he replied that he never had, adding: "those which I considered *Alope* in my list are probably intergrades"; and the examples which Mr.

Putnam sent me labelled *Alope* were females of *Nephele*. Mr. J. R. Muhleman, long a collector in Macoupin Co., Ills., writes that he has no *Alope* in his collection and does not know that it occurs there. Prof. S. A. Forbes, of Normal, Ills., writes: "We get *Nephele* here, but not *Alope* in this immediate vicinity. The latter is reported to us from Bureau Co. and also from northern Ills., by Dodge, Worthington and others." Mr. Worthington says: "I have never taken *Alope* typical form in northern Illinois and know of no one who has. In my list of Ills. butterflies I included *Alope* on information of Prof. G. H. French, who says he has himself taken it in southern Illinois. I have doubts about *Alope* being found in Illinois or Iowa. All the Michigan examples I have seen were variations of *Nephele Olympus*." On this I wrote Prof. French, who resides at Bloomington, in south Illinois, and he sent me what he had called *Alope*. It was *Nephele* with a slight yellow haze about the ocelli. This, Mr. French says, was taken 50 miles north of Bloomington, and is the only *Alope* he ever has seen or known of having been taken in southern Ills. Mr. Dodge formerly lived in Bureau Co., Ills., and he writes (in reply to my questions as to *Alope* in Illinois and Nebraska): "I have never given particular attention to these forms, but I am strongly inclined to believe that you are right, at least as regards the species here (Nebraska). At all events, I was particular to collect the varieties here last summer, and those I have sent you represent both forms as found with us." These were either pure *Nephele Olympus*, or a little off type only. Prof. Parker, at Grinnell, Ia., says: "I have not seen at the west, I am sure, the bright-banded *Alope*." Lieut. W. L. Carpenter, U. S. A., who has collected for several seasons about Fort Omaha, Nebr., says: "*Alope* is such a striking species, I have no hesitation in saying that I have never seen it before" (I enclosed an example to Lieut. Carpenter). "If it occurs in the valley of the lower Missouri it must be as a straggler from the east, and a rare visitor, or I should have seen it." Mr. Scudder informs me that at the time the Iowa list spoken of was published by him, he considered the two forms, *Alope* and *Nephele*, as one species.

Therefore, for the States beyond Indiana it seems clear that *Alope* does not fly. If it appears anywhere it would be on the southern side, along the Ohio River, inasmuch as this form does inhabit Kentucky. Indeed the only *Alope* Dr. Landis discovered was taken in Indiana near the Ohio, at South Bend, and that but a single example.

Prof. Cook was under the impression that *Alope* was found in Michi-

gan, but less abundantly than *Nephele*. He sent me several examples, two of which were females, taken at Lansing, and labelled *Alope*, a third, male, from Indiana just south of the State line, was so labelled. All these were *Nephele* with a little yellow about the ocelli. With them was a pure type *Nephele* from Lansing. On writing Prof. Cook respecting these, he replied: "I feel confident that there are no typical *Alope* in Michigan, if none that I sent are such. I have seen several Michigan collections and never one specimen with more yellow than the yellowest which I sent you. Years ago you named for Dr. Miles some of our Lansing '*Alope*.' So you see my authority was good."*

Mr. F. S. Sleeper, of Kalamazoo, Michigan, writes: "*Nephele* pure type is quite common in this locality. I have never seen *Alope* here, but I have one specimen which I captured in Ingram Co. in 1867, which is undoubtedly the true *Alope*." Ingram is the county in which is Lansing, the capital of the State.

Prof. D. J. Higley, of Ann Arbor, writes: "I send a specimen of what I have supposed *Alope*. I think this is not nearly so common as the form *Nephele*. The yellow in the specimen sent is more conspicuous than any I have seen." This example has a clear yellow space just about each ocellus and a ligament of same shade joining the two rings together. Outside is a narrow obscure yellow space. It is to be classed with *Nephele*.

We may say then that *Nephele* alone inhabits the country west of New York to the Rocky Mountains, except that it may be found in eastern Ohio and occasionally in Michigan; and is a second time modified on the Pacific slope, appearing as *Boopis*. The more northern variety *incana* is nearer to *Nephele* type than is *Boopis*, and possibly may prevail to the northward and in Brit. Am. connect with the type. *Gabbii* is nearer to *Alope* than *Nephele*. *Wheeleri* is considerably different from *Alope* or *Pegala*, and I cannot give a suggestion as to its origin. Perhaps it should rank in a distinct group, though I here leave it with *Pegala*.

* It was in 1863 that I named the specimens for Dr. Miles. In 1866 I wrote the paper on these forms which was printed in Proc. Ent. Soc., vol. vi., p. 195. I had brought together a large number of specimens from many localities, and came to the conclusion that *Alope* and *Nephele* were two distinct species, and gave my reasons therefor, but I find that I then classed nearly all the variations (now known to be intergrades) with *Nephele*, using these words: "*Alope* varies comparatively little, and very little in the direction of *Nephele*. The variation of *Nephele* is extreme and in the direction of *Alope*, but with the greater number of variations close to the type. Occasionally one individual more aberrant than the rest reaches farther towards *Alope*," etc.

In cataloguing the series would run thus :

Genus SATYRUS.

GROUP I.

Sub-Group 1.

1. PEGALA, Fabr., 1775.
2. ALOPE, Fabr.
 1. dimorphic form, ALOPE Fabr., 1793.
 - var. *Texana*.
 - var. *maritima*.
 2. dimorphic form, NEPHELE Kirby, 1837.
 - var. *incana*.

1 sub-species OLYMPUS.

2 " BOOPIS.

3. GABBII, Edw.
4. ARIANE, Bois., 1852.
5. BARONI, Edw.

Sub-group 2.

6. PAULUS, Edw.

Sub-group 3.

7. MEADII, Edw.

Sub-group 4.

8. WHEELERI, Edw.

GROUP II.

9. SILVESTRIS, Edw., 1861.
 - atus*, Bois., 1869.
10. CHARON, Edw.
11. PHOCUS, Edw.

GROUP III.

12. STHENELE, Bois., 1852.

NORTH AMERICAN NOCTUIDÆ IN THE ZUTRAEGE.

SECOND AND THIRD HUNDREDS.

BY A. R. GROTE, -

*Director of the Museum, Buffalo Society Natural Sciences.**Anomis crosa*, 19, fig. 287-288.

"Savannah." I have identified this species from specimens taken in Georgia and Alabama. Hübner figures the variety in which the wings are orange except the s. t. space. Usually they are terminally darker shaded. The species is compared with *A. exacta*, by Hübner. Mr. Thaxter caught this species in Jamaica, W. I.

Eulepidotis alabastraria, 22, fig. 311-312.

"Savannah." Hübner considers the insect a Geometer. It seems to me that his figure represents a Noctuid related to *Palindia*.

Brotis vulneraria, 23, fig. 319-320.

"Bahia." I have identified this species from a specimen taken by Prof. Hinsdale at Racine, Wisconsin. The species is probably an occasional visitant with *odora* and *zenobia*, and does not breed within our territory. Hübner considers it to be a Geometer, but, I think, incorrectly.

Leucania albilinea, 25, fig. 337-338.

"Buenos Ayres." Gueneé describes under this name our common species *Harveyi* Grote. He says, Noct. 1, 89: "L'individu figuré par Hübner, équ'il a reçu du Bresil (?), est beaucoup plus soucé que le mien. Serait-ce une espece distincte?" I find that the costa is uneven in Hübner's figure and also that the pale central shade is more continuous; the costal region is darker, there is no distinct black basal dash, the terminal dark shading is not continued along the cell inferiorly. The division of the blackish shades by a pale shading over median nervure is quite characteristic of *Harveyi*, and the failure to give this in Hübner's figure induces my belief that a South American species will be discovered approaching nearer to Hübner's figure, for which reason I keep the designation *Harveyi* for our N. Am. species.

Eunetis ultronia, 26, fig. 347-348.

"Pennsylvania." This is the species generally known as *Catocala ultronia*.

Argyrogramma omega, 29, fig. 373-374.

"Savannah." Gueneé refers this as a synonym to *verruca*, and probably correctly. Hübner's figure represents a species with a single silvery ringlet and no exterior mark.

Aletia argillacea, 32, fig. 399-400.

"Bahia." I have identified this with the *Noctua xyliana* of Say, Proc. Am. Ass. Adv. Sci., 13, 1874. This species seems to have spread from Brazil and Central America to the West Indian Islands, from whence during the last half of the last century it made its appearance in the cotton fields of the United States. Here the cotton plant is an annual, and the insect is brought face to face with a longer winter and a perishable food-plant. From my experiments I believe that in the central (and of course the northern) portions of the cotton belt the fall escaping and hibernating moths perish before the new cotton plant is large enough in the spring to receive their eggs. No experiments have yet substantiated the successful hibernation in any portion of our increasing cotton territory. It seems probable in default of this evidence that the Eastern worms come from the flights of the moths from the West Indies, the Western from southwest continental sources, always supposing that from the advance of cotton growing towards the Mexican frontier a locality has not been reached in that direction where the insect can sustain itself, owing to the relative shortness of interval between the crops or by having an alternative food-plant on which the earliest worms are nursed. It is evident that the cotton plant and the *Aletia* must be studied together to arrive at a true conclusion.

Septis mucens, 9, fig. 415-416.

"Pennsylvania." I have identified this species in Belfrage's Texan collections, CAN. ENT., xi., 206. Gueneé gives Florida as locality after Doubleday, and Pennsylvania probably after Hübner. Has it been taken in the Middle States? Belfrage sends a suffused variety, as I regard it, together with the typical form as figured by Hübner and described by Gueneé. Gueneé refers the insect to *Xylophasia*. It has hairy eyes and I have placed it in *Mamestra*.

Agnomonis sequestriaris, 10, fig. 419-420.

"Georgia." Gueneé refers this species as identical with *anilis* Drury, I think without doubt correctly.

Aedia fasciolaris, 15, 443-444.

"Bahia." I have a specimen exactly corresponding with Hübner's figure, in the ovate pale s. t. spot outside the line, the iridescent white basal patch of secondaries, etc. It differs in these and other characters strongly from *nigrescens*, with which Mr. Morrison has incorrectly united it.

Oygyia imperita, 16, 447-448.

"Labrador." I have a specimen of this species which belongs to *Agrotis*, from this locality.

Auchmis confusa, 25, fig. 495-496.

"Pennsylvania." This species has hairy eyes and I have placed it under *Mamestra*.

Melicleptria tuberculum, 29, 517, 518.

"Pennsylvania." I have placed this species in *Lygranthocia*.

Tarache ardoris, 34, fig. 551-552.

"Georgia." Gueneé identifies this species from Montevideo. I have never seen it. It is possibly not found in North America.

Crochiphora flavistriaria, 35, fig. 555-556.

"United States." Gueneé refers this species to *Poaphila*.

Porphyrinia matutina, 35, fig. 557-558.

"Georgia." This is *Alaria gauru* of Abbot & Smith.

Agnomonia quadriflaris, 37, fig. 569-570.

"United States." A common species referred by Gueneé to *Poaphila*.

Tarache candeffecta, 39, fig. 587-588.

"Pennsylvania." A common species throughout the Atlantic District.

Euthisanotia timais Cr., 39, fig. 589-590.

"West Indies." This species occurs on our Atlantic coast as a visitor borne on the winds. It is my *Philochrysa regnatrrix*, Proc. Ent. Soc. Phil., 2, pl. 8, fig. 4.

While Hübner must be cited as authority for the species in the first three Hundreds of the Zutraege, Geyer must be credited with the remaining two, which were issued after Hübner's death.

ANNUAL MEETING OF THE MONTREAL BRANCH.

The seventh annual general meeting of the Montreal Branch of the Entomological Society of Ontario was held on Monday, the 17th May, 1880, at the residence of the Vice-President, Mr. H. H. Lyman.

An interesting paper was read by Mr. Couper on the Milk-weed (*Asclepias tuberosa*) and some of its insect frequenters. The paper drew attention to the curious fact that the colors of the different insects feeding upon this plant were, almost without exception, red and black.

The Secretary and Treasurer read his annual report, which showed the finances to be in a most satisfactory condition.

The election of officers then took place, resulting as follows :

President—G. J. Bowles.

Vice-President—G. B. Pearson.

Secretary and Treasurer—Geo. H. Bowles.

Curator—F. B. Caulfield.

Council—Messrs. H. H. Lyman, Wm. Couper and Robert Jack.

A short time was pleasantly spent in examining several cases of rare Lepidoptera belonging to Mr. Lyman, after which the meeting adjourned.

GEO. H. BOWLES, Secretary and Treasurer.

CORRESPONDENCE.

DEAR SIR,—

Mr. W. H. Edwards' note of Oct. 20 recalls a very remarkable gathering of *Danais archippus* which came under my own observation, at Racine, Wisconsin, in the first week of Sept., 1868. The insect appeared in great numbers, and gathered in several swarms about trees in the vicinity. The day was cloudy, but without rain. Shortly after noon the swarms seemed to gather and settled upon a tree in my garden, a well-formed black oak about 15 inches in diameter at the trunk, and perhaps 40 feet high. The swarm covered the southern aspect of this tree so

abundantly that the green of the leaves was quite obscured by the brown of the wings of the butterflies. A few sailed back and forth through the air as if seeking a place to alight. when the wings of those sitting, opening and shutting as if by a single impulse, caused the prevailing color to shift from the dark hue of the upper surface to the lighter color of the lower surface. They remained until after nightfall, but were gone when we looked for them in the morning. No attempt was made to capture or count them, but the swarm must have contained some thousands.

S. H. PEABODY, Champaign, Ills.

DEAR SIR,—

Our season here is remarkably early ; the following insects have been observed on dates named :

Camberwell Beauty, <i>V. antiopa</i>	March 18
Small Blue Butterfly, <i>Lycania neglecta</i>	“
Cabbage Butterfly, <i>Pieris rapæ</i> , emerged from chrysalis in the house.	March 30
Sulphur Butterfly, <i>C. philodice</i>	April 4
Cabbage Butterfly, <i>P. rapæ</i>	“
Green Emperor Moth, <i>A. luna</i> , just out.....	April 14
Ajax Swallow-tail, <i>P. ajax</i>	April 16
American Silk-worm, <i>S. cecropia</i> , just out.....	April 18
Currant Saw-fly, <i>N. ventricosus</i>	“
Grape-vine Flea Beetle, <i>Haltica chalybea</i>	“
The Colorado Potato Beetle, <i>Doryphora decemlineata</i> .Apr.	11

E. W. CLAYPOLE, Yellow Springs, Ohio.

DEAR SIR,—

On Friday evening last (25th) while sitting reading, I heard a noise in my breeding box, and on taking it down I saw a fine specimen of *P. cresphontes*, which had been out for some time, as it was full of life. I was afraid that it might be hurt by flitting about, but it was perfectly safe. I am not sure when it went into the chrysalis, but it was late in October. I got the larva on the 11th Oct., and it fed a good while. It is not large, measuring just 3½ inches when set out. My room has not been very warm, and nothing else has yet come out.

Hamilton, Ont., Jan'y 26, 1880.

WILLIAM MURRAY.