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The Canadian Entomologist.

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No. 12

ENTOMOLOGY FOR BEGINNERS.

BY THE EDITOR.

It is intended that in the forthcoming volume of the CANADIAN ENTOMOLOGIST each number shall contain at least one paper addressed especially to beginners in Entomology. Our esteemed coadjutor, Mr. Jas. Fletcher, of Ottawa, has kindly offered to assist in this undertaking, and we hope that other able hands will render all the aid they can. We want in this way and by the aid of illustrations to make the ENTOMOLOGIST more interesting to the general public and especially to the young, as well as to agriculturists, and we trust that this can in some measure be accomplished without interfering with its value as a scientific journal and a medium of communication among advanced Entomologists. It is to the young that we must mainly look for recruits to fill the vacancies which time will make in the Entomological ranks, and if by any means we can induce some of our young friends to devote their leisure hours to Entomological studies

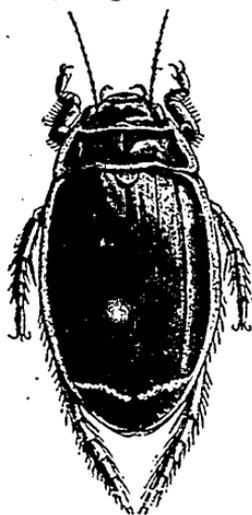


Fig. 13.

we shall be abundantly rewarded for our efforts, for the taste once acquired will seldom wane or die. We do not propose at present to follow any systematic course, but to treat in a series of brief articles of the habits and life history, as far as they are known, of such insects as are frequently met with, no matter what Order they may belong to. We hope also to be able to present occasional papers containing hints and instructions in reference to collecting and preserving insects.

Dytiscus Harrisii (fig. 13). This is one of the carnivorous water beetles, known as "Diving Beetles" or "Water Tigers," a strong, sturdy creature of an oval flattened form, with oar-like swimming legs, covered with long hairs. It is very active in the water, darting and diving about in different directions with great rapidity, the form of its body with sharp sides enabling it to cut

through the water with great ease. They may well be called the sharks of the insect world, for there are few things that live in the water which are safe from their attacks. They are especial enemies of the larvæ of other aquatic insects; they feed also upon tadpoles, molluscs and small fish, and when pressed by hunger they do not hesitate to devour one another. They may be kept in an aquarium and fed on water insects and small pieces of raw meat, which they suck greedily.

Fig. 13 represents this species very correctly; it is black with a broad margin of pale yellow on each side, and stripes of the same color across the front of the head and on both the front and hind margins of the thorax; there is also an irregular yellow line crossing the wing covers near the tip. The under side is somewhat paler with reddish markings. Examples of this insect are often brought to us during the summer by persons who have found them in tubs or barrels of water and who were puzzled to know how they could get there. Beneath their hard wing covers they have a large pair of membranous wings, by the use of which they can fly with great ease; by this means they are enabled to travel from pond to pond in search of their prey. When wishing to change their location they crawl out of the water (usually towards evening) either up some reed or other water plant, or to the margin of the pond, and suddenly open their wing covers, expand their wings and rise into the air almost perpendicularly to a great height. Their descent is nearly as sudden and direct, and they often, when descending, drop into the water with considerable force. It would appear that they are enabled to distinguish the water from a considerable height by its glassy surface, for sometimes they have been known to drop with violence upon glazed garden sash, which they had evidently mistaken for water.

The female lays her eggs in the water, where they soon hatch into young larvæ, possessing the ferocious disposition and voracious appetite of their parents. The larvæ grow rapidly, and when mature are about two inches long, with large flattened heads armed with sickle-like jaws, with which they seize other insects and hold them while they suck their juices; they sometimes quickly snip off the tails of young tadpoles, and are known to attack young fishes and suck their blood. Many years ago, when searching with a dip-net in a pond for the larvæ of Dragon-flies, we caught one of these savage creatures, and supposing it could be as safely handled as the libellulæ larvæ, took hold of it, when it quickly turned and buried its sharp jaws in the flesh of one of our fingers, making the blood flow

quite freely. These larvæ breathe through their tails, which they protrude into the air for that purpose. When full grown and about to assume the pupa state, the larva leaves the water, and burying itself in the earth, constructs there a round cell within which it undergoes its change, and if this occurs in summer, it appears in two or three weeks as a perfect beetle; but if in autumn it remains in the chrysalis state all winter, transforming to a beetle in the spring.

Fig. 14 represents another of our large water beetles, *Hydrophilus triangularis*. This species is entirely black, and so strong and muscular as to be difficult to hold in the hand when captured. The relationship of this tribe of insects (*Hydrophilus*) with the preceding one (*Dytiscus*) is very close. There is much similarity of form and a close resemblance in habits; their method of swimming, however, is different, for while in *Dytiscus* both paddles are moved simultaneously, in *Hydrophilus* they are moved alternately, hence the stroke of the latter is much less effective. We are not aware that anything has been written on the early stages of *Hydrophilus triangularis*, but in Europe the life history of a closely allied species, *Hydrophilus piceus*, has been carefully traced by several observers, and there is little doubt but that our species has similar, if not identical habits. The female of *H. piceus* has the singular habit of spinning a silky cocoon for her eggs, one side of which is furnished with an upright, bent, horny point, an inch long, which is supposed to be serviceable in conveying air to the interior. These eggs, some fifty or sixty in number, are placed in an upright position and in regular order in their receptacle, which is round and flattened and attached to some water plant at the surface of the water. In warm weather the larvæ are hatched in from twelve to fifteen days, when they escape at the lower part of the cocoon, which is closed only by a few threads. They undergo three moultings, and when full grown measure nearly three inches in length. The head is horny and of a very singular form, its lower surface being convex, while its upper surface is flattened. Its sharp and formidable jaws are well adapted for seizing and securing its prey. They are said to attain their full growth in July, when they leave the water, bury themselves in the earth, where they undergo their changes in a manner similar to that of *Dytiscus*.



Fig. 14.

ON THE LARVAL HABITS OF LIMENITIS ARTHEMIS (WITH
ITS CO-FORM PROSERPINA), AND ALSO OF
L. DISIPPUS.

[From Advance Sheets of Part VIII., Vol. 2, of *Butterflies of North America.*]

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

The larvæ of *Arthemis* feed on the leaves of willow, aspen, bass-wood, and, it is said, on thorn. In the Catskills, the eggs are laid the last days of July or early in August, on young trees, and but one egg upon one leaf. This is placed near the tip, and the newly hatched larva eats away the leaf on both sides of the midrib. When at rest, it is to be found on the stripped portion of the rib, and is easily discovered by this habit. When two larvæ are hatched on one leaf, as happens when two eggs have been laid in confinement, Mr. Mead has noticed that one of them occupies the midrib, while the other rests on a perch constructed by itself from the side of the leaf. This perch, he says, is nearly a quarter of an inch long and about one fiftieth of an inch in diameter, irregularly cylindrical and composed of frass and small bits of the leaf, fastened together and covered with grayish silk.

Limenitis Disippus has in all respects larval habits similar to *Arthemis*, and as I have often watched the construction of the perch in that species, one account will apply to both. The end of the rib is no sooner laid bare than it is coated and wound with silk, and to the extremity are fixed grains of larval excrement, at first but two or three, placed one after the other in line. These are bound together and to the rib, and being small as grains of rifle powder, they form a continuation of about the same dimensions as the rest of the perch, and seem effectual to prevent curling as the rib dries. As the larva grows, the process is continued until this artificial portion will measure five or six tenths of an inch, and makes a stout, irregular cylinder, the entire perch reaching about one and a half inches. It is constantly strengthened by additions of silk, the larva almost invariably, as it goes back and forth from its feeding ground, adding threads and patching the weak places. On the perch the larva, in its younger stages, that is, before hybernation, always rests, going to the leaf for food at short intervals. It occupies the middle of the perch and its usual attitude is a twist, the ventral legs clasping; but the anterior half of the body is bent down by the side of and somewhat under the perch. If

two larvæ are placed on the same leaf, one always takes possession of the extremity, often with something of a contest and knocking of heads together; but the other will presently be found on one edge excavating on either side of a narrow strip which is to constitute the base of the perch. This is bound and lengthened with frass and serves every purpose.

Both these species of larvæ have a habit of accumulating little scraps of leaf at the base and under side of the perch till quite a packet is formed, and this is rolled back as the substance of the leaf is eaten so as to be close to the cut edge of the leaf. This edge, in willow, is kept nearly square, a section being eaten from one lobe and then a corresponding one from the other. In beginning on a fresh section, the larva lies diagonally across one corner, the anal legs clasping the base of the perch, and its head will strike the side of the leaf about two tenths inch above the corner. It eats a canal nearly perpendicular to the side and towards the midrib; not all at once, by any means, for this is the result of several meals, in the intervals always returning to the perch. When the rib is reached, the larva then begins to feed on the lower side of the canal next the rib, and to keep the slender and unsteady bit of leaf in position it spins guys from the end and edge to the solid leaf opposite and to the rib. As the feeding proceeds and a considerable triangle is held only by a narrow strip, which diminishes at each mouthful, more guys are put out, and, at last, when the triangle falls, it is held by the threads and swings to the base of the perch. If not, it is soon brought there by fixing one thread after another from it to the rib and leaf till it is pulled to its place. Here it is bound loosely. As other bits are added, there comes to be an open packet, held together by simple threads, and of about one tenth inch diameter. In the two younger stages this is moved along as the larva feeds, and is always kept close to the leaf, partly by pushing, what is gained at each effort being secured by threads, or it is rolled by attaching successive threads from the farther side to the leaf and rib till the mass is turned over. After the second stage the packet is left behind, and no additions are made to it. I was at first puzzled to account for this construction; but happening to see one of the caterpillars back down the perch and drop its excrement directly into the packet, it occurred to me that really this was the magazine whence the larva drew its materials for lengthening the perch. On pulling some of the packets apart a few grains were always found in them. This I believe to be the use of the packets, and without some contrivance to catch the frass, it is difficult to see how

the larva obtains the materials it uses. Apparently it drops just about enough into the packet for the object in view, for it is certain that the grains are usually expelled wherever the larva happens to be, and fall to the ground. After the end of the perch is sufficiently strengthened and there is no further need of the grains, the packet is dropped behind and neglected.

The larvæ of *Arthemis* hatch in from seven to nine days, undergo two moults, and construct, each for itself, cases or hybernacula of leaves in which to pass the winter. As the weather in spring becomes settled and warm, they emerge from their cases, feed a few days sparingly, and pass the third moult, soon to be followed by the fourth and last, and must change to chrysalids from 1st to 15th June.

The larvæ of *Disippus*, however, mostly pass three moults before they make their cases (at Coalburgh, W. Va., though perhaps but two towards the northern limit of the species), and two moults in the spring. But occasionally a larva is found constructing its case and taking possession after the second moult. Whether these individuals pass more than two moults in the spring, I am not yet able to say. Both species cut out the patterns of the cases as follows: First eating a narrow canal for one quarter inch, the width of the head, obliquely outward from the stem at base; next a canal of same length on the side of the leaf, about three fifths the distance to the apex, perpendicular to the edge; then turning this at a right angle in the direction of the first canal and cutting for a little distance; then crossing to the other half of the leaf and cutting similar canals; after which the extremity of the leaf was cut off by an incision from the bend in the second canal directed obliquely forward to the midrib, first on one side, then on the other; next the first and second canals on one side were joined, then on the other side, and there remained of the leaf but a small fiddle-shaped piece, lying almost equally on either side the rib. Before and during the time this work was progressing, the larva had taken intervals of rest from the cutting, and had occupied itself in weaving threads from the branch to the stem, and along the upper side of the leaf, thus coating with silk what was to be the inside of the case. Finally, beginning at the base, it drew the edges partly together for a little distance, leaving an open space between of about one tenth inch, and held them in position by single threads; then proceeded to weave a thick permanent covering to this gap; which done, it worked back, drawing the edges as before, and weaving, till at length the case was complete. As it

spun, the larva was in a constant state of anxiety about its work, as if it foresaw the storms of rain and wind it must be subjected to for many long months, shut in this slender house. In closing, it lies along the midrib inside, its anterior segments extending over the top, and it moves its head from side to side weaving a concave edge. But it often reached far over and added a thread here and there where the work seemed to be finished, and it would frequently leave the case to inspect the fastenings about the branch, and to weave additional threads there as needed. The silk is passed entirely around the branch, and binds both sides of the leaf-stem. In weaving at the case the larva would soon become exhausted. I timed one actively at work for ten minutes, and there succeeded an interval about as long of rest, the larva lying motionless along the midrib. When at last the case is finished, the larva enters and rests awhile, but presently comes out, runs about examining the stem and the fastenings, then returns—and this scrutiny will be repeated perhaps three or four times. Two larvæ were kept in the same glass, each of which had commenced a case and partly inclosed it, when I removed one. The other soon began to amuse itself by shifting about, trying each case and working at it, and finally completed and occupied that which it had not begun. Some days after all had apparently retired for the season, one came out and wandered uneasily about, but a few hours later was found to have returned to its case and was seen no more.

There was some variation in the mode of cutting the pattern, as sometimes work was begun on the side of the leaf instead of at the base. But it always resulted in the same fiddle-shaped piece. The cutting was evidently fatiguing, from the inconvenient position of body required, the head and anterior segments having to be bent sideways, even to a right angle much of the time, and the larva frequently rested and shifted its place. It was never found on the wrong side of the cut, however, or in danger of falling with the rejected portion of the leaf. Occasionally after having begun a case the larva would desert it and construct another. The larvæ finally entered the cases head first, their bodies contracting in length and proportionately thickening so as to completely fill the upper end of the tube, and allow nothing to be visible from the aperture, while over this last the long flap of the leaf soon curved sufficiently to keep out water.

Probably in the natural state the case of *Arthemis* is constructed from the leaf on which the caterpillar began its existence, whether willow or aspen.

This is so with *Disippus*. The ends of the leaves have been eaten away and only the sides need shaping. But if the residue is insufficient, or for any reason does not answer the purpose, the caterpillar moves to another leaf and begins cutting.

ON A NEW PSOCUS.

BY WM. H. ASHMEAD, JACKSONVILLE, FLORIDA.

In my investigations of the insects of the Orange tree, I have discovered another curious insect on some branches infested with Scale Insects, and given me by Major A. J. Russell. I at first took them to be Aphides, but on closer examination they proved to belong to *Psocus*.

The eggs are laid in oval masses under and frequently on upper part of leaf, and are protected by a closely woven web, through which are sprinkled sooty particles. The young, when first hatched, are very active, white, Aphis-like looking creatures, from a dozen to twenty clustered together, in all stages of development, beneath the web. On disturbing they disperse from under it with surprising rapidity. They probably prey upon the young Scale Insects and the decaying matter caused by them. As I can find no description or mention of them, I submit the following :

Psocus citricola, n. sp.

Elongate, pale yellowish ; head large, as wide as long, outer edge from eye to eye forming a perfect half circle ; eyes are large and very prominent ; maxillary palpi four-jointed, the basal joint little longer than either of the others, but narrower ; the others about even in length but gradually increasing in thickness, the last being the thickest ; antennæ three-jointed, first two short, same size, as wide as long ; the last joint is long and filiform, reaching nearly to the end of abdomen, and covered with long fine hair ; thorax narrower than head, slightly longer than wide, rounded at edges, with a transverse suture dividing it into two parts (immature specimen) ; abdomen longer than head and thorax together, eight segments, the largest being nearly twice as wide as thorax ; legs six, rather long, tarsi two-jointed, ending in two minute claws. The abdomen and

legs have small short hairs springing out all over them. Wings hyaline, with costal, subcostal, median and submedian veins; in fore wings the subcostal runs parallel with costal until before reaching apex it bends downwards and then curves upwards, ending at termination of costal vein, forming a cell which is opaque; it also sends a veinlet from before middle that descends and curves around upwards until near the third of the wing, when it divides, the lower ending in outer edge; the other runs to below apex, near the edge, where it divides into two short veinlets, terminating at outer edge; median vein curves slightly downwards until near the middle of wing; it then divides into two, the lower descending till near apex of inner edge, when it suddenly curves upwards, terminating at outer edge, the cell thus formed being opaque; the other veinlet ascends, crossing the branch of the subcostal till just before reaching the apex it breaks into two veinlets, forming a small triangular cell at apex. Hind wings contain one costal, three subcostal, two submedian, and one internal cell. Length of matured specimens from .10 to .12 of an inch.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO:

The sixth annual general meeting of the Montreal Branch of the Entomological Society of Ontario was held at the residence of G. J. Bowles, Esq., on Tuesday, the 3rd June, 1879, at 8 o'clock p. m.

Mr. Bowles read a paper entitled "Some of the insects that frequent the orchard and garden—under what circumstances they increase unduly, what insects to spare, what to kill, and how to kill them, with other useful information," by the Rev. F. W. Fyles, corresponding member of the Nat. Hist. Soc.

The annual report of the Secretary-Treasurer was then read and adopted. This report showed that after meeting the current expenses of the year, there still remained a very fair balance on hand.

The proceedings were closed by the election of the following officers for the ensuing year:—President, G. J. Bowles; Vice-President, H. H.

Lyman ; Secretary and Treasurer, Geo. H. Bowles ; Curator, F. B. Caulfield ; Council—Robert Jack, W. Couper and G. B. Pearson.

The meeting then adjourned.

G. H. BOWLES, Sec'y.

Annual Report of the Council of the Montreal Branch of the Entomological Society of Ontario.

In presenting their sixth annual report, your Council have much pleasure in stating that the Society is still making satisfactory progress.

Eight very pleasant meetings have been held during the year, and besides the many interesting Entomological items recorded in the minutes of the Society, the following papers have been read before the members :

1. On the larvæ of *Papilio brevicauda* and *Pieris borealis*, and their food plants—W. Couper.

2. On the May Beetle, *Lachnosterna quercina*, and its parasites—G. J. Bowles.

3. Introductory notes on the Ichneumonidæ—G. J. Bowles.

4. Notes on *Phyciodes Harrisii* and *nycteis*—H. H. Lyman.

5. On the Saw-flies—G. J. Bowles.

6. My Entomological Trip to the Godbout River, 1878—W. Couper.

7. On the insects of the Mammoth Cave (selected)—Geo. H. Bowles.

The following books have been added to the Library :

Riley's Reports, 2, 4 and 5, making the set complete. The nine reports have been bound in three volumes, and form a very valuable addition to our Library.

Hentz's Spiders of the United States, with 21 plates.

Saussure's Solitary Wasps of America, with 4 plates.

La Crysomele des Patates, from the Department of Agriculture, with 1 plate.

Report of the Entomological Society of Ontario, 1878.

Reports of the Fruit Growers' Association of Montreal, 1877 and '78.

Our order for books to the Naturalists' Agency is still not quite filled, and a balance of about \$10 remains in their hands.

Your Council would note that additions are still being made to the list of species in the "Montreal Catalogue," and would recommend the work to the members as one worthy of zealous prosecution.

In regard to the labors of the coming season, your Council feel glad

to report that the members are beginning their collections with renewed vigor; and they trust that the next year's operations will show a great advance in the study of our fascinating science in Montreal.

The whole respectfully submitted.

GEO. JNO. BOWLES, President.

Montreal, 3rd June, 1879.

THE SPECIES OF *EROTYLA*, *SPRAGUEIA*, *FRUVA*, *XANTHOPTERA*, *EXYRA* AND *PROTHYMIA*.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

EROTYLA SULPHURALIS Linn.

The neuration of this European species is as follows: Fore wings 12-veined, 8 out of 7 well beyond the extremity of the accessory cell, 9 out of 8, a comparatively short furcation to costa. Hind wings 8-veined, 5 weaker than the rest, joined to the weak cross-vein which closes the cell; this latter is comparatively shorter than in *Spragueia*, veins 3 and 4 longer.

SPRAGUEIA LEO Guen. = *onagrus* H.-S. (nec *Guen.*) fig. 209.

Fore wings 12-veined, 8 and 7 together from the extremity of the accessory cell, 9 out of 8, a long furcation to costa. Hind wings 7-veined.

This North American species is the type of the genus *Spragueia*. I collected *leo* in Alabama. The fore wings have the costa striped with sulphur yellow to apical fourth, the costa beyond is orange to apices and there is an orange terminal band. A sulphur yellow stripe runs from base outwardly along sub-median interspace. The rest of the wing is blackish plumbeous, the central dark portion divided into three spots by two transverse orange lines which intersect the narrower dark space along internal margin as well. Fringes blackish except at anal angle, where they are orange. Three dark costal marks, the first two surmounting the two transverse orange lines, the outer of which latter tends to be broken and angulate on the median vein.

There can be no doubt that Herrich-Schaeffer's figure does not represent *onagrus* as illustrated and described by Gueneé. This confusion led me formerly to regard *leo* and *onagrus* as varieties of one species, but from my present material I must consider that we have two distinct species. Whether one of these is the *leo* of Gueneé admits of some doubt from his description. But if the species is but slightly variable in the continuation of the two orange lines which break up the mesial blackish stripe, his description will apply. In Herrich-Schaeffer's figure these two lines are, in effect, not continued across the wing, but joined in a sort of horse-shoe mark on internal margin; but the upper part of the horse-shoe is in reality the continuation of the basal submedian stripe, above which the lines are discontinued. If the outer orange median line alone be continued, then, we would have Gueneé's spot "tresgrande, en Y plein," which consists of the bent subterminal band joined to the spherical reniform. While I have not before me the exact counterpart of Gueneé's description or Herrich-Schaeffer's figure, I believe it more reasonable that *leo* should vary to include both, than that I should suspect a third species in my material. That Herrich-Schaeffer's figure represents an easily understandable variety of my species I have no doubt.

SPRAGUEIA ONAGRUS, Guen., 2, 205, Pl. 10, fig. 2.

Fore wings 12-veined, $\bar{8}$ out of 7 a little beyond the extremity of the accessory cell, 9 out of 8, a long furcation to costa. Hind wings 7-veined, cell closed by a weak cross-vein.

Collected by Mr. Schwarz in Florida. In the character of the fringe of primaries it agrees with *leo*. It differs by the fusion of veins 8 and 7 at base, in which it stands nearest of all the species to *Erotyla*, but the hind wings are 7-veined and on primaries vein 9 is longer, as in the other species of the genus. The fore wings are sulphur-yellow at base with a rather broad plumbeous basal streak, a curved line below it above internal margin, which with the rest of the wing is orange, except the sulphur-yellow costal region. The discal spots are distinct, surmounted by three detached costal marks which note the inception of the anterior line, median shade and posterior line. A broad bent dark band on subterminal space, not continued to costa. A pre-apical costal mark. The first two of the four costal marks nearly fuse with the orbicular. In fresh specimens the colors are very vivid. In colors and ornamentation the species resembles *leo*. It is distinguished by the absence of the two orange

lines and of the median blackish longitudinal shade, as well as by the isolation of the spherical discal spots.

SPRAGUEIA PLUMBIFIMBRIATA Grote.

Fore wings 12-veined, 8 and 7 together out of the extremity of the accessory cell, 9 out of 8, a long furcation to costa. Hind wings 7-veined. The neuration agrees with *leo*.

This species, collected by Belfrage in Texas, has the fringes of primaries plumbeous; at internal margin a few pale hairs are sometimes to be noticed, but there is no distinct patch as in *leo* and *onagrus*. In color this species wants the orange of its allies, in ornamentation it resembles *dama*, but there is no basal plumbeous marking.

SPRAGUEIA DAMA Guen.

Fore wings 12-veined, 8 and 7 together out of the extremity of the accessory cell, 9 out of 8, a long furcation to costa. Hind wings 7-veined. The neuration agrees with *onagrus*, except that vein 9 is thrown off a very little further from the origin of 8.

I collected this species in Alabama. The fringe of primaries is entirely orange, flecked with plumbeous opposite the cell, and there are a few plumbeous hairs at internal angle.

I have a specimen of Guenee's variety "A" collected by Belfrage in Texas, July 30.

SPRAGUEIA TORTRICINA Zeller.

Fore wings 12-veined, 8 and 7 together from extremity of accessory cell, 9 out of 8, a long furcation. Hind wings 7-veined.

The species is bright yellow and has narrower wings than *Xanthoptera nigrofimbria*; the fringes are blackish and there are two cellular dots, the outer surmounting a blackish abbreviated band resting on internal margin two-thirds from base. The primary wings are a little more produced apically than in the other species, but the neuration agrees and the structure of the front differs from *Fruva*, to which genus I have referred it, CAN. ENT., ix., 69. It has been taken by Belfrage in Texas, May 10.

The clypeus is narrow and smooth in the species of *Spragueia*, flat on the first four species or but slightly bulging; in *tortricina* and *guttata*, especially in the latter, it is somewhat globose. In *Erotyla* the front is much projected and the surface is rough, the infra-clypeal plate is promin-

ent and the front terminates in a wide-lipped protuberance, centrally flattened, its lower edge exerted. In *Fruva fasciatella* the infra-clypeal plate is also prominent, the front is elevated and is crowned by a shallow, wider and more narrowly edged and rounded depression. Structurally *Fruva* is more closely allied to *Erotyla* than *Spragueia*, as we shall see in discussing the neuration of *F. obsoleta*, yet in ornamentation the resemblances are reversed.

SPRAGUEIA GUTTATA Grote.

Fore wings 12-veined, 8 and 7 together from the extremity of the accessory cell, 9 out of 8, a long furcation to costa, the accessory cell smaller than in the other species. Hind wings 7-veined.

This species has very distinct ornamentation, the fore wings being light sulphur yellow crossed by black lines; the only orange is at base on internal margin, and a band running upwards on median space within the t. p. line, interrupted by the black-ringed, sulphur-yellow, spherical reniform, and extending beyond it to apices. The fringes are orange, touched with blackish at apices, opposite the cell, and again about internal angle. It has been collected by Heiligbrodt in Bastrop Co., Texas.

The wings are narrower in *Spragueia*. The neurational characters which distinguish the North American genus from the European *Erotylā* (*Agriphilā*) are first the 7-veined secondaries, with the three-branched median vein wanting the weak vein 5, while the cell is longer. Then the longer vein 9 of the primaries, while in all the species except *onagrus*, veins 7 and 8 spring together from the extremity of the accessory cell; in *onagrus* they are joined on a shorter stem than in *Erotyla sulphuralis*.

FRUVA FASCIATELLA Grote.

Fore wings 12-veined, veins 8 and 7 out of the extremity of the accessory cell, 9 a long furcation. Hind wings with vein 5 obsolete. The genus differs from *Spragueia* in the bulging clypeus surmounted by a shallow cup-like depression. But there is a faint indication of an independent vein on hind wings at the cross-vein, immediately beyond which it vanishes.

This species varies in the color of the indefinite shadings of the primaries from dusky olivaceous to ochreous. The discal dots and t. p. line are more or less evident. It is common in Texas.

FRUVA OBSOLETA Grote.

Fore wings 12-veined, veins 6 and 7 out of the extremity of the accessory cell, 9 a short furcation. Hind wings with vein 5 weaker, but distinctly present.

The neuration approaches *Erotyla* more closely than the other species in the presence of the weaker vein 5 on the secondaries, and the shortness of vein 9 on fore wings. The position of 8 and 7 on fore wings is, however, as in *fasciatella*, being separate at base. The species has unicolorous, dusky olive-fuscous primaries, a little paler shaded over costal region at base, and showing a variable ochrey reflection exteriorly. No markings. Illinois and Texas in June.

I have a single specimen of *Fruva acerba* Hy. Edw., from California, which seems allied to *fasciatella*.

XANTHOPTERA NIGROFIMBRIA Guen.

I restricted, Trans. Am. Ent. Soc., 295, 1873, the genus *Xanthoptera* to this type, proposing in the Check List, 1875, *Exyra*, with the type *semicrocea*, for the hairy species with differing venation and which are found to feed in the larval state on the species of *Sarracenia*, or pitcher plants. Guenee's single species of *Exyra* was only known to him through Abbot's drawing.

In *nigrofimbria* the fore wings are 12-veined, the accessory cell longer than in *Spragueia*, veins 7 and 8 separate at base, 9 out of 8 a rather long furcation. Hind wings 8-veined, cell closed, vein 5 hardly weaker than the rest. The palpi are rather long and free from the front with well developed terminal joint, closely scaled. The front is smooth, rather wide and slightly elevated with a shallow depression and discolorous rim. The thorax and head are closely covered with flattened scales. The fore wings are rather broad with produced apices.

XANTHOPTERA SEMIFLAVA Guen.

Fore wings 12-veined, 8 and 7 joined at base, 9 out of 8, a long furcation. Hind wings with vein 5 very faintly indicated. Head and thorax closely scaled. Front globose.

This species differs from the following species of *Exyra* by the closer squamation and the wide, slightly elevated front, in which it agrees with *nigrofimbria*. But there seems to be no rim and shallow depression in the

clypeus. It agrees with *Exyra* also in the union of 8 and 7 at base, but the accessory cell is shorter even than in *nigrofimbria*. On the other hand, vein 9 is longer than in the latter and differs from *Exyra* greatly in this respect. This species has been taken in Texas by Belfrage in April and May. Its generic position may afterwards be changed, but I leave it for the present where it was placed by Gueneé. It is easily known by its lemon yellow thorax and base of primaries, which are outwardly purply black, the line dividing the two colors being *oblique*. It varies slightly in the extent of the darker external portion of the wing.

EXYRA SEMICROCEA Guen.

Fore wings 12-veined, the accessory cell greatly elongated, veins 8 and 7 united at base, 9 a very short furcation. Hind wings with vein 5 nearly as strong as the rest. Front not elevated, rather narrow with a slight inferior tubercle. Squamation of palpi, head and thorax long, thick and hairy or consisting of narrow scales. Fore wings broad with blunted apices. I have not been able to thoroughly examine all the species, but I refer to this genus *semicrocea* Guen., *Ridingsii* Riley, *fax* Grote, and *Rolandiana* Grote. The latter, one of our most brilliant Noctuids, is described in Psyche, II., 38, where also the larva, which feeds on *Sarracenia purpurea*, is described by its discoverer; my friend Mr. Roland Thaxter, after whom the species is named. Mr. Jas. Ridings brought specimens of *semicrocea* and *Ridingsii* from Georgia, but when the material was submitted to me I did not recognize the latter as a distinct species. Mr. Townsend Glover discovered the larva of *semicrocea* feeding on *Sarracenia violaris*, and sent me a drawing of it now many years ago. It has been fully illustrated by Prof. Riley, Trans. St. Louis Academy, Vol. iii.

Prothymia Hüb.

After a careful examination of the type of *P. subolivacea* Harvey, I regard it as a synonym of *P. orgiae*. Three species are described from our territory: *P. coccineifascia* Grote, *P. rosalba* Grote, and *P. orgiae* Grote. This latter is pale yellow with the external margin shaded with rosy. Two faint, obscure, shade lines take the place of the subterminal and t. p. lines; these lines are even, sub-parallel, oblique or slightly curved. Two minute superposed dots take the place of the reniform. In *subolivacea* the tone of the wings is slightly olivaceous and the thorax and base of the wing and internal margin shaded with pale rosy. Otherwise

it does not differ as far as I can see. The species may be known by the discoloured purplish fuscous head and thorax, the dark color extending on the shoulders of the fore wings. It has been collected in Texas by Belfrage in March and July. The primaries are more pointed in *orgiae* and this species is more faintly colored when compared with its congeners.

The species may be thus catalogued :

Erotyla Hübn.

sulphuralis Linn. Europe.

Spragueia Grote.

onagrus Guen., 2, 205. Florida.

Type leo Guen., 2, 205. Alabama.

plumbifimbriata Grote, C. E., ix., 68. Texas.

dama Guen., 2, 205. Alabama, Texas.

guttata Grote, C. E., vii., 225. Texas.

tortricina Zeller, Beitr., i., 15. Texas.

apicella Grote, Trans. Am. Ent. Soc., iv., 21. Alabama, Texas.

truncatula Zeller, Beitr., i., 3.

Fruva Grote.

Type fasciatella Grote, C. E., vii., 225. Texas.

obsoleta Grote, C. E., ix., 69. Illinois, Texas.

Xanthoptera Guen.

Type nigrofimbria Guen., 2, 241. N. Y., Ala., Texas.

semiflava Guen., 2, 241. Texas.

Exyra Grote.

Type semicrocea Guen., 2, 241. Georgia.

Ridingsii Riley, Trans. St. Louis Acad., iii., 240. Georgia.

nigrocaput Morrison, Proc. Bost. Soc. N. H., 17, 153.

fax Grote, Trans. Am. Ent. Soc., 295. Georgia.

Rolandiana Grote, Psyche, ii., 38. Mass.

Prothymia Hübn.

coccineifascia Grote, Trans. Am. Ent. Soc., 294. N. Y., Texas.

rosalba Grote, Trans. Am. Ent. Soc., 295. Penn., Mass.

orgiae Grote, Trans. Am. Ent. Soc., 116. Texas.

subolivacea Harv., Bull. B. S. N. S., 3, 11.

DESCRIPTION OF A NEW SPECIES OF PAMPHILA.

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

P. DION.

Male—Expands 1.2 inch.

Upper side has the disk, cell and basal areas pale fulvous, the latter much obscured; costal margin also fulvous, but obscured, and inclining to red in the sub-costal interspaces; the apex and hind margin broadly bordered with fuscous; stigma long, narrow, formed by two velvety-black spots, the lower one a little back of the line of the other; the black arc of cell forms a continuation of stigma and joins a dark stripe which runs along upper side of subcostal to base, the whole forming a sub-triangular inscription such as is seen in *Arpa*. Secondaries have the disk to base obscure fulvous, but there is a clear fulvous ray on the outer part of this area.

Under side of primaries ferruginous, deepest over costal margin; area below cell to inner margin black, and over median interspaces pale black; on the disk an oblique band of four yellow or fulvous spots, besides a fifth spot, obsolescent, out of the line and opposite end of cell. Secondaries ferruginous, of uniform tint, except that there are two pale rays from base, one of which passes through cell, the other occupies submedian interspace, to margin.

Female—Expands 1.5 inch.

Upper side fuscous with a slight tint of fulvous; primaries have two yellow sub-apical spots, and an oblique row of yellow spots across the disk; secondaries have the disk nearly as in male, more obscured, but with the bright ray. Under side as in the male.

This species is closely allied to *Arpa* Bd. and Lec., but may be distinguished from it by the pale rays on disk of secondaries, *Arpa* being one shade of color. I formerly received *Dion* from Mr. G. M. Dodge,

Nebraska, and supposed it to be *Arpa*, and so gave Nebraska as one of the localities in my Catalogue. This season I have received the species from the southern shore of Lake Michigan, in Indiana, from Mr. Chas. E. Worthington; also from Mr. J. A. Moffat, of Hamilton, Ont., who says it inhabits one locality there. It would appear then to occupy a belt extending from Canada to Nebraska.

CORRESPONDENCE.

DEAR SIR,—

Mr. A. H. Mundt, of Fairburg, Ills., writes me thus: "On 7th Sept., while walking through a grove near this place, I saw a large number of *D. Archippus* hovering about and settling upon some limbs of a hickory. More from curiosity than anything else, I went again the next day before sunset, and found the butterflies in still larger numbers on two branches of the tree. (The weather had been pretty cold for several days, with slight frost at night.) Those sitting within reach of my net seemed to be alarmed and would fly upon approach, but would alight again. I resolved to make a further test, and after dark I started for the grove with a long step-ladder, a lantern and box, and took 125 specimens, 51 ♂, 74 ♀, all of them perfect." If such assemblages of these butterflies are usual, they have so far escaped notice, and the object of them is matter for conjecture.

W. H. EDWARDS.

Coalburgh, W. Va., Oct. 20, 1879.

DEAR SIR,—

In the June number of the CAN. ENT., W. E. Saunders remarks that he saw a specimen of *Papilio thoas* on the 11th May, and that "the appearance of this butterfly at so early a date would seem to indicate that they are double-brooded here, unless it can be shown that the escape of the imago from some of the chrysalids is much earlier than from others." I have obtained two fine specimens of this butterfly from mature larvæ; one in 1878, the other this year. The first example went into chrysalis about the middle of September, and the imago appeared on the 9th of May following. The second was in chrysalis only from the 7th September to the 23rd of March. I think the temperature at which the chrysalids

were kept was about equal. On the first day of July this year I took two specimens of *thoas* in King's Co., N. B., and I have seen them on the wing in St. John Co., a few miles from the city, at the same date in other years. I have one example captured here a few days later.

CAROLINE E. HEUSTIS, St. John, N. B.

DEAR SIR,—

I have got caterpillars of *P. thoas* or *crephontes* taken in the garden of A. Reid, in the west end of the city, feeding on a bush called the "burning bush," from its going off with a blaze when light is held to it; I do not know its Botanical name. Two of them have gone into chrysalis.

J. ALSTON MOFFAT, Hamilton, Ont.

[The plant referred to is *Dictamnus fraxinella*.—ED. C. E.]

DEAR SIR,—

On p. 195 of the present volume, the CAN. ENTOM. makes me say that I regard *Disippus* as "probably the original type" of *Basilarchia*. I have never held such an opinion, but the very opposite.

SAML. H. SCUDDER.

Cambridge, Mass., Dec. 1, 1879.

PAPILIO CRESPHONTES.—Mr. Wm. Murray, of Hamilton, writes as follows: "We have a new butterfly in Hamilton and vicinity, and several of them have been captured; it is *P. crephontes* (*thoas*). I got two of the larvæ this fall feeding on *Dictamnus fraxinella rubra*; one has gone into chrysalis, and the other died after it had hung up to undergo its change."

On the 16th of October, Mr. Watson, of Thedford, Ont., brought us a specimen of this larva, which had been found feeding on Prickly Ash, *Xanthoxylum fraxineum*. It was nearly full grown, and we fed it on Prickly Ash and Orange leaves until it spun up. In the endeavor to shed its larva skin it died when the chrysalis was more than half developed; the same fatality attended a specimen which we tried to rear last year.—ED. C. E.

ERRATA, VOL. XI.—P. 13, l. 16, for "2 ♂" read *a*, ♂; p. 15, l. 11, for "ii." read *i*.; p. 214, l. 9, for "oscillated" read ocellated; on p. 206, l. 20, 22 and 26, one *s* should be deled from *Morrissonia*.

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