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The Canadian Entomologist.

VOL. XIX.

LONDON, APRIL, 1887.

No. 4

THE LARVA OF LIPHYRA BRASSOLIS PROBABLY APHIDIVOROUS.

BY REV. W. J. HOLLAND, M. A., PH. D., PITTSBURGH, PA.

Some two years ago I received from Rev. L. C. Biggs, H. B. M. Chaplain at Penang, a parcel of insects collected by Mr. F. G. Durnford in Sungei-Ujong. Among them was a specimen the envelope containing which was labelled *Charaxes Durnfordi*, n. sp. Mr. Biggs, in sending the lot, called attention to this particular specimen in his note, saying: "It looks as if it were covered with mildew, which Durnford assures me is really fluff detached at the time of its capture." I did not examine the specimen very particularly at the time of its receipt, except to note that it was covered with a whitish mealy deposit, particularly thick upon the abdomen, and that it was not a *Charaxes*. Some three months or more ago I undertook the task of expanding this lot of insects and arranging them for my cabinets. I found, as I was putting the envelopes into the pans to relax them, several which contained specimens of a large "mealy bug." These were laid aside. At last I came to the alleged "*Charaxes Durnfordi*." What was my delight to find it to be a fine large female of *Liphyra brassolis*, Westwood. I had just received from Mr. W. H. Edwards a copy of his most interesting paper upon the habits of the larva of our *Feniseca Tarquinius*, an insect revealing very close relationship to the gigantic *Liphyra*, alike in the form of its wings, their neuration and their color. The true explanation of the "fluff" or mealy deposit upon the abdomen and lower side of the wings of the specimen instantly flashed upon my mind. I hastily looked up the envelopes containing the scale insects or "mealy bugs." A comparison beneath the microscope of the white particles clinging to the abdomen and lodged upon the wings of the *Liphyra*, with the mealy covering of the shield lice preserved in the envelopes, revealed their identity. I mentally put the two things together and conclude:

a. That Mr. Durnford captured this specimen of *Liphyra* near a colony of scale insects, which was so large as to attract his attention and lead him to put a few of them into papers.

b. That this female was engaged in oviposition just before she was captured by Mr. Durnford, and that the mealy white deposit which Durnford spoke of as "fluff," which Mr. Biggs compared to mould or mildew, is nothing else than fragments of the white covering of the scale insects, over and among which the butterfly had been flying while engaged in the act of laying her eggs.

If my conclusion is correct, and it seems to me that there can be no question of its correctness, we have a second species to add to the list of those Lepidoptera, the larvæ of which are carnivorous, or aphidivorous, or coccivorous, as the reader pleases.

Light is also thrown by this discovery upon the generic relationship of *Feniseca* and *Liphyra*. The two are brought together into the same group. The classification of the Lycaenidæ of the world is as yet not fixed upon a final basis, but we are gradually reaching just conclusions. For my part, I would fail to agree with the assertion of my good friend, Mr. Edwards, to the effect that *Feniseca* is to be referred to the Erycinidæ. The formation of the legs, the neurulation, the shape of the antennæ and of the chrysalis, is such as to convince me that no mistake has been made in putting this genus among the Lycaenidæ. The fact that the larva presents points of difference from the larva of such a species as *L. Pseudargiolus*, or *Chrysophanus Americana*, should not weigh as against these other points in fixing the generic relationship.

NATURAL HISTORY NOTES ON COLEOPTERA—No. 3.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Cicindela punctulata Fab. The Cicindelas are generally regarded as diurnal, many of them appearing only during the hottest sunshine and disappearing if there comes but a cloud. In one respect *punctulata* is an exception, for while it flies by day like the others, it is occasionally (if not habitually) a night-flier. Several times late in summer it has been taken on my table at night, attracted by the light, and last autumn in a house in

the outskirts of the city I took in this way a couple, and was told that what was considered the same insect was a frequent visitor. This habit I think is not unknown.

Anisodactylus (Xestonotus) lugubris Dej. is frequently confounded with *A. Harrisii*, both species being often found together, and their size and general appearance the same. *Harrisii*, however, has two setigerous punctures at each side of the epistoma, while *lugubris* has but one; so that if this is remembered, a glance will separate them. There is a short description of this species in the Trans. Am. Phil. Soc., N. S., Vol. x., p. 343; and recently the female has been well described by Lieut. T. L. Casey, Contributions, etc., part 1, p. 9. under the name of *Harpalus Manhattanis*.

Pinophilus. The described species of this genus are five in number. One of these (*densus*) is Californian; the others belong to the South Atlantic and Gulf, with extensions into the Middle States. *P. latipes* occurs here sparingly, but is not recorded further north; it is variable as to its habitats; I have taken it in damp alluvial places under drift, under stones on dry hills, and under the damp bark on fallen timber. Mr. A. C. Reisig, of New Orleans, La., who finds this species, as well as *picipes*, *parvus* and *opacus*, abundantly, states that they occur mostly in wet places around a small species of Palmetto, between the sheathing leaves of which they often crawl when the weather is cold, and are taken less often under the loose bark of trees, which he thinks is too dry for them. Mr. T. L. Casey took two of the species "in damp earth under decomposing vegetable matter, and in a few instances under stones;" two other of the species were "attracted at night to electric lights at El Paso, Texas." (Cal. Acad. Sci., Bul. 6, p. 262.) From the above it will be seen its habitats are various and are probably all used merely for shelter; and this does not materially conflict with the statement in the Classification, p. 99, that the species are "found under bark of trees." That, and similar statements elsewhere, are to be taken only in the widest sense and are correct enough for all practical purposes. It does not live in the ejectamenta of animals, nor in putrid animal matter. The specimens of *P. latipes* found by me under bark seemingly fed on an abundant liquid of decomposition found there, and such substances, with small larvæ, crustaceans, etc., probably constitute their food.

Amphicrossus ciliatus Oliv., *Europs pallipennis* Lec., *Bactridium cavicolle* Horn. The first of these was taken plentifully and the others

sparingly in April and May at sap on the stumps of black walnut, under chips. Black walnut cut from January to April produces on northern exposures a flow of sap until June, and by the judicious placing of chips, all the insects that delight in putridity may be taken, and their number is great. If the surface of the stump be hacked unevenly, the minute species will be found in the cracks of the undetached chips. Birch cut in the same way might do as well, as it flows sap abundantly and for a long time.

Pallodes (silaceus) pallidus Beauv., so abundant in many species of mushrooms, is here entirely pallid, some specimens having the elytra a little infuscate at the sides. As it occurs in Florida it appears so different as not to be readily recognizable by those acquainted only with the pale form. The head is pale; the thorax has the disk dark piceous, becoming paler to the margin; the elytra vary from dark piceous to castaneous, the whole upper side being highly polished and iridescent. From Dr. Horn's description of this species in his monograph of the family, one is scarcely prepared for such extremes in colour variation, as this is not greatly emphasized.

Betarmon bigeminatus Rand. Collectors desiring this pretty little species can beat it sparingly from spruce growing in open places, from June till August.

Cleotus aphodioides Ill., is found in early spring (till May) under the bark of dead standing trees not yet separated from the wood—notably oak; last April (25th) I took more than one hundred individuals from one small tree, from two to eight being packed in one cavity and many of them in copula, as the day was warm; these beetles were not bred in the place where found, but came there to hibernate. They enter the tree through a hole in the bark that has served the previous summer for the exit of some wood-bred beetle—in the present instance *Urographis fasciatus*; they scoop out when necessary some of the borings of the original inhabitant between the wood and the bark, and in this excavation pack themselves closely, leaving the hole by which they entered open. Where their larval life is spent is unknown, but it would appear to be under ground, as many—nearly all—of the beetles had the deep submarginal groove of the elytra filled with white dried mud, giving them the appearance of being surrounded by a pale cincture. Of the other species (*C. globosus*) I have found but a single individual; the principal differences between the two seem to be that in the latter the punctures of the striae are not so close and the margin of the elytra serrate. Should it be found in numbers these

differences might be overcome, as some of the individuals of *aphodioides* have the margin semi-serrate, and the punctures of the striae nearly as far apart, and a corresponding approximation of the other species in the other line would about cause them to meet.

Nicagus obscurus Lec. The position of the genus of which this species is the only known representative has been a matter of no little discussion by systematists; to some it is a Lucanide, while others—among them the authors of the Classification, find the Scarabæidan characters to preponderate. See Jour. Acad. Nat. Sci. Phil., 2 s., v. 1, p. 86; and Classification, p. 245.

April 23rd of last year, I took 63 specimens, five only of which were females; these with one exception differed greatly from the other sex in size and appearance, being much larger, more convex, less hairy and with the elytra evidently striate, resembling some *Sericea*. The exception, however, differed chiefly from the males by its shorter tarsi and stouter tibiae. In death the joints of the antennal club are mostly open, but in life they seemed capable of being closed contiguously, though the want of a lens prevented me from verifying this absolutely.

They were all taken on the margin of a creek on a deep deposit of loose, white sand, left on the recedence of the spring flood. The day was very warm, and they were first noticed about 3 p.m. coming seemingly from an adjoining pasture ground, and disappearing suddenly in about an hour on the sun clouding over. They flew very slowly, circling around close to the sand as if in search of something, and alighting in tracks and indentations, they were easily picked up. Just why they resort to sand deposits is not understood; it may be for sexual purposes, but if so they cannot live there in the larval state, because these sand beds are swept away by every overflow; it may be for warmth (as in the case of *Cotalpa lanigera*, several specimens of which I took there that evidently came for the heat), but others have observed them doing the same thing in the heat of midsummer; or it may be in search of decomposing shell fish, but there were none there, and in fact it is not proven that the larvæ live on decaying animal substances, though once found near dead *Unios*, and in the light of other facts I would say such is improbable, were it not that long ago I adopted the motto "*Festina lente*," in deciding adversely to the opinions of accurate and distinguished observers. The species seems widely distributed in the Atlantic States, from Michigan southward,

though few collectors have been fortunate enough to find it more than once. He who shall make known the manner of its life will have done something for science.

Mantura floridana, Cr. The difference in colour between the specimens found here and in Florida is very noticeable; here it is a rufous brown colour above, with the apical third of the elytra paler, the colour insensibly fading into that of the disk without much contrast. There it is larger, piceous black, apical third pale whitish, with the separation of the colours sharply defined, very much as in *Cercyon praeextatum*. The characters are the same, though they look enough unlike to be different species.

Mesites subcylindricus Horn. I took here a pair of this and would have had difficulty in recognizing with certainty the female had the male not been present. The male described by Dr. Horn was probably above the average size, .26 inch. I have two, measuring .18 and .23 inch.; and a female .22 inch. The male and female differ greatly in the appearance of the beak; in the female it is longer, strictly cylindrical, highly polished, a little dilated at apex, impunctate except a few coarse punctures at base, where there is also an elongate impression and a puncture between the eyes, which are small; the antennæ are inserted so close to the eyes as to be sub-contiguous, and the scrobes are obsolete. In the male it is as described by Dr. Horn, in substance, round, flattened above and below, dilated over the insertion of the antennæ, a short canalication near base, a puncture between the eyes, and surface apparently longitudinally strigose, with fine shallow punctures; antennæ slightly post-median. It seems rare.

Cnesinus strigicollis Lec. Occurs here occasionally on Osage Orange, which it probably followed from the south.

A GORDIIDIDE FOUND IN BRASSICA OLERACEA.

Whether the individual alluded to is a *Gordius*, or of some allied genus, my limited knowledge of the *Annelida* does not permit me to determine. In September a German gardener brought to me what he called a "cabbage snake, a dangerous thing full of poison," the bite of which he veraciously assured me he had known in Germany to produce a "felon." He had taken it from the middle of a head of cabbage which he had split open. It was entirely white (the color of the cabbage), as

thick as a common knitting needle, and twenty-three inches long, as nearly as it could be measured. I kept it in a 4-ounce bottle in hydrant water, which was changed occasionally. It amused itself by looping into all sorts of complex knots, and again straightening out, but so slowly that its movements were tedious to observe. With age the colour faded to pale yellow. It lived till March, when unfortunately I supplied it with boiled water (cold, however,) from the hot water spigot, and when I observed it again it was lifeless, and had turned brown. It is now in alcohol. This occurred three years ago, and I was promised more specimens, but till date none have come to hand. My acquaintance with *Gordius* is limited to the statements found in works of entomology, where it is alluded to as parasitic only on insects and spiders. Though not strictly entomological, a paper from some one acquainted with this family would prove very instructive.

TEXAN FORFICULIDÆ.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Only seven species of this family of Orthoptera are as yet known from Texas. More species must occur along the southern border, but so little attention has been paid to this family that it may be long before the fauna is fairly well known. Perhaps the publication of this list may help to swell the number. One species is described more fully than ever before for readier identification. All the species mentioned are briefly characterized in a synopsis of the N. American species in the Bulletin of the U. S. Geol. Surv. Terr., vol. ii., p. 249.

Labidura riparia (Pall.) A single specimen, from the collection of Mr. Uhler, was collected in (western?) Texas by Capt. (now Gen.) Pope, March 10.

Spongophora brunneipennis Serv. A common species, apparently, in all parts of the State. Mr. Belfrage has taken it at Clifton, and also in other parts of the State. Mr. Boll found it not uncommon at Dallas. Immature specimens were taken by him Feb. 17, and mature in bottoms on Feb. 23 and Aug. 19. This species is the *Forf. flavipes* of Schaum MSS., under which name I formerly distributed some specimens. I append a description drawn up from more than twenty specimens, mainly from Texas and Florida.

Head depressed next the hind border, elsewhere tumid, smooth, shining, blackish castaneous; the labrum, neighboring parts and palpi luteous, the basal joints of the outer maxillary pair obscured a little with fuscous; antennæ 14-15 jointed, luteous, a little tinged with brown beyond the base.

Pronotum as broad as the head, scarcely longer than broad, the sides and posterior border scarcely convex, posterior angles rounded, lateral edges a little marginate; surface of the color of the head, scarcely paler at the sides, slightly wrinkled, but otherwise smooth, flat on posterior half and sides, the rest a little tumid; a sharp median impressed line. Tegmina of the same color, nearly twice as long as the pronotum, slightly and broadly emarginate at the tip, slightly produced next the inner edge. Exposed part of wings nearly half as long as tegmina, honey yellow, with a broad inner and apical belt of dark castaneous, almost or quite as black as the tegmina; the extreme edge dull luteous. Legs uniform honey yellow.

Abdomen with nearly parallel sides in the male, a little convex in the female; dark, rich castaneous or mahogany brown, much obscured with black, especially on the sides, at the incisures and down the middle, and excepting the clearly colored terminal segment, distinctly punctate, less deeply on the terminal segment; lateral plications of second and third segments rather slight; last segment quadrate, twice as broad as long, with parallel sides, depressed in a triangular space next the posterior border (♂), or tapering a little, with a median longitudinal depression (♀), at the bottom of which is a slight longitudinal depressed line. Pygidium of female hardly extended, moderate in size, quadrate; of male large, triangular, with laterally produced angles, and a more or less broadly truncate apex, often laterally and concavely excised, the whole broader than long.

Forceps of female about half as long as the abdomen, simple, straight, horizontal, incurved at tip, pretty strongly depressed, bluntly pointed, the superior inner edge with a quadrate, laminate, depressed, blackened basal tooth, much broader than long, and followed, after a brief space, by a series of minute tubercles nearly to the tip; inferior edge blackened, minutely tuberculato-denticulate, the base largely and obliquely excised. Forceps of male slender, nearly two-thirds as long as the abdomen, horizontal, scarcely incurved, excepting at the rather bluntly pointed

apex, depressed, especially on the apical half, bluntly carinate on outer edge, inner edge arcuate, excised as far as the triangular, sharp, rather prominent tooth on the middle of the basal half; beyond, and sometimes previously, minutely tuberculate in a double series nearly to the tip.

Length of body, male, 8.5-11.25 m.m., female, 8-11 m.m.; of antennæ, 5-6 m.m.; of tegmina and wings, 4-4.25 m.m.; of hind femora, 2.1-2.4 m.m.; of forceps, male, 3.5-4.75 m.m., female, 2.5-3.5 m.m.

Forficula tæniata Dohrn. I have seen a pair of specimens from Mr. Uhler's collection, coming from Texas.

Forficula exilis Scudd. The only specimen known comes from Texas (P. R. Uhler).

I have also another Texan species of *Forficula* from Mr. Uhler's collection, but it is immature.

Labia guttata Scudd. Three specimens were taken by Mr. Belfrage in Bosque county.

Labia minor (Linn.) This widespread species has reached Texas, and is abundant there. Mr. Belfrage has taken many mature specimens in June and September at Clifton.

Labia melancholica Scudd. The single specimen known was taken by Mr. Belfrage (at Waco, or near Austin) on Feb. 24th.

PARTIAL LIST OF CAPSIDÆ TAKEN AT BUFFALO, N. Y.

BY E. P. VAN DUZEE.

For the last two seasons I have turned my attention more particularly to collecting the Hemiptera; and very naturally became deeply interested in the family of the Phytocoridae, or Capsidæ, as they are generally called. They are the most distinctively northern family of the Heteroptera, as the Jassidæ are of the Homoptera; but they seem to have been neglected by European as well as American Entomologists, probably because of the variability of the species, and their frail structure which makes them difficult of preservation. The literature of the Capsidæ, though perhaps not as meagre as of the Jassidæ, is widely scattered and fragmentary as regards American species, and makes this a difficult family to study.

The species mentioned below have, with few exceptions, been taken with the sweep-net from grass, weeds, or low bushes, in open fields and

borders of woods and streams, within a radius of twenty miles from this city. I have marked with an asterisk such species as I have taken in Ontario, mostly at Ridgeway; but without doubt most of the species found here could be found on the Canadian side of the river.

* *Brachytropis calcarata* Fall., May to Aug. In damp situations.

* *Trigonotylus ruficornis* Fall., June and July. Not common.

* *Miris instabilis* Uhl., *M. affinis* Reut., May to Aug. Common in dry fields. The dark fuscous form is rare here. Some beautiful green examples taken at Ridgeway, Ont., May, 1886.

* *Leptopterna dolobrata* Linn., May to Aug. In dry fields. Probably our most abundant Hemipter. It attains full development about June 1st, and frequently appears in immense swarms in favorable localities.

* *Trachelomiris oculatus* Reut., June to Aug. Rare.

* *Trachelomiris Meilleurii* Prov., *Nabidea coracina* Uhl., June to Aug. Common in open rich fields.

Resthenia insitiva Say. One example of the form with black scutellum, taken July 4th, 1879.

Lopidea media Say, July, common. A few examples of the yellow variety, named *C. robinia* by Mr. Uhler, taken in July, 1885.

Phytocoris eximus Reut., July and Aug.

Phytocoris tibialis Reut., July and Aug. A handsome species, occurring in considerable numbers among rank weeds, near water.

Phytocoris pallidicornis Reut. One example taken at Colden, N. Y., July, 1885.

Phytocoris scrupens Say, June and July. Very variable. The most abundant form here is the pale or ochreous variety, generally taken on the Staphylea. One example of the typical form described by Say was presented to me by Mr. Ph. Fischer, who took it near this city, and with it another variety which may prove to be a distinct species; it has the pronotum black, with the narrow edge, and three longitudinal vittæ ochreous, and differs slightly in other respects from the ordinary forms of *scrupens*.

Phytocoris colon Say. Three examples taken in Aug., 1886. This species was described by Mr. Say in 1831, but seems to have been overlooked by later Entomologists until 1884, when M.

Provancher took it near Quebec. The present examples add a third locality where this interesting insect has been captured. As collectors turn their attention more to the Hemiptera, it will doubtless be taken in most of the Northern and Middle States.

Neurocolpis nubilus Say, July and Aug. Most abundant on sumach.

Dichroscytus rufipennis Fall., July. Rare.

* *Calocaris rapidus* Say, June and July. Very common on flowers of the Compositæ.

Megacelum fasciatum Uhl., July. Rare.

Lygus pabulinus Linn., July and Aug. Variable in size.

* *Lygus pratensis* Linn., June to Oct. Abundant.

* *Lygus flavomaculatus* Prov., *L. strigulatus* Walk., May to Oct. Very common.

* *Lygus invitæ* Say, June to Aug. Another common species.

Lygus monachus Uhl. Rare. Kindly determined for me by Mr. Uhler.

* *Coccobaphes sanguinarius* Uhl., July and Aug.

Pæciloscytus basalis Reut., June to Sept. A very common and variable species on *Ambrosia*, thistles, and other weeds, particularly in dry fields.

* *Pæcilocapsus lineatus* Fab. June to August. Common.

* *Pæcilocapsus goniphorus* Say. May to Sept. Very abundant and variable. *Var. C.* Say and *Var. F.* Reut., seem to represent the two extremes as found here.

* *Pæcilocapsus dislocatus* Say. June. Not uncommon, and by Mr. Uhler considered as a variety of the preceding.

Pæcilocapsus affinis Reut. June. Rare.

* *Pæcilocapsus marginalis* Reut. June and July. This might easily be confounded with *var F.* of *goniphorus*, but on close comparison is readily distinguished by the several characters given by M. Reuter (*Capsinæ*, *Bor. Am.*, p. 75.)

Systratiotus venaticus Uhl. July.

Systratiotus americanus Reut. July and Aug. Swept from rank weeds in damp situations. Determined by Mr. Uhler.

Camptobrochis nebulosus Uhl. Rare.

Orthops scutellatus Uhl. Not common. Colden, N. Y., July, 1886.

Orthops pastinacæ Fall. The present examples seem to agree in every respect with Douglass and Scott's description of this species

in their "British Hemiptera," and I feel but little doubt about the determination, although I possess no European specimens for direct comparison. I think this is its first reported occurrence in this country. It is not uncommon here on Umbelliferæ, especially *Conium maculatum* and *Hieracleum sativum*, from May to July; and like the preceding species, is variable in color and marking.

- * *Capsus ater* Linn. May to Aug. Abundant everywhere.
- Monalocoris filicis* Linn. July and Aug. Common on various ferns in deep woods. I have rarely taken it in open sunny places.
- Sericophanes ocellatus* Reut. Rare. Swept from grass in a dry meadow in June.
- * *Ilnacora Stalii* Reut. July and Aug. Swept from coarse weeds in damp places.
- Pilophorus bifasciatus* Fab. July and Aug.
- * *Pilophorus confusus* Kirsch. June to Aug. Not uncommon on pines and other trees.
- * *Globiceps flavomaculatus* Fab. June and Aug. The macropterus form rare.
- Garganus fusiformis* Say. July and Aug. Generally taken in company with *Lopidea media* Say.
- * *Stiphrosoma stygica* Say. June and July. Very common, especially on wild sunflowers.
- Halticus bractatus* Say. July. But one fully developed specimen taken. The undeveloped form common.
- Halticus apterus* Linn. July. Common.
- * *Idolocoris famelicus* Uhl. May to Aug. Not uncommon.
- Idolocoris agilis* Uhl. July and Aug. Not uncommon. Most of the specimens which I have examined have the pronotum and scutellum entirely black. Occasionally an example occurs with the yellow markings as described by Mr. Uhler.
- Macrocoleus coagulatus* Uhl. June to Aug. Dry dusty roadsides; swept from grass and low weeds.
- Episcopus ornatus* Reut. Two examples of this pretty little Capsid occurred to me while sweeping weeds near this city, July, 1885.
- Plagiognathus obscurus* Uhl. July. Abundant on various Composite flowers.

Agalliaestes associatus Uhl. June to Sept. All the examples I have taken differ from Mr. Uhler's description in having the posterior femora mostly black. This, with many other species of Hemiptera, were kindly determined for me by Mr. W. H. Ashmead.

Agalliaestes pulicarius Fall. Not uncommon at Colden, N. Y., in July. No other localities are known to me. It is a common European species; but seems not to have been heretofore reported from this country.

Agalliaestes verbasci H. Schaf. June and July. Common on mullen.

Besides the 53 species enumerated above, I have taken 25 species in this vicinity which, through the want of the proper material, etc., I have as yet been unable to satisfactorily determine. The present list, although fragmentary, indicates an interesting field open to northern collectors; and we notice with pleasure an increasing interest in the Hemiptera, which have been for so long neglected.

SOME FURTHER NOTES ON PHYSONOTA.

BY F. B. CAULFIELD, MONTREAL.

On May 23rd of the past year (1886) I again found *Physonota helianthi*, Rand., on its food plant (*Helianthus decapetalus*) in the same locality as in the previous year. The insects were now in the spring, or what I would call their nuptial dress, and were entirely of a bright golden green, with the exception of the margin, which is transparent with pearly reflections. In the fall dress the elytra are black, irregularly spotted with white, the thorax white with five black spots. In the spring dress the thorax is concolorous with the elytra, and bears *only three black spots, the anterior double spot being entirely absent.*

During the past summer I examined many specimens belonging to different colonies, and all were alike in this respect. They appeared to be much more lively than in the fall, creeping about the plants and pairing. A specimen taken in the hand, after a few feints, spread its wings and flew quickly to some shrubs a few yards distant. I brought home a pair taken *in coitu*, in the hope of obtaining eggs, but did not succeed, although they fed and paired freely in captivity.

On the 25th, they began to lose the bright golden green, changing to a dull yellowish green. As the bright green disappeared, the black top of the head became visible through the thorax, showing the double anterior spot of the form *5-punctata*. On dissecting specimens and removing the head, I found that the anterior spots are transparent, while the posterior spots being opaque, are not affected by seasonal changes of colour. In the nuptial dress the anterior spots are concealed by the bright green, giving a three-spotted form (*helianthi*), but in the fall dress the black top of the head is seen through the transparent spots, producing the form *5-punctata*. On June 12th, I again visited the colony, and found several couples paired. Many of the females were gravid, but no eggs were found. All the beetles were in the nuptial dress. Visited it again on June 19th, with the same result. On June 26th, I tried again and found several groups of young larvæ, showing that I must have overlooked the eggs, although I had searched carefully for them. Some of the larvæ had moulted and the cast skins were on the leaves. As the larvæ were of two sizes, eggs had probably been deposited a week or two previous. All the larvæ were on the under surface, but had eaten holes through the leaf by which their presence could be easily detected. These young larvæ are of a paler green than when full grown, and the yellow stripes are not so bright and are broken up into spots, giving them a grayish appearance. Their presence on the under surface of the leaf, near its extremity, gave me a clue to the whereabouts of the eggs, and after a little further search I succeeded in finding them. They are deposited in an irregular cluster attached to the under surface of the leaf, about half an inch from the tip, just where it tapers off. The egg cluster is just the width of the narrow portion of the leaf, and is about the size of a pea. In general appearance it closely resembles a gall. In shape it is roughly pyramidal, the base being attached to the leaf. Its colour varies from green to pinkish brown, the colours generally appearing in blotches. The eggs are arranged in horizontal layers lengthwise with the leaf, the number decreasing to the apex. They are of a greenish white colour, elongate oval, smooth. They adhere strongly to each other and are surrounded by a tough covering or envelope, no doubt exuded by the female. The eggs are not so firmly attached to the enveloping substance as to each other, and can be detached with a little care. One cluster that I counted contained twenty-three eggs, and this, I think, judging from the groups of young larvæ, would be about the general number. . When emerging, the larvæ either work their way out

between the covering and the leaf, or cut a hole through the side; the former is, I think, the plan generally adopted, as I found many clusters partly separated from the leaf and slightly raised, but only a few with a hole cut in the side. The latter may perhaps be the work of a parasite.

July 10th.—Only a few beetles seen, but all were in the nuptial dress. Larvæ abundant.

July 24th.—Only one beetle seen, still in the nuptial dress. Larvæ of different sizes plentiful. Some full grown larvæ brought home at this date produced the beetle the first week in August, all in fall dress, black and white; five black spots on thorax.

August 7th.—Nearly all the larvæ being about full grown, have scattered over the leaves. Found one group lately emerged and one egg cluster not yet hatched. Found three pupæ, one on under surface of leaf, two on upper, and one larva about to pupate on upper surface of leaf. Found one beetle in nuptial dress and one in fall dress. The former with three spots on thorax, the latter with five.

August 14th.—Found one beetle in nuptial dress; those in fall dress becoming plentiful. Could find no fresh egg clusters. Larvæ of different sizes still on the plants.

August 21st.—Beetles in fall dress abundant, none seen in nuptial dress; none seen pairing or moving about. A few larvæ still on the plants. Boxed five beetles for home observation.

August 26th.—Three of the beetles, 2 ♂, 1 ♀, taken in black and white dress on August 21st, have changed colour to dull green, with a slight showing of the bright, golden green of the nuptial dress. A larva taken on same date has given a dipterous parasite now in cocoon. This parasite emerged August 30th, but the wings did not fully expand. It belongs to the Tachinidæ, but I have no means of identifying it. It is rather smaller than a common house fly, and darker in colour.

August 27th.—The bright golden green showing more plainly on the three beetles; the anterior spot on thorax being now a patch of bright green, and the white spots of elytra have almost entirely disappeared.

September 1st.—The three beetles entirely bright golden green; three spots on thorax. The other pair retained the black and white dress unchanged, all being kept under the same conditions. None paired or ate anything, generally resting quietly on the sides of the box. All died before the end of the month.

September 18th.—A few beetles seen, all in fall dress. One larva found. This larva was brought home, but died before pupating.

October 9th.—Searched again for *Physonota*, but could find none. Food plant almost entirely dried up and withered, so that the beetles had probably gone into winter quarters.

From these observations we may sum up the history of *Physonota* as it occurs in this locality somewhat as follows :—With the return of summer the beetles leave their winter quarters, in which dress I have not yet been able to ascertain, but by the latter end of May all are in the nuptial dress. They then pair, and through June and July deposit eggs, the bulk of these being laid during the former month. The larvæ when young are social, but when nearly full grown separate, pupating on the leaves. The beetles from these issue from the beginning of August to near the end of September; the larger number appearing in August. These are all in the fall dress of black and white, and hibernate before pairing.

The places in which I find the species being rough ground overgrown with plants and shrubs, I have, so far, failed to find them in their winter quarters.

As three of the beetles changed from the black and white of fall to the nuptial dress while in confinement, we might expect to find them do so under natural conditions, but two seasons' observations seem to prove the contrary. Possibly in a more southern locality the species may be double-brooded.

BOOK NOTICE.

THE BUTTERFLIES OF NORTH AMERICA. By W. H. Edwards. Third Series, Part I. Houghton, Mifflin & Co., 4to., Boston. Price, \$2.25.

It is with very great pleasure that we receive from our esteemed contributor, Mr. W. H. Edwards, the First Part of the Third Series of his magnificent work, "The Butterflies of North America."

The last part of Volume II. was issued in November, 1884. It is a matter of deep congratulation to all Lepidopterists that the talented author now sees his way to resume publication; but we regret exceedingly to learn from a notice in Science, of 4th February, that to enable

him to continue his unselfish labours he had to sacrifice many of the valuable type specimens in his collection.

The Part which has just come to hand contains three plates and nine pages of descriptive letter-press. Of the former, which have been executed under the supervision of Mrs. Mary Peart, it is not too much to say that they are exquisite, and are all equal to the very best in Vols. I. and II.

Plate I., which is accompanied by a complete life history, illustrates *Colias Eurydice* Bd., var. *Bernardino* Edw., in all its stages, from egg to maturity, and also a female of var. *Amorphæ* Hy. Edw.

On Plate II. we have a life-like representation of *Argynnis Nitocris* Edw., male and female.

On Plate III. we find figures of *Argynnis Lais* Edw., a pretty little species (but belonging to the same group as *Cybele*, *Atlantis* and *Electa*), discovered in the Northwest Territories by Capt. Gamble Geddes, in July, 1883. The artist has been particularly happy in the coloration of this plate, especially so in catching the peculiar dull ochrey-brown tint which is characteristic of the female. Of most interest to Canadians, however, is the fact that although this species is abundant in certain parts of the Northwest Territories, easily accessible, and comparatively well settled, nothing is known of its preparatory stages. The eggs of the species belonging to the same group are easily obtainable by tying females over growing plants of violets. Surely some of the readers of the CANADIAN ENTOMOLOGIST have friends living in the Calgary District, or at McLean, where it is very abundant, who, even if not entomologists, would, were the scientific importance of the results placed before them, at any rate take the trouble to confine a few females in gauze bags over living plants, and send Mr. Edwards the eggs. There is very little trouble about this matter; living roots of violets can be sent by mail in a piece of oiled-paper, and will grow easily, if kept watered, in any of the tins used for canned vegetables (flower-pots are rare commodities in the N. W. T.) All that is necessary is to bend two pieces of wire so as to make a pent-house over the plant, and then placing a bag of muslin over the whole, secure it by means of an elastic band round the top of the can. This should be kept out of doors in a shady spot.

The importance of Mr. Edwards's studies on the Diurnal Lepidoptera of North America is perhaps hardly appreciated, until we remember that, with the exception of a few of our commonest butterflies, almost nothing

was known of their life-histories until he turned his attention to them in 1868. At the present time, however, it is far otherwise; for by close study, diligent care, and accurate observation, he has himself worked out the complete life-histories of a large proportion of the recorded North American species. Moreover, many discoveries of great interest have rewarded his constant efforts: The tri-morphism of *Papilio Ajax* and *Colias Eurytheme*, the seasonal dimorphism first of *Grapta Interrogationis*, then of others in the same genus, as well as the effects of cold upon larvæ and the perfect insects, may especially be referred to.

There was a marked advance in Vol. II. over Vol. I. in the amount of information given concerning the life-histories of the species described. This is accounted for in the prefatory notice of the present part as follows:

“When Vol. I. was undertaken, in 1868, nothing was known by myself or any one else, of eggs, larvæ, or chrysalids, except of the more common butterflies. As an egg or larva could but rarely be traced back to a particular female, it was impossible that much knowledge could be gained of the life-histories. Scarcely any advance in this respect had been made, in fact, since the time of Abbott, about 1800.” . . . But in 1870, I discovered an infallible way to obtain eggs from the female of any species of butterfly, namely, by confining her with the growing food-plant . . . and from that day to the present I have so obtained eggs at will . . . and have reared larvæ without end. In this way, many cases of polymorphism have been established, and the position of many doubtful forms settled. A light has also been thrown on the limits of variation in species. In every case I have preserved descriptions of the several stages . . . Of a large proportion, also, Mrs. Peart has executed colored drawings, magnified when necessary, and my albums contain nearly one thousand figures.”

Mr. Edwards concludes: “And so, in this Christmas time of 1886, I commend Vol. III. to the good will of the friends who have made my small audience for so many years.”

Surely we may go further—a long way further—than this, and commend it not only to the few friends who have had the good fortune to listen to Mr. Edwards's teaching in the past, and perhaps to catch some of his enthusiasm; but also to every Entomologist or possessor of a library, whether in America or any other part of the world, who wishes to

have the most complete, as far as it goes, accurate, and, for the style of the work, the cheapest—in short, *the best*—work yet published upon the Butterflies of North America.

J. FLETCHER.

ON HEMARIS DIFFINIS, BOISD.

BY A. R. GROTE, BREMEN, GERMANY.

In my own collection I labelled a form in which a slight dentation of the terminal band on primaries was perceptible (and which in this respect agreed with Boisduval's figure in the Species General, and with Abbot's of *fuciformis*) as *H. diffinis*. It differed from *tenuis* by a greater breadth of band, a perceptible apical stain, a somewhat brighter or more yellow-haired body. Whether this was Mr. Strecker's *Aettira*, I knew not, since I was unacquainted with this author's work, having seen only his numbers on occasion. *H. tenuis* is more purely a black and yellow species, with no red; it is the smallest and commonest of our Northern forms; the bands narrow, quite even, black; the vitreous spaces seeming larger. Undoubtedly it will be labelled *diffinis*, as, before we wrote, everything was labelled *diffinis* or *thysbe* belonging to this genus. This genus is of the class I have called *progenera*, the species being near allied in all stages. Our forms (although *axillaris* strikingly contrasts with *tenuis*) are near together structurally; they vary in one direction, viz., the gradual increase of the apical red stain, of the width and dentation of the band of primaries, of general bulk. But they are all outgrowths of *fuciformis*, so to speak. They are quite different from *gracilis*. This latter, though very distinct, appears to me to be strictly congeneric with the European *bombyliiformis*, rather than with *fuciformis*, to stand alone without near allies, hence I divided it sub-generically to draw attention to its value as compared with the *tenuis* series, among which the Californian forms which I know, *palpalis*, *thetis*, range themselves. Quite American, and therefore certainly to be considered by themselves, are the forms I separated under *Hæmorrhagia*. The mission of Entomologists is to discriminate, not to confound. If our categories are unstable, they may be corrected, but inevitably they must be erected with precision to avoid the popular error of confounding different looking insects under the same category and under the same name.

CORRESPONDENCE.

DANAIS ARCHIPPUS.

Dear Sir,—The butterfly *Danais archippus* is not only harmless, but beneficial. Its food plant (*Asclepias*) is very troublesome to farmers in this part. The butterfly almost always lays her eggs on the pedicel of the flower, so that when the larvae hatch, they attack the flowers and eat down into the ovaries. I have seen an umbel of flowers eaten almost entirely by two larvae. I think they are quite a check to this weed, hindering it from seeding. If they only fed on the leaves, they could not possibly hurt the plant. The mature larva does not feed on the flowers, probably because when it reaches maturity there are not many flowers left.

GEORGE HALEY, Brownfield, Maine.

OPHELETES GLAUOPTERUS PARASITIC UPON CIMBEX AMERICANA.

Dear Sir,—In the autumn of 1884, I picked up in my garden a larva of *Cimbex Americana*, Leach. This has always been one of my favourite insects, not only for the beauty of the pale yellow larva, with the stripe of deep black down the centre of its back, but also on account of the interest which centres around the emergence of the imago in spring, to see, should it chance to be a female, to which of the three "varieties" it might belong. As the larva in question was apparently full fed, I placed it in a box with some earth and a few of the leaves of its food-plant (*Ulmus Americana*, L.) and in a few days it spun its hard, brown cocoon. The following spring, on looking into the box, I was much pleased to find, instead of the well known, gaudy and clumsy *Cimbex*, a fine female of the handsome Ichneumon fly, *Opheletes glaucopterus*, Linn., a species not at all common at Ottawa.

J. F.