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The Canadian Entomologist.

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NOTES ON COLEOPTERA.—No. 8.

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

Panagæus crucigerus, Say.—The living beauty of this beetle is but feebly represented by the dull and faded examples usually seen in collections. Its bright sparkling colours lose their brilliancy onward after life ceases, for which no restorative has yet been discovered. It is not infrequent along the New Jersey coast, occurring sometimes in abundance. The mature insects may be found on Brigantine Beach from the middle of July onward. They are in their greatest abundance about the first of September, at which time they seem to be disclosed. The eggs of many *Carabidæ* are deposited in July and August, and from such, imagoes are produced during the same months of the succeeding year. Individuals of these same and other species hibernate and oviposit in the spring, but their offspring are usually not perfected till the next year. *Panagæus crucigerus*, however, at least on the coast, seems to oviposit in the spring, probably during April, and to disclose the same year about the time mentioned, as appears from observations repeatedly made, one of which is given. Sandy depressions are seen covered in summer two or three inches in thickness with sea trash, below which the ground is damp from capillary attraction, as they are only a few inches above the ordinary summer tides. These are the beds of tidal streams, which, during the winter and spring till near April, are constantly covered with salt water from ocean or bay, many of them being formed during that time, and previously existing ones filled up. On the first of September, on overturning some of the weeds deposited on one of such places, several examples of *P. crucigerus*, too immature for use, were taken, which evidently had been bred where they were found. As this bed had been formed during the winter, of course the eggs from which these insects were derived must have been deposited after March. It was physically impossible for the larvæ to have reached there from other places, because for a long distance around there was nothing but dry and burning sand.

To account for the rapid development it may be stated that these places are inhabited by multitudes of small crustacea and other minute forms of maritime life, so that the food supply of the larvæ is most ample, promoting quicker growth and earlier maturity than occurs in the case of species less bountifully supplied. A couple of weeks afterwards the rest of this place was fully investigated and over fifty well chitinized examples obtained, while many others were seen which were still immature.

This species was described by Mr. Say from a specimen cast alive by the waves on the sea beach of Senipuxten, Maryland, the last of September, and it is now recorded as occurring on the sea coast of New York, New Jersey and Florida; also Lake Pontchartrain, Louisiana.

Amara fulvipes, Putz.—This beetle was unknown here till recently, when Mr. Klages took a large number in a pasture field, where there were cattle, late in the year (October)—many of them paired. I took it in this city since at electric lights in June, and once in a field in a hilly place later. It probably inhabits the hilly districts along the foot of the Alleghanies. It is decidedly a fine species, belonging among the large elongate forms *(Lirus)*. It does not appear to be generally known, or at least is not plentiful enough to appear on an exchange list, while none have been received for identification. In the last two catalogues of European Coleoptera there is an *Amara (Tricena) fulvipes*, Serv., and if my investigations are correct Putzey's species must be renamed.

Bradycellus cognatus, Gyll.—*Tachycellus* appears for the first time in a general European catalogue, in edition IV., just published (May, 1891), and under it is this species. While the first three joints of the antennæ are not really pubescent like those which follow, yet they are armed so thickly with long thick hairs that its removal from *Bradycellus* seems doubtfully justifiable. This species is native in Europe and in Asia, as well as in North America.

Quedius fulgidus, Er.—This beetle has been taken in a more northern latitude than is recorded of any other species. It was found during the voyage of the Alert and Discovery towards the North Pole, 1875–76, at Discovery Bay, in Grant Land, North America, in about lat. 82°. (Linn., Jour. Zoology, XVI., 107.) This beetle is remarkable otherwise for the power it has of adapting itself to a variety of climates, being found likewise in very warm countries, as Asia Minor, Barbary, Java, Tasmania, Australia, etc., in all of which it seems to be native. This world-wide distribution has produced considerable variation, especially in its colora-

tion, and it is not well agreed among eminent coleopterists whether there should be one species or two. The form found in Grant Land is stated to have been the common black British form, *mesomelinus*, Marsh.

Tanarthrus salicola, Lec.—This interesting little Anthicide was described from the salt marshes of the Rio Colorado, where it is said to have the habits and activity of a Cicindelide. I saw an example taken by an amateur entomological friend on a salt marsh near Lincoln, Nebraska, which shows the species to be also an inhabitant of the alkaline salt marshes west of the Rocky Mountains.

Leptinus testaceus, Müll.; *Caucasicus*, Motsch.; *Americanus*, Lec.—This curious beetle, which is blind, is known to be native in Europe and Western Asia, as well as in North America. Its consideration here is chiefly intended to present at one view what is known of its habits and what has been written about it, with the view to ascertain more nearly its mode of life. The chief bibliographical references in American literature are :—

1. Proc. Acad. Nat. Sci., Phil., 1866, 367. Described by Dr. Leconte, under the name *Americanus*, from examples found by Dr. Brendel at Keokuk, Iowa, under a log, in a mouse nest.

2. Classification of the Coleopt. of N. A., 1883, 77. "Lives with various small rodents and insectivora, either on their bodies or in the material of their nests, but whether as true parasites or merely as guests has not been determined."

3. Proc. Ent. Soc., Washington, I., 16, 1884. "Known to be parasitic only in the imago state."—*Schwarz.*

4. Insect Life, I., 200. Prof. C. V. Riley states that the larvæ and imagoes had been found around Washington in the nests of *Graphops.*

5. Scientif. Amer. Suppl., XXV., 10356, June 1888, and re-printed in Insect Life, I., 306. "It is known to be parasitic on mice, as it has been found upon them in Philadelphia by Dr. John A. Ryder, and I have taken it in the nests of a common field mouse near Washington."—*Riley.*

6. Proc. Ent. Soc., Wash., II., 2. "Parasitic on wood mice and on other small rodents."—*Schwarz.* Mr. H. Ulke has also taken this species. Prof. Jerome Schmitt, of St. Vincent College, Westmoreland Co., takes it comparatively frequently, and kindly permits the use of his notes. Nov. 3rd, 1890, one example was taken in a mouse nest under a log, the mouse having just fled; cold and snowing. Many nests of mice were examined by sifting during the winter, but no *Leptinus* were obtained

from them. Feb. 18, 1891, three examples were sifted from leaves drifted against a fence, but not in company with mice. June, 27, under a decaying log in a lot of dry vegetable matter, possibly an abandoned mouse or bumble bees' nest, some 50 or 60 specimens were obtained. July 3rd, under circumstances similar to the last, about a dozen examples were found. August 10th, a single example was found on Chestnut Ridge (one of the Alleghanies) under a stone where no nest nor mouse far nor near could be found. The result of Mr. Schmitt's collecting shows that *Leptinus* may be taken at any season of the year. It also shows that it is not wholly dependent on mice or mice nests for its food, as of the five captures it only occurred once with a mouse. All previously recorded captures were made in the nests of this rodent, which has given rise to the expression : "*Parasitic in the nests of mice*," etc. The statement that *Leptinus* is parasitic on the bodies of mice is unsupported, except in one erroneous instance, from which all assertions of this kind have probably arisen. The statement in Insect Life cited, that it has been found on mice by Dr. John A. Ryder, proves, on being traced up, to be somewhat erroneous, and it is found, curiously enough, to have been a mole—and dead—on which it occurred, perhaps much in the way a *Cercyon unipunctatum*, a *Silpha*, *Choleva*, etc., might have been there.

That *Leptinus* is not a parasite seems to have been the opinion of some distinguished European authors, among them, Mr. A. Fauvel, who published a paper on the subject in 1863, in Annales. Ent. Soc., France, of that year, in which he states that this insect is found under dead leaves, in leaves in hollow logs, under logs, stones and roots, and thinks, with Fairmaire (cited), that the opinion that they are parasitic on or with rodents is erroneous ; advancing the conjecture that they feed on small fungi, like most *Choleva*, *Agathidium*, *Oxypoda*, *Tachyporus*, etc., the decaying leaves and mosses of the nests of rodents often furnishing supplies of this small vegetation accounting for their presence there. If Mr. Fauvel is correct in this surmise, it would be only in line for them to resort occasionally to a carcass for food, if in its vicinity, as is the well-known habit of many insects which live on decaying matter and low forms of life, thus accounting for their presence on a dead mole, as found by Dr. Ryder. Whatever may be the nature of its food, from the foregoing it is evident it can and does live independent of animals, and that the proper term to apply to it in its relation to rodents would, perhaps, be frequently inquilinous. In Europe the distribution of *Leptinus* is, Germany, France, Sweden, Caucasus ; in America, that mentioned above.

But, were the country collected over by the mode employed by Professor Schmitt, without doubt it would be found to be a common and widely distributed species.

Agabus (Colymbetes) discolor, Harris, New England Farmer, 1828, 164.
A. (C.) phœopterus, Kirby, Faun. Bor. Am., 1837, p. 70, No. 102.
A. (C.) phœopterus, Kirby (Mann.), Bul. Nat., Ges. Mosc., 1853, 159.
A. discolor, || Lec., An. Lyc. Nat. Hist., New York, V., 204, 1852.
A. obliteratus, Lec., Smith, Cont. XI., 5, 1860.
A. (Gaurodytes) Lecontei, Horn, pro. *A. discolor*, || Lec., Tr. Am. Ent. Soc., IV., 417.

These forms have been heretofore united and disunited in a variety of ways, and what appears to be the true synonymy seems at present a little clouded.

Discolor, Harris, has in the Munich catalogue for a synonym *phœopterus*, Kirby, but the reading of the descriptions shows this to be an error.

A. phœopterus, Kirby, was described from examples taken in lat. 54°. A form determined by Mannerheim to be this species was taken in Alaska. *A. discolor*, || Lec., was described from California, and *obliteratus*, Lec., from Kansas.

In Dr. Leconte's List of North American Coleoptera, 1863, p. 17, these forms are tabulated thus:—*A obliteratus*, Lec. (? *phœopterus*, Kirby, *discolor*, || Lec.), which means that the last two are considered identical, and in case of the identity of *obliteratus* and *phœopterus* the latter would have the precedence.

That *discolor*, || Lec., and *obliteratus* are quite distinct has been satisfactorily shown by Mr. Crotch, l. c.; and it now remains to show the identity of *phœopterus*, Mann., and *discolor*, || Lec. In 1854, Dr. Leconte sent a large number of Pacific Coast species to Motschulsky for comparison with the types of the Russian authors, and in the autographic letter of Motschulsky, now in my possession, containing the results of his comparisons, dated Jan. 26th, 1855, is written of this species: "*Agabus discolor est d'apres*, Mannerheim, *Ag. phœopterus*, Kirby." This, therefore, would seem to settle the identity of *discolor* and *phœopterus*, Mann., which Mannerheim in some way came to regard as Kirby's species. Dr. Leconte, in his List, l. c., appears to have acceded to this. But when in Europe, in 1870, after an examination of Kirby's types, and giving a short description of the male and female, merely says of this and *A. bicolor*,

Kirby: Both species are allied to *A. discolor*, Proc. Acad. Nat. Sci., Phil., 1873, 326. The foregoing discussion seems to warrant the following synonymy:—

Agabus discolor, Harris, Massachusetts, (seemingly unknown).

A. phœopterus, Kirby, British America; lat., 54°.

A. Lecontei, Crotch; *discolor*, ||Lec.; *phœopterus*, || Mann. California, San Francisco, Vallecitas; ? Alamosa, on the Rio Grande, at 7,600 feet, (differs in being less oval and more parallel, *Leconte);* Alaska, Peninsula of Kenai, Island of Afnognak.

A. obliteratus, Lec.; Kansas, Ft. Laramie, Lawrence; Colorado, Leavenworth Valley at 10–1,1000 feet; Southern Colorado; Northern New Mexico; Wyoming, Lake Como.

A. bicolor, Kirby.—A single specimen was taken by the Richardson expedition at lat. 54°. It likewise occurred in Alaska on the peninsula of Kenai.—*Mannerheim.* While in Europe Dr. Leconte examined ♂ and ♀ types, giving brief descriptions of each (Proc. Acad, l. c.). This appears to be a good species and, with *phœopterus*, should have a place in our catalogues.

Phœopterus, *Lecontei*, and *bicolor* seem very close, and their separation by the various descriptions without the presence of examples could not prove very satisfactory.

CERURA SCOLOPENDRINA, Boisd.

I think I have satisfactorily identified this species. I captured a specimen at Yosemite, California, on June 5th, 1891, that bears out Boisduval's description. The specimen, however, is *Cerura aquilonaris*, Lintn., and these names will have to be considered as referring to the same species. I have also received a specimen from Mr. C. A. Wiley, of Miles City, Montana, so the species probably occurs from the Atlantic to the Pacific. The synonymy will stand as follows:—

Cerura scolopendrina, Boisd.

1869—Boisduval, Lep. de la Cal., p. 86.

Aquilonaris, Lintn.

1877—Lintner, 30th Rept. N. Y. State Mus., p. 197.

1891—Thaxter, Can. Ent., Vol. XXIII., p. 34.

It is unfortunate that the rule of priority will not allow us to retain Prof. Lintner's name for this species, since his characterization of it is so careful and exact as to render its recognition easy, which is not the case with Boisduval's description.

Harrison G. Dyar.

DESCRIPTIONS OF SOME BUTTERFLY LARVÆ FROM YOSEMITE.—II.

BY HARRISON G. DYAR, YOSEMITE, CAL.

Junonia cœnia, Hubn.

Egg.—Spherical,a little flattened at the base, with about twelve vertical ribs running to the micropyle; colour,shining pale green; diameter, .5 mm.

First Stage.—Head rounded, black and shiny; width, .25 mm. Body sordid greenish, with long black hairs curving forward, arising from small lustrous tubercles. Feet concolorous with the body.

Second Stage.—Head bilobed, black and shiny,with a number of hairs; width, .5 mm.; body sordid purplish, almost black, with short black tubercles arranged as in the last stage, and bearing numerous short fine hairs. Cervical shield ochreous; anal plate black. The tubercles on the cervical shield are black.

Third Stage.—Head bilobed, a conical tubercle at the apex of each lobe, shining black with yellow piliferous tubercles; width .95 mm. The body and the series of spined processes, which represent the tubercles of the preceding stage, are black, the former more reddish subventrally. The lateral tubercle on joint 2 is orange, as is also a smaller subventral one on joints 2, 3 and 4 each. As the stage advances a double dorsal and subventral row of white dots appears, and, later, the bases of the substigmatal spines (row 4), and the anal feet become orange tinted.

Fourth Stage.—Head bilobed, bulging laterally, a spined process at the apex of each lobe, pointing forward; colour black, very shiny, with many white conical setiferous granulations; labrum and bases of antennæ, whitish; width 1.8 mm. Body velvety black, the long-spined processes shiny blue-black, a short one above the spiracle on joint 2 and a longer one below it, beside a short stigmatal one on joints 3 and 4, orange. A

geminate dorsal and stigmatal row of white dots, three or four on each segment. Feet all black, the abdominal ones tipped with reddish. The fold of skin behind the head is orange tinted.

Fifth Stage.—Head bilobed, a short spined process from the vertex of each lobe; many conical granulations each bearing a hair. Colour, shining black in front, but largely bright fulvous posteriorly, and at the vertex; a fulvous patch covering the clypeus; granulations fulvous or yellow, processes black; the labrum and bases of the antennæ white; width 2.5 mm. Body velvety black, the long (1.5 mm.) and slender spined processes shiny blue-black, except rows 5, 6 and 7, which are orange, row 7 being pale. The rows are arranged as follows, and correspond to the arrangement of warts in the Arctiidæ (except *Halesidota*), except that the rows on each side of the dorsal line in Arctia (row 1) are here fused to form a single dorsal series :—

No processes on joint 2; a subdorsal and lateral series on joints 3 and 4; a dorsal (1), subdorsal (2), superstigmatal (3) and substigmatal (4) row on joints 5–12; two subdorsal ones on joint 13; two tubercles (5) and (6) above the bases of the legs, and four short ventral spines (7), on the legless segments. A geminate diffuse dorsal series of numerous minute yellow dots, like dust, in which appears later a double dorsal series of segmental dashes; a geminate stigmatal row of large yellow spots, the substigmatal ones almost forming a continuous line, with many minute dots like the dorsal series. The skin behind the head, spots at the bases of spines 3 and 4, and the abdominal legs, reddish-orange; thoracic feet black. Spiracles black, with a pale yellowish border.

Chrysalis.—Of usual shape in the sub family and without any marked prominences. Eyes large; the depression between the thorax and abdomen slight. Thorax very slightly ridged dorsally, without points; a dorsal abdominal series of very slight points. Cremaster broad, flattened, its hooks fastened in a button of silk. Colour black, not shiny, dotted with white on the back, especially in a series of eight subdorsal white patches, the first of which (over the eyes), and the last two (on the middle and end of the abdomen respectively) are confluent over the dorsum. Length, 17 mm.; width, 6 mm.

ON SOME DESTRUCTIVE LOCUSTS OF NORTH AMERICA, TOGETHER WITH NOTES ON THE OCCURRENCES IN 1891.

BY LAWRENCE BRUNER, LINCOLN, NEBRASKA.

(Delivered before the Association of Economic Entomologists, at the Third Annual Meeting, August 17th, 1891.)

In introducing this subject it is my intention to speak shortly upon the various species of Locusts which have appeared in injurious numbers within the territorial limits to be designated with each species. Some of these species have covered a vast area of territory, and have caused extensive injury from time to time, while others have appeared over limited areas only, and have caused but slight injuries; but yet these have been sufficient to necessitate their mention amongst the destructive species of the country. Taking them altogether, we have exactly twelve destructive locusts within the territory designated.

Dissosteira longipennis.—Selecting the species as they occur to me, I will mention first the Long-winged Locust. During the early part of July reports came from the eastern and south-eastern portions of Colorado of locust depredations. The first of these was that trains had been stopped by grasshoppers getting on the rails of the Santa Fe Railroad, 100 miles or thereabouts east of Denver. Shortly after this, reports appeared in the newspapers of serious damage being done around the point where they were first mentioned as stopping trains. About this time other reports of depredations came in from North Dakota and Minnesota and other portions of the west and north-west. On the strength of these reports Prof. Riley instructed me to visit the localities, for the purpose of ascertaining the extent of country overrun, the actual and possible future injury which might result, and the exact identity of the species concerned. Being a Nebraska man, and looking out for first interests, I naturally went to Colorado, the nearest locality to my home from which reports had been received. I first visited Akron, Colorado, the nearest point on the Burlington and Missouri line to the region infested. There securing a team and driving to the south only about six miles, the advance guard of the enemy was encountered. Imagine my surprise at finding here an entirely new insect, as far as destructive locusts are concerned. There in Colorado, and in immense numbers, was the *Dissosteira longipennis*, an insect usually considered rare in collections, and one heretofore only known to occur

over the higher portions of the plains lying to the eastward of the Rocky Mountains, in the States of Wyoming, Colorado and New Mexico. This insect, as ascertained from inquiry, covered an area of about 400 square miles of territory in sufficient numbers to materially injure the grasses growing on the ranges of the entire region—and amongst these grasses, the species of *Bouteloua*, or Gramma grasses, and the Buffalo grass, *Buchloe dactyloides*, seemed to be the most attacked, grains and other cultivated plants not appearing to be especially attractive to it. In fact very little or no injury was done by it to the cultivated crops growing within the region infested. About the same time that I was investigating this insect upon its northern line of injury, Profs. Snow and Popenoe were studying the same insect upon the southern border of its range, and they found practically the same food-habits there that I had noted in the north, and, by enquiry, found that the insects had come into that country from the south last fall, and had laid their eggs over a large area. This year when the eggs hatched, the young began to move from their breeding centres in all directions, seeking open places and the edges of ploughed fields, and following roadways. This trait of seeking open spots this season is probably due to the habit of the insect of naturally living on open ground where grasses are short and scattered. The present year was very wet in this particular region and caused an undergrowth of grasses, hence the desire to find the natural conditions under which the insect lives. The young began moving and finding these open places, there congregated. Having thus gathered together in large numbers, they must feed, and they naturally swept the grasses clean around these spots; so noticeable was this in certain spots where they had gathered about the hills of a species of ant which raises mounds of small gravel and cuts away the vegetation for some distance around them, they had enlarged these areas, in some places for fully half an acre. This year Messrs. Snow and Popenoe observed them flying southward with such ease, by reason of their long wings, that they resembled birds.

Dissosteira obliterata, Thomas. Closely related to the above and very similar in appearance to it, is a second species of these large, long-winged locusts, which was found in injurious numbers along with *Camnula pellucida* in Idaho last year. It was quite common in the Wood River county lying north of Shoshone, and in the vicinity of Boise City, Idaho. One form of this species was described by Saussure as *Dissosteira spurcata* in his "Prodromus Œdipodorum". This is not the *Œdipoda oblitata* of Stoll.

Camnula pellucida.—This is the insect which has occasionally been very destructive in parts of California and Nevada. It has since spread eastward into Idaho, where it is very destructive the present season, covering an area of at least 1,300 square miles of territory. It also appears in great numbers, with several other species, in the Red River Valley of Minnesota, North Dakota and Manitoba. I also observed it abundantly in the Prickly Pear and Gallatin Valleys of Montana, near the mouth of the Yellowstone, in North Dakota, in portions of Wyoming, Colorado and the extreme western parts of Nebraska. It also occurs in the New England States and British America. This is a species which readily adapts itself to any new locality, being the most easily acclimated of any of our injurious locusts. When once established it is there to stay, and will require earnest attention from time to time in the future. In fact, I consider this locust, though not migratory, fully as destructive as the Rocky Mountain or true migratory locust, from the fact that it so soon becomes acclimated.

Acridium americanum.—This large, handsome locust is the species which occasionally devastates Yucatan, Central America and Mexico, and even reaches the United States in injurious numbers along our southern coasts. It has also been known in dangerous numbers as far northward as the Ohio River, and occurs sparingly as far north as the Northern States, but I imagine never reaches British America.

Dendrotettix longipennis.—"Post Oak Locust" of Texas. During the spring of 1887, while visiting Washington County, Texas, to investigate a local outbreak of an injurious locust, I heard of a species that was attacking the oaks of that particular region, and in some places entirely defoliating them. On my way from the region where I had been working, to the city of Brenham, we passed through the infested locality, and I obtained some of the insects in question, which were then in the larval stage. A careful examination proved the insect to be new and congeneric with a species heretofore collected only in the vicinity of St. Louis, Missouri, which also occurred only on oak. About a year later this species was described by Professor Riley under the above name. The insect occurs in two forms, long-winged and short-winged. The former flies with great ease and often leaves the trees in midday and alights in fields and other clearings—with the least disturbance it rises again and flies to the tops of the adjoining trees. The larvæ and pupæ are also exceedingly active, and run over the branches and trunks of trees with great

rapidity. The eggs are laid in the ground around the bases of the trees. An area of at least fifty square miles of forest was completely defoliated by these insects during that and the previous year.

Melanoplus spretus.—The Rocky Mountain or Migratory Locust. This is the insect which is generally referred to as the destructive locust of North America, and has caused more injury during the past twenty years than any dozen of the other species combined. It is this species which we most fear, on account of its migratory habits—so marked is this trait that swarms hatching on the Saskatchewan have been traced to the Gulf of Mexico in one season. Its habits have been so frequently described that further mention is unnecessary. Suffice it to say that at the present time it is again decidedly on the increase along our northern boundary. During the present year reports of its injury were received from Minnesota, North Dakota and Manitoba, by the Department of Agriculture, and upon investigation I found these reports to be only too true. In Minnesota and Dakota the authorities, ably assisted by the efforts of settlers, have been carrying on a vigorous warfare with marked results, which will doubtless save their crops from devastation next season

Melanoplus atlanis, Riley. The Lesser Migratory Locust.

This locust, which frequently becomes very injurious on account of its excessive increase, is somewhat smaller than the Rocky Mountain species. It is also migratory in its habits, but to a much less degree than is *spretus*. In its distribution this insect is much more widely spread than the preceding—being a common one in almost all parts of our country from the Mexican boundary to the 53rd degee of north latitude, and even beyond in some parts of the country. It is the species which most frequently does the locust injury in the New England States, much of that in our Northern States, and some of that in the extreme north-west. It has also been known to become injurious even in the Middle and Southern States. In its distribution *atlanis* appears to be more partial to hilly or mountainous country, and especially is this noticeable in reference to its appearance in destructive numbers. It also seems to prefer wooded or mixed country to the open prairie or plains.

As would naturally be expected from its wide distribution, this particular locust presents some variation in its size, colour, and to some extent also, its structure. At any rate, there appear to be three well-marked forms of the species to be met with within the confines of North America.

Melanoplus devastator, Scudd.

A third species of the genus *Melanoplus* is the one that occasionally appears in destructive numbers in portions of California and the adjoining States. It is about the same size as the *atlanis* just mentioned, and often does considerable injury to the crops of the regions where it occurs. Although this locust is know to inhabit almost the entire region lying to the west of the main divide of the Rocky Mountains, and to reach even beyond in Montana and Colorado, it has never, to my knowledge, been injurious except in Nevada, California, Arizona and Oregon. This species also occurs in two forms, viz., small and large, being the spring and fall broods as nearly as I have been able to decide from specimens in collections.

Melanoplus bivittatus, Say. The Two-striped Locust.

This is our common species of "native grasshopper" all over the country, and the one that so frequently becomes injurious to our gardens and about the edges of fields. It occurs from the Atlantic to the Pacific, and from the Gulf of Mexico to the Saskatchewan. Its increase in destructive numbers appears, however, to be confined chiefly to the regions lying between the Rocky Mountains and the Atlantic. This locust also appears to vary considerably in its size and colour. There are, however, two well-defined forms of it, the one receiving the name *bivittatus* and the other going by that of *femoratus*—the latter occuring only northward.

Melanoplus differentialis, Thos. The Differential Locust.

Next to the species just mentioned we frequently find a second species of our large native locusts appearing in destructive numbers. This latter species occurs in the Western and Middle States only, and is here very often known to become unduly numerous and destructive to both field and garden crops. It has been reported at different times to have been present in such numbers in portions of Illinois, Indiana, Missouri, Kansas, Iowa and Nebraska. A melanistic or black form of it is quite frequent in portions of Nebraska and Kansas; but otherwise it is quite permanent in its characters.

Melanoplus ponderosus, Scudd. The Ponderous Locust.

An insect very closely related to the preceding is that known to the entomologist by the above name. It is a native of several of our Southern States, and has on several occasions been the depredator of crops in portions of central Texas. As the name would imply, it is of robust form, and it has a somewhat similar appearance to *differentialis*.

Melanoplus femur-rubrum, DeG. The Red-thighed Locust.

Last on the list of destructive locusts is herewith presented the one that perhaps enjoys the greatest geographical range of all of our species. It is the common one in all parts of the country from the Atlantic to the Pacific and from the Arctic circle to Central America. Its devastations, while perhaps not as vast as some of the preceding, have been more frequent and have occurred at more localities than those of any other one. Like the *bivittatus*, *differentialis* and several of our non-destructive species, *femur-rubrum* is a frequenter of rather low places and rank vegetation.

After giving these brief notes on the various species of locusts that have been known in the past to have been connected with the injuries from this class of insects within the country, it will not come amiss for me to say a few words about the subject for the present season, and to give my opinion as to the probable outlook for the coming year. Briefly, then, let me say that there have been received reports of locust injury from the following States:—Alabama, Mississippi, Texas, New Mexico, Arizona, California, Idaho, Colorado, Kansas, Nebraska, North Dakota, Minnesota, Iowa, Indiana, Ohio, Michigan and New York. In fact, there have been more separate reports received the present year than ever heretofore from this cause.

Now a word or two as to the different species of these destructive locusts that are responsible for the injuries of the present year. In California the *devastator* is present; the *Camnula pellucida* is known to be unduly common in Idaho, Minnesota, North Dakota and parts of the Rocky Mountain region; the Rocky Mountain or Migratory locust is the one that is responsible for most of the injury that has been reported from the Red River Valley of Minnesota and North Dakota as well as in Manitoba to the north of the international boundary; *Melanoplus differentialis* is the one that must receive much of the blame for Kansas and Nebraska injury; while in the States of Indiana and Ohio *femur-rubrum* and *bivittatus* are the guilty parties. *Melanoplus atlanis* is present in injurious numbers in the Red River Valley along with *bivittatus*, *spretus* and the *Camnula pellucida*. In Colorado and New Mexico for the first time *Dissosteira longipennis* has appeared as one of the injurious species of the country.

While all of these locusts, along with nearly every other species of the

group which are native to North America, are to be counted as injurious, the particular one that has been the dread of the whole country, and especially of the region lying between the Mississippi River and the Rocky Mountains, is the Migratory species, *Melanoplus spretus.* This insect is now on the increase in a limited area on our northern boundary and across the line in the province of Manitoba. By continuing the prompt and energetic efforts that are being carried out by the populace and State authorities of the States of Minnesota and North Dakota we can be assured of success only provided the Canadian Government will also see the advantage of co-operation at this time. This, let me state, is all the more necessary at this particular time, as all reports seem to indicate that at present this locust is not present in abnormal numbers in any other part of the country. A stamping out of the pest in this region might, therefore, give immunity from their further injury for many years to come.

Finally, let me urge on the inhabitants of all infested regions that a "stitch in time saves nine." In other words, we do not know what the climatic conditions may be a year hence, whether they will be such as to favour the hoppers or not, so we had best do the wise thing and stamp out the pest. This has been done time and again in the past, and the recent work in the north shows how very profitable is the warfare when carried on persistently. By the plowing under of the eggs laid last fall, and the use of the kerosene pans or hopper-dozers in the destruction of the young locusts that did hatch, the twelve counties in the two States of Minnesota and North Dakota saved by actual computation on wheat alone the neat little sum of $400,000. This, mind you, in a year not considered a locust year, and not to take into consideration what was saved to the region for other crops and the injury that might have resulted next year had the hoppers not been destroyed. With every favouring circumstance, the comparatively few locusts of this one species that have thus far been destroyed, the present year in this region would have been sufficient to overrun at least calculation the entire area of the State of Minnesota, the two Dakotas and Nebraska, along with portions of Iowa and Kansas. True, these favouring circumstances might never occur, but it is always best to be on the safe side. This we should know from our past experience with this same insect.

"Native" locusts, while perhaps not to be dreaded equally as much as the species just spoken of, certainly can commit an equal amount of injury when size and numbers of the insects are taken into consideration.

They cannot, it is true, get up and fly away to regions new, but they are equally rapid breeders with favouring conditions. They can be destroyed equally as well, if not better than can the Rocky Mountain species, on account of their local restriction even in the regions where found.

MEETINGS OF THE MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The 162nd meeting of the branch was held on April 14th, at 74 McTavish Street, Mr. H. H. Lyman, President, in the chair. Owing to some of the members being busy with college examinations the attendance was not so good as usual.

Mr. Lyman read a paper entitled, "Can Insects Survive Freezing?" quoting from several well-known authorities on Entomology in favor of an affirmative answer to this question. A number of very interesting specimens were exhibited by the members. After spending some time in examination of these, and discussion, the meeting adjourned.

The 163rd regular and 18th annual meeting of the branch was held on May 12th, at 74 McTavish Street, Mr. H. H. Lyman, President, in the chair. The attendance of members was good, including the Rev. Mr. Fyles of Quebec.

The annual report of the Council for the past year, and the Treasurer's report were read, and will be published, as usual, in the next report of the Society.

Mr. Hausen read a paper entitled, "Some Little Known Canadian Coleoptera," containing descriptions of two new species, viz., *Zilora canadense* and *Philonthus stictus*. This paper has been published in the Record of Science, Vol. IV., p. 319, with plate.

Rev. Mr. Fyles read a note on *Nematus pallidiventris*. A European species of saw-fly lately introduced into this country, with description of larva, pupa and imago. (See CAN. ENT., XXIII., p. 135.)

After spending some time in discussing these papers and examining specimens, the meeting adjourned.

The 164th meeting of the branch, held on June 18th, was principally devoted to "sugaring" for moths on Mt. Royal, but Noctuidæ seemed to be scarce and very few were attracted. The meeting was held later at 74 McTavish Street, Mr. H. H. Lyman, President, in the chair. Mr. Hausen read a note on "The Occurrence of *Platynus rugiceps*, Mann., at Montreal," and after some discussion the meeting adjourned.

A. F. WINN, *Secretary*.

A NEW SPECIES OF CERURA.

BY GEORGE H HUDSON, STATE NORMAL SCHOOL, PLATTSBURGH, N. Y.

Cerura modesta, n. sp.

Male.—Front and vertex nearly white. Collar a little darker, tinged with a faint creamy yellowish-brown. Thorax dark steel-blue, almost black, with metallic purplish reflections, the orange scales forming so marked a feature in other species either entirely absent or with but a faint trace of their presence. Patagia concolorous with thorax, edged outwardly with white. Abdomen black above, or nearly so, the segments bordered behind with pale cinereous, thickly clothed with long fine white hairs, whitish beneath.

Primaries on outer third nearly concolorous with collar, not white as in *borealis* and *aquilonaris*, whiter towards base; spots and bands an even blackish dull purple, nearly concolorous with thorax. A spot at the base of subcostal and median veins; and just beyond this, a row of four similar spots crossing the wing at nearly right angles to the costa and forming a straight, or almost a straight, line. A wide mediam band, from 3.7 to 5 mm. on costa, inner edge nearly straight, parallel with the row of four spots, outer edge slightly excavated just above and below median vein, narrowing to from 2.5 to 3.8 mm. and widening again at inner margin to about the same width as on costa, often appearing wider on inner margin from its union with other outer lines. Subterminal band from 3 to 4 mm. wide on costa, outer edge nearly parallel with margin to near the anal angle, narrowing rapidly on the inner edge from vein 5 to vein 3, where it becomes obsolete, appearing again at near anal angle. Between the median and subterminal bands, there are three very fine almost obsolete lines, one within or including the elongated prominent discal spot, the others, beyond this, scalloped, slightly pointed and a little darker on the veins; these lines become more distinct at inner margin, where they often unite with the submedian band. The pattern is much like that of *occidentalis*, and the fine lines are similarly marked by spots on the costa. The two bands are very uniform in colour, are not bordered by darker lines, and show almost an utter absence of the edging of orange scales found in other species. The terminal intervenular spots are very small, as small as in *albicoma*. The vestiture is thin, the scales narrowing more rapidly than in *borealis* and *aquilonaris*, as you pass from base to external margin, giving the outer part of the wing a

thin, semi-transparent appearance, the ends of the scales are more serrate and more closely appressed to the membrane.

Secondaries nearly concolorous with primaries, paler, with a diffuse subterminal band widest opposite the discal spot and expanding again at anal angle. In one specimen there is another narrow band just before the subterminal and subparallel with it, more distinct beneath. Interven-ular spots connected by a fine dark terminal line of the same colour.

Beneath, paler, discal spots elongated and distinct. On primaries the median and subterminal bands often unite throughout their entire length, covering the entire wing, save only the basal portion, a narrow whitish costal streak, and a narrow and quite uniform whitish band on the outer margin of the wing.

Expanse, 40 to 44 mm.

Described from seven males.

I have taken the species from the electric lights in Plattsburgh, N. Y., in 1887, 1890 and 1891, as follows: May 9–3, 10–4, 12, 13, 15–5, 19, 20, 21–2, 23, 26, 27, June 1, 11, 20. The figure after the date shows the number taken, where the date alone occurs but one specimen was taken. *Occidentalis* has not been taken before May 11th, and *cinerea* and *borealis* not before the 28th.

DESCRIPTION OF A NEW SPECIES OF ARGYNNIS FROM ALBERTA TERRITORY.

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

Argynnis Victoria.

Male.—Expands two inches. Upper side pale fulvous, primaries a little obscured next base, secondaries largely, the dark area covering nearly the basal half; the black markings rather heavy; a common black marginal border, narrow on primaries, one-third wider on secondaries; a common series of small submarginal spots, sub-oval on primaries, crescent on secondaries, and on neither wing touching the marginal border; the rounded spots largest on primaries; the discal angular band on same wing heavy, on secondaries light; a bar on arc of cell of primaries, another crossing the cell a little within, a rounded elongated spot depending from subcostal, near middle of cell, and a crescent close to the base; in the submedian interspace an angular cross bar; on secondaries a V shaped spot at end of cells.

Under side of primaries faded fulvous, brownish over basal part of cell; small patches of orange-ferruginous in the sub-costal interspaces; the markings repeated, reduced, pale; secondaries orange-ferruginous, deepest next base; a marginal black line, and within and parallel a heavier one; next this on each interspace is a small yellowish patch which crosses the inner line nearly or quite to margin, and on basal side are a few black scales, which, in the two or three posterior interspaces, take crescent shape; the round spots repeated; close above these is a narrow transverse band of connected yellow-white crescents, not well defined, each with scattered black scales at top; across the disk a broad angular band of yellow-white, edged on both sides rather heavily by black; this may be considered as a chain of spots, as the separating nervules are black, and the one in the cell is prolonged nearly to the yellow band, and cut almost in two by the black edging of the arc of cell; the deep orange space beyond this discovers no spot except a small whitish triangle in cell, which is without black edging; at the base whitish patches at the origin of the interspaces and cell, sprinkled with black, the posterior ones edged black without. The mesial band has something of a margaritaceous sheen, but it is very slight and dull. Body red-brown above, beneath the abdomen is grey-yellow; legs red; palpi have long red frontal hairs, among which are a few black; antennæ fuscous above, red below; club black, tip ferruginous.

The female I have not seen, but Mr. Bean tells me that is essentially like the male.

Described from a single male taken with others of both sexes by Mr. Thos. E. Bean, at Laggan, Alberta. He says: "It is strictly alpine, and the rarest butterfly regularly found here. It flies in a part of the district which *Alberta* frequents, but at the highest parts of that district almost altogether, and it differs entirely in its habits from *Alberta*. The sexes are alike, but the female is moderately larger than the male. It is the most difficult butterfly I have found to capture. The last week in July seems to be the time of flight." There is no other American species with which to compare *Victoria*. It is as large as the Laggan *Eurynome*, but has the peculiar mesial band (under hind wing) of the *Chariclea* group, though with a difference, both edges being more regular, and the colour white. That two new species of Argynnis should have been discovered by the indefatigable naturalist at Laggan is noteworthy. Doubtless many more remain to reward the labours of other zealous workers in the vast unexplored regions of British America.

SMERINTHUS OPHTHALMICUS, BD.

In the July number of CAN. ENT., page 143, Prof. French described the larval stages of this species but did not observe the egg and first stage. These I can supply, as follows :—

Egg.—Elliptical, flattened above and below, smooth, slightly shiny; colour probably green. Under the microscope it is seen to be covered with crowded minute shallow depressions. Dimensions, 2.0 × 1.8 × 1.3 mm. Laid singly on under surface of leaf.

First Larval Stage.—Head rounded, slightly bilobed, not pointed as in the next stage, green, slightly shiny, and dotted with yellow, but not granulated, with a curved yellow line from before the eyes on each side, meeting each other below the vertex. Antennæ and labrum white; jaws and ocelli black. Width, 1 mm. Body annulated, minutely pilose and dotted with yellow, with a distinct pale yellow subdorsal line and oblique lateral lines on joints 5–12, occurring above and below the subdorsal line, but dislocated, except on joint 12 where a single distinct line runs to the base of the horn. Horn minutely pilose, dark red, pale at base, 2 mm long.

The second stage is as described by Prof. French; width of head, 1.5 mm.

Food Plant.—Poplar (*Populus*). Larvæ from Mariposa County, California. HARRISON G. DYAR.

CORRESPONDENCE

MELITÆA PHAETON.

Sir,—While spending a few days in Ottawa, during July of last year, I was fortunate enough to find a batch of the larvæ of *Melitæa phaeton*, which composed a large colony in their tent-like web upon the tip of a robust stem of *Chelone glabra*, which is their favorite food plant in that district. I was anxious to breed the species, so boxed the whole colony and brought it back with me to Port Hope. Here, however, I could not find any plants of *Chelone glabra*. Upon turning up Scudder's "New England Butterflies," I found that honeysuckle, *Lonicera*, was given as a food plant. I first offered the larvæ leaves of trumpet honeysuckle, obtained from a neighbour; but, as this was not convenient, I resolved to try them on Tartarian honeysuckle, of which an abundance grew in the

garden. They took to it with comparative readiness, and much to my delight I succeeded in bringing a goodly number through the winter. I hibernated them in an area window below the surface of the ground, but without any special care. Towards the end of April, as soon as the young leaves began to unfold, I took them out of winter quarters and fed them again on the Tartarian honeysuckle. The first specimens began to pupate about the end of June, and in July I had the pleasure of seeing the perfect butterflies.

A. M. BETHUNE.

Port Hope, August 28, 1891.

HALISIDOTA TRIGONA.

Sir,—When describing this species in Kansas Transactions I gave the differences which I observed between Herrich-Schæffer's figure of the Brazilian species, *specularis*, and my material. Mr. Dyar's note was therefore not warranted and, had he seen the Kansas Transactions, he probably would not have published it. In reply to Mr. Smith's note, I would state, that I have not seen the British Museum material. I do not know whether this is correctly determined, but I should rely on Mr. Butler's comparisons, as he most certainly knows Herrich-Schæffer's work. The type of *specularis* came, I presume, from Boisduval, and will in this case be accessible to study. The matter will probably be settled by the bringing together of fresh material from the south-west and by breeding the North American species. In the meantime *trigona* must stand as the first description of a North American species belonging to the *specularis* group, which seems to belong, more particularly, to South America.

A. R. GROTE.

LIMENITIS LORQUINI.

Sir,—Please correct my statement, p. 174, that "the second brood of larvæ (of *L. lorquini*) probably hibernate in the second stage," etc., to the following:—"Part of the first brood, and the entire second brood, pass the winter in the second larval stage in hibernacula formed of the basal part of a leaf spun together at the top."

H. G. DYAR, Yosemite, Cal.

AGROTIS SUBGOTHICA.

Sir,—In reply to Mr. Tutt's note in the July number of the CAN. ENT., p. 159, I would state that I have no knowledge of Haworth's work in which *subgothica* is described. I have everywhere taken Stephens's identifications of Haworth's species. Now Stephens figures *jaculifera* of Guenée, as figured in the Species Géneral, typical *jaculifera*, as *subgothica*, of Haworth (?). If, then, Stephens is wrong, and Haworth's *subgothica* is a variety of *tritici* and not our American species, this latter must be known as *jaculifera*, and Prof. Lintner's name of *tricosa* must then clearly be retained for that species, as insisted upon by myself. Stephens's figure is unmistakably based on our American species; how nearly the European *tritici* resembles this I cannot, at the moment, say. The following will be the synonymy of *Agrotis jaculifera*. According to Mr. Tutt's statement that *subgothica* of Haworth is a variety of *tritici* of Linné, our American species must be listed as follows:—

jaculifera, Guen., fig.
    subgothica, Steph, fig. in err.
tricosa, Lintner.
    jaculifera, Guen. var. A.
    jaculifera, Smith, in err.
herilis, Grote.
    jaculifera, Guen. var. B.
    herelis, Smith.

A. R. GROTE.

SOME CORRECTIONS.

Sir,—In my paper, CAN. ENT., page 152, I say I have placed *Agrotis costata* and its near ally *A. idahoensis* "together wrongly," line 10. It is clear from the context that I meant in a wrong position in my lists. The two species are closely allied, differing in colour, *costata* being reddish, *idahoensis* purplish, and, in *costata*, the pallid costal region is whiter and broader. The two belong together. I have always associated them, and, indeed, described the one comparatively with the other. The types are in British Museum On page 148, line 6 from bottom, for grouping, read association. On page 151, for "The Practical Entomologist," read the practical entomologists. I was writing, not of a publication, but of a class of working entomologists, whose figures (mostly duplications of the same cut) confounded the three forms: *subgothica*, Stephens (=*jaculifera*, Guen.), *tricosa*, Lintner (=*jaculifera*, Smith), and *herilis*, Grote (=*herelis*, Smith). A. R. GROTE.

Mailed September 21st, 1891.