

INCISALIA IRUS, GODT.

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STUDIES IN THE GENUS INCISALIA.

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The genus *Incisalia* was proposed by Minot in 1872, to separate from the unwieldy genus *Thecla* those small butterflies which, on a basis of general similarity of structure in the imago, seemed to be most intimately related to Hübner's *niphon*, which stands as the type.

Ten forms referable to this genus have been described, eight of which must tentatively be regarded as good species. The *augustinus* of Westwood is now sunk as a synonym of *augustus* (Kirby), and the *arsace* of Boisduval and Le Conte is accorded varietal distinction under Godart's *irus*. All the species are confined, as far as is known, to North America, and with the exception of *Mossi* (Hy. Edwards), hitherto reported only from Vancouver Island, are found within the United States.

Niphon enjoys the widest distribution, being found on both sides of the continent, and, in the east, ranging from Canada to Georgia. *Augustus* is apparently confined to the northern part of the eastern half of the continent. It is abundant in Canada, and I have taken it as far south as Maryland. *Irus* and *Henrici* have been confused so often that the geographical distribution of neither is definitely determined. It may, however, be confidently stated that the range of *Henrici* is more restricted than that of *irus*. The latter occurs in Georgia according to Abbot (whence *Henrici* has not been reported) and is found along the Atlantic Coast States as far north as Maine, and inland at least to Ohio and Illinois. Lacking further definite information Dr. H. G. Dyar, in his recent List of North American Lepidoptera,* gives as the habitat of *Henrici* West Virginia only. This species has also been taken at Cincinnati, O. (Miss Braun), Rockland Co., N. Y. (F. E. Watson), Albany, N. Y. (J. H. Cook), Schenectady, N. Y. (Harry Cook), and Franklin, Pa. (W. T. Bell) † It doubtless occurs in other places, where it has been overlooked by collectors or confounded with *irus*.

*U. S. Nat. Mus. Bull., No. 52.

†Psyche, Vol. 8, p. 143 (Nov., 1897).

These four species, *niphon*, *augustus*, *Henrici* and *irus*, constitute the representation of the genus east of the Mississippi, and our knowledge of their life-histories is far from complete. Since all are measurably common on the glacial sand plain west of this city, I endeavoured to ascertain the food plant of each (unknown, except in the case of *niphon*) and to breed the larvæ. The study has been full of interest, and my efforts have met with success beyond my expectation.

I.—*Incisalia Irus*.

Time of flight.—Species single brooded; the butterfly very abundant during May. It appears each year during the last week of April, and has practically disappeared by June 1st, although I have taken worn individuals as late as June 20th. Its season of greatest abundance is the end of the second week in May.

Oviposition.—Each female produces from 12 to 18 eggs,* which she places singly on the opening buds (rarely on the leaves) of the food plant, *Lupinus perennis*. The butterfly chooses the middle of the day for ovipositing, and disposes of her whole store within an hour. I have never observed a second egg placed upon any plant, except when the butterfly chanced to return to it after visiting another. One cannot readily distinguish the gravid female by her flight, for it is not heavy, but rather may be described as businesslike. She flies directly to the erect raceme, alights without preliminary fluttering, and, after walking about for a few seconds with wings closely appressed and motionless, selects a suitable spot and thrusts her horny ovipositor among and beneath the hairs which clothe the lupine. Immediately upon extruding the egg the insect flies away, occasionally covering a distance of twenty or thirty yards before again ovipositing. In consequence, it often requires a sharp eye and a lively step to follow her through the low growth. Still, it is by no means impossible, for she never leaves the open, refusing to fly through dark spots and turning aside to circle a tree rather than come under its shadow. The eggs are thus scattered over a comparatively broad area, and are to be looked for upon the racemes (usually on the calyxes) of plants exposed during the middle of the day to the full glare of the sun.

The egg.—In all, forty-two eggs were carefully examined under the microscope, and I have nothing to add to the descriptions already published. However, the figures given in Scudder's "Butterflies of the Eastern United States and Canada" seem to me to be somewhat ideal or

*Edwards secured 15 eggs from a female imprisoned over plum.

diagrammatic. In no instance did I find the raised reticulation and the bosses so regular either in outline or arrangement as there depicted. I have therefore represented in Plate 1 the micropyle (fig. 1) and a part of the surface sculpture (fig. 2) from the region of greatest diameter. These figures are reproduced from camera lucida drawings, and exhibit typical characters.

Period of incubation.--A number of eggs were secured, with the exact time of oviposition, and in each case the birth of the caterpillar was determined to within an hour or two, except when it occurred during the night. The average duration of this stage was found to be 4 days 2 hours. Two hatched after only 3 days, and several were delayed to 5 days 4 hours.

The larval stages.--In freeing itself from the eggshell the caterpillar eats only enough to permit it to escape. It bites a hole through the edge of the concave top, usually destroying the micropyle. Of all the empty shells examined, only two were found with this structure intact and suitable for drawing. The newly-born larva seeks the petals* of the flower on which it finds itself and bores a hole through them just large enough to accommodate its body. Through this it crawls into the heart of the blossom and feeds upon the stamens, pistil and carina. It is a fact worthy of note that the *alæ* and *vexillum* are not eaten, and, with the exception of the minute hole by which, as a baby, the caterpillar entered, the flower seems uninjured. Without doubt, this habit serves as a measure of protection against their ever-watchful enemies. Fig. 3 shows a flower of the lupine (x 2.25) and the small hole by which I detected the presence of many of the larvæ collected or marked for study. Around the hole the tissue dies, and is discoloured for a very little distance. Fig. 4 is the same, with one wing removed to show the riddled keel.

The first moult evidently takes place within the flower; whether the others do is doubtful. As long as the petals last the caterpillar lives within their purple shadow, † probably moving to a new home whenever the immediate supply of food has been exhausted. When this happens, the petals are not punctured, but access to the inside of the flower is gained between them. There is thus no indication of the presence of a

*The larvæ from two eggs found on leaves attacked the parenchyma of the upper surface. These were not collected, but, with others, were left for observation in the field. One of them was discovered by a small black spider, which carried it off before my eyes. The other disappeared the day after hatching, may have been killed, or sought the flowers.

†It may be merely a coincidence, but I have never found a larva on the variety *albiflora*.

larva except in its first home. The excrement is soft, wet and green when the insect has been feeding upon succulent tissues; dry, granular and coloured when the anthers have been eaten.

After the petals have withered and the pod is developed, the larvæ may be found boring into the latter and feeding openly by day. It is, however, much more difficult to find them at this time, possibly because their number is depleted.

Three moults are undergone before pupation, the caterpillar finally attaining a length of 12-16 mm. The length of larval life varies considerably, but all the insects bred were in chrysalis before the second of July.

Pupation.—When fully grown the larva grows restless and refuses to eat. For two or three days it will circle its prison time and again, noticeably decreasing in size in the meantime. When it was noticed that one desired to pupate it was transferred to a shallow glass-covered box filled with sand, over which dry leaves and twigs had been liberally sprinkled. One of the most interesting facts determined concerning this species is that the larva constructs a rude cocoon of leaves or other *debris*, fastened together with a considerable amount of silk. These "cocoon" are less finished than those of many Hesperidæ, and remind one of similar shelters constructed by *Everes comyntas*. Fig. 5 in the plate shows one made of three leaves, and scarcely covering the chrysalis; fig. 5a, one of a single leaf and much silk; fig. 5b, one of parts of two leaves and little silk; fig. 5c, the largest and firmest of all. This is composed of six leaves or parts of leaves and a withered *Vaccinium* flower, fastened by silk in five different places. This has been opened and folded back along the line A-B.

The chrysalis.—Figs. 11, 13, 15, 101, 107, 109, 110 and 112 show variation in the size and outline of the chrysalids. These are drawn natural size by tracing the shadow cast under a point of brilliant light, and are not symmetrical, because the chrysalis not being flat on the ventral surface tips a little to one side or the other; 13, 110 and 112 did not yield imagoes; 11 and 15 gave males; 101, 107 and 109 gave females.

Parasite.—A dipterous larva came out of No. 110 on February 9th, 1906, and hardened into a short cylindrical pupal case, rounded at both ends. On February 28th the fly emerged, and is evidently a Tachinid. I have referred it to the genus *Exorista*, but am not able to identify it further.

(To be continued.)

COLLECTING NOTES ON COLEOPTERA.

BY W. KNAUS, MCPHERSON, KANSAS.

While collecting at Brownwood, Texas, in the latter part of May, 1904, I secured half a dozen three- and four-inch sections of a Mesquite tree, about three inches in diameter, that had been cleared from land the preceding fall. The sections were infested with Coleopterous larvæ, and were put into a breeding box to see what would develop. The first transformation into imagoes was in July, when a small Ptinid, *Trogoxylon Californicum*, Lec., began to emerge in numbers. A little later three or four specimens of a small Cucujid, *Lathropus vernalis*, Lec., emerged. In August a dozen specimens of *Sinoxylon Texanum*, Horn, had transformed, their cells being in the white wood part of the Mesquite. After emergence, a number of these bored holes straight into the wood their full length, or deeper. At this time also appeared three or four Clerids, *Elasmocerus terminalis*, Say, pupating like the *Sinoxylon*, in the white wood near the bark. August 4 the first specimen of *Cyllene crinicornis*, Chev., emerged; two or three September 18, and two or three others the first week in October. About fifty per cent. of the larvæ of this species died before entering the pupal state. The larvæ channelled through all parts of the wood. Two or three parasitic Hymenoptera emerged up to November. The *Trogoxylon* continued to thrive and transform until extreme cold weather. Examinations of the wood in April and May, 1905, showed the *Trogoxylon* still at work in the white wood, and every examination during the summer and fall showed live and dead insects of this species.

Some time during July four more specimens of the Longicorn, *Cyllene crinicornis*, transformed, and were found dead, and two or three dead *Sinoxylon Texanum* and one *Elasmocerus terminatus*, Say, were also found.

The capture of two or three specimens of *Hilipus squamosus*, Lec., on spice wood near Galena, Kansas, by Mr. Eb. Crum, has been recorded. This fine Curculionid was described from specimens taken from under pine bark in Georgia. It has also been taken in Kentucky, but it is rather unexpected to find the species in Kansas.

Dr. G. H. Horn, in his "Halticini," 1887, describes *Crepidodera longula*, and says: "Collected at McPherson, Kansas, on Willows, by William Knaus." The Doctor was slightly in error. The type specimen was collected near Osage City, in June, 1883, by myself, and occurs from

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Central Kansas east. I have taken at McPherson two or three specimens of an Epitrix that seems to be new. It is closely related to *cucumeris*, but is larger, thorax more robust, and elytra and thorax almost entirely ferruginous or testaceous.

At Alomogordo, N. M., and El Paso, Texas, the 14th to 20th of June, 1905, the common Aphodius was *pumilus*, Horn, one of the smallest in the genus. Among other things, I sent specimens of this species to Mr. Chas. Dury, of Cincinnati, Ohio. He wrote me that he was glad to see the little fellows, as he had collected the type specimen from which Dr. Horn wrote his description more than twenty years ago, about half a mile north of Las Cruces, N. M. One specimen was all he could find, and this he gave to Dr. Horn.

Aphodius larrea, Horn, is recorded as being taken by Mr. G. W. Dunn on the plant, *Larrea Mexicana*, near El Paso, Texas. I took four specimens of this Aphodius at El Paso, June 18th, 1905. They were not on *Larrea*, but were taken where Aphodius with normal appetites would be expected to be found.

Canthon vigilans, Lec., is recorded as being from Kansas, but I never saw a specimen from this State until I took a single one at McPherson. They are rare in Kansas, this State evidently being the northern limit of range.

Celestethus alternatus, Fall, is described by the author in his revision of the Ptinidae, from three specimens, two of which were taken by Prof. T. D. A. Cockerell with the locality Wootens, N. M. Last June I took two specimens of this species by beating, near Cloudcroft, on the summit of the Sacramento Mountains, nine thousand feet above sea level. Wootens is down Fresno Canon about four miles, and is two thousand feet lower in altitude.

June 14th to 17th, 1905, a new *Dichelonycha*, *testaceipennis*, Fall (MS.), occurred plentifully from Cloudcroft to Wootens, being easily secured by beating scrub oak, young pines and firs, wild roses and willows. I collected over the same ground two years before, and at the same time in the month, but did not see a single *Dichelonycha*.

This season I took several specimens of a fine large Embaphion, which will be described as new by Dr. F. E. Blaisdell, under the name of *contractum*, on the summit near Cloudcroft, N. M. Two seasons before I collected over the same ground on the same dates (June 12th to 17th) as this year, but did not see an Embaphion.

At Alamogordo, N. M., on the flat east of the town, I took, June 13th, 1905, along an overflow stream from an irrigation ditch, a single specimen of what I thought was *Cicindela rectilatera*, Chd. Last December, while looking over the material taken at the above place, I turned this specimen over and noticed that the last ventral segment was reddish testaceous. This is different from the typical *rectilatera*, and I soon ascertained that the insect was *Cicindela flavopunctata*, Chev., recorded heretofore in the United States only from Nogales, Arizona, on the Mexican border. My specimen is a female, and when compared with females of the sub-species *rectilatera* (placed as a sub-species of *flavopunctata* by Dr. Walther Horn in his "Index," published February, 1905), from Texas, it is lighter brown in colour, the elytral suture is more coppery, the head, thorax and body are not so robust, and the last abdominal segment is bright reddish testaceous. As establishing the north-eastern range of this species, it may be noted that Alamogordo is eighty-seven miles north-east of El Paso, Texas, on the Rio Grande, the boundary line between the United States and New Mexico.

The F. H. Snow expedition from the University of Kansas to south-east Arizona, in August, 1905, was fortunate in securing a large series of the heretofore rare *Cicindela pimeriana*, Lec., east of Douglas, on the Mexican boundary. This species, while almost identical in colour with *unicolor*, Dej., and in form with *Hornii*, Schp., is easily recognized despite the rather meagre description we have of it. It is longer than *unicolor*, thorax slightly longer, anterior angles more prominent, constricted at base and apex slightly more than *unicolor*, with median depression deeper. Elytra gradually widening from base to near apex, being almost identical in shape with the body of *Hornii*, except that it is a little smaller and flatter. Labrum white in both sexes, antennæ more slender than in *unicolor*, with basal joints less hairy. Front of head equally hairy in both sexes. Elytra smoother and more shining than in *unicolor*. Colour varying from purple to green. Humeral dot and transverse dash of median band of elytra occasionally present. Upon request, Mr. Eugene G. Smyth, of Topeka, Kansas, examined the elytra of *pimeriana*, and reports as follows: "Under strong power of the microscope, the elytral tips show decidedly serrulate—minutely and beautifully serrulate. The elytral tips of *pulchra* and *scutellaris*, examined under the same power, are entirely smooth. Comparing the surface of elytra of the three species: *scutellaris*, surface smooth, scarlet to crimson, iridescent in all lights, impunctate, or with shallow green punctures anteriorly; *pulchra*, very smooth,

crimson to violet, iridescent only in certain lights, impunctate at apex, strongly punctate anteriorly, the punctures brilliant crimson; *pimeriana* smooth, uniform green, iridescent in certain lights, strongly punctate throughout, as in *fulgida*, the punctures being vivid violet towards apex, more brassy towards humerus. The apparent bluish colour of *pimeriana* is probably due to the combination of green and violet, as there is not the slightest trace of blue to be seen under the microscope."

The late M. L. Linell, in Proceedings of the National Museum, No. 1096, pages 726-7, describes *Lachnosterna alpina* from four male specimens, taken near Alta, Utah. Last December Mr. Tom. Spalding gave me two specimens of this insect, which he obtained by digging, at an altitude of about 10,000 feet, on November 26th, near Alta. They were male and female, and as the original description was made from males, some notes and comparisons with the male may be of interest.

Male: length, 17 mm.; width, 9 mm. Female: more robust; length, 18 mm.; width, 10 mm. Antennal club a little more than half the length of the stem. Punctuation of thorax not so dense as that of the male, but punctures deeper. Punctuation of head dense and deep. Hairs on metasternum not so long or numerous as in male. Pygidium sparsely punctured, with punctures deeper than in male. Hind tarsi shorter and more slender than those of the male. Penultimate segment of abdomen strongly margined. The genital structure is very close to that of *dubia*; the pubic process is almost identical with that of *dubia*, except that it is smaller, slightly flatter and the truncated tips slightly arcuate, with the bristles at the tip and on front surface more numerous and not so long as in *dubia*. The superior plates the same as in *dubia*.

PROCEEDINGS OF THE HAWAIIAN ENTOMOLOGICAL SOCIETY for the year 1905. Honolulu, April 3, 1906. 36 pages, two plates.

The group of able and enthusiastic Entomologists now resident in Honolulu have organized a Society and published their first year's proceedings in pamphlet form. While the papers and discussions naturally deal with local species, there is much in them of general interest; the most important article is Mr. Van Dine's "Notes on a Comparative Anatomical Study of the Mouth-parts of Adult Saw-flies," illustrated with two plates. We heartily wish abundant success and continued prosperity to this new Society and its members.

A FIRST LIST OF ONTARIO ODONATA.

BY E. M. WALKER, B. A., M. B., TORONTO.

(Continued from page 110.)

Sub-family *Cordulegasterine*.

40. *Cordulegaster maculatus*, Selys.—Port Sidney, 1897 (W. Brodie).
Also reported from Ontario by Hagen.

41. *Cordulegaster diastatops*, Selys.—Port Sidney, June 17, 1896 (W. Brodie).

42. *Cordulegaster obliquus*, Say.—In an old box of entomological fragments I found part of the abdomen and one wing of a dragon-fly very different from anything else in my collection. On receiving a specimen of *obliquus* from Dr. Calvert recently, I at once recognized my fragments, and a careful comparison showed that they indeed belong to this species, which could scarcely be mistaken for any other. The specimen was taken many years ago at De Grassi Pt., but I recollect nothing about its capture, and have never seen a *Cordulegaster* of any kind since.

Sub-family *Æschnine*.

43. *Boyeria vinosa*, Say.—De Grassi Point, July 17-Aug., 1901; Algonquin Park, Aug. 8-31, 1902-03, abundant along the North Branch of the Muskoka River.

The nymphs are found at De Grassi Pt., in the clear water, under stones near the lake shore. They transform on boulders, boat-houses, wharves, etc., sometimes climbing to a height of six or seven feet, but usually only three or four.

After the first flight the imagoes often rest for a day or so under the verandah roofs of the cottages, which are only a few steps from the shore. After this I have only occasionally seen them flying quite low along the margin of the lake, but never away from the water. In Algonquin Park they are abundant, but never seem to leave the vicinity of the rivers.

44. *Epiaschna heros*, Fab.—There are two specimens of this insect bearing Toronto labels in Dr. Brodie's collection in the Educational Dept., Toronto. I have twice seen an immense dragon-fly at De Grassi Point, in July, 1903, which I think could have been none other than this species.

45. *Æschna constricta*, Say.—Hamilton (Anderson); Toronto, July-Sept.; De Grassi Point, July 17, 1904-Sept.; Algonquin Park, Aug. 28, 1902; Thessalon, Algoma. The commonest *Æschna* at Toronto, but at De Grassi Point it is usually far outnumbered by *A. verticalis*. This was not the case, however, in 1904.

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46. *Eschna clepsydra*, Say.—De Grassi Point, Sept. 9, 1901; Dwight, Aug. 23, 1903; Algonquin Park, Aug. The commonest species in Algonquin Park in 1902-'03, but scarcer southward.

47. *Eschna verticalis*, Hagen.—Point Pelee, Aug. 7, 1901; Toronto; De Grassi Point, July 16–Aug. 28, 1901, abundant; Tobermory, Bruce Co., Aug. 25, 1901; Algonquin Park, Aug.; Thessalon, Algoma.

48. *Anax junius*, Drury.—Toronto, April–June, Sept., abundant; De Grassi Point, July 9, 1901, Aug. 8, 1901, teneral; Stokes Bay, Lake Huron, Aug. 27, 1901; Queenston, July 1, 1903. The earliest species to appear in the spring.

Family LIBELLULIDÆ.

Sub-family *Macromiina*.

49. *Macromia Illinoiensis*, Walsh.—De Grassi Pt., July 17–Aug.; Algonquin Park, Aug.

This species breeds in Lake Simcoe, and the exuviae are often found upon tree-trunks and boathouses, usually ten or fifteen feet from the shore, and sometimes six or seven feet above the ground. The imagoes are often seen patrolling the roads through the woods, where they fly with great swiftness in a more or less regular beat, and seldom rest. They may also sometimes be seen flying low over the water.

50. *Didymops transversa*, Rambur.—De Grassi Point, July 4, 1901, 1 ♀ from poplar thicket. I have seen two or three others, but they are very rare. A number of exuviae were found in Algonquin Park, where they are probably fairly common.

Sub-family *Cordulinae*.

51. *Neurocordulia Yamaskanensis*, Prov.—A number of exuviae of a *Neurocordulia* were found on the logs of a timber-slide on Ragged Lake, Algonquin Park, in Aug., 1903. Drs. Calvert and Needham, to whom specimens were sent, both expressed the opinion that the species should be *Yamaskanensis*, as the nymph of *obsoleta*, the only other regional species, is already known and is distinct. *N. Yamaskanensis* was described by Provancher from specimens taken on the Yamaska River, P. Q.

There is a ♂ *Neurocordulia* in Dr. Brodie's collection which is not *obsoleta*, but I had no opportunity of ascertaining whether it be *Yamaskanensis* or not.

52. *Epicordulia princeps*, Hagen.—Hamilton (Anderson); Toronto, June; Algonquin Park, Aug., 1 exuvia (Hahn).

This insect breeds in Grenadier Pond, Toronto, but is not very common. I found about a dozen exuviae in a boathouse, and one attached to a reed at the water's edge, and have occasionally seen the imagoes flying over the water. They seem to be quite tireless in flight. The species is probably locally common in Ontario, as I have frequently seen it in collections. There are many specimens in Dr. Brodie's collection, but they are unlabelled.

53. *Tetragoneuria spinigera*, Selys.—I have 1 ♂, 2 ♀♀, of this insect taken by Mr. J. B. Williams at High Park, Toronto, May 24, 1902. They are all teneral. Mr. Hahn has some exuviae from Algonquin Park, which I believe belong to this species.

54. *Tetragoneuria cynosura*, Say.—Toronto, June–July 14, 1904. Algonquin Park, Aug., exuviae (?).

55. *Tetragoneuria semiaquea*, Burm.—Toronto, June, July; De Grassi Pt., July; Go Home and Burwash Bay, Sept. 17, 1903, mature nymphs; Algonquin Park, July 25, 1900 (Macoun), Aug., 1903 (exuviae).

I have bred both *cynosura* and *semiaquea* from nymphs taken from Grenadier Pond, Toronto, and do not believe they can be separated by the characters given by Needham. I am pretty well satisfied that they are one and the same species.

Semiaquea is much the commoner form wherever I have collected.

56. *Helocordulia Uhleri*, Selys.—Algonquin Park, Aug., 1903–4, a number of exuviae.

57. *Somatochlora elongata*, Scudd. — Toronto, June; De Grassi Pt., June 29, 1901–July 19, 1904; Algonquin Park, Aug. 17–20, 1903.

This species is abundant at Lake Simcoe and Algonquin Park, but is very difficult to capture, as it usually flies at a height of twenty to forty feet, seldom descending to within reach of the net. It frequents woodland roads and glades. I took one specimen inside the house at Toronto.

The superior appendages of the male are more incurved in the examples from Toronto and Lake Simcoe than in those from Algonquin Park.

58. *Somatochlora forcipata*, Scudd.—Algonquin Park, July 15, 1900, 1 ♂ (Macoun).

59. *Somatochlora tenebrosa*, Say.—Hamilton (?), 1 ♂ (Anderson).

60. *Cordulia Shurtleffi*, Scudd.—Algonquin Park, Aug. 11, 1904, 1 exuvia (Hahn).

61. *Dorocordulia libera*, Selys.—De Grassi Pt., July, rare; Thessalon, Algoma, 1 ♂.

Sub-family *Libellulinae*.

62. *Nannothemis bella*, Uhler.—This species has been reported from Ontario by Hagen, but I have never seen it at large.

63. *Celithemis eponina*, Drury.—Toronto, July, common around Grenadier Pond; Sarnia, Aug. 12-16, 1901.

64. *Celithemis Elisa*, Hagen.—Toronto, June 24-July, 1901, common locally; Go Home, Georgian Bay; Sarnia, Aug. 12, 1901, common; Dwight, Muskoka, Aug. 23, 1903, 1 ♂.

65. *Leucorhinia intacta*, Hagen.—Hamilton, June; Toronto, May 20, 1903-July, Aug. 26, 1904, very abundant; Lake Simcoe, June-July 13, 1901.

This species breeds in great numbers in Grenadier Pond, and after *Anax junius*, is the first one to appear in the spring. The specimen taken on Aug. 26 had emerged long after the regular season for the species was over. It was a rather undersized teneral female, and the wings are suffused with a smoky colour, and deep yellowish at base.

66. *Leucorhinia glaciatis*, Hagen.—This insect has been reported by Hagen from London and Michipicoten, Lake Superior.

67. *Leucorhinia frigida*, Hagen.—There are a number of specimens of both sexes of this species in the collection of the Biological Dept., Toronto, taken at Go Home, Georgian Bay. I have also two females from Algonquin Park, taken by Prof. Macoun July 7, 1900.

68. *Sympetrum scoticum*, Don.—De Grassi Pt., July 3, 1904, 1 ♂ from a clearing in a tamarack swamp near a sluggish stream. I have done much collecting in this spot, but have never seen another example. It has been reported from Ontario once before by Hagen, and probably occurs more commonly in the north, as I have found it abundant in Quebec.

69. *Sympetrum costiferum*, Hagen.—Toronto, July-Aug.; Toronto Island, flying over the lagoons, July 25, 1904; Bruce Peninsula, Aug. 23, 1901; Thessalon, Algoma. This species is somewhat local, but is fairly common along the Don River, Toronto, and around the lagoons at Toronto Island.

70. *Sympetrum vicinum*, Hagen.—Toronto, Sept. 8, 1902; Point Pelee, Aug. 7, 1901; Walpole Island, River St. Clair, Aug. 13, 1901; Algonquin Park, Aug. 18-Sept. 1, 1902-3; Dwight, Sept. 2, 1902; De Grassi Pt., Aug.-Sept. A very common and generally-distributed species.

71. *Sympetrum semicinctum*, Say.—Toronto, Oct., 1891; De Grassi Pt., Aug., very rare; Go Home, Georgian Bay; Algonquin Park, Aug. 17, 1903; Catfish Lake, Algonquin Park, July 23-25, 1900 (Macoun). A local species, sometimes common where it occurs.

72. *Sympetrum assimilatatum*, Uhler.—Walpole Island, River St. Clair, Aug. 13, 1901, a fair specimen taken with *S. rubicundulum* and *obtrusum* from an open marsh.

73. *Sympetrum rubicundulum*, Say.—Hamilton; Toronto, July-Nov.; De Grassi Point, July 15, 1901-Sept.; Walpole Island, River St. Clair, Aug. 13, 1901; Niagara Glen, June 28, 1903; Go Home, Georgian Bay; Algonquin Park, July-Aug.; Thessalon, Algoma. Our most abundant *Sympetrum*. Specimens from Walpole Id. average considerably larger than those from Algonquin Park.

74. *Sympetrum obtrusum*, Hagen.—Toronto, July-Oct.; De Grassi Pt., July-Sept.; Walpole Id., River St. Clair, Aug. 13, 1901; Southampton, Aug. 20, 1901; Algonquin Park, July-Aug. Abundant, but less so, as a rule, than *rubicundulum*.

75. *Sympetrum corruptum*, Hagen.—Toronto, Humber River, Sept. 25, 1891, 1 ♀ (Brodie).

76. *Pachydiplax longipennis*, Burm.—Hamilton (Anderson); Toronto, June 22, 1903-Aug.; Burwash Bay, Georgian Bay, Sept. 17, 1903, mature nymphs.

I have bred this species from nymphs taken in Grenadier Pond, Toronto, where it flies in abundance in July.

77. *Mesothemis simplicicollis*, Say.—Point Pelee, Aug. 8, 1901, 1 ♂ worn and pruinose; Hamilton (Anderson); Toronto, June 20, 1903; De Grassi Pt., July 13, 1901. A common species in Toronto and southward, but rare further north.

78. *Micrathyria berenice*, Drury.—This species has been reported by Calvert from the Thousand Islands, New York, and is therefore doubtless a resident of the adjoining parts of Ontario.

79. *Ladona Julia*, Uhler.—London; Toronto, June 24, 1904; Go Home, Georgian Bay, July 19, 1904, young and half-grown nymphs, 1 ♂ imago, no date; Algonquin Park, July 5, 1900 (Macoun).

80. *Libellula incesta*, Hagen.—Pt. Pelee, Aug. 7, 1901, 3 ♀♀.

81. *Libellula basalis*, Say.—Hamilton; Toronto, June 22, 1901-July, abundant at High Park; Lake Simcoe, July 4, 1901; Niagara Glen, June 28, 1903.

82. *Libellula quadrimaculata*, L.—Hamilton; Toronto, May 20, 1901–July; De Grassi Pt., July 4, 1901.

This widespread species is always common in Ontario, and sometimes exceedingly abundant.

83. *Libellula semifasciata*, Burm.—Toronto, High Park, June 11, 1901, June 15–22, 1903, common and the first *Libellula* to appear in the spring.

84. *Libellula pulchella*, Drury.—Point Pelee, Aug. 7, 1901; Sarnia, Aug. 12, 1901; Hamilton, June; Toronto, June 22–Aug.; De Grassi Pt., July 3–5, 1901; Go Home, Georgian Bay, July, 1904; Thessalon, Algoma.

This species is nearly as abundant and some seasons more so than *L. quadrimaculata*.

85. *Plathemis Lydia*, Drury.—Point Pelee, Aug. 8, 1901; Niagara Glen, June 28, 1903; Hamilton; Toronto, June 24–July; De Grassi Point, July 15–19, 1901; Thessalon, Algoma.

86. *Tramea Carolina*, L.—Toronto, May 24, 1904, one fresh male. The only other *Tramea* I have ever seen was flying over a pond near Toronto, on June 24, 1901. I watched it for half an hour, but it never rested, and never came within my reach.

TWO NEW HOMOPTERA FROM AFRICA, AND SYNONYMICAL NOTES.

BY G. W. KIRKALDY, HONOLULU.

Superfamily TETIGONIOIDEA.

Scaphoideus Annae, sp. nov.—Different from all the other species of *Scaphoideus* known to me, by the presence of only one median subapical cell in the tegmina, instead of two; the subcostal (marginal) cell widens apically, the outer branch of the radial vein being continuous up to the apex of the tegmen, not ending at the base of the subapical cells as in the other species. The interolateral margins of the eyes are straight, diverging very slightly towards the dorsal apex, and the posterior margin of the pronotum is a little more emarginate. It may be taken as the type of a new subgenus, *Scaphoidophyes*. (*Scaphoideus* proper has been found in America, Ceylon, Japan, Australia and Hawaii, the last doubtless introduced.)

May, 1906

Vertex black, with three small whitish testaceous spots at the apex, this being also the colour of the face, sterna and legs. There are also two tiny testaceous specks, and a short, narrow line at base of vertex. Pronotum dark fulvous, anterior and lateral margins irregularly black. Scutellum pinkish brown, posteriorly ivory-white, lateral margins broadly black. Tegmina fulvotestaceous, subhyaline, subcostal (marginal) area ivory-white, a black wedge about the middle; extreme base, veins more or less, and apex of tegmina, blackish smoky. Wings smoky. Vertex not quite as long, or about as long, as broad between the eyes, apically obtuse angled. Pronotum basally a little wider than head with eyes. Anal vein of tegmina united to suture by a cross vein which is curved apically. Length, 6 mm. to apex of tegmina.

Hab.—Africa, Hinterland of the Ivory Coast, Bouake.

Superfamily FULGOROIDEA.

Oliarus Bouakeanus, sp. nov.—Allied to *O. Natalensis* (Stal.).

Ferruginous, deepening on the scutellum; a spot on each side of the vertex, the pronotum in the middle, keels of frons and clypeus, and a spot at the junction of the two last named, yellowish. Scutellar keels yellowish-ferruginous. Tegulae obscure yellowish, sometimes darker at the extreme anterior part. Tegmina hyaline, more or less unevenly suffused with cinereous, strongly granulate, subcostal (marginal) vein with about 18 or 19 granules, of which 13 are on the apical half and 4 close to the base. Apical half of tegmina with irregular brown spots and flecks. Veins pale yellow or colourless, granules blackish brown. Stigma obscure pale brown, with a dark streak on the interior margin. Legs pale yellowish. Abdomen more or less dark ferruginous.

Vertex a little longer than wide, a little wider at base than an eye, lateral margins converging anteriorwards, and forking about their middle, the inner branches meeting acute-angularly. Head much narrower than the pronotum. Lateral keels of scutellum straight, converging a little posteriorly, submedian keels curved. Radial vein forks much farther from the base than does the cubital. Length $5\frac{1}{2}$ – $6\frac{1}{2}$ mm. to apex of tegmina.

Hab.—Africa, Hinterland of the Ivory Coast, Bouake.

SYNONYMICAL NOTES, ETC.

Cathedra, Kirkaldy, 1903, Entom., XXXVI, 179 = *Pristiopsis*, Schmidt, 1905, Stettin. Ent. Zeit., LXVI, 332 (homotypical).

Delphacissa, new subg. of *Delphacodes*, representing Fieber's typical subgenus of "*Delphax*," characterized by "Stirnkiel bis auf den Scheitel fadenförmig"; type *uncinata*.

Delphacodes Melichari, n. n. = || *Liburnia fumipennis*, Melichar, nec Fieber.

D. Anne, n. n. = || *Delphax concinna*, Fieber, nec Stal.

D. taprobanensis, n. n. = || *Liburnia pallidula*, Melichar, nec Boheman.

D. sinhalanus, n. n. = *Liburnia frontalis*, Melichar, nec Kirschbaum.

D. Kahavalu, n. n. = *Delphax venosus*, Motshulsky, nec Germar.

Eumelicharia, n. n. = || *Walkeria*, Mel., nec Flem., type *Flata radiata*, Dist.

Ormenis epilepsis, n. n. = || *marginata* (Brünn).

I wrote Dr. Melichar some years ago that his names were preoccupied, but as he has not, to my knowledge, altered them yet, I must do so now.

PRACTICAL AND POPULAR ENTOMOLOGY.—No. 13.

SOME BEETLES OF EARLY MAY.

BY C. J. S. BETHUNE, LONDON, ONTARIO.

Many of our younger members are now for the first time forming a collection of insects. They are filled with delightful enthusiasm, and almost everything is a prize that comes within reach of their nets. Butterflies and beetles are usually the first to attract attention and to become the most conspicuous features in the incipient collection. Not many of the former are yet on the wing, but an almost endless variety of beetles may be found by careful search, aided by sharp eyes and nimble fingers. It is the object of this paper to draw attention to some of the more conspicuous species.

First in order come the Tiger Beetles (*Cicindela*), of which over thirty varieties are to be found in the Dominion, but only about a dozen in Ontario. These lively creatures are to be found in hot sunny places, such as the sandy margins of streams, dry roads and footpaths, and one or two species on logs or boulders to which the sunlight has access in open woods or groves. Though brilliantly metallic in colouring when closely observed, they generally conform very much to the ground they frequent, and would not be seen by an untrained eye, but a little watchfulness soon reveals the beetle as it runs about in search of its prey, and

then a swift stroke of the net is required for capture. They are ever on the alert, and when alarmed take instant flight for a few yards, and come to the ground with their face to the pursuer; as he draws near they fly again, and after some distance has been covered in this way, a long flight is made back to the starting place. However, after a little practice they can be captured in fair numbers. The following are our commonest species:

Cicindela vulgaris (fig. 13) and *C. purpurea* (fig. 14) are widely distributed, and may be found very early in the season; the figures show their characteristic markings, the latter, as its name implies, is of a beautiful reddish purple colour above. *C. generosa* (fig. 15) is a magnificent



FIG. 13.



FIG. 14.



FIG. 15.



FIG. 16.



FIG. 17.

creature, but is not nearly so abundant as the preceding species; sometimes it is found in gardens. *C. hirticollis* (fig. 16) and *C. repanda* frequent hot sandy places, but *C. sexgutta* (fig. 17), a very beautiful metallic-green species, and *C. punctulata*, a slender and smaller blackish beetle, are found in open woods or on somewhat shady roadsides. The larvæ of these beetles (fig. 18), live in holes in the sand, where they lie in wait for their prey; they have a metallic head with formidable jaws, and a curious hump on their backs, which prevents them from slipping down in their dens.



FIG. 18.

On dull cloudy days, when there are no Tiger Beetles about, and on bright days also for that matter, the collector may turn over loose stones, logs, pieces of board, or other rubbish, and he will be sure to find a variety of beetles of all sizes hurrying away to hide themselves from the sudden exposure to light. These are for the most part

Ground-beetles (*Carabidae*), which form a very large family, the members of which resemble each other closely in general appearance, and, with few exceptions, are very hard to name correctly. Fig. 19 (*Harpalus caliginosus*) represents a common shape and the prevailing black colour; (fig. 20) the Bombardier beetle (*Brachinus*), so called from its remarkable power of discharging a very pungent fluid, accompanied by a slight report and some smoke-like vapour; this will stain the captor's fingers, and is evidently a means of defence against ordinary enemies; the head and thorax of this beetle are yellowish-red, and its wing-covers dark blue.



FIG. 19.



FIG. 20.

A large and handsome beetle of this family will also be occasionally met with—the Caterpillar-hunter—(*Calosoma calidum*), fig. 21. It is black, with rows of bright coppery spots on the wing-covers, and may be at once recognized from the figure. When handled it leaves on the fingers a persistent odour that is not very agreeable. With these ground beetles the collector is sure to find some very pretty silky-green specimens of medium size (*Chlenius sericeus*).



FIG. 21.

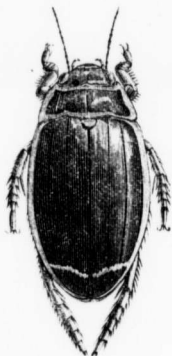


FIG. 22.

Let the explorer now turn to the water. In shallow ponds in fields and meadows, which dry up in summer, there will usually be found a variety of swiftly-swimming water-beetles; one of the largest, *Dytiscus Harrisii*, is shown in fig. 22. These are by no means easy to catch, but with a long-handled water-net one may have exciting sport and fair success. In the mud, or running over it, on the margins of pools and streams, many minute species of beetles will also be found.

The enthusiastic collector is not apt to be fastidious, and will not, therefore, hesitate to turn over horse and cow manure, under the masses of

which he will find Rove-beetles (*Staphylinide*), long, narrow creatures, whose wing-covers only partially cover the abdomen, and who run swiftly with their tails turned up over their backs; also several species of Dung-beetles (*Scarabæide*), one of which has a black head and thorax and bright wing-covers, the colour of red sealing-wax (*Aphodius fimetarius*).

Flying low in open fields on the borders of woods, and making a noise like a bumblebee, there may be captured a stout hairy beetle, half an inch long, of an ivory colour, sprinkled all over with irregular black spots (some specimens are entirely black)—this is sometimes called the Bumblebee beetle (*Euphoria inda*). When it appears again in the autumn it is known to fruit-growers as a very destructive creature, from its habit of burrowing into ripe pears and peaches.

During warm evenings the May beetles or Cock-chafers (*Lachnosterna*) come out in myriads, attacking the tender foliage of trees and shrubs, and often coming into houses, attracted by light. Fig. 23 represents the beetle and its grub and chrysalis. Later on in the month, about Victoria day, May 24, the handsome Goldsmith beetles (*Cotalpa*

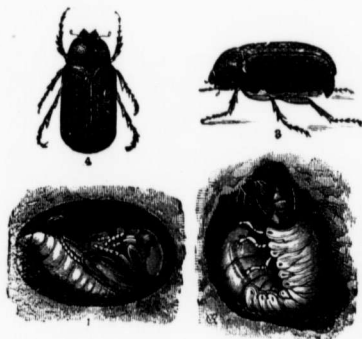


FIG. 23.

lanigera) are on the wing for a few evenings, and may be found under electric lights in the streets of towns and villages. This fine beetle has the head and thorax golden and the wing-covers creamy-yellow; beneath it is metallic-green with a woolly breast.

Enough has now been written to show the young collector what a rich field is open to him in air and field and water, and what an infinite variety of curious and beautiful forms will reward a patient search. The joy of success may soon be his, and he will be filled with the delight of finding new and interesting creatures wherever his explorations may extend.

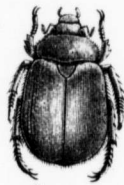


FIG. 24.

NEW ROCKY MOUNTAIN BEES, AND OTHER NOTES.

BY T. D. A. COCKERELL, BOULDER, COLO.

Bombus iridis phacellæ, n. var.—♀. Hair of face black, with a little pale intermixed; yellow hair of thorax in front dense, not at all mixed with black; yellow of scutellum neither divided nor mixed with black; hair on inner side of basal joints of tarsi dark; *hair on second and third abdominal segments entirely deep red* (much less dense, and not nearly so bright as in *B. ternarius*), but second with a large bare median triangle; hair of fourth segment and sides of fifth yellow.

Hab.—Ward, Colorado; alt. 9,000 ft., at flowers of *Phacelia circinata*, July 18, 1905. (W. P. & T. D. A. Ckll.) This has the structure of *B. iridis*, but the brightly-coloured abdomen gives it such a different aspect that I at first took it for a new species. I am now convinced that *B. iridis* belongs to the series of *B. ternarius*, in which it is easily recognizable by the red of abdomen being confined to segments 2 and 3, hair of face mostly black, yellow of thorax anteriorly not mixed with black, and pubescence on inner side of hind tarsi fuscous. No doubt *bifarius* and *ornatus* are varieties of *ternarius*, but *iridis* appears to be a perfectly valid species.

Osmia hypocrita, n. sp.—♀. Black; of the narrow, parallel-sided type; abdomen shining, scopa black; front, vertex, thorax above, and first two segments of abdomen, with much rather dull white hair; pleura, rest of abdomen, and legs, with black hair, not at all dense. Length about (or hardly) 13 mm., width of abdomen about $3\frac{1}{2}$ mm. In all respects this is so like *Monumetha argentifrons* that, until I examined it with a lens, I did not doubt that it belonged to that species. It is, nevertheless, undoubtedly distinct, and will be easily separated by the following characters: Mandibles smaller, in the closed condition I see only two teeth, and there do not seem to be others; the upper and lower (or inner and outer) mandibular carinæ are, at their ends, at least twice as close together as those of *M. argentifrons*; clypeus with a strong, smooth and shining, longitudinal median ridge; anterior edge of clypeus somewhat turned up, and broadly and shallowly emarginate; hair on clypeus and at its sides white, but some short black hair near its anterior edge; eyes *diverging* above (in *M. argentifrons* they slightly converge above); hair on lower part of cheeks white; vertex smaller; parapsidal grooves strongly converging anteriorly; punctures of mesothorax denser and smaller; the wings offer nothing distinctive in colour or venation, except that the second recurrent nerve is less distant from the end of the second submarginal

cell; the abdomen and legs are about the same, except that the light hair of the abdomen has not any distinct tendency to form patches, and is reduced almost to nothing on the third segment. Perhaps this should be referred to *Mouumetha*, if that is a valid genus; but I am not quite sure whether it is really a close ally of *M. argentifrons* or an example of "convergent evolution." *O. frigida*, Sm., seems to be allied.

Hab.—Boulder, Colo., June 27, 1905. (W. P. Cockerell.)

Osmia Novomexicana, Ckll., was taken at Boulder, Colo., June 17, 1905. (W. P. Cockerell.) It is new to Colorado.

Nomada ornithica, n. sp.—♂. Length, 8 mm., or a little more; black and lemon-yellow, with some red on legs; belongs to the subgenus *Xanthidium*. Head and thorax densely and coarsely rugoso-punctate; eyes sage-green; head broad; mandibles (except apically), labrum, clypeus, supraclypeal mark (which is large, and broader than long) and lateral face-marks all yellow, except that there is a very small black spot on each side of clypeus, at the suture; labrum with a very small apical tubercle; face little hairy, but the supraclypeal area and upper part of clypeus are covered with appressed white hair; lateral face-marks triangular, following clypeus to the top, but ending bluntly and a little away from the orbital margin, a short distance below level of antennæ; lower orbital margin narrowly yellow, the stripe going a short distance up the posterior margin; scape swollen, lemon-yellow, black behind; flagellum thick, red beneath and laterally, but black above, the black more extensive on the apical joints; no sign of denticulation; third antennal joint about half as long as fourth; mesothorax coarsely rugoso-punctate, entirely black; upper border of prothorax, tubercles, tegulæ, large mark on pleura (having the shape of a bird's head and neck, the tip of the bill almost touching the tubercle), scutellum, except margins, and a short band on postscutellum, all yellow; scutellum swollen and gibbous; metathorax black, with a small yellow spot on each side near the lower end; anterior coxæ without spines; legs yellow, suffused with ferruginous basally, with black on the coxæ, trochanters, and posterior femora and tibiæ behind; wings dusky at apex, stigma ferruginous, nervures more fuscous; basal nervure meeting transverse-medial; second submarginal cell twice as broad as third above; abdomen very minutely punctured, and with six broad yellow bands, the intervals between the first four black, but the hind margins of the fourth and fifth segments reddish; apical segment black basally; apical plate notched; ventral segments nearly all

yellow, with the hind margins broadly light reddish, except the basal segment, which is black, with a large yellow mark not unlike a buffalo-skull in shape.

Hab.—Boulder, Colo., June 11, 1905. (W. P. Cockerell.) In many respects this agrees with the description of *N. flavipes*, Provancher, but I have supposed that to be really a *Micronomada*. Should *flavipes* prove to be a *Xanthidium*, it will be separated from *N. ornithica* by its larger size, yellow posterior orbits, yellow of scutellum reduced to two spots, darker wings, etc., but it is known only in the female, and the male might show more resemblance. In my table of Rocky Mountain *Nomada*, *N. ornithica* runs to *N. civilis*, which it closely resembles in general appearance, but it is easily known from *civilis*, by the broad short lateral face-marks, the much more parallel orbits, the longer fourth antennal joint, etc. In my *Xanthidium* table (Proc. Phila. Acad., 1903, p. 580) it runs to *N. pascoensis*, but differs in the lateral face-marks, much less red on legs, etc.

Augochlora fervida, Smith.—Boulder, Colo.; 2 ♀'s, June 4 and 10, 1905. (W. P. Cockerell.) Mr. Titus does not credit this species to Colorado in his article in CAN. ENT., May, 1901. Our specimens have the hind spur with four spines, except that one has only three on one side. They differ from *A. humeralis* in having the first four ventral segments of abdomen green, but it is doubtful whether *humeralis* is really a distinct species. In Mr. Vachal's recent paper (Misc. Entomologica, 1903-4) the species of *Augochlora* are referred to *Halictus*, and *humeralis*, being preoccupied in that genus, is changed to *Pattoni*. However, the description of *Pattoni* given by Vachal does not accord with *humeralis*; but, except for certain characters (colour of tibiae and tarsi, 4 spined spur) of the legs, suggests *A. cerulea*, Ashm., and a specimen is cited from Fort Lupton, Colo., which must be one of those already recorded by Titus as *cerulea*. On the other hand, I feel reasonably sure that the Texas material of *chorisis*, Vachal, must have been *fervida*.

Sphcodes eustictus, n. sp.—♀. Length hardly 6 mm. A *Sphcodium* (this hardly seems a distinct genus), allied to and closely resembling *S. Cressonii*, Rob., or *S. mandibularis*, Cress. (these are probably not distinct species), but very easily distinguished from these by the conspicuously punctured second abdominal segment.

Labrum not emarginate; mandibles ferruginous; antennal joints 3 and 4 both very short, and of about the same length; punctures of vertex strong and dense; of clypeus very large but sparse; mesothorax shining, with large, distinctly-separated punctures; tegulae pale testaceous; area

of metathorax semicircular, well defined, well plicate basally, otherwise with irregular raised lines, forming a few polygonal areas: basal nervure falling short of transverso-medial; fifth and sixth abdominal segments darkened; first segment with very sparse punctures, irregularly scattered, some large, some microscopical, the effect reminding one of the stars in the sky; basal half of second segment with numerous very distinct punctures, and minute (microscopical) ones scattered between; third segment hairy, with numerous minute piliferous punctures.

Hab.—Prospect Lake, Colorado Springs, Colo., May 22, 1904.
(T. D. A. & W. P. Ckll)

Colletes salicicola, Ckll., subsp. *geranii*, nov.—♂. Compared with female *salicicola* (the only sex known) from Las Cruces, N. M., *geranii* shows the greatest similarity, only the following differences being such as might not well be merely sexual: malar space longer, being about or nearly as long as broad; first recurrent nervure joining the very broad second submarginal cell at or a little beyond its middle (conspicuously beyond in *salicicola*); clypeus with very close small punctures in the middle above; sides of apical triangle of metathorax (below the transverse ridge) wholly without the definite fine raised lines of *salicicola*; first abdominal segment more strongly punctured. The abundant white hair is as in *salicicola*. Flagellum long, very dark reddish, nearly black; stigma ferruginous; no black hair anywhere; legs black, only the claws and ends of claw-joints ferruginous; labrum with a median pit. Length 8 mm.

In my table in *Psyche*, 1905, it runs to *C. gaudialis*, but differs by the colour of the stigma and thoracic hair. It does not agree with anything in Robertson's table; it runs first to 4, and then on to 5, though joint 4 is not quite as long as 2 + 3, then on to 10, where it could only be compared with *C. productus*, but the punctures of the scutellum are similar to those of the mesothorax, and the tegulae are clear testaceous (black in *productus*).

Hab.—Boulder, Colo. (W. P. Cockerell.) Five males, June 10 to 27; one at flowers of wild *Geranium*.

Colletes Tucsonensis, n. sp.—♂. Tucson, Ariz., Nov. 7. (Cockerell.) Length nearly 9 mm.; exceedingly like *C. salicicola geranii*, but differing thus: malar space shorter, distinctly broader than long; labrum with three broad grooves or sulci; punctures of mesothorax rather larger; abdomen broader, the punctures of the first segment sparser. The white

hair is quite the same. It is also very like *C. gypsicolens*, Ckll., but differs from that by the much broader abdomen, with the second and third segments very much more strongly punctured, and the darker, redder stigma. The lateral faces of truncation of metathorax are shining, with piliferous punctures; the triangle (below the cross-ridge) is very shiny, scarcely at all sculptured, except for a median longitudinal keel failing below. The tegulae are rufo-testaceous, darkened basally. Second submarginal cell very broad; b. n. falling a rather long distance short of t. m. (almost reaching t. m. in *gypsicolens*). In Morice's European table (Tr. Ent. Soc., Lond., 1904), *C. Tucsonensis* runs to *C. nanus*, but it is larger, and the abdominal bands are by no means as broad as the spaces between them. The malar space is, however, rather short for this group, and if we look for the species among those with a short malar space (for which, however, it is a little too long) it runs to 15, and has long erect hairs on disc of second segment, but only short ones on the following. It could then run to 19 (the intermediate joints of posterior tarsi being longer than broad), but the sixth ventral plate is quite simple, there being at most a faint basal elevation of small size to indicate the rudiment of a carina. (This plate is also simple in *gypsicolens*, but in *geranii* it has a distinct though delicate carina).

Greeleyella Beardsleyi, Ckll.—Boulder, Colo., June 5, 1905. (W. P. Cockerell.) One ♂. This genus and species was previously known only from the female, obtained at Greeley, Colo., where, as I learn from Professor Beardsley, it visits the flowers of *Malvastrum coccineum*. The male from Boulder has darker nervures, a less obliquely truncate marginal cell, and the first recurrent nervure enters the first submarginal cell not far from the end, instead of meeting the transverso-cubital. These differences may possibly indicate a second species, but I do not think so. The sexual characters are as follows: Head broad and subquadrate; clypeus creamy white, with a black process directed downwards on each side of the labrum; face otherwise dark; labrum ferruginous, with a prominent transverse ridge or keel; mandibles nearly all ferruginous; tibiae and tarsi, and about apical third of femora, light ferruginous.

Since writing the above, I have found in my wife's collection a female taken at Boulder, June 17, 1905, at flowers of *Malvastrum*. It agrees in venation with the female type. There is also a male taken June 17, in which the first recurrent nervure joins the transverso-cubital, but otherwise identical with the male of June 5.

Ceratina nanula, Ckll.—Boulder, Colo., June 27, 1905. One ♀ at flowers of *Calochortus Gunnisoni*, and one ♂ at flowers of *Osmodium* (W. P. Cockerell), known from *C. Neomexicana* by the very small size and clear wings. This and the next are new to Colorado.

Ceratina Neomexicana, Ckll.—Common at Boulder, Colo. The male, not before described, differs in the usual manner from the female; the branches of the clypeal T are about equally long, but the upper one is much broadest; the supraclypeal area has a few large punctures; the projecting point on the sixth abdominal segment is covered with light hair having a fulvous tint; apical projection small and low; process on hind femora large, forming more than a right angle. This is, perhaps, more like *C. Tejonensis* than any other male *Ceratina*, but the end of the abdomen is quite different. The Boulder females include specimens with the following data: June 26, at flowers of *Platycodon grandiflorum* in cult. (Ckll.); Aug. 3, in flower of *Argemone intermedia* (Ckll.); June 12, at flowers of *Onosmodium* (W. P. Ckll.); June 27, at flowers of *Calochortus Gunnisoni* (W. P. Ckll.); April (Sellars and Williams).

Sphecodes Pecosensis, Ckll.—Boulder, Colo., 1905. (W. P. Ckll.) The specimen has the mandibles only bulging within, with nothing that could be called a tooth, but it is in all other respects exactly like one from Cheyenne Canon, which has a well-formed tooth, as in the type. It is evident that the presence or absence of a tooth on the mandibles should not be held to distinguish a species of *Sphecodes* (at any rate, when exhibited by a single specimen) in the absence of other characters. *S. Pecosensis* has much superficial resemblance to a number of species, but is easily known by the first two abdominal segments being sparsely punctured, the punctures conspicuously of two sizes, the strongly-depressed suture between these segments, and the dark hair at the apex of the abdomen.

Proteraner leptanthi, Ckll., was also taken by my wife at Boulder (male, June 10); so also *Sphecodes Sophie*, Ckll. (♀, June 12.)

Prosopis Fedtschenkoi, n. n.—*Prosopis frontalis* (F. Morawitz, in Fedtschenko, Turkestan Mellifera, II., 1876, p. 275). (Not of Fabricius, 1804.)

The Fabrician insect is a *Camptopoeum*, but it was described as a *Prosopis*, and according to the rules in vogue the name may not be repeated in the genus.

Prosopis Pereziana, n. n.—*Prosopis Morawitsi*, Perez. Esp. Nouvelles Mellifères, 1903, p. 68. (Not of Dalla Torre, 1896.)

Andrena metallescens, n. n.—*Andrena metallica*, Radosz. Horæ Soc. Ent. Ross., 1876, p. 83. (Not of Fabricius, 1793.)

Andrena succincta, Imhof, 1832.—This name is a homonym, because of *A. succincta*, Fabr., 1781, Petagna, 1786 (= *Dasygoda*), but the species is quite uncertain, and being now nameless, may be consigned to oblivion.

Apis dorsata Binghami, n. n.—*Apis zonata*, Smith. Jn. Linn. Soc. III, 1859, p. 8. (Not of Gravenhorst, 1807.)

Apis mellifera Lamarckii, n. n.—*Apis fasciata*, Latreille. An. Mus. Hist. Nat., 1804, p. 171. (Not of Linné, 1767.)

Crocisa Frieseana, n. n.—*Crocisa atra*, Friese. Z. f. Hym. u. Dipt., 1905, p. 7. (Sunda Archipelago.) (Not of Jurine, 1807.)

The following are also homonyms, and must be given new names :

Megachile pruinosa, Friese, 1903. Texas. (Not of Perez, 1897.) Friese (in litt.) holds that *pruinosa*, Perez, is *argentata*.

Sphcodes gracilior, Perez, 1903. Algeria. (Not of Morawitz, 1894.)

Nomada superba, Perez, 1903. France. (Not of Cresson.) Prof. Perez writes that his *superba* is a remarkable variety of *N. chrysopyga*, Morawitz; it may stand as *N. chrysopyga Pereziana*.

Colletes brevicornis, Perez, 1903. (Not of Robertson, 1897.)

Halictus testaceus, Nurse, 1902. India. (Not of Robertson, 1897.) Nurse has proposed the name *H. orpheus* for his species.

Halictus nigricornis, (Fabr.) Say, 1837, does not invalidate *H. nigricornis*, Morawitz, 1886 (from Tibet), because the Fabrician insect was originally described under *Andrena*, and is an *Agapostemon*. It is a generally accepted (I believe) and very excellent restriction of the rule regarding homonyms, that secondary references (*i. e.*, subsequent to the original description) do not count, unless the species referred is still considered to belong to the genus to which it was transferred.*

Eulema, Lep.—Lepelletier, Hist. Nat. Ins., Vol. 2, 1841, spells this name *Eulema*, giving *Eulema* as the vernacular (French) rendering. Curiously, all authors have used the latter spelling instead of the former. Scudder (Nomenclator Zoologicus) has the correct spelling.

Epeolus interruptus, Rob.—Boulder, Colo. At flowers of *Townsendia grandiflora*, July 5, 1905. 3 ♀'s. (W. P. Cockerell.) Previously known only from Illinois.

*Incidentally, it is to be noted that some of the names of our Noctuid moths are homonyms. Thus *Lycophotia congrua* is based on *Agrotis congrua*, Smith, 1890, not of Walker, 1865. *Triphaena confusa* is based on *Agrotis confusa*, Smith, 1887, not of Alpheraky, 1882.

NOTES ON SOME MOSQUITOES FROM NEWCASTLE,
JAMAICA.

BY M. GRABHAM, M. A., M. B., GOVERNMENT MEDICAL SERVICE, JAMAICA,
WEST INDIES.

During the summer and autumn of 1905 several small collections of mosquitoes were sent to me by Major Hassard, of the Royal Army Medical Corps, and Colonel Loscombe, from the Military Station at Newcastle, alt 4,000 feet, and more recently a number of living larvæ from the same locality, collected by Miss Maclaverty. The species represented are as follows:

1. *Stegomyia fasciata*, Fab.
2. *Culex fatigans*, Wied.
3. *Culex secutor*, Theo.
4. *Culex Hassardii*, nov. sp.
5. *Howardina Walkeri*, Theo.
6. *Howardina aureostriata*, nov. sp.
7. *Dendromyia*, ? nov. sp.

1. *Stegomyia fasciata*, Fab.—A few specimens of this form and *S. fasciata*, Fab., sub-species *Luciensis*, Theo., were sent in one of Major Hassard's collections. It appears to be quite uncommon.

2. *Culex fatigans*, Wied.—Specimens were received in all the collections, and the larvæ from rain-water barrels.

3. *Culex secutor*, Theo.—Very abundant and troublesome during the day. Larvæ very numerous in tanks and river-side pools.

4. *Culex Hassardii*, nov. sp.—♀. Head grayish, with narrow curved pale golden scales and hairs clustered thickly on the occiput and between the eyes, upright forked scales on the nape, sides of the head black, eyes bordered with bright white scales; antennæ, palpi and clypeus black; proboscis black, penultimate quarter of its length banded with yellow scales; apex yellow. Thorax grayish, clothed with numerous elongated spindle-shaped black and white scales; white scales collected in two conspicuous white spots near the centre, and a broad area near the scutellum, also in patches along the borders of the mesothorax, a number of long black hairs especially abundant about the origin of the wings. Prothoracic lobes white-scaled. (Fig. 25, 4.) Central lobe of the scutellum white scaled. Lateral lobes black. Pleura black, with several patches of white scales. Metanotum deep brown. Halteres with pale yellow stems and knobs. Legs bluish-black, clothed with black scales

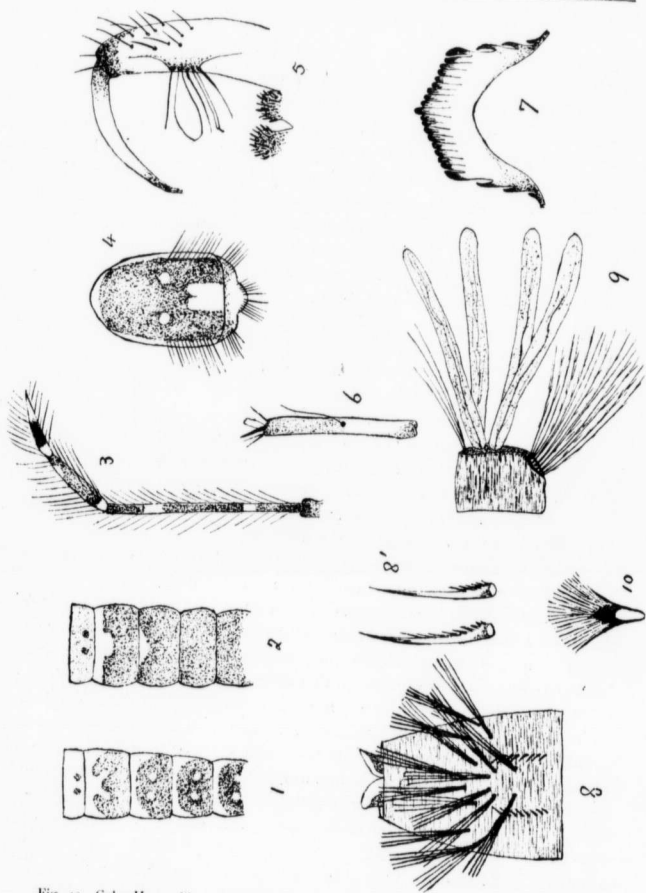


Fig. 25. — *Culex Hassardii*: 1, male abdomen; 2, female abdomen; 3, male palpus; 4, thorax of female; 5, male genitalia; 6, larval antenna; 7, labial plate; 8, air-tube; 8', teeth; 9, appendages of ninth segment; 10, scale of comb.

with bluish metallic reflections. all joints faintly banded both apically and basally. Venter of femora and tibiae pale, with white scales. Apical banding of the hind tibiae conspicuous; ungues equal and simple. Abdomen black, speckled with grayish scales, base grayish, with black and white scales, two black spots in the centre; second segment with broad basal creamy band expanding in the mid line into a square area; third segment with a narrow crescentic basal creamy area, the following segments unbanded; last two apical segments with faint basal bands. All the abdominal segments bordered apically with long white hairs. (Fig. 25, 2.) Wings densely scaled, veins with thick median and broad lateral scales, especially on the third and fourth long veins. Scales not mottled. The first submarginal considerably longer and narrower than the second posterior cell, stem only one-sixth the length of the cell. Stem of the second posterior slightly larger than half the cell; posterior cross vein rather more than its own length distant from the mid cross vein.

Length, 4-5 mm.

♂.—Scale ornamentation of the head and thorax closely resembling that of the ♀. Palpi exceeding the proboscis by the two terminal joints; terminal joints hairy and somewhat swollen, bearing many long hairs in a row on each side; apex and base of the terminal joint white-scaled, penultimate joint basally banded; on the venter, a little below the apex, there is a white scaled area. (Fig. 25, 3.) Antepenultimate joint with two bands of white scales, the distal broader one a short interval below the apex, at a point corresponding to the band on the proboscis; the narrow basal band a short distance above the base; a row of black hairs along the inner aspect; apical region somewhat inflated. Abdomen, base white, with two central black spots; second segment with broad basal band expanding laterally into wide areas, also centrally into two divergent rounded areas. Third and following segments with basal bands expanding at the sides; scales of all the lateral areas brighter than those in the middle portion of the bands, which are creamy; two white spots in the centre of the third and succeeding segments. (Fig. 25, 1.) Appendages of the basal segment of clasp composed of a leaf-like organ and a broad flattened hooked spine, also three simple straight spines. Apical segment terminating in two blunt teeth. (Fig. 25, 5.) Ungues of the fore and mid legs uniserrated and unequal, of the hind equal and simple.

Length, 4-5 mm.

The following points were noted in the adult LAKVA: Antennæ short, truncate, nearly straight, smooth, entirely devoid of spines. Lateral tuft represented by one short hair. A short lamella and several short spines at the apex. (Fig. 25, 6.) Labial plate columnar, lateral teeth strongly curved, upper nearly straight. (Fig. 25, 7.) Air tube short, a little longer than broad (at the base), subconical; row of pecten of eight curved and spinous teeth, their serrations reduced to a row of fine elongated spicules. (Fig. 25, 8, 8'.) Eight pairs of four-fid hairs are attached to the central region of the tube posteriorly, forming a characteristic cluster. Scales of comb 15-20, each consisting of a thin oval basal plate bordered with fine radiating hairs. (Fig. 25, 10.) Terminal portion of the ninth segment completely encircled by a ring of chitin. Terminal tufts of hairs springing from distinct plates; the upper tuft of only two pairs of hairs, the lower of seven pairs, the latter feathered. Anal papillæ very long narrow cylindrical, relatively larger than those of any other Jamaican Culicid; papillæ stiffened with fine spiral chitinous threads. (Fig. 25, 9.)

Pupa: siphons short, apertures bordered internally by many fine branching hairs. Terminal appendages broad, segments nearly equal; mid rib extending as a fine hair a short distance from the free margin.

OBSERVATIONS.—A few living larvæ of this species, with some of *Culex secutor*, Theo., were sent in September, 1905, by Major Hassard, after whom I have named the species, collected by him from a tank at Newcastle. They were easily distinguished by their pale straw-coloured bodies and dark heads and siphons. The singular group of hairs at the back of the siphon, and the very long anal papillæ at once attracted attention. In January, 1906, I found some specimens in a water barrel at the Government Botanic Garden at Castleton, alt. 500 feet, living harmoniously with *Stegomyia fasciata*, Fab. The adult insects bred from these bit vigorously. I have placed this species provisionally in the genus *Culex*; the characters of the larval siphons and antennæ clearly point to its being an aberrant form.

5. *Howardina Walkeri*, Theo.—This species is stated to cause much annoyance during the day; it abounds in woods, breeding in Bromelias. I have already described the larva in my Monograph on the Culicidæ of Jamaica; the following noteworthy points were omitted: two stout branched hairs are present on the clypeus; the rays of the hair tufts on

the body are flattened, and feathered along their margins. The pecten rows extend through the whole length of the tube, a branched hair is present on each side, about half way up; the chitinous covering of the thorax and abdomen is densely covered with interlacing dendritic spicules. The unguis of this species are as follows:

♀. All equal and simple. ♂. Fore tarsus unequal, larger claw biserrate, the mid tooth blunt; basal tooth narrow and pointed; smaller claw uniserrate. Mid tarsus unequal, larger claw biserrate, with a blunt mid tooth; smaller claw uniserrate. Hind tarsus, claws equal and simple.

6. *Howardina aureostriata*, nov. sp.—♀. Proboscis black, slightly curved downwards, rather long and narrow, three-quarters length of abdomen. Palpi black, extremity of terminal joint golden-scaled, a few golden scales on the upper median surface of the penultimate joint; under surface of palpi speckled with gold scales. Antennæ black, scattered gold scales throughout its length, especially on the lower joints; about three-quarters length of proboscis. Clypeus black. (Fig. 26.) A narrow



Fig. 26.—*Howardina aureostriata*; ornamentation of head and thorax.

median band of golden scales on the centre of the occiput, two broad bands of golden scales on each side of the occiput, the intervening spaces black-scaled; a number of upright forked scales on the nape; scales on the extreme sides of the head silvery. Thorax black-scaled, with seven rows of brilliant narrow curved golden scales, the outermost pair starting from the wing insertions, curving round and bordering the mesonotum laterally and anteriorly; the next pair arise from the preceding near the anterior border of the mesonotum, and run backward, terminating in the lateral lobes of the scutellum; the innermost pair also originate anteriorly, and course backwards, gradually narrowing, over three-quarters the length of the mesonotum. The seventh row arises in the hinder third of the mesonotum, and terminates on the posterior margin of the mid lobe of the scutellum. Prothorax with brilliant silvery scales. Patches of silvery scales on the pleura. Scutellum with a median and two lateral bands of golden scales. Three long hairs on each of the lateral lobes and four on the central lobe. Wings with pale brown scales, the lateral ones long and narrow, median ones short and obconical. First submarginal cell narrower and one-third of its length

longer than the second posterior cell, its stem less than half the length of the cell; stem of the second posterior as long as the cell; posterior cross vein more than its own length behind the mid cross vein. Halteres with white stems and brown knobs. Abdomen black-scaled, with violet reflections; first four segments with basal bands of golden scales; all segments apically bordered with long white hairs. Triangular patches of silvery scales on the sides of the segments extending ventrally a short distance. Venter with broad basal bands of golden scales on all the segments except the last two. Legs black, with violet reflections, speckled with golden scales, especially towards the extremities; femora golden-scaled on the under surface throughout their whole length, upper surface golden-scaled near the base, a few silvery scales at the apices above forming three spots, especially on the mid and hind legs. Tibiæ unbanded in all the legs. A narrow white basal band on the mid metatarsus. Broad basal bands of silvery-white scales on the metatarsus and first two tarsi of the hind legs. Ungues equal and simple.

Length, 2.5 mm.

♂.—Palpi black, very long and narrow, extending about one-quarter of their length beyond proboscis; three long black hairs at the extremities of the terminal joints; a few on the sides of the penultimate and at the extreme apices of the antepenultimate joints; a few golden scales at the junction of the terminal and penultimate joints; a conspicuous band of golden scales at the lower third of the antepenultimate joint. Shaft of the antennæ conspicuously golden-scaled. The median band of gold scales on the occiput is divided into two by a line of black scales. Abdomen black, segments with long white hairs along the apical borders; all segments with silvery lateral areas; in the last three segments these nearly meet dorsally, forming basal bands. Venter with broad basal bands of silvery scales, among which are a few golden scales along the mid line. Ungues, of the fore leg, unequal, larger biserrated, smaller uniserrated; of the mid leg larger biserrated, smaller uniserrate; of the hind leg simple and equal.

Length, 2.5 mm.

Description of the adult LARVA.—Seen in the breeding jar, it has an almost transparent outline; the head and siphon of a dull red colour. When disturbed it displayed marked activity, retreating with great speed to the dark side of the bottle, and hiding among the algae. Head nearly

circular, dull red in colour; antennæ transparent, slightly curved inwards, gradually tapering to a blunt apex; lateral hair tuft reduced to a single simple stout hair, one-quarter the length of antenna, arising about half way up the shaft. Apex with four very short spines and a lamella; surface of shaft entirely devoid of spines. A pair of stout simple hairs on clypeus. Mentum a wide angle of 20 rounded teeth. Several tufted hairs on the upper surface of the head near the bases of the antennæ. Thorax and abdomen with scattered tufted hairs, rays 5-20 elongated, jagged at the eyes, some obsoletely feathered; lateral hairs feathered. Comb of twelve stout straight spines in a single row. Air tube sub-cylindrical, about five times as long as broad (at the base), not swollen, tapering gradually towards the summit. Pecten of two rows of simple elongated spines, 24 in number, extending half way up the tube, with a compound 2-3-fid hair situated at the upper extremity of each, about the middle of the tube. Chitinous plate of ninth segment narrow, saddle-shaped, widely open below, with long spines along its posterior border, a large simple hair at the posterior inferior border (corresponding to the digitate hair in *H. Walkeri*). Ventral group of hairs springing from a diamond-shaped plate. Dorsal group of two pairs, one compound, with short branches, the other pair simple and of great length. Anal papillæ narrowly conical, one-third the length of the longest dorsal hairs. Pupa, siphons long and narrow. Terminal appendages ovate, nearly equally divided by mid rib.

OBSERVATIONS.—The first specimen of this fine species was sent by Colonel Loscombe in September, 1905. Recently three larvæ were found among a number of *H. Walkeri* larvæ collected by Miss Maclaverty from Bromelias, and sent to me alive. They were isolated and developed into adult insects. The pupa stage in both this species and *H. Walkeri* is unusually long—4 days. The chief points of difference between the two species are to be found in the characters of the frontal hairs, hair tufts and siphons. The chitinous covering of the thorax and abdomen of *H. aureostriata* is entirely devoid of the spicules so conspicuous in *H. Walkeri*, which give the latter its dark appearance.

7. *Deudromyia?* nov. sp.—A much-broken specimen of ♀ was sent by Colonel Loscombe, not in a condition to allow of a satisfactory description. The mid legs have triangular basal areas of white scales quite unlike any other species of the genus.

NEW LEPIDOPTERA.—No. 2.

BY ANDREW GRAY WEEKS, JR., BOSTON.

Æthilla Buffumi, sp. nov.—Habitat: Suapure, Venezuela. Expansion, 1.25 inches.

Head and palpi above dark brown, with a few gray hairs; below nearly white. Thorax and abdomen the same above as head; below gray. Antennæ nearly black, with indistinct white annulations at base of each joint. Club, above black, beneath grayish. Legs light brown, with slight white annulations at joints.

Upper side of fore wing dark brown, heavily dusted with grayish at basal and inner marginal areas. The apical area shows none of this dusting except as slight suffusion from basal side. A series of very prominent semi-transparent white spots extends from centre of costa across the end of discoidal space towards lower angle. The first two of these are simply subcostal spots. The next lower is large, covering the entire end of discoidal space. Below this is another large spot, and between these, nearer the hind margin in first submedian interspace, is another but smaller spot. Near the apex are two white subcostal dots. The basal portion of discoidal space has a dark band extending downwards to the centre of inner margin. A similar dark band extends from below the apical subcostal spots to the inner margin just outside the large white spots. These are often indistinct, but show their permanent character in their extension through the hind wing. The marginal fringe is generous, but of the ground colour.

Upper side of hind wing is same in colour as fore wing, but the grayish hairs and scales quite cover the entire surface. A dark band runs from centre of costa across the wing to inner margin, just above the anal angle, following contour of the hind margin. Nearer the base, and barely crossing the centre of discoidal space, is a similar band. These two bands, as above noted, are continuations of the dark markings or bands of fore wing.

Under side of fore wing dark brown. The large white spots are more contiguous, more as a band. The two subcostal dots are repeated. The lower angle area is lighter than ground colour, a branch of it extending upwards through the apical area to the costa.

These markings are not prominent, and are softened by suffusion.

Under side of hind wing dark brown, the dark bands of upper surface being repeated, but showing more suffusion. Inner marginal area lighter than ground colour.

Taken in January, 1900.

May, 1906.

Pamphila Bryanti, sp. nov.—Habitat: Suapure, Venezuela. Expanse, 1.25 inches.

Head and thorax above rich dark brown, with hairs of a somewhat greenish tinge; below light brown or mouse colour. Abdomen above the same; below mouse colour, tending to white along central line. Antennæ nearly black above; below the same, suffusing to light brown towards the club. Legs mouse colour.

Upper side of fore wing rich dark brown above, with five or six white markings. The costa is well dusted with golden scales from base midway to apex. Hind margin has a slight whitish fringe. In apical area are two subcostal white dots. Below these, in centre of wing, are two large white spots, one above the other, and in interspace below, but nearer base, is a much larger white spot.

Upper side of hind wing rich dark brown. From upper angle to anal angle is a line of scattered non-prominent lighter hairs. Hind margin has a slight whitish fringe. The central portion of the wing, covering discoidal space area, has a decidedly dark line in some lights, hardly noticeable on casual inspection.

Under side of fore wing dark brown, without the richness of upper surface. The white spots are repeated, being, as in many of this genus, semitransparent. Costa slightly dusted with lighter scales. Inner marginal area darker than rest of the wing. Hind margin is edged with a black thread.

Under side of hind wing the same colour as fore wing. The line of lighter hairs of upper surface extending from upper angle across centre of wing towards anal angle and parallel to hind margin, appears as a line of interspacial dots, not well defined, but fairly prominent.

Variations.—In a few specimens there is a white dot at end of discoidal space on upper surface of fore wing, and also a third but minute subcostal dot. The white markings show scarcely any variations, however, in the specimens in my collection.

Taken in January, 1900.

Pamphila Chinoba, sp. nov.—Habitat: Suapure, Venezuela. Expanse, 1.12 inches.

Head, thorax, abdomen and legs dark brown above; beneath gray. Antennæ dark brown, with gray on under side at club.

Upper side of fore wing dark brown, with no markings excepting interspacial dark spots along hind margin.

Upper side of hind wing the same as fore wing, excepting that the hind marginal interspacial dark spots are more pronounced, and the edge of the margin is a little lighter than ground colour.

Under side of fore wing light brown, close to mouse colour. The costal area shows a tendency to some lustre. The hind margin is edged with a black thread and a narrow border of gray. The interspacial dark spots of the upper surface of hind margin are repeated, but not prominently. Inner marginal area grayish.

Under side of hind wing brownish gray, mottled with slight interspacial streaks of darker colour. From the costa near upper angle an irregular dark band runs across to near the centre of inner margin. Another branch of this band extends from the same point on the costa down to the anal angle along the hind margin. Outside of this are repeated the interspacial dark spots of upper surface, being black and very prominent. The inner marginal area is light gray, with slight mottling towards anal angle. The hind margin has a dark thread.

Variations.—In many specimens the marginal interspacial dark spots are practically wanting on upper surface. The hind margin is occasionally well bordered with gray hairs. Also there is a suggestion of three subcostal white spots on the fore wing, but none of the twenty specimens in my collection show them at all conspicuously. The under side shows but little variation except in the distinctness and depth of colouring of the dark bands.

Taken in August, 1900.

Achlyodes Melcheri, sp. nov.—Habitat: Suapure, Venezuela. Expanse, 1.35 inches.

Head, thorax, abdomen, antennæ and legs rich dark brown (nearly black) above; beneath a shade lighter.

Upper side of fore wing rich dark brown, nearly black. Towards the apical and hind marginal areas the colouring becomes somewhat lighter, sufficient to show a series of dark interspacial markings along the hind margin. Within this, running from costa towards centre of hind margin, is another series of similar dark markings, forming a band. Still nearer base, and crossing end of discoidal space, is a suggestion of another dark band. These dark markings are so indistinct in a fresh specimen that they would be seen with difficulty. In worn or faded specimens they would, undoubtedly, be quite prominent.

Upper side of hind wing very rich dark brown. From the upper angle to anal angle extends a series of interspacial lighter dashes,

following contour of the margin, and above these, near end of discoidal space, are two slight dashes also. These markings are almost too indistinct to warrant mention.

Hind margins of both wings have a slight fringe of ground colour.

Under side of fore wing dark brown, but lighter and less rich than upper surface. The suggestions of dark markings are repeated. Inner marginal area a little lighter than balance of wing.

Under side of hind wing the same dark brown, the lighter markings of upper surface being repeated. The basal area has a few indistinct mottlings.

A coloured plate of a species like this is absolutely necessary for anything approaching accurate identification, and a plate will be duly published at a later date.

It may resemble *Adelyodes castalus*, Hew., but that has three subapical light spots, which do not appear at all in this, and on close inspection of the scale distribution on under side of hind wing, considerable difference will be noticed.

Taken in November, 1899.

Plestia Kikkawai, sp. nov.—Habitat: Suapure, Venezuela. Expanse, 1.25 inches.

Head, thorax and abdomen above dark brown, with a few grayish hairs. Circles of grayish hairs at base of each segment of abdomen. There is a white dot at base of each antenna. Antennæ dark brown, tip beneath gray. Legs nearly white.

Upper side of fore wing dark brown, with nine white spots or markings, giving the wing almost a mottled appearance. The largest of these is at centre of discoidal space, strongly concaved on marginal side. Below this, in the next two lower interspaces, are two white spots. This row of spots is edged with very dark brown on basal side. Near the end of discoidal space, near costa, is a small white spot. There are two larger white spots or markings in the first and second submedian interspaces, both of them more or less concaved on marginal side. There are three apical white dots. Below them, near lower angle, is a well-defined marking of very dark.

Upper side of hind wing is dark brown. Costa and portion of discoidal space close to base crossed by a heavy white band. Below this, near centre of wing, is a prominent white spot, with a smaller one adjoining it. A band of very light brown extends on each side of these spots towards upper angle and inner margin respectively, giving the

appearance of a series of brownish spots. The hind margin, which is somewhat dentated and enlarged at anal angle, has a very irregular and jagged line of light brown, forming a series of interspacial light brown spots, extending from anal angle to upper angle.

Under side of fore wing brown, somewhat lighter than upper surface, and with less lustre. The white spots are repeated, showing more transparency. The lower submedian interspace and the inner marginal area are lighter than the ground colour.

Under side of hind wing brown, a shade darker than fore wing. The white and brown markings of upper surface are repeated, but are all white. The hind margin has a slight whitish line.

Variations.—In some specimens the light brown marginal border or series of interspacial spots noted on upper surface of hind wing is continued upwards across marginal area of fore wing, but it is so variable in its definiteness that it may be considered a distinct band in some specimens, or a mere suffusion in others. The small discoidal spot of fore wing is often joined to the larger one in the discoidal space.

Taken in January, 1900.

SELIDOSEMA UMBROSARIUM, HUBNER.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

In a recent paper on the "Lepidoptera of the Kootenai District" (page 910), Dr. H. G. Dyar remarks of this species: "No specimens; one from Mr. Cockle's collection. The specimen agrees with two in the National Museum, bearing Dr. Packard's original labels, '*Boarmia indicataria*, Comp., Walker's type,' and '*Boarmia umbrosaria*, Hbn., *B. gnophosaria*, Gn,' the specimens originally coming from the Meske and Riley collections. They are males, and show a hair pencil on the hind tibiæ, so I transfer *umbrosaria* to *Cleora*, following Hulst's separation of *Cleora* and *Selidosema*."

In this conclusion I cannot concur, having raised from larvæ, when in Florida, one male and three females of this species, the male having *no* hair pencil, and an exact counterpart of Packard's figure of the type (Mono. Geom., Plate XI, fig. 23), which came from Demopolis, Ala. When at Cambridge I examined this type, which proved that it was correctly placed in *Selidosema*. With it under this name were perhaps twenty specimens, six of which were the true *umbrosarium*, the rest being a species I take frequently in the Catskill Mts., belonging in the genus *Cleora*, and at that time without name in my collection. On my return home I sent one of

May, 1906.

these to Mr. L. B. Prout, thinking it might be one of Walker's species. He writes me that it is the *indicataria*, Walk., the type of which is in the British Museum, comparison having been made with it. Here, I think we have the explanation of Dr. Dyar's reference of *umbrosarium* to *Cleora*, but why he should ignore the name *indicataria*, since one was so labelled, I cannot explain. The Nat. Mus. specimens bear Dr. Packard's labels, and as he mingled the two species in his collection, it is quite probable that he distributed them also under one name. *Umbrosarium* is more heavily powdered with black, while *indicataria* is gray, but rubbed specimens of the former might be taken for the latter. Probably they are mingled in most collections, but I find *umbrosarium* rather rare. Recently I have obtained three males and two females from Atlanta, Ga., and am inclined to the belief that its habitat is more strictly southern than is generally supposed, while *indicataria* is found throughout the temperate zone. The localities given by Dr. Packard (Mono., page 441) refer mostly to *indicataria*, and his remarks partly to one and partly to the other species.

Dr. Hulst places *Polygrammaria*, Pack., as a synonym of *Cleora indicataria*, Walk. This is an error. The type in the Packard collection is a male having *no* hair pencil, and belongs to *Selidosema*.

Before me is a male taken in Arizona, which I conclude is this species. It agrees exactly with Packard's description and plate, and in the points to which he calls attention in his remarks. Many of the species of *Alcis*, *Cleora* and *Selidosema* are incorrectly placed, as evidenced by their structure. For instance, *Haydenata* is not an *Alcis*, having *no* hair pencil; Dr. Hulst created the genus *Somatolophia*, which he states is without hair pencil, and places as its type what I believe to be this species. I cannot account for the "tufts on first and third segments" of abdomen, which certainly are present in that specimen, and not in any other which I have examined, except that it is or was freshly emerged, and the tufts had not been rubbed off. I know by experience in raising Geometrids that these tufts are detached by a slight wind or touch. Dr. Dyar some time ago called attention to this genus, and says "both genus and species must fall." Perhaps if *Haydenata* is not an *Alcis*, it may remain as a *Somatolophia*. Until these groups can be studied and rearranged, this had better stand, however, until a decision can be reached by a study of *all*. Again, Dr. Hulst places in the genus *Epimecis*, Hub., our large Geometrid *Virginaria*, Cram. He characterizes the genus as *without* hair pencil in male. If that be correct, then our species is *not* an *Epimecis*, since it *has* a hair pencil.

BOOK NOTICES.

BULLETIN OF THE BRITISH COLUMBIA ENTOMOLOGICAL SOCIETY.—No. 1, March, 1906 (Quarterly).

We heartily welcome this first publication by our friends in British Columbia. It is intended to be a medium of communication between the widely-scattered members of the Society in that Province, and will no doubt prove a useful bond of sympathy in each other's work. The four pages now issued give an outline of what has already been done in several orders, and a first instalment of a list of B. C. Coleoptera, comprising the Coccinellidæ; they also furnish the proceedings of the Society, notes and records, etc. The number is useful and interesting, and the publication will soon prove indispensable to all who study or collect the insect fauna of our Pacific Coast Province. There is a vast field of territory to be explored, and important discoveries will soon reward the painstaking investigator.

REPORT OF THE EXPERIMENTAL FARMS OF THE DOMINION FOR 1905. Ottawa, 1906, pp. 461.

This goodly volume contains the reports for the past year of the Director and other officers of the various Experimental Farms scattered over the Dominion. While all contain much matter of general interest and of great value to the farming community, we are chiefly attracted to that of the Entomologist and Botanist, Dr. James Fletcher (pp. 159-204), in which he treats of insects affecting cereals, fodder crops, roots and vegetables, fruit crops, forest and shade trees, and in the Botanical part of the Dodder on clover and alfalfa. Among those specially dealt with may be mentioned the Hessian Fly, the Pea Moth (*Semasia nigricana*), the Spined Rustic (*Barathra occidentata*), which has hitherto been considered a rare moth, but whose larvæ appeared in numbers at Ottawa, and did much damage to various plants; its life-history is described, and a plate given showing the moth and caterpillars in different stages. The Larch Case-bearer (*Coleophora laricella*) is another instance of an insect that had not previously been recorded as injurious.

A large number of other insects are more or less fully described, and practical directions for dealing with them are given. We are glad to receive the report so early in the year, enabling all concerned to deal with their insect foes as they appear. Too often it happens, through delays in printing, that reports of this kind come out too late to be of use during the season for which they are intended. We are thankful to Dr. Fletcher for giving us in so concise and excellent a form the results of his labour and experience during the past year.

Mailed May 2nd, 1906.