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A FEW DAYS IN NEWFOUNDLAND.

BY E. M. WALKER, TORONTO.

In the summer of 1914 I had the opportunity of spending a few days in Newfoundland, which I had long wished to do, for I had heard enough about its beauty and the peculiarities of its fauna and flora to arouse within me a strong desire to see some of these things for myself.

Unfortunately I had but five-days to spend on the island and two of these were cold and wet, so that the chief result of my trip was a greatly increased desire to go there again.

My main object was to collect and observe the dragonflies, particularly of the genus *Somatochlora*, the species of which are nearly all inhabitants of the far north, and are consequently less known than those of any other North American genus of the order Odonata. A collection of dragonflies made by Dr. D. A. Atkinson at the Bay of Islands and Grand Lake, Nfd., and recorded by Mr. E. B. Williamson (*Ent. News*, XVII, 1906, pp. 133-139) was so rich in species of this genus that I had little doubt that I could obtain a good series of them even in a few days. So I planned to go at once to the Bay of Islands and spend there the few days that I had at my disposal.

Leaving North Sydney on the night of June 24th, I arrived at five o'clock on the following morning at Port aux Basques on the southwestern corner of Newfoundland, and immediately boarded the train which was to take me to my destination, Humbermouth, on the Bay of Islands, about 120 miles up the west coast. (I might almost have said "embarked" on this train, for the trip was more like a rough sea voyage than a railway journey.)

Port aux Basques is a quaint little fishing village, and I longed to spend a day there, but could not afford the time. The low, rounded, treeless hills, enveloped in mist, the stunted vegetation

and great stretches of moors had a semi-arctic aspect suggestive of the tundra or barren-grounds of the far north, and I have no doubt they would prove of great interest to the entomologist. Though treeless, patches of dwarfed spruce, not more than two or three feet high, occupied the more sheltered slopes, and these became more frequent and of gradually increasing height as the train drew away from the coast.

In a very short time groups of stunted, gnarled trees began to appear, most of them so windblown and fantastically shaped as to be scarcely recognizable. They were mostly spruce, tamarack and balsam poplar. I noticed here and elsewhere that the tamarack has apparently never been attacked by the larch saw-fly (*Nematus erichsonii*), which has probably devastated the entire area occupied by this tree on the continent, and it is to be hoped that Newfoundland, at least, will be spared the ravages of this destructive pest.

The greater part of the country through which we passed on the way to the Humbermouth consists of vast swamps and bogs, sometimes densely wooded with black spruce, but in the wetter parts supporting only a scattered growth of stunted trees of this species and of tamarack. Here and there we had glimpses of beautiful bog flowers, and at one spot where the train stopped one could have gathered bunches of that magnificent orchid, the Showy Lady's Slipper (*Cypripedium reginæ*), close to the railway track. The vegetation along the railway was in some places extremely rank, one of the commonest plants being the cow-parsnip (*Heraclium lanatum*), which, though a tall stout plant with us in Ontario, is far larger in Newfoundland, the usual height being seven or eight feet. It is likewise far more abundant, and, in fact, is regarded there as a troublesome weed.

On account of the boggy character of this country, very little of it has been cultivated, although, when properly drained and treated with lime, it produces a fine growth of timothy and other crops.

The monotony of these bogs is frequently relieved by hills, magnificent ravines and gorges in which the vegetation is sometimes so rank and vigorous as to recall British Columbia. These

ravines are well timbered with tall white spruce, balsam-fir, yellow and white birch and balsam poplar, with occasional specimens of our familiar white pine, and the dense undergrowth, a luxuriant tangle of shrubs, ferns and flowering plants, makes a most alluring sight to an entomologist. In all of these ravines there are clear rushing streams, many of them no doubt teeming with salmon and speckled trout.

During the course of the trip I had the usual tantalizing experience of passing innumerable ideal-looking spots for dragonflies; ponds, pools, and lakes of all sizes, some dark and bog-margined, others shallow and reedy, all of them inviting.

Humbermouth, my destination, was reached about 3.30 p.m. and, from a picturesque standpoint, no finer spot could have been selected as the terminus of my trip. The broad Bay of Islands, surrounded by majestic wooded hills and the clear rushing waters of the beautiful Humber, just beyond the village, were thrilling in their peaceful grandeur; but I soon determined from the topography of the country that this was no place for dragonflies, so on the following day, which was cold and wet, I again took the train southward and got out at Spruce Brook, which I had noted on the way as a promising locality.

Spruce Brook is a famous resort for salmon fishing, and the Log-cabin Hotel is one of the most delightful places I have ever visited. In such a remote spot I was not prepared for the modern conveniences which I found there, and the kindly interest and courtesy shown me by the proprietors, Messrs. Whittington and Dodd, were of material assistance in enabling me to make the most of the few days I spent there.

The Log-cabin Hotel is situated on the shore of a beautiful lake in a broad valley, flanked by low wooded hills. The land in front of the hotel is largely cleared and partly cultivated, but on all sides there are rich woods, with streams, marshes and ponds within easy reach. The flora is very luxuriant and apparently abundant in species, so that the entomological outlook seemed full of promise. In this, however, I was doomed to disappointment.

I lost no time in looking up a promising place for dragonflies. I was directed to a small pond, nearby, with a marshy shore and connected with Spruce Brook itself. The weather was dull and

wet, and it was getting late, so that I was not discouraged in finding only a few specimens of *Cænagrion resolutum*, a little pale blue damsel-fly, which is widely distributed across Canada and already known from Newfoundland. I also took from the creek a single nymph of a *Lestes*, apparently *unguiculatus*, and one of *Æshna umbrosa*, neither of which had been previously reported from the island.

On the following day I found a small lake, a mere expansion of a trout stream, the upper end of which was bordered by an open marsh covered with short sedges and similar marsh plants. It looked favourable, but dragonflies were exceedingly few, *C. resolutum* being the only species that could be called common. *Enallagma calverti*, another blue damsel-fly of wide distribution in the north, was taken in small numbers, and I also got two specimens of *Somatochlora albicincta*, the first of the genus which formed the chief objective of my trip. The most interesting find, however, was another little *Cænagrion*, of which I had taken a pair the preceding year at Nipigon, Ont., and which proved to be the *Agrion interrogatum* of Selys, previously known only by a single imperfect female from Saskatchewan, described in a Belgian journal 40 years ago. (See Can. Ent., XLVII, 1915, pp. 174-181). I searched here for more specimens of this rarity on this and the following day, but succeeded in getting only two more specimens. Along the wood road leading to this lake from the railway a few large dragonflies of the genus *Æshna* were occasionally seen, but they were so few that I considered myself lucky to have captured one of them. It was *Æshna interrupta* E. Walk., another species of transcontinental range.

This lumber road was a good general collecting ground, but collecting was difficult owing to the swarms of black flies (*Simulium venustum* ?), "punkies" or sand-flies (*Culicoides* sp.) mosquitoes and deer-flies (*Chrysops*). I collected a few of the latter which were kindly determined for me by Mr. M. C. Van Duzee, and I was surprised to learn that five species were represented among them, viz., *C. mærens* Wlk., *C. frigida* O. S., *C. celer*, O. S., *C. excitans* Wlk., and *C. mitis* O. S. The only other Tabanid I noticed was the common *Tabanus affinis*, of which I took but one specimen.

On the afternoon of my third day at Spruce Brook I determined

to visit a certain marsh at the far end of a lake about half a mile long, which lies between densely wooded hills not far from the hotel. In order to reach it I had to struggle through a dense black spruce swamp extending the entire length of the lake. Now a black spruce swamp is always enticing to me, but on this occasion I had had enough of it by the time I reached the marsh, without the return trip, and the worst of it was that when I did arrive there no dragon-flies were to be seen, except a very few of *C. resolutum* and *E. calverti*.

It was here though, and at the other marsh, that I found the sole representatives of the Order Orthoptera which I came across in Newfoundland. These were a very few young nymphs of *Chorhippus curtipennis* Harr., one of the most common and widespread of Canadian grasshoppers. The season was certainly very backward, but, in spite of this, one would have expected to find at least the nymphs of the commoner grasshoppers in the fields and clearings. I searched for these in vain, however. Morgan Hebard has recently published a list of six species of Orthoptera from Newfoundland (Ent. News, XXV, p. 306, 1915), two of which (*C. curtipennis* and *Melanoplus fasciatus*) were already known to occur there, and my colleague, Dr. A. G. Huntsman, brought me three species from the Bay of Islands, taken in 1915, and all included in Mr. Hebard's list. Our commonest field grasshoppers, *Melanoplus femur-rubrum* and *M. atlantis*, are unknown in the island, and it is quite probable that they do not occur there. No crickets have been taken and only one long-horned grasshopper or "stone-cricket," *Ceuthophilus terrestris* Scudd. The absence of these common and widespread insects is interesting, but it is only part of a general condition characteristic of this island, of which I shall have more to say later.

(TO BE CONTINUED).

SOME NEW RACES AND SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WM. BARNES, M.D., AND J. MCDUNNOUGH, PH.D.

DIURNALS

Basilarchia arthemis rubrofasciata, subsp. nov.

A series before us of 6 ♂'s and 1 ♀ from Northwestern Canada shows certain constant points which we think warrants

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the bestowal of a racial name. In typical *arthemis*, which we might point out was described from New York (probably vicinity of New York City), the submarginal band on underside of secondaries consists of a series of red spots, separated from the marginal green lunules by a well defined black area; in this new race this submarginal area is occupied by a continuous reddish band extending completely up to the green lunules and only separated from the interior white band by a narrow line of black; the basal area is also largely suffused with reddish, making the three red spots near base of wing much less distinct than in the typical form. On the upper side the ground colour is a dead black and the red submarginal spots of secondaries are large and with scarcely a trace of green edging on their inner side. It is this form that is figured by Say from Lake Winnipeg, which is apparently about the eastern limit of the race.

Types—One ♂, Saskatchewan (Croker); five ♂'s, Cartwright, Man.; one ♀, Calgary, Alta. (Dod) in Coll. Barnes.

***Junonia coenia nigrosuffusa*, subsp. nov.**

The smoky-black Arizona form of *cœnia* has been generally and wrongly listed as *negra* Feld., which was described from specimens taken on the Rio Negro in Northwestern Brazil and which is evidently a form of the S. American *lavinia* Cram., distinguished by its metallic green shaded secondaries. We propose the above name for the Arizona race, which has in general the maculation of typical *cœnia*, but the whole upper surface suffused with black-brown, rendering the white subapical banding very obscure; the eye spots of the secondaries are often considerably reduced in size as compared with those of the northern *cœnia*.

Types—Three ♂'s, Palmerlee, Ariz.; two ♂'s, Babaquivera Mts., Ariz.; one ♂, Huachuca Mts., Ariz.; one ♀, Arizona, in Coll. Barnes.

***Brenthis aphirape dawsoni*, subsp. nov.**

Specimens from Hymers, Ont., show several points of difference from Labrador specimens (typical *tricoloris* Hbn.). The upper side has a deeper brown colour, with a strong suffusion of black, especially along the outer margin, where the brown lunules are

almost entirely effaced; the submarginal row of black spots is very large and there is a tendency for these spots to lengthen out and touch the marginal black area; they are preceded by a well defined black suffusion, which is usually very faint in Labrador *tricularis*. On the underside the median band of secondaries is strongly silvered and stands out prominently against the leathery-brown background, which is slightly deeper in tone than that of Labrador specimens. We take pleasure in naming the race after Mr. Horace Dawson, who by his conscientious collecting has greatly added to our knowledge of the lepidopterous fauna of Northwestern Ontario.

Types—A long series of ♂'s and ♀'s from Hymers, Ont. (June 15-30) in Coll. Barnes.

***Brenthis chariclea grandis*, subsp. nov.**

This form from Hymers, Ont., bears the same relation to *chariclea boisduwali* Dup. from Labrador that *aphirape dawsoni* does to *tricularis* Hbn. It is considerably larger than typical *boisduwali*, the ♂'s averaging 40 mm. wing expanse as compared with 35 mm. in the latter form; the black marginal border is heavier and the submarginal black spots larger with a tendency to become elongate and join the marginal band. On the underside the apex of primaries is heavily and broadly suffused with deep purple, with scattered yellowish markings, and on the secondaries the area beyond the median band of spots is almost entirely of the same deep rich purple colour, with at most only traces along the veins of the paler yellowish shading found in *boisduwali*.

Types—A long series of ♂'s and ♀'s from Hymers, Ont. (Aug. 1-15, Dawson) in Coll. Barnes.

***Lycæna rita*, sp. nov.**

♂.—Upper side brilliant violet-blue, with a narrow black border to both wings about 1 mm. wide, that of the secondaries tending to break up more or less into isolated spots shaded slightly with orange internally near the anal angle; fringe white, faintly checkered with black. Beneath creamy white, with a distinct black marginal line to both wings and checkered fringes;

primaries with a rather faint marginal row of oblong spots, reaching neither the costa nor the inner angle, followed by a row of six large black spots almost joined to form a continuous band; the usual postmedian row of spots large, black, much excurved opposite the cell, and almost touching the submarginal row; a broad black dash in the cell and a series of three small subbasal spots. Secondaries with a marginal row of six black spots and a submarginal row of black dashes of which the two costal ones are heavy and round, the remainder being reduced and rather lunular in shape; between these two rows of spots a broad orange band fills the entire space from anal angle to vein 6; a bent postmedian row of prominent round black spots and a subbasal row of four similar spots with a black discal dash.

♀.—Pale brown above, with a broad orange band on secondaries, much as on the underside, and a more or less distinct row of marginal round spots; occasionally the inner margin of this band shows traces of blue scaling, which may also be found at base of primaries; underside as in the ♂.

Expanse 23 mm.

Types—Three ♂'s, S. Arizona (Poling); one ♂, Santa Rita Mts., Ariz.; one ♂, Rio Verdi Mts., Ariz.; three ♀'s, S. Arizona (Poling) in Coll. Barnes.

The species is closely allied to *enoptes* Bdv., but differs in the whiter ground colour of underside with broader orange band; the spots are also rather heavier and the blue of the upper side more violet in shade; the ♂ genitalia, while quite distinct, show a relationship to *enoptes* rather than to *baivoides* Behr., which has totally different sexual organs. We expect to make a few notes at a later date on these much confused species, together with figures to illustrate the points of distinction.

HEMILEUCIDÆ.

Hemileuca lucina latifascia, subsp. nov.

Specimens from Manitoba, while agreeing with typical *lucina* from the New England States in the transparent appearance of the wings, have the pale banding very much broader, especially on the primaries, leaving only a narrow black border of equal width

on both wings and much as in *nevadensis* Stretch; from this latter species, apart from their more transparent appearance, they may at once be distinguished by the thoracic vestiture, which is black, not pale yellow, as is found in *nevadensis*. The discal spot of secondaries in the Manitoba race is generally shorter and shows much more tendency to obsolescence than in either *lucina* or *nevadensis*.

Types—Five ♂'s, one ♀, Aweme, Man. (Criddle) (Sept.) in Coll. Barnes.

NOCTUIDÆ.

***Ipimorpha viridipallida*, sp. nov.**

Primaries pale greenish ochre, with the usual markings of the genus, consisting of an outwardly oblique white t. a. line, slightly bent inwards in the central portion, an almost straight t. p. line, slightly angled opposite the cell, a faint and strongly irregular s. t. line defined inwardly by greenish shading, a large round orbicular outlined in white and a similarly outlined upright reniform constricted in the middle; claviform very faintly outlined and appressed to the t. a. line. Secondaries almost pure white, with a faint dark curved postmedian line crossing the central area of the wing. Beneath whitish, with a faint postmedian line crossing both wings.

Expanse 35 mm.

Types—Six ♂'s, two ♀'s, Truckee, Calif. in Coll. Barnes.

Most closely related to *nanaimo* Barnes, with practically identical markings; the pale greenish colour of primaries and the white secondaries readily separate it, however, from this species.

***Abrostola parvula*, sp. nov.**

Thorax gray and brown mixed, posterior tufts light brown. Primaries with basal area to t. a. line brown, shaded with whitish at extreme base; t. p. line geminate, inner line faint, outer sharp, black, slightly angled below costa, rather evenly rounded to vein 1, where it bends outward, forming a slight but noticeable angle; median area dark blackish brown, containing the pale orbicular, subreniform and reniform spots the former two placed obliquely

to each other and joined, forming a figure eight; all the spots with more or less central brown shading, but with no very definite defining lines, t. p. line diffuse, whitish in costal half, geminate and incurved in lower half, the inner line being very distinct and dark brown; three or four black interspaceal dashes below the apex of wing and a white sharply dentate but broken s. t. line preceded by a diffuse narrow brown shade, the apices of the dentations almost touching the outer margin and tipped with brown; fringes slightly checkered by pale dots at ends of veins. Secondaries smoky, paler in basal half in the ♂ with a faint dark median curved line. Beneath smoky, secondaries paler, both wings with discal dot and dark postmedian line.

Expanse 24 mm.

Types—One ♂, S. Ariz. (Poling) one ♀, Redington, Ariz. in Coll. Barnes.

Allied to *urentis* Gn., but considerably smaller. We have other specimens apparently similar to the type from Kerrville, Tex., and Shovel Mt., Texas, which may, however, prove to be a distinct race when more material is available for examination.

THE HEATH COLLECTION OF LEPIDOPTERA.

BY F. W. WOLLEY DOD, MIDNAPORE, ALTA.

(Continued from Page 167).

HETEROCERA.

SPHINGIDÆ.

Hemaris diffinis Bdv. var. *ariadne* B. & McD.

Hemaris thysbe Fabr. One had the fore part of the abdomen green, though in most of the specimens it was yellow. Some with dentate inner edge to the marginal band were separated as var. *cyliceformis*. All these forms grade easily through to one another.

Deilephila gallii Rott.

Deilephila lineata Fabr.

Ampelophaga chærilus Cram.

Sphinx drupiferarum S. & A.

Sphinx gordius Cram. One specimen.

Sphinx vancouverensis Hy. Edw. and var. *albescens* Teffer.

Sphinx chersis Hbn. One specimen.

Marumba modesta Harr.

Smerinthus jamaicensis Dru. and var. *geminatus* Say. A single specimen in the series was of the typical form *jamaicensis* with the round pupil to the ocellus.

Smerinthus cerysii Kirby.

Paonias excæcatus S. & A.

Paonias myops S & A..

Cressonia juglandis S. & A.

SATURNIIDÆ.

Samia columbia Sm. var. *nokomis* Brodie.

Telea polyphemus Cram.

CERATOCAMPIDÆ.

Anisota virginiensis Dru.

SYNTOMIDÆ.

Scepsis fulvicollis Hbn.

Ctenucha virginica Carp. One specimen.

LITHOSIIDÆ.

Crambidia casta Sanb.

Lexis bicolor Grt.

Hypoprepia miniata Kirby.

Hypoprepia fuscata Hbn. and var. *plumbea* Hy. Edw. This variety is distinguished by a wide border on secondaries.

Clemensia albata Pack.

NOLIDÆ.

Celama cilicoides Grt.

Nola sp. near *ovilla* Grt. Two specimens. One of these was submitted to Messrs. Barnes and McDunnough, who were unable to give it an exact name, but stated that it was nearest *ovilla*.

ARCTIIDÆ.

Eubaphe immaculata Reak.

Eubaphe spp. Probably *rubicundaria* Hbn. and *quinaria* Grt.

Haploa lecontei Bdv. and vars. *militaris* Harr. and *vestalis* Pack.

Haploa confusa Lyman.
Estigmene acraea Dru.
Estigmene prima Slosson.
Estigmene congrua Walk.
Hyphantria textor Harr.
Diacrisia virginica Fabr.
Isia isabella S. & A.
Phragmatobia fuliginosa Linn.
Phragmatobia assimilans Walk.
Hyphoraia parthenos Harr.
Apantesis virgo Linn.
Apantesis virguncula Kirby.
Apantesis parthenice Kirby.
Apantesis oithona Strk. var. *rectilinea* Kirby.
Apantesis williamsi Dodge, var. *determinata* Neum.
Ammalo tenera Hbn.
Euchætias oregonensis Stretch.
Halisidota tessellaris S. & A.
Halisidota maculata Harr.

AGARISTIDÆ.

Alypia langtonii Coupes. Males of this species stood separately as *octomaculata* Fabr. This error has been a very general one in collections throughout Canada, Lyman going to the extent of publishing an erroneous correction of Holland's figures. In the male sex, *langtonii* and *octomaculata* resemble one another very closely indeed, and both have two white spots on the secondaries, whereas *langtonii* ♀ has only one.

NOCTUIDÆ.

Charadra deridens Grt.
Raphia frater Grt.
Acronycta americana Harr. Females stood correctly, males of the same species standing as *hastulifera*.
Acronycta dactylina Grt.
Acronycta cretata Sm. stood as *leporina*.
Acronycta innotata. The whitest specimens of this stood as *cretata*, whilst some ochreous tinted specimens stood correctly as *innotata*. I thought at first that these latter might be *betula* Riley,

but subsequent investigation showed that I was wrong. I have not, so far, seen *betula* from western Canada.

Acronycta interrupta Gn. A single worn female.

Acronycta marula G. & R.

Acronycta lobeliae Gn. Two specimens.

Acronycta manitoba Sm. A series stood correctly named. Others stood under *hasta* Gn, whilst three rather large, but otherwise similar, specimens were separated as *telum* Gn. I attached the label to one of these specimens as evidence of what Smith claimed to have at last identified from Manitoba is "the true *telum* of Guenée."

Acronycta radcliffei Harv. Two specimens correctly, and a third rather small one, as "? *tarlarea* Sm."

Acronycta quadrata Grt.

Acronycta spinigera Gn. A single female, dated June 23rd, 1910.

Acronycta superans Gn.

Acronycta funeralis Grt. A female, June 27th, 1912.

Acronycta fragilis Gn.

Acronycta grisea Walk.

Acronycta falcula Grt.

Acronycta albarufa Grt.

Acronycta hesitata Grt. One specimen.

Acronycta inclara Sm. Smith admitted that the aggregate of specimens to which he first gave the name *inclara* (viz., the *hamamelis* of the Monograph) contained a mixture of species. He had made no type, but ultimately fixed Hampson's figure under *inclara* as representing the type of the species.* Unfortunately the figure is a poor one, but I have carefully compared it with specimens in the British Museum, and have not the least doubt as to the species represented. It appears to be fairly common in Manitoba. The Heath collection contained a long and variable series, of which some stood as *inclara*; others as *hamamelis*, and a few small specimens as *modica* Walk.

Acronycta impleta Walk. var. *illita* Smith.

Acronycta sperata Grt. I could see no justification whatever for the attempted separation of the "supposed new species very

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near *sperata*," which Smith claimed to have discovered from Cartwright, and which was recorded by Heath in his published notes.

Acronycta noctivaga Grt.

Acronycta impressa Walk.

Acronycta obliterata S. & A.

Arsilonche henrici Grt. The North American representative of European *albovenosa*.

Microcalia dipteroides Gn.

Bryophila lepidula Grt. var. *avirida* Smith. Most were the true dull coloured *avirida*, but they graded through to a form nearly as pale, though not quite as bright, as typical *lepidula*.

Bryophila teratophora H. S.

Moma geminata Sm. One of the specimens had a narrow, dark, smoky transverse band, not previously observed in the species.

Chytonix palliatricula Gn. and var. *iaspis* Gn.

Baileya dormitans Gn.

Hadenella tonsa Grt.

Catabena lineolata Walk. One specimen, May 25th, 1911.

Platysenta videns Gn. Amongst this series stood one *Himella contrahens* and one *Orthosia inops*.

Senta defecta Grt.

Balsa malana Fitch.

Atheis (*Caradrina*) *extima* Walk.

Proscenus (*Caradrina*) *miranda* Grt.

Hypocæna (*Caradrina*) *rufostriga* Pack.

Oligia festivoidea Gn.

Hillia iris Zett (*orasis* H. S.) A single specimen was of the red-brown var. *vigilans* Grt., and the rest of the ochreous grey form known as *senescens* Grt.

Hillia algens Grt. A series stood correctly, and another series stood elsewhere as *Cleocercis curvifascia* Sm.

Hillia dircinigra Walk.

Protagrotis (Luperina) niveivenosa Grt. This species, which has occasionally, but by no means always, a spine on hind tibia, is identical with *vivalis* Grt. The fact was not known to Sir George Hampson when he published a *vivalis*.

Luperina flavistriga Sn. One female, Aug. 1st, 1911.

Luperina stipata Morr.

Luperina passer Gn. There was also a male, dated July 25th, 1911, of a pale grounded, black shaded form of which I have seen specimens from all the way from Montreal to Vancouver Island. I have tried to prove this a distinct species, but so far unsuccessfully. The genitalia in no wise differ from those of normal *passer*.

Hadena indocilis Walk. and vars. *runata* Smith and *enigra* Smith. *Indocilis* is the form standing in our lists as *remissa* Hbn. After much attention to the subject, I have decided that *runata* Smith and *enigra* Smith are in all probability variations of the same species. *Ferens* Smith is an exact synonym of *runata*, and *enigra* is exactly like some of my British specimens of *gemina* Hbn., of which *remissa* Hbn. is a European var. corresponding to our *indocilis*. *Separans* Grt. and *lona* Strk. are probably the same species as *indocilis*, in which case *lona* refers to a form similar to *enigra*. The male genitalia of all the above-named forms, so far as I have yet examined them, both British and North American, are alike. This is about the most variable of our *Hadenas*. The Heath collection contained a single female only of the var. *enigra*, lacking abdomen, but otherwise in splendid condition, and dated June 26th, 1905. It stood in the series with *miniota*, to which it bears a very close resemblance.

Hadena alia Gn. and var. *rorulenta* Sm.

Hadena vultuosa Grt.

Hadena cerivana Sm. There was one very peculiar aberration which I associate here, though it differed widely from anything previously seen.

Hadena lateritia Hfn.

Hadena dubitans Walk. The black form.

Hadena plutonia Grt. About a third of the specimens so standing were this species, one was *dubitans*, and the rest *Helotropha reniformis*.

Hadena devastatrix Brace. A few of this species stood under their correct name, but a number far greater did duty for *versuta* Smith.

Hadena arctica Bdn.

Hadena occidens Grt., mixed in the series with *arctica*.

Hadena miniota Sm. A few specimens, including two female co-types. I have elsewhere expressed my conviction that *miniota* was a bronze-coloured form of *versuta*, but recent examination of the genitalia of a large number of colour forms of Calgary males has disclosed strong evidence of the existence of two species, not always separable on superficial characters. One unfortunate result of this discovery is that the exact identity of *versuta* must at present remain in doubt. It is quite probable that older names properly belong to both species.

Hadena cariosa Gn. Two specimens.

Hadena commoda Walk. (syn. *alberta* Sm.) Only two specimens stood under their correct name, but numerous others were found mixed with other species. Four specimens stood as *cogitata* Sm. as well as one small specimen of *lateritia*, in truth most surprisingly like *commoda*.

Hadena lignicolor Gn.

Hadena inordinata Morr. One specimen, standing as *semilunata* Grt., the distinctness of which is doubtful.

Hadena mactata Sm., including the grey form *allecto* Sm. A female specimen of a probable variation of this species stood, quite wrongly, under *adnixa* Grt.

Hadena modica Gn.

Hadena semicana Walk. (syn. *hausta* Grt.) One specimen, mixed in the series with *exhausta* Sm. Standing as *semicana* was a single badly worn specimen of *Parastichtis discivaria* Walk. Smith always had an entirely wrong conception of *semicana*, and used to give this name to pale specimens of *fractilinea*, from which it is widely distinct.

Hadena exhausta Sm. A series of very poor specimens.

APHIDIDÆ FOUND ON THE APPLE IN BRITAIN
AND THE
DESCRIPTION OF A NEW SPECIES FROM AFRICA.

BY FRED V. THEOBALD, M.A.

(Continued from Page 213).

Aphis (Myzus) nigra, nov. nom.

Aphis oxyacanthæ Koch (non Schrank).

Myzus oxyacanthæ Schonteden.

Koch, Die Pflanzen, p. 55, figs. 70, 71, 1857.
Schonteden, Les Aphid. Palæarct., p. 173 (190?).
Theobald, Entomologist, XLIV, p. 404, 1911.

This aphid was found by Koch and described from specimens on *Pyrus pyrastrer* during May.

It has so far been found in Britain in two localities; once at Mortimer, Berkshire, on apple trees (12, VI, 1911) and at Wye on apples (2 and 20, VI, 1911) and on Hawthorn (6, VII, 1907).

From notes sent me, it appeared to have been abundant on apple trees at Mortimer, with *A. crataegi*, but later at Wye in the same year I found it in several large colonies on apples, living under the leaves of some Worcester Pearmain and a Peasgood Nonsuch, and previously in the same locality on Hawthorn hedges. I have only seen apterous females, but Koch describes and figures the alate viviparous female.

Apterous viviparous female:

Black and shiny; antennæ black, not half the length of the body, of six segments; the 1st wider than the 2nd, scarcely longer; the 3rd nearly as long as the 6th, 4th and 5th about equal, basal area of the 6th nearly half as long as the flagellum; the last two segments and most of the 4th markedly imbricated. The legs may be all black, but now and then the tibiæ seem to be paler on their basal two-thirds.

Alate viviparous female:

Described by Koch as being all black, except the tibiæ, which are yellowish, except at their apices. There are four pairs of lateral

abdominal papillæ before the cornicles. Antennæ black and shorter than the body. Cornicles rather short, black. Cauda black, prominent.

***Aphis rumicis*, Linnæus.**

Aphis papaveris Fabricius.

Aphis thlaspeos Schrank.

Aphis favae Scopoli.

Aphis atriplicis Fabricius.

Aphis aparines Schrank.

Aphis armata Hausmann.

Aphis dahliæ Mosley.

Aphis hortensis Fabricius.

Aphis atriplicis Buckton.

Aphis euonymi Fabricius!

Aphis ulicis Fabricius.

Rumicifex Amyot.

Meconaphis Amyot.

Linnæus, Syst. Nat., II, 734, 5 and 736, 16.*
Theobald, Rept. Eco. Zool., 1913, p. 27, 1914.

This very abundant black aphid, which occurs on such a great variety of plants, especially Docks (*Rumex spp.*), Beans (*Fabia spp.*), Poppies (*Papaver spp.*) and *Euonymus spp.*, was found by myself breeding in small colonies on apple trees at Wye in July, 1913, and again at Borough Green in Kent. In the same year I also found numbers on an apple tree near Herne Bay in Kent. In July, 1913, it was also sent me from the Cyder and Fruit Research Station at Long Ashton, near Bristol, from apple trees. In Kent only apterous viviparous females and their larvæ were found, but from Long Ashton alatae, as well as apterae and larvæ were sent. Specimens from apple trees near Exeter, Devonshire, were also received during the same year.

The so-called "Black Dolphin" or "Collier" appears, however, to be only a casual visitor, and has never been reported as causing any material damage. The apterae can at once be told from the black *Aphis (M.) nigra* by being mealy, and from the dark mealy *Aphis crataegi* by being globose and not flattened.

*For other references vide my paper in Journ. Bd. Agr. (England and Wales) 1912, pp. 467-476.

Moreover, the two last never have white flecks upon them, so often noticed in *Aphis rumicis*, especially in the nymphæ.

In the alate female stage it can at once be told from *Aphis cratægi* by the absence of the basal pale abdominal band and general absence of farinose matter. As I have not seen any alatae of *A. nigra*, I cannot compare them, but the resemblance to *rumicis* is great.

Siphocoryne avenæ, Fabricius.

Aphis avenæ Fabricius.

Aphis avenæ-sativæ Schrank.

Aphis annuæ Oestlund.

Aphis mali Fitch (non Fabricius).

Aphis cratægifoliæ Fitch.

Aphis fitchii Sanderson.

- Fabricius, Ent. Syst. IV, 214, 22, 1774; Syst. Rhyng, 297, 21, 1803.
 Schrank, Fr. Boica, II, p. 104, 1801.
 Kaltenbach, Mono. Pflanz., p. 108, 1854.
 Walker, Ann. Mag. Nat. Hist., Sc. 2, V, p. 269, 1849.
 Fitch, 1st Rept. Nox. & Ben. Ins., St. N. Y., pp. 49-60, 1856.
 Fitch, 4th Ann. Rept. Reg. Univ., N. Y., p. 65, 1851, and p. 66 (= *cratægifoliæ*) and Cat. Hom. N. Y., St. Cat., 1851.
 Walker, Cat. Brit. Mus. Homop., p. 986 (mali), 1852.
 Fitch, 6th Rept. Ins. N. Y., pp. 91-97, 1865.
 Walsh, Phil. Ent. Soc., p. 301 (= *mali*), 1862.
 Walsh, Proc. Ent. II, p. 37 (= *mali*), 1867.
 Riley, Am. Ent. I, p. 99 (= *mali*), 1869; and II, p. 178 (= *mali*), 1870.
 Kaltenbach, Die Pflanz. a. d. Klasse, Ins., p. 216, No. 79, 1874.
 Saunders, Rept. Ent. Soc. Ont., p. 344 (= *mali*), 1877.
 Riley & Monell, Bull. U. S. Geol. & Geog. Surv. V, I, 25 (= *cratægifoliæ*), 1879.
 Thomas, 8th Report St. Ent. III., p. 83, 1879.
 Saunders, Canad. Ent. XV, pp. 96-97 (= *mali*), 1883.
 Osborn, Bull. Iowa Agri. Coll., 2, 91 (= *mali*), 1884.
 Saunders, Rept. Ent. Soc. Ont., p. 23 (= *mali*), 1884.
 Fletcher, Rept. Canad. Cent. Exp. Farms, 22 (= *mali*), 1887.
 Forbes, Trans. Ill. St. Hort. Soc., p. 92, 1887.
 Lintner, Rept. Inj. Ins., N. Y., for 1886, p. 118, 1887.
 Oestlund, Aphid. Minn., p. 64 (= *mali*), p. 51 (= *cratægifoliæ*), 1887.
 Riley, Sec. Agri. Rept. U. S. Ent., 1889, p. 348, 351, 1890.
 Hillman, Bull. II, Neb. Agri. Exp. Sta., 1890.
 Hieronymus & Pax., Herb. Cec. fasc. VI, No. 192, 1890.
 Osborn & Serrine, Proc. Iowa Acad. Sci. I, pt. III, p. 99 (= *cratægifoliæ*), 1893.
 Webster, Journ. N. Y. Ent. Soc. III, p. 119 (= *mali*), 1893.
 Webster, Insect Life, VI, p. 152 (= *mali*), 1893.
 Weed, Trans. Am. Ent. Soc. XX, p. 299 (= *mali*), 1893.
 Bruner, Rept. Nebr. Hort. Soc., p. 172 (= *mali*), 1894.

- Webster, Bull. 51, Ohio Agri. Exp. Sta., pp. 111-117 (= *mali*), 1894.
 Fletcher, Rept. Canad. Cent. Exp. Farms, p. 199, 1895, and p. 163, 1896 and p. 206, 1898.
 Alwood, Bull. 100, Vag. Agri. Exp. Sta., p. 89, 1899.
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 Johnson, Bull. 26, (n.s.) U. S. Dept. Agri. (D. E.), p. 80, 1900.
 Lugger, Bull. 69, Minn. Agri. Exp. Sta., p. 192, 1900.
 Sanderson, Bull. 26 (n. s.) U. S. Dept. Agri. (D. E.), p. 67, 1900.
 Sanderson, Trans. Penns. Hort. Soc., p. 45 (= *mali*), 1901.
 Hunter, Bull. 60, Iowa Agri. Exp. Sta., p. 99 (= *mali*), 1901.
 Schonteden, Marcellia, Avellino, II, p. 95, 96, 1903. and Ann. Soc. Ent. Belg. 47, p. 178, 1903.
 Pergande, Bull. 44, U. S. Dep. Agri., Div. Ent., p. 7, 1904.
 Tavares, Broteria. IV, p. 103, 1905.
 Marchal, Autun. Mém. Soc. Hist. Nat. XVIII, p. 305, 1905.
 Sanderson, Bull. 74, Del. Coll. Agri. Exp. Sta., pp. 137-149 (= *fitchii*), 1906.
 Theobald, Rept. Eco. Zool. 1905, pp. 30-32, figs. 10, 11, 14, 15 (= *fitchii*), 1906.
 Gillette, Journ. Eco. Ent. I, p. 308, 1908.
 Schonteden, Mém. Soc. Ent. Belg. XII, p. 217, 1906.
 Gillette & Taylor, Bull. 133, Colo. Agri. Exp. Sta., p. 30, 1908.
 Theobald, Insect Pests of Fruit (= *fitchii*), p. 137, figs. 111-114, 1908.
 Tullgren, Upp. Prak. Ent. XXII, p. 56, 1913.
 Patch, Bull. 233, Maine Agri. Exp. Sta., p. 266, 1914.
 Davis, Bull. 112, U. S. Dep. Agri., 1914 (Oat Aphis).

Aphis prunifoliae Fitch is given by Schonteden as a synonym of this species. As far as I can see, Fitch's species is only *Aphis pruni*.

Prunifoliae is described by Fitch in his First and Second Report on Noxious and Beneficial Insects of the State of New York, p. 122, 1856.

DESCRIPTION:

Alate viviparous female (spring migrant):

Head, pronotum and thoracic lobes almost black to olive brown, the two last often very shiny; pronotum green in front and behind. Abdomen green, with black lateral spots, 3 to 4 large ones outside and 5 small ones mediad; a dark patch in many at base of the cornicles,* one on the inside and two dark bars caudad of the cornicles, the first broad, the second narrow. Anal plate black. Cauda brown or greenish brown in the middle, dark at the edges. The antennæ are shorter than the body, black; the two basal segments nearly equal in length, the second barrel-shaped and narrower than the first; 3rd nearly as long as the 6th,

*Sanderson describes his *fitchii* as having a yellow spot at the base of the cornicles. This I have never seen in any European specimen.

about twice as long as the 4th, with 17-20 sensoria over its whole length, but not so markedly tuberculate as in *kochii* and *cratagi*, but with many more sensoria than in *pomi*; 4th segment with 10-14 sensoria, the same length as the 5th; the 5th with 0-6 sensoria, including the usual sub-apical one; the 6th about as long as the 4th and 5th; the last three imbricated. Cornicles rather short, either brown or pale greenish brown, somewhat swollen in the middle or irregularly cylindrical constricted at the apex, which is more or less flared and, to some extent, constricted at the base; in some specimens the cornicles are almost black. Legs dark, except base of femora and most of the tibiae, which are pale greenish brown to pale green or yellowish. Base of wings green to yellow.

Length 1.5 to 2 mm.; wing expanse 6 to 7 mm.

Return alate migrant:

Very similar to the former, but appears to be smaller in most cases, and the 5th antennal segment has seldom more than the usual sub-apical sensorium, but in an occasional specimen 1-2 extra ones may occur. The abdomen more variable, green, yellowish or pale brown.

Variation in sensoria of alate female.

The apple spring migrant may often have no sensoria on segment 5, except the usual sub-apical one, but now and then from 1-3 may occur. This also seems to be the case with "*fitchii*" in America. Those from oats and wheat, the return migrants to the apple and pear, usually have none but the sub-apical one, but now and then 1-3 may also occur. In America it seems that this segment usually has a few sensoria. Pergande figures the second generation—the migratory female—with sensoria on segment 5 and states that segment 3 is always strongly tuberculate, frequently also 4 and sometimes also more or less 5 (Bull. 44, D. E., U. S. Dept. Agri.).

Apterous viviparous female:

Green to yellowish green with often more or less distinct mottled areas or dark green median and lateral lines; oval. Eyes black. Antennae green, dusky at the tips. Cornicles greenish

brown to brown,* slightly swollen in the middle, flared at the tips, where they are slightly constricted, and also to some extent constricted at the base. Legs pale green; tarsi dusky. Cauda small, pale brownish. Antennæ vary from 5 to 6 segments; when of 5 segments, the third is as long as the fifth; 4th longer than the basal area of the 5th; basal area of latter about $\frac{1}{3}$ the length of the flagellum; when of 6 segments, the 3rd is about as long as the 6th; 4th and 5th about equal in length; the apical segments, where they are darkened, are markedly imbricated. In some specimens there is a marked dorsal median deep green stripe, made up of various shaped patches on each segment, sometimes broadly elongated. A few patches of white powder between the dorsal and lateral darker green stripes on the anterior abdominal segments may occur.

Length 2 mm.

The *larvæ* are yellowish green, with two dark spots on the head; legs brownish to greenish white; cornicles deep brown or all green.

Pupæ light yellowish green.

Oviparous female:

Apterous. Somewhat oval. Yellowish green, yellow to almost green or dull green; head often slightly brownish; also the pronotum, antennæ and legs. Antennæ short, of 5 segments, about or less than half the length of the body; 1st segment wider and longer than 2nd; 3rd not quite as long as 5th; paler at the base; 4th short, only a little longer than base of 5th, with a single marked sensorium; 5th with swollen basal area, about quarter length of flagellum.** Eyes dark, prominent. Proboscis reaches to base of second legs, acuminate, apical segment longer than the penultimate. Hind tibiæ slightly broadened, with 29-32 sensoria, not quite reaching the apex. Cornicles short, brown to black, in some almost green, flared at the tip and constricted at base and apex; markedly imbricated. Cauda moderate, spinose, with three pairs of lateral hairs; blunt at apex and dusky to brown.† Anal plate

*Sanderson says that in America it has a "rusty yellow spot at the base of the cornicles." I have never seen this in European specimens.

**Sanderson says "antennæ with but 6 segments."

†Sanderson mentions a dull reddish or orange spot at the base. This I have never seen.

dark, broadly expanded, spinose, with a few hairs. A small papilla between the cornicles and cauda. Hind tibiae with rather long hairs.

Length .8 to 1 mm.

Male.—Alate. Head and thorax black, shiny. Abdomen black and dull green,* and with dusky lateral spots; dark at the apex. Antennae black, variable in length, not quite as long, to a little longer than the body; 1st segment larger than 2nd; 3rd not quite as long as the 6th; base pale, with 17-20 sensoria over its whole length; 4th about as long as the 5th, thick, with 14-18 sensoria; 5th with 5-12 sensoria; basal area of 6th small. Proboscis dark, reaching the 2nd pair of legs, acuminate, apical segment longer than penultimate. Cornicles black, flared at apex, constricted at base and apex, imbricated. Legs with dark coxae; fore femora green, except at apex, mid and hind dark brown; tibiae green, with dark apices; tarsi dark. Cauda black. Anal black; the cauda with two pairs of lateral hairs and spinose; penis yellow. Wings with brown veins and yellowish-green insertions.

Length 1 to 1.5 mm.

DISTRIBUTION:

Europe generally; America; Africa?

FOOD PLANTS:

Pyrus malus, *Pyrus communis*, *Crataegus* sp., *Avena sativa*, *Avena orientalis* and *Avena fatua*; *Hordeum hexastichon*** and *Hordeum distichon*, *Tritivum sativum* and various *Gramineae* spp.? Walker gives *Cydonia vulgaris*, *Sorbus aucuparia*, *Mespilus germanicus* and *Crataegus oxyacantha*. Oestlund records it on Wild Crab Apple and Mountain Ash.

Davis, in his recent paper (Bull. 122, U. S. Dept. Agri., 1914), gives the following food plants: Gramineae—Wheat (*Triticum vulgare* and *T. dicoccum*†); Oat (*Avena sativa*), Wild Oat (*A. fatua*);

*Sanderson says light yellowish brown.

**The usual name for Barley is *Hordeum vulgare*, but the cultivated forms are grouped into three races: 6-rowed Barley (*Hordeum sativum hexastichon*); 4-rowed Barley (*Hordeum sativum vulgare*), and 2-rowed Barley (*Hordeum sativum distichon*). *Avena sativa* is the Common Oat; *Avena fatua*, the Wild Oat; *Avena orientalis*, the Tartarian Oat.

†The latter is recorded by Mordwilck as hosts of *Aphis padi*, Kalt.—*avena*, Fabr. This is not the *Aphis padi*, Reaum.

Tall Oat Grass (*Arrhenatherum elatius*); Barley (*Hordeum vulgare*); Two-rowed Barley (*H. distichon*); Wall Barley (*Phleum pratense*); Canada Blue Grass (*Poa compressa*); Kentucky Blue Grass (*Poa pratensis*); Annual Meadow Grass (*Poa annua*); Crab Grass (*Syntherisma sanguinale*); Upright Chess (*Bromus racemosus*); Rescue Grass (*Bromus unioloides*); Cheat (*Bromus secalinus*); Hungarian Brome Grass (*Bromus inermis*); Orchard Grass (*Dactylis glomerata*); Italian Rye Grass (*Lolium multiflorum*); Perennial Rye Grass (*Lolium perenne*); Red Top (*Agrostis alba*); Red Fescue (*Festuca rubra*); Sheep's Fescue (*F. ovina*); Meadow Fescue (*F. pratensis*); Hard Fescue (*F. ovina duriuscula*); Reed Canary Grass (*Phalaris arundinacea*); Melic Grass (*Melica bahini* and *M. penicillaris*); Johnson Grass (*Andropogon halepensis*); Broom Corn (*Andropogon sorghum*, var.); Koeler's Grass (*Koeleria cristata*); Wild Rye (*Elymus geniculatus*); Virginia Wild Rye (*Elymus virginicus*); Nodding Wild Rye (*E. canadensis*); Corn (*Zea mays*); Teosinte (*Euchlæna mexicana*); Typhaceæ: Cat-tail (*Typha latifolia*); Ammiaceæ: Celery (*Apium graveolens*); Compositæ: Tick Seed (*Coreopsis sp.*); Malaceæ: Apple (*Malus malus*); Pear (*Pyrus communis*); Hawthorn (*Crataegus coccinea*, etc.); American Mountain Ash (*Sorbus americana*); Quince (*Cydonia vulgaris*); Wild Crab Apple (*Malus sp.*); Rosaceæ: Ninebark (*Opulaster opulifolius*); Amygdalaceæ: Plum (*Prunus sp.*); Choke Cherry (*Padus virginiana*) and Wild Black Cherry (*Padus padus* and *P. serotina*); Pergande also gives *Cornus sp.*, *Bursa bursa-pastoris*, *Arctium minus*, all probably accidental hosts.

I have never found it on *Padus*, and it certainly is not the *Aphis padi* of Reaumur.

LIFE-HISTORY:

Fabricius originally described this species from specimens found on Oats (*Avena sativa*). Kaltenbach on *Avena fatua* and *sativa* and on *Hordeum hexastichon* and *distichon*. Thomas (Third Rept., p. 53, 1879) refers to *avenæ* as appearing on the fall wheat and oats in America, working upon the leaves and stalks singly, and that when winter appears that they move down to the ground, some at least entering the soil, and feed upon the sap of the roots, and at the same time he found an alate individual on the blade.

As far as I have observed, the winter is passed in Britain entirely in the egg stage on the apple and pear.

The ova hatch in the beginning of April and by about the 20th of that month I have found numbers of apterous viviparous females on the apple leaves. These apteræ continue to increase through May and towards the end of the month alatae commence to appear. The earliest date I have of winged females is the 21st, from Hailsham in Sussex. At Wye they have usually appeared about the 29th, but in 1914 many occurred as early as the 10th. These alate viviparous females migrate from the apple and pear until the middle of June, by which time all seem to have disappeared. Pergande and others traced this migration to corn and grasses in America—the so-called *Aphis fitchii* of Sanderson—on the apple, becoming the *Aphis avenæ* of Fabricius on corn. In Britain I have found the same. Apteræ occur on oats, and more rarely barley, from late June onwards. In 1911 I found many as late as September the 19th. By October 15th winged forms have been frequently noticed on self-sown and wild oats, and in most years by the 20th of that month all had flown from the corn back to the apple and pear. But this cannot be general, for the return migrants to the apple seem to appear gradually. Winged females have been for many years noticed to appear on the apples over a much greater length of time. It is possible that many come from wild grasses, although repeated search has failed to reveal them on any kind of grass in the south of England. The alate females on the apple produce living young and these become the apterous oviparous females and the alate males. These sexuales I have found in large numbers year after year in October, and many continue to oviposit late into November. The earliest oviparous females I have found were in October 4th in 1911; the latest on November 15th in 1915. Sanderson says that in America few eggs are laid before September 1st, but in these Islands I have never found any laid as early as that.

Miss Patch says "this species migrates from the apple and certain other members of the Rose family to the oat and other grasses for the summer." She also records it on *Cratægus* at Orono, Maine, U. S. A., in June, as alatae and pupæ, the latter were green with darker green longitudinal median and sub-lateral lines,

between which ran a row of whitish spots and no-rusty or orange-coloured markings near the cornicles.

Davis in his recent paper (Bull. 112, U. S. Dept. Agri., 1914) points out that in America *avenæ* also passes the winter as viviparous females at the lower parts and roots of wheat and other grasses. In the latitude of La Fayette, Indiana, it winters either as viviparous females on grain and grasses or in the egg stage on apple and pear. Further north, he says, this species is probably unable to winter in any but the egg stage, whilst in the southern parts of the United States they may live over winter as viviparous females only, no egg stage appearing. He thus concludes that the apple is not a necessary alternate host. In a recent letter to me this authority thinks that my *Siphocoryne splendens* from Egypt* may be the same as *avenæ*, but it differs markedly in structure, and I have never seen *avenæ* crimson and green in Britain, but Professor Davis says it may be so in America.

DESCRIPTIONS OF AND OBSERVATIONS ON SOME CHALCIDOID HYMENOPTERA.

BY A. A. GIRAULT, GLENNDALE, MD.

***Eupelmus marylandicus*, n. sp.**

Female—Length 1.95 mm., excluding the ovipositor valves, which are straight, compressed somewhat and extruded for a length equal to somewhat over half that of the abdomen. Slender, graceful. Allied to the Australian *pachyscapha*.

Dark metallic purple, the tarsi except the last joint, tips of tibiæ narrowly and the distal half (or a little more) of the middle tibia, white or nearly. Fore wings brown from the proximal end of the bend of the submarginal vein distad to apex, the infuscation broken by two distinct, straight, longitudinal, hyaline stripes, the cephalic and shorter from the base of the stigmal vein to apex and including the cephalic wing margin; the other much longer, extending from a point caudad of middle, nearly opposite the middle of the marginal vein to the apex. Stigmal vein slender, nearly two-thirds the length of the postmarginal. Antennæ inserted about

*Bull. Ent. Res.

July, 1916

in the middle of the face, but below the ventral ends of the eyes, the latter shorter than the cheeks. Scape greatly, rectangularly dilated (over twice longer than wide, excluding the bulla); pedicel somewhat longer than wide at apex, subequal to funicle 5; funicle 1, or the "ring-joint," a little wider than long; 2 over twice longer than wide, 3 and 4 subequal, longest, a little longer than 2; 8 a little longer than wide, subequal to club 1. Mandibles tridentate. Wings rather slender. Cephalic raised piece of scutum and the lateral ridge weak, yet distinct. Axillæ small, convex barely separated, or not at all; scutellum globular, convex. Pronotum quadrate. Abdomen a third longer than the thorax. Sculpture weak. Cephalic femur compressed. Middle tarsi with black teeth beneath.

Described from one female captured by sweeping in the forest, Chevy Chase Lake, Maryland, April 24, 1915.

Type—Catalogue No. 20094, U. S. N. M., the above female on a tag, the head and a fore wing on a slide.

***Eupelmus speciosus*, n. sp.**

Female—Length 2.00 mm., the ovipositor valves shortly extruded.

Light orange yellow, the wings hyaline or sometimes slightly infuscated under the marginal vein, the head dark metallic green (except the mouth) as is also the distal third of the scutellum; legs, ovipositor valves and scape pale yellow. Pedicel suffused with yellow; rest of antenna black. Scape a little compressed; pedicel twice longer than wide at apex, longer than any of the funicle joints, of which 4 is longest, nearly twice longer than wide; 1 wider than long, 2 a fourth longer than wide, 3 next longest, 8 somewhat wider than long. Postmarginal vein but very slightly longer than the stigmal. Head, axillæ and scutellum densely scaly, rest of thorax delicately so. Lateral ridges of scutum joined across near caudal margin, the raised triangular piece reaching to about the middle. Ovipositor valves black at extreme base. Abdomen narrowing gradually to apex, as long as the rest of the body combined. Middle tarsi with black teeth beneath.

Described from seven females in the collection of the U. S. National Museum, on tags bearing the following label: "4841⁰¹¹, April 3, 1890." Locality, Washington, D. C.?

Types—Catalogue No. 20091, U. S. N. M., the above specimens, a pair of antennæ on a slide.

Eupelmus cyaniceps Ashmead **utahensis**, new variety.

Female—Length 2.00 mm., excluding the ovipositor, which is two-thirds the length of the abdomen.

Differs from the description of *rosæ* Ashmead in having the cephalic femur metallic. Differs from *cleri* in having the post-marginal vein no longer than the stigmal and the ovipositor valves broadly dusky at tips; runs to *cyaniceps* Ashmead, but differs in being much less robust, in having the cephalic tibiæ nearly wholly metallic. *Caudal legs metallic* (except tarsi); middle tibiæ yellow, also the femur except proximad more or less. Funicle 1 much wider than long, 2 and 3 subequal, longest, each about twice longer than wide.

Described from two females in the collection of the U. S. N. M., from American Fork, Utah, July.

Types—Catalogue No. 20092, U. S. N. M., the above specimens on tags, a head and fore wing on a slide.

Compared with types of *cleri* and *cyaniceps*. Middle white portion of ovipositor much longer than the basal blue portion, shorter than the distal dusky portion.

Eupelmus cyaniceps Ashmead **amicus**, new variety.

Female—Like the typical form, but the ovipositor valves more slender and the white middle portion shorter than either basal or distal portion (in the typical form the yellowish middle portion is longest.)

Described from three pairs on tags in the U. S. N. M., labelled: "From *Bruchus amicus* Horn, Las Cruces, New Mexico."

Types—Catalogue No. 20093, U. S. N. M., the above specimens (three tags).

Eupelmus charitopoides, new species.

Female—Length 1.85 mm., excluding the ovipositor, which is extruded for a length equal to that of the abdomen.

Dark metallic green, the wings subhyaline; tarsi, knees, tips of cephalic tibia, distal half of caudal tibiæ and middle tibiæ except

a cinctus just below the knee, reddish brown; teeth of middle tarsus ventrad white, dense, soft. Venation yellow. Postmarginal vein nearly twice the length of the stigmal, which is moderately long. Head and thorax very delicately scaly. Axillæ barely separated inwardly. Lateral ridges of scutum distinct, the raised cephalic, mesal portion small. Antennæ inserted below the middle of the face, slightly below the ventral ends of the eyes; scape distinctly much compressed; pedicel twice longer than wide at apex, subequal to funicle 5; funicle 1 slightly longer than wide, 2 and 4 longest, each about thrice longer than wide, 8 thickest, about a half longer than wide. Differs from *Charitopus schwarzi* Ashmead in being shorter, the stigmal vein is twice longer, the legs differently coloured and so on.

Described from one female in the U. S. N. M. from Harper's Ferry, West Virginia, May 19.

Type—Catalogue No. 20094, U. S. N. M., the above specimens on a tag, an antenna on a slide.

Scutellista cyanea, Motschoulsky.

Several pairs reared from *Ceroplastes galeatus* Newstead, Kampala, Uganda, Africa, September 6, 1915 (C. C. Gowdey).

Eurytoma galeati, new species.

Female—Length 1.95 mm. Abdomen as long as the rest of the body.

Agrees with the description of *transvaalensis* Cameron, except as follows: The scape is entirely reddish, the middle and caudal tibiae each bear a distinct, middle black cinctus; the marginal vein is distinctly somewhat longer than the postmarginal. On the depressed basin of the propodeum, which is reticulated, there is a nearly half complete median channel composed of two foveae end to end on each side of a very narrow median carina. Club 2-jointed; funicles 4 and 5 each somewhat longer than wide, longer than the pedicel. Abdominal petiole a little wider than long. Segment 5 of abdomen longest, equal to 3 and 4 united, abdomen dorsad glabrous, finely scaly distad of segment 5 and on the lateral aspect. Mesopleurum finely punctate, caudal half finely striate cephalo-caudad. Prepectus mostly glabrous. Punctures dense,

distinct. Distal segment of abdomen long-pointed. Stigmal vein slightly shorter than the postmarginal. Funicle 1 somewhat over half the length of the body of the scape.

Described from two females reared from *Ceroplastes galeatus* Newstead, Kampala, Uganda, Africa (C. C. Gowdey), September, 1915.

Types—Catalogue No. 20095, U. S. N. M., the above specimens on tags, plus a slide bearing antennæ, a fore wing, caudal legs, a fore leg and a middle tibia.

***Aphelinus automatus* Girault.**

A female, Vienna, Virginia, from *Aphis setariae* (W. F. Turner).

***Coelopisthia confusa*, new species.**

Female—The same in stature, and so forth, as *fumosipennis* Gahan, but differing as follows: The legs (excluding the concolorous coxæ) are darker, being reddish; the antennæ are inserted a little higher up on the face and differ notably in that the ring-joints are normal (that is not large, the second not subquadrate), the scape is red, the pedicel nearly all dusky black, funicle 1 a little wider than long, 4-6 subequal, much wider than long; the infuscation of the fore wing is fainter and more diffused, yet distinct. At least one mandible 4-dentate (other not seen). Flagellum black.

Described from one female in the collections of the U. S. N. M., labelled "*Semiotellus chalcidiphagus* Walsh., Washington, D. C." This species, superficially, is very similar to *Homoporus crassinervis* Thomson.

Type—Catalogue No. 20096, U. S. N. M., the above female on a tag, a pair of wings, a caudal tibia and the antennæ on a slide.

A NEW GENUS OF PTEROMALID CHALCIDOID HYMENOPTERA FROM NORTH AMERICA.

BY A. A. GIRAULT, GLENNDALE, MD.

***Tomocerodes*, new genus.**

Female.—Belongs to the Eunotinae. Like *Tomocera* Howard, except that the caudal tibia is armed with a very long, stout spur,

as in *Ophelosia*. Antennæ 8-jointed (excluding a very minute ring-joint). Segment 2 of the abdomen occupying the entire surface. Scutellum without a delicate cross-suture near apex. Male antennæ 7-jointed, the funicle joints as in male *Eurytoma*, the club as long as the scape and solid; a very minute ring-joint, but not counted. Abdomen with a scanty tuft of hairs at base on each side. A short postmarginal vein, as in *Tomocera*. Mandibles tridentate, not especially large.

Tomocerodes americana, new species.

Female.—Of the habitus and stature of *Tomocera* genotype. Dark reddish brown, the fore wing infuscated as in the named species, except that the infuscation is rectangular rather than ovate, its ends subtruncate, its proximal end not past the base of the marginal vein (but conical at caudal wing margin and somewhat proximad of the marginal vein) and distad it extends somewhat closer to the apex. Dorsal abdomen (except the sides at base), propodeum (except laterad of the lateral carina except at caudal margin) and all the dorsal thorax laterad of the axillæ and scutellum, metallic purplish; also venter of abdomen more or less (especially distad). Club black, the funicle and tibiæ washed distinctly with purple. Stigmal vein longer than the shortened marginal. Marginal fringe of fore wing somewhat longer than usual (that is, not extremely short). Pedicel much longer than any of the funicle joints, the latter moniliform, 1-2 subequal, smallest, 5 largest, over twice the size of 1. Club not quite as long as the funicle. Abdomen glabrous. Head and thorax very delicately scaly. Propodeum a little longer at the meson, with median and lateral carinæ, the latter closer to the meson than to the minute spiracle; between these carinæ, a cross-carina near the cephalic margin (longer) and one near apex, both curved a little; also a looped carina from base of the lateral carina over to near the spiracle. Dorsal thorax with isolated black bristles. Axillæ not advanced. Scutum nearly as long as the scutellum.

Male.—A third smaller and entirely metallic purple, the wings hyaline, the tarsi brown. The scape is still long, but much shorter than in the female, the pedicel globular; funicles 1 and 2 close.

together, 1 ovate (the axis oblique), the others triangular, the base of each triangle about half the length of the club; each funicle joint with a tuft of long silky hair from the apex of their lateral prolongation. Mandibles tridentate.

Described from one pair in the U. S. N. M., labelled "Oaxaca, Mexico, Koebele."

Types.—Catalogue No. 20192, U. S. N. M., the above specimens plus a slide bearing the heads and caudal tibiae and a female fore wing.

JOHN BICKERTON WILLIAMS, F. Z. S.

We regret to record the death, on Sunday, May 28, 1916, of Mr. John Bickerton Williams, one of the oldest members of our Society. Mr. Williams had been in Toronto only about three weeks since his return from Bermuda, where he had spent the winter and where his health, which had been failing for the past few years, had apparently much improved.

Mr. Williams was born in Liverpool, England, in 1848, and was educated as an architect, practising a few years in Birmingham before coming out to Canada in 1881. Since then he resided chiefly in Toronto, though he spent a few years in Montreal in the early nineties. He was a Fellow of the Zoological Society and was interested in various branches of zoology, but more especially in ornithology, of which he had a wide and accurate knowledge. Since 1906, when he was appointed Cataloguer of the Biological Museum of the University of Toronto, he did a great deal of useful work in identifying, arranging and labeling the museum specimens, particularly the birds. In entomology he also accomplished much useful work for the museum, his interest centering in the butterflies; and he contributed several articles to the Canadian Entomologist and the Annual Reports of our Society. He was for many years a most valued member of the Toronto Branch of the Society, acting for long periods as Secretary-Treasurer and as Librarian-Curator. He was also Honorary Curator of the Royal Canadian Institute.

Mr. Williams was unmarried, his only relative in Canada being a brother, Mr. A. R. Williams, of Toronto.

GEOMETRID NOTES.

NEW SPECIES AND ABERRATIONS.

BY L. W. SWETT, WEST SOMERVILLE, MASS.

Hydriomena californiata Pack. ab. **niveifascia** nov.

Expanse 30-35 mm.

Wings pale gray, the red and smoky bands being replaced by silvery white bands. The markings are as in normal *californiata*, except that the watery line of the mesial band of the fore wings is replaced with white. Where the basal and extra-discal reddish shadings usually occur is also white. The marginal, smoky band is replaced with white and the margin of the wings pale gray. The hind wings are smoky brown, with two curved bands, as in the normal form. The extradiscal dots on the fore wings are minute and black. Beneath them is a trace of the white lines above, showing through on the fore wings; otherwise, as in normal *californiata*.

This is a most striking form, and would require some time and study to place it correctly, if it were not for the date of capture and the character of the palpi. I do not believe in describing aberrations of the species of *Hydriomena* where they are slight, but this albinic, banded form seems very unusual, and I recall no previous case of this variation in North America form.

Holotype—♂, Goldstream, B. C., April 19, 1908, from Mr. E. H. Blackmore, in my collection.

Allotype—♀, Victoria, B. C., June 6, 1908, returned to Mr. E. H. Blackmore.

Nomenia obsoleta, n. sp.

Expanse 20-23 mm.

Fore wings white, with a very slight fuscous tinge, the costa with nine or ten irregular brown lines, which, if produced, would cross the wings. The first line curves outwardly to the median vein, then stops and appears as a spot on the inner margin. The other lines, continued to the intradiscal, show only as minute brown dots on the median vein and inner margin. The intradiscal line is very irregular and shows only very faintly, appearing as heavy dots on the median vein and inner margin. The discal dot is small and black, with the median space pure glistening white. The extra-

discal double line is the most prominent marking on the wings. It starts as a geminate line at the costa, just beneath which it is outwardly sharply angled. It curves backward from costa toward discal spot, opposite which it is again outwardly angled; then runs a straight course for a short distance and, making a curve inwardly runs straight to inner margin. At the costa there is a large brown spot joining these geminate extradiscal lines, another at the median vein and a smaller one on the inner margin. Beyond, the marginal lines run almost straight across the wings with no inward curve as in *duodecemlineata* Pack., the only angle being at the costa. Fringe pure white, with black dashes at ends of veins. The wings are not gray as in *12-lineata* Pack., but glistening white with brown spots, and the extradiscal is the only line crossing the wing except the two marginal pale lines. Hind wings pure glistening white, with trace of extradiscal line running straight across the wing. It appears as a dot on the inner margin, then on each vein to the cell, where it is elongated and heavy; then in small dots on veins to the outer margin. There is an apparent marginal line, but the dots are so small and faint that it is difficult to see. I can see no discal spot except perhaps a slight darkening of the scales.

Beneath: Fore wings darker than above, with fuscous tinge, extradiscal and marginal lines showing through. Discal spots black and prominent on all the wings. Hind wings white, as above, extradiscal line running straight across the wing, appearing as dots on the veins, no curve visible. Beyond this there are traces of two marginal faint dotted lines. On the abdomen above at base are two twin dots which sometimes join, forming a black band. Geminate spots are also present on each segment almost to the tip. This species differs from *duodecemlineata* Pack. in its larger size, pure white colour and brown spots and course of lines.

Holotype—♂, Goldstream, B. C., April 19, 1908, from Harvey collection.

Paratype—♂, Victoria, B. C., April 19, 1908, in Provincial Museum Collection.

Allotype—♀, Goldstream, B. C., April 19, 1908, from Harvey collection.

Paratype—♀, Victoria, B. C., April 26, 1908, from Harvey collection.

All these were received through Mr. Blackmore. I am not sure that the ♂ paratype is exactly like the others. It has a fuscous tinge and more nearly approaches the *!2-lineata* Pack., but it is best referable here, I think. *Obsoleta* Swett looks a trifle like small *Venusia cambrica* Curtis, if pure white, though the antennæ would show the difference at once.

***Diastictis andersoni*, n. sp.**

Expanse 27 mm.

Fore wings smoky gray or bluish gray, with three prominent costal brown patches. The first is a basal patch, from which a faint line curves outwardly to inner margin. The second line runs almost straight across wing to margin; the third line is most prominent and runs with an outward curve to about two-thirds of the wing, and then runs straight to inner margin. There is a trace of a fourth costal patch, and beyond the extradiscal line is a heavy fuscous shade running from median vein to inner margin. Hind wings are of the same colour as fore wings, and extradiscal band curves outwardly across wing. No discal spots apparent in any of the wings above. Fringe grayish, with a slight darkening near apex of fore wings. Beneath, the fore wings are a smoky gray in colour; the extradiscal line showing through; beyond which they are somewhat striated. Hind wings: Discal dot large, extradiscal line heavy, and all the wings somewhat striated, giving them a mottled appearance. This form looks somewhat like *occiduaria* Pack, if smoky gray, but the extradiscal lines on both wings are more curved, and it lacks any yellow shade.

This form is possibly an aberration of some known species, but I hardly think so, as it was taken by Mr. Anderson at Atlin, B. C., which is pretty far north. I take pleasure in naming this form after Mr. Anderson, who has proved to be an indefatigable collector, and who has done much to further our knowledge of the Geometrids of Northern British Columbia.

Holotype—♂, Atlin, B. C., July 13, 1914, in my collection through the kindness of the collector, Mr. E. M. Anderson.

Paratypes—from same locality and date in Provincial Museum collection at Victoria, B. C., also in that of Mr. E. H. Blackmore.

This form must be allied to *inceptaria* Walk., which is, in my opinion, distinct from *argillacearia* Pack. Dyar's reference is also incorrect. It was described as *Numeria inceptaria* in the Canadian Naturalist and Geologist, Vol. 5, pp. 241-266, Aug. 1860. *Argillacearia* Pack. seems to lack definite lines, while, according to the description, *inceptaria* has two on the hind wings and three on the fore wings. I rather think it is nearer *evagaria* Hulst and *inceptaria* than *argillacearia*.

SOME ROCKY MOUNTAIN ANDRENID BEES.

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

Andrena cyanura, sp. n.

♀.—Length about 12 mm.; black, with the abdomen shining dark blue; hair of head and thorax abundant, mainly very pale ochreous or white, with an ochreous tint, but black at sides of face, on lower part of clypeus, on front, vertex anteriorly, cheeks, posterior part of mesothorax and pleura except upper part; sides of metathorax with copious entirely pale hair; facial quadrangle much broader than long; process of labrum very broadly rounded; clypeus strongly and closely punctured, with a median raised line; facial foveæ dark chocolate, broad, ending a little below level of top of clypeus; antennæ dark, third joint a little longer than next two together; mesothorax entirely dull, with small punctures; area of metathorax granular, defined by absence of hair; tegulae black; wings strongly brownish; stigma rather small, ferruginous, with a dark fuscous margin; nervures fuscous; second s. m. very broad, receiving first r. n. at or near middle; legs with black or sooty hair, floccus on hind trochanters white; hind femora with long white hair on upper side; tibial scopa with stiff, nearly straight hair; abdomen without bands, dorsally almost without hair, shining, without distinct punctures; dense hair at apex black; second segment depressed about a third.

Hab.—Troublesome, Colorado, 2 ♀'s at flowers of *Salix*, June 8, 1908 (*S. A. Rohwer*). A remarkable species, superficially like *A. vicina*, but easily known by the blue impunctate abdomen. From *A. lawrencei* V. & C., it is known by the larger size and black thorax. Also at Troublesome, on the same day, Mr. Rohwer took *A. vierecki* Ckll. at flowers of *Amelanchier*.

July, 1916

***Andrena hirticincta surda*, Ckll.**

This was described from Colorado, the precise locality unknown. Mr. S. A. Rohwer took a male at flowers of *Polygonum*, along with a female *A. vierecki* Ckll., at Boulder, Colo., Aug. 24, 1908. The occurrence of *vierecki*, a spring species, on this date is surprising, and seems to indicate a second brood.

***Andrena pertarda*, Ckll.**

A female was taken at Meeker, Colorado, Aug. 7, 1909 (*Terry Duce*).

***Andrena apacheorum*, Ckll.**

This occurs in Colorado; Green Mountain Falls, August (*J. W. Frey*).

***Andrena tacitula grossulariæ*, V. & C.**

Only the male has been described. I took a female at flowers of *Prunus melanocarpa*, Florissant, Colo. June 24. It looks like *A. cyanophila*, but is quite distinct by the less broadly depressed second abdominal segment, the details of area of metathorax, and colour of hair on hind tarsi. It is also near to *A. salicifloris*, but the metathorax is different. Clypeus very densely and coarsely punctured, with a smooth median line; facial foveæ narrow, separated from eye only by a shining line, extending far below level of antennæ; third antennal joint about as long as the two following together; flagellum largely red beneath, broadly so apically; mesothorax and scutellum strongly and densely punctured, but disc of mesothorax posteriorly shining between the more widely separated punctures; area of metathorax with strong longitudinal rugæ; stigma dark reddish; hair of head and thorax above fox-red; abdomen shining, well punctured, second segment depressed a little more than half; second to fourth segments with yellowish white hair-bands at sides; hair at apex fawn colour; hair on inner side of tarsi light reddish.

***Andrena nigratarsis*, V. & C.**

Mr. S. A. Rohwer took both sexes at flowers of *Opulaster ramaleyi*; at Boulder, May 23; also a female, June 1. The species is close to *A. fragariana* Graen., but larger; it has the venational

and other characters of typical *Micranãrena*. The male has the tegument of the face entirely black, and the long flagellum is obscurely brownish beneath.

***Andrena candidiformis*, V. & C.**

The facial quadrangle is broader than long, not the reverse, as stated in the original description.

***Halictus cyaneiceps*, sp. n.**

♀ (Type).—Length 8-9 mm.; black, with the front and upper part of sides of face more or less distinctly bluish, contrasting with the pure black clypeus and supraclypeal area; pubescence dull white, forming broad bands at bases of abdominal segments; clypeus little produced; antennæ black; mesothorax shining and sparsely punctured on disc posteriorly; scutellum shining, with punctures of different sizes; area of metathorax dull, finely roughened, basally obscurely sublincolate, at apical middle there is a depression; posterior truncation not distinctly defined; tegulae piceous; wings greyish hyaline, stigma and nervures dusky amber colour; punctures of abdomen excessively minute; hind spur with short blunt teeth.

♂.—Length hardly 8 mm.; face broad; clypeus shining, with a broad creamy-white band; flagellum long, marked with ferruginous beneath; area of metathorax shining apically; tarsi dark brown.

Hab.—Rio Ruidoso, New Mexico (C. H. T. Townsend); the type taken at flowers of *Heliopsis scabra*, July 31, alt. prox. 6500 ft.; also found (both sexes) on flowers of *Potentilla thurberi*, July 31, and on July 20, at 6900 ft., at flowers of *Verbascum thapsus*. South Fork Eagle Creek, New Mexico, at flowers of *Sicyos parviflorus*, Aug. 18, at 8000 ft., and Aug. 19, at 8250 ft. (C. H. T. Townsend). I have had *H. cyaneiceps* a number of years, and have referred it with hesitation to *H. bardus* Cresson and to *H. forbesii* Rob. It is very closely related to *forbesii*, but distinguished by the bluish front of the female and dark tarsi of the male. I have not described the structure in detail, where it agreed with *H. forbesii*. The male is very like that of *H. trizonatus* Cress, but is readily distinguished by the broad, short head. Male *trizonatus* was taken on *Potentilla thurberi* at the same time and place as *cyaneiceps*.

NOTES AND QUERIES.

A JAPANESE BUG NEW TO NEW JERSEY (Hemip.).

During the latter part of the summer of 1915 an outbreak of "lace bugs" occurred on hardy azaleas growing in widely separated parts of New Jersey, notably at Rutherford, Riverton, Arlington, Palmyra and Far Hills. At some of these places the damage was quite severe, much of the foliage being lost and the remainder discoloured and brown. Through the courtesy of Dr. L. O. Howard, the species was identified by Mr. Otto Heidemann as *Stephanitis azaleæ* Horv., of the family Tingitidæ. Mr. Heidemann also said that this insect was first observed in the United States by Dr. Chittenden several years ago at Washington, D. C., on azalea plants from Holland, the bugs being imported there from Japan. Most of the infested azaleas in New Jersey came originally direct from Japan. For the past several years *Azalea amana* var. *Hinodegiri* has been a favorite with New Jersey importers, and this was the variety against which most of the bugs directed their attacks. The species was described in 1912 by Dr. G. Horvath in the X *Annales Musci Nationalis Hungarisi*, p. 333, Budapest, Austria.

HARRY B. WEISS, New Brunswick, N. J.

A STATE'S INSECTS AND THEIR ACTIVITIES.

BY HARRY B. WEISS, NEW BRUNSWICK, N. J.

According to Smith's Insects of New Jersey, and other papers dealing with the insect fauna of that State, the number of species listed from New Jersey is about 10,530. Considering them collectively, and in a general way, it is interesting to know what they are doing. Are most of them injurious to vegetation? Are many beneficial? and so on, are the questions which naturally arise when so many species are considered. Such inquiries can best be answered by charting the actual proportions of each group engaged in different lines of work. This has been done on the accompanying chart. The large circle indicates what proportion of the total number of all species found in New Jersey is occupied by each of the important orders. The smaller circles indicate the predominating activities of each of the main groups, these activities being separated as: insects injurious to vertebrates, those feeding upon or injurious to vegetation, predatory species, scavengers and parasites. It would be possible, of course, to have a larger number of divisions, but many

would complicate matters considerably and make the chart difficult to follow. As it stands, one can obtain a general idea as to what

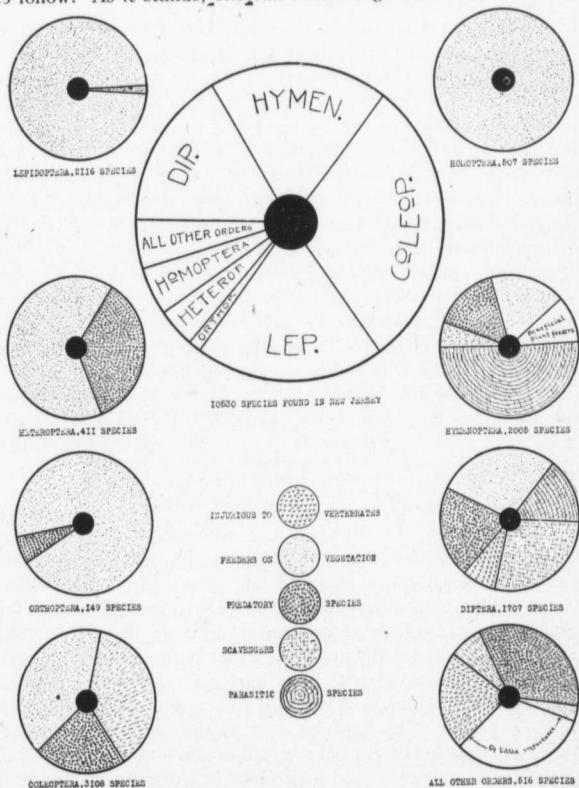


Fig. 9.

the insects belonging to each order are doing. It is a noteworthy fact that almost one half of the species of insects, which we have in our midst, are engaged in useful activities.

Mailed July 12th, 1916.