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NOTES ON SOME SPECIES OF NOCTUIDÆ DESCRIBED BY FRANCIS WALKER.

BY PROF. JOHN B. SMITH, NEW BRUNSWICK, N. J.

In Vol. XXXII. and XXXIII. of the list of Lepidoptera Heterocera in the British Museum, Mr. Walker described some species from "West Canada, in the Rev. Mr. Bethune's collection." No records of specimens in the Museum are given, and the descriptions are of specimens apparently returned to the collector. On the chance of these specimens being still in existence I wrote Dr. Bethune, begging him for such assistance and information as was in his power to afford. He very kindly responded, saying, "I shall send you by mail to-morrow a box containing the few specimens that I have left that were named for me by the late F. Walker. The labels on them are mostly in his own hand-writing. When I came here in 1870 I had no room for my cabinet and was obliged to store it away in a dark place for some years. I was also so very hard worked, building up this school, etc., that I was unable even to look at my specimens. Consequently the *Dermestes* got in and destroyed a large number—especially those set low down—that were my first captures, and that Walker had named. Thus many of his types had perished. I do not think it matters very much, as the descriptions and identifications were often so unsatisfactory. After seeing what I send you, you might *abolish* all the others that are stated to be in my collection, because they are no longer in existence and cannot be identified."

The box came duly to hand, and as the specimens gave rise to some doubt, and I desired to fully establish the value of the labels, I again wrote Dr. Bethune, and he replied :

"I have been unable to find any more records regarding my 'Walker insects.' The *printed* labels and numbers on those I sent you were put on by myself—the *written* ones are Walker's. It is of course quite possible that some of them got transposed, as they have been changed from one cabinet to another, and had also to go through a severe disinfecting

process to get rid of the *Dermestes*. This has no doubt happened in the case of the specimen marked *Agrotis ordinata* that you refer to.

"Where the specimen agrees with Walker's printed description, it is either a type or corresponds closely to his type—perhaps examined at, or nearly at the same time. * * * My first acquaintance with Walker was in 1863 when I spent some time in London. I was in England during the greater part of '63 and '64. I used frequently to go to the Brit. Museum, and struck up a great friendship with W., which continued to his death. We corresponded regularly, and he sent me his publications and quantities of European and other insects, for which I made the best return I could. He was one of the quietest and gentlest of men; his sensitive nature was much pained by some of the harsh and rough criticisms that were passed upon his work. His mistake was in attempting too much. Had he confined himself to the Diptera, his reputation would probably never have been impaired."

At my request Dr. Bethune kindly gave me permission to deposit these specimens in the U. S. National Museum at Washington when I had examined them, and there they now are, accessible to all students who may desire to verify my conclusions.

Nine species only are described by Walker as "In Rev. Mr. Bethune's collection," but a number of others are given as from West Canada, and sometimes they are said to come from Mr. Bethune.

Of these nine species eight are represented in the specimens before me, one only, *Agrotis vetusta*, is wanting. With the exception of the specimen labelled "*Agrotis ordinata*," all are evidently the types, agreeing in sex and in all other points with the description. In *Agrotis ordinata* I cannot accept the labelled specimen as type, though it agrees in at least one important feature—the sex.

The few specimens which are not types, are in many instances erroneously named—provided that the species we know under Walker's names are really his species.

In detail the specimens before me are as follows:—

Mamestra insulsa, Walk., C. B. M., Lep. Het. IX., 234, 1856.

An imperfect specimen; but not the type. It is *Hadena ducta*, Grt., (Bull. U. S. Geol. Surv., IV., 176, 1878). The type is in the British Museum and has been examined by Mr. Grote who said first it was an *Hadena*, and afterwards that it was an *Agrotis* allied to *repentis* (*Carnades messoria*). Walker's description applies perfectly to the specimen

before me, and does not apply well to any form of *messoria* known to me. As the type is in existence, the best way will be to cite *insulsa*, Wlk., as a questionable synonym of *ducta*, Grt., and thus call the attention of whoever may have a chance to make the comparisons to the probabilities. The species was described from Orillia, West Canada, and the locality is therefore in favor of the name.

Mamestra displiciens, Wlk., C. B. M., Lep. Het., XXXII., 660, 1865.

The specimen is labelled by Walker, and is evidently the type. It is a normally marked *Carneades messoria*.

Mamestra unicolor, Wlk., C. B. M., Lep.-Het., IX., 233, 1856.

Determined by Walker, but not the type. It is *Noctua clandestina*, Harris, and therefore agrees with the type, which Messrs. Grote and Robinson have also identified with *clandestina*.

Mamestra nigriceps, Wlk., C. B. M., Lep. Het., XXXII., 659, 1865.

Apparently the type, agreeing well with the description, but without Walker's written label. A printed label has been substituted for the original, if a written one ever existed.

This species is also equal to *Noctua clandestina*, Harr. It was described as in Dr. Bethune's collection.

Mamestra contenta, Wlk., C. B. M., Lep. Het., IX., 232, 1856.

A badly rubbed specimen, but easily recognizable as *Hadena devastatrix*, Brace, and therefore like the type which Mr. Grote has referred in the same way.

Agrotis reticens, Wlk., C. B. M., Lep. Het., XXXII., 692, 1865.

Two specimens, one with Walker's written label, the other with a printed "Type" label and a printed specific label. Both specimens are *Carneades messoria*, Harris.

Agrotis ordinata, Wlk., C. B. M., Lep. Het., XXXII., 691, 1865.

The specimen bears Walker's written label, and is described as in Dr. Bethune's collection; but it does not at all agree with the description. Neither does it agree with the description of any other of the species described from Dr. Bethune's collection. The specimen is *Pyrophila tragopogonis*, Linn., and I can only imagine that Walker in placing his labels, placed this one on the wrong specimen, or that in the transferring in Dr. Bethune's collection, another specimen became substituted for the type. What is described is really a form of *Carneades messoria*, Harr., to which I would cite *ordinata* as a synonym.

Agrotis vetusta, Wlk., C. B. M., Lep. Het. XXXII., 691, 1865.

This species is not represented in the material sent, and I am entirely unable to apply the description to any form known to me, either in the *agrotids* or in the *noctuids* as a whole. According to Dr. Bethune's statements the type, mentioned by Walker as in his collection, has no present existence, and as the description cannot be satisfactorily applied, the name must drop. I have reprinted the description in my Revision of the *Agrotids*, p. 212.

Walker has described under the specific name *vetusta* an *Agrotis*, a *Mamestra* and a *Mythimna*. It was *Mythimna vetusta* which Mr. Grote suggested might be his *murænula*, not the *Agrotis* as I erroneously suggested in my transcript, nor the *Mamestra* as Mr. Grote stated in the last number of the CAN. ENT.

Agrotis inextricata, Wlk.

A specimen of *Carneades messoria*, Harris, is so labelled in Walker's handwriting, but I cannot find any description of the species under that genus. Walker does, however, describe a *Mamestra inextricata* (C. B. M., Lep. Het., XXXII., 658, 1865), and as the description applies well enough and the specimen is said to be in Dr. Bethune's collection, it may be accepted as type, and cited as a synonym to *Carneades messoria*.

Agrotis indirecta, Wlk., C. B. M., Lep. Het., XXXII., 659, 1865.

In this case also the species is described under *Mamestra*, and the species applies well to the specimen labelled *Agrotis indirecta* in Walker's handwriting. The specimen is *Carneades messoria*, making the fifth name applied to this species in Dr. Bethune's material alone!

How many more of Walker's names can be applied to this species when the types are studied, it is interesting to contemplate? Thus far no redescriptions of *Carneades tessellata* have been identified; but it seems scarcely possible that the species should not have been represented in material received by the British Museum, and its variations must have afforded full scope to Walker's peculiar genius.

Hadena tenebrifera, Wlk., C. B. M., Lep. Het., XXXIII., 714, 1865.

A male specimen in very fair condition is *Semiophora catherina*, Grt., (CAN. ENT., VI., 116, 1874, *Matuta*). The specimen bears Walker's label, agrees with the description, and is unquestionably the type. The species must be known in future as *Semiophora tenebrifera*, Wlk., and *Catherina*, Grt., cited as a synonym.

Apamea velata, Wlk., C. B. M., Lep. Het., XXXII., 671, 1865.

The type is in unusually good condition, bears Walker's label, and is *Apamea sera*, G. & R., (Tr. A. E. S., I., 345, pl. 7., f. 5). The species must be known in future as *Apamea velata*, Wlk., and *sera* cited as a synonym.

Apamea rubrescens, Wlk., C. B. M., Lep. Het., XXXII., 671, 1865.

The type, bearing Walker's label, is in very good condition, and is the species recently described by myself as *Tenio-campa venata*, (Ent. Amer., VI., 123, 1890). The species will be known in future as *Tenio-campa rubrescens*, to which *venata*, Smith, must be cited as a synonym. I should be delighted to refer all the species described by me as synonyms, could I thereby identify an equal number of the Walker species.

Apamea, n. sp.

A specimen bearing this label, in Mr. Walker's handwriting, is *Parastichtis perbellis*, Grt.

Caradrina multijera, Wlk.

A specimen named by Walker, but bearing a label in Dr. Bethune's handwriting, is also *Parastichtis perbellis*, Grt. The specimen is not the type, and is an evident misidentification.

Xylina signata, Wlk.

The specimen bearing the label in Mr. Walker's handwriting is *Dasylophia interna*, Pack., and is not the type.

Heliothis binotata, Wlk.

A specimen of *Plusia aereoides*, Grt., is so labelled, but I cannot find any description of the species.

Heliothis temperata, Wlk.

This label, in Mr. Walker's handwriting, is attached to a specimen of *Plusia aerea*, Hbn.; but as in the case of the preceding, I cannot find that the name has been sanctioned by a description.

Bryophila, sp.

A specimen of *Acronycta hamamelis*, Gn., is so labelled by Mr. Walker.

Altogether this little lot of insects, while disposing of a few unidentified names, illustrates well the character of Mr. Walker's work. None of these names could have been with any degree of certainty applied from the descriptions to the species really intended, and the generic references are as often misleading as an assistance.

NEW RHOPALOCERA AND HETEROCERA.

BY B. NEUMOESEN, NEW YORK.

Catopsilia neleis, var. *floridensis* ♂ ♀.

A beautiful variety of *C. neleis*, Boisd. It differs from its tropical types considerably.

The ♂♂ have a bright sulphur-yellow in basal half of primaries, the broad anterior space being of a creamy white instead of the citron colour in the typical form.

The same is the case with the secondaries, except that three-quarters of the area of wings are of bright sulphur.

♀♀ are not yellow, but creamy-white with large black discal spots, black rimmed apices and anterior margins of primaries, and with prominent citron tinge of the basal area of secondaries.

C. neleis has so far been unknown to our fauna.

The collector whom Mr. Chaş. Palm and I sent to the Upper Indian River of Florida succeeded in capturing about fifteen specimens of this form.

Catopsilia agarithe, var. *Maxima*.

The ♂♂ intense orange colour with prominent black dotlets at interception of nervures and exterior margins, both on primaries and secondaries.

The ♀♀ of equally intense colouring. The discal spot, the diagonal line of dots from apex to submedian nervure and along exterior margin of primaries being brownish red. On secondaries the markings along exterior margin are dark red with blackish tint, much resembling those of *C. philea*.

Expanse of wings, 66 mm.; length of body, 26 mm.

The examples caught (about 50) have been found uniform in size and markings. This is a giant form of its kind and remarkably handsome.

Habitat: Upper Indian River, Fla. Types coll. Neumoegen and Palm.

Oeta compta, var. *floridana*.

Much larger than the typical form. Head, thorax, and primaries of dark reddish-orange. The interspaces between transverse lines of primaries larger than in the type form.

Secondaries: Costa, apex, exterior margin, and nervures black, basal half grayish, hyaline. Abdomen steel blue.

Expanse of wings, 25 mm.; length of body, 11 mm.

Habitat: Upper Indian River, Fla. Types coll. Neumoegen and Palm.

About fifty specimens were caught, all uniform in appearance.

Antarctia Beanii, n. spec.

♂. Thorax and abdomen above and below very hairy, concolorous with primaries, the abdomen somewhat paler, especially at the sides.

Head, breast and antennæ bright reddish-brown, the latter prominently pectinated. A blackish tint on patagiæ, and a faint black dorsal line on abdomen. Legs bright reddish-brown, the femora especially so.

Primaries reddish brown, of lighter tinge at base and basal part of costa. The following maculations in brownish-black. Two large irregular median bands starting from costa, one between base and center, and the other above discal cell respectively, running across the entire wing and converging at center of interior margin, thus forming a triangle, resembling the Roman letter V. A broad band along exterior margin. Fringes blackish. In some specimens the marginal band being broken up in irregular blotches. These various bands are so conspicuously placed as to show the inner spaces, enclosed by them, more prominently, the latter looking like a triangle resting with its base on costa and like a mesial line outwardly curved. Secondaries rose colour. Fringes blackish. Two mesian bands of gray-black, irregularly formed. The anterior band more pronounced, the interior one being more of a curved line of irregular, large dots.

Below, both primaries and secondaries reddish brown, merging into rose colour along anal margin of secondaries and costa of primaries. All maculations grayish-black, faintly indicating marginal and anterior mesian bands on primaries, and showing the mesian bands of secondaries.

♀. Antennæ minutely pectinated, nearly simple, of bright rose brown colour with blackish tinge at base. All maculations brighter than in the ♂, especially the reddish and rose tints.

Expanse of wings: ♂, 33-35 mm.; ♀, 29-30 mm. Length of body: ♂, 10 mm.; ♀, 10 mm.

Habitat: Laggan, Alberta, N. W. T. Types coll. B. Neumoegen.

This is the most northern *Antarctia* so far found in our fauna.

I take great pleasure in dedicating this handsome species to Mr. Bean, to whose indefatigable explorations of the Alberta subalpine fauna I owe my specimens.

Antarctia Beanii, v. *fuscosa*.

A beautiful variation in which the primaries in ♂ and ♀ are nearly uniformly brownish-black from base to exterior margin. The triangular spot at costa as well as the mesian line being slightly indicated.

Types coll. B. Neumoegen.

It seems to me that *Arctia Brucei*, Hy. Edw. (Entom. Amer., Vol. III., p. 183), is not a true *Arctia*, but very closely related to *A. Beanii*. Excepting the slight differences of structure in the ♀♀, these insects show conclusively how near our genus *Antarctia*, Hb., comes to Lederer's genus *Ocnogyna*.

All the specimens of *A. Beanii*, including its var. *fuscosa*, having been raised by Mr. Thos. E. Bean, I asked him for some data about the larvæ and their life habits, to which he kindly acceded. I publish them herewith in his own words :

"All specimens are bred from larvæ taken (when in or near final stage) near Laggan. Only one imago has been found in the four seasons I have collected here. One ♂ bred in 1886 from an estray larva was the first seen. In 1888 the imago above mentioned was found. (July 2, a ♂.) In 1889, 2 ♂♂, 1 ♀ were bred from estray caterpillars. So up to 1890 only six were seen, though I often searched for them. But in June, 1890, I found them more frequent in one limited tract of about two acres—elsewhere none to be found. Larva feeds on willow exclusively, I think. At any rate all I have found feeding were on willow. The imagines bred in 1890 came from pupa chiefly between July 4th and 21st, though one ♂ delayed until Aug. 4; 1890 was a late season. Those bred in 1889 emerged June 8 and 24 (2 ♂♂), June 26 (1 ♀). Males and females equally numerous. The ♂♂ are noticeably larger than the ♀♀, as an average. As to extremes of size, the ♀♀ vary most; there are more extra small ♀♀ than ♂♂. The ♂♂ average decidedly darker than ♀♀. Occasional ♀♀ are extremely dark. This species occurs at an elevation ranging from 4,800–5,000 feet, so far as observed. The mature larva is about 24 mm. long. Ventral and basal lateral region clothed with rust-red hairs. Dorsal and upper lateral region usually has jet black hair, but sometimes some of the hairs are whitish. Hair of median lateral region sometimes black, sometimes whitish."

Heterocampa nivea, n. sp.

Antennæ slightly pectinated, white above, black below. Head, thorax, abdomen, legs, and both wings white. Thorax and abdomen heavily

tufted. A little dusting of black across basal half of primaries. A few black grains on costa, between discal space and apex, and a few black tiny dots at intersection of nervures and exterior margin of primaries.

Below, uniformly white.

Expanse of wings, 46 mm.; length of body, 14 mm.

Habitat: Virgin River, S. Utah. ♀. Type coll. Chas. Palm.

Gonodonta unica, n. sp.

Palpi, head and collar brilliantly white. Eyes black. Antennæ brown. Thorax heavily tufted, dark brown. Patagiæ powdered with gray. Abdomen and legs bright yellow. Fringes grayish brown. Interior margin inwardly curved near the outer angle and overlapping near base. Primaries, for three-quarters of their extent from base, dark brown with an olive tint, bordered by a dark transverse, undulating line, and showing in this field traces of such lines. Discal spot indicated by olive colour. Base, inner curve of interior margin, and a basal dash of lilac grainlets. The space from costa near apex down to the sharply pointed outer angle transversed by well defined undulating lines of lighter colour. Secondaries of uniform bright yellow. Fringes concolorous. A black irregular marginal band to anal angle.

Below: Primaries brownish-black fading into light yellow along exterior margin. A bright yellow basal tuft, and the costa of the same bright colour. Nervures indicated by yellow lines. Secondaries uniformly yellow.

Expanse of wings, 33 mm.; length of body, 12 mm.

Habitat: Indian River, Fla. Types, ♂♂. Coll. Neumoegen and Palm.

This insect is easily distinguished from its West Indian and South American relatives by its size and yellow secondaries.

Heliodora, n. gen.

Eyes prominent, naked. Infra-clypeal plate projecting. Vestiture hairy. Palpi short and fringed. Abdomen stout, untufted. Primaries long and narrow, rounded at apices, curving somewhat at exterior angle, and bulging near base. Secondaries much broader than primaries, rounded. Tibiæ spinosæ, armed with two outer claws.

Heliodora magnifica, n. sp.

Eyes black. Antennæ brown, slender. Head, collar, thorax, and upper part of abdomen straw-yellow. Fringes brown. Legs yellowish-

white. Primaries consisting of two distinct, uniform colours. The lower and larger area, starting upward from bulge near base in an outwardly curved line, and rounding off sharply at apex, is a field of chestnut-brown. The rest, from below base rounding upward, running parallel with costa to apex and including half of discal cell, is a costal field of bright yellow. Secondaries light yellow, fading into white along anal margin and near basal area. Brown exterior marginal line. Fringes light yellow.

Below: Abdomen yellowish-white. Primaries and secondaries yellowish-white with a decided metallic sheen. A narrow strip of bright yellow along costa of primaries, and in the centre of same a broad brown dash triangularly formed and pointing towards base. Fringes prominently brown.

Expanse of wings, 22 mm.; length of body, 5 mm.

Habitat: Houston, Texas. Type, ♀. Coll. R. Neumoegen.

This beautiful *Heliothid* is unlike any other of our fauna, both in shape of wings and odd markings. It comes, apparently, near the genus *Schinia*, Hb.

A NEW BUTTERFLY FROM LOWER CALIFORNIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

Pyrgus pelagica, n. sp.

Habitat: San José del Cabo, Lower California.

Expanse, 1.25 inches.

Description.—Under side of palpi and head covered with whitish hairs; top of same blackish-brown gray; forehead with some whitish hairs mixed with the darker. Thorax and abdomen blackish above, end of abdomen shading into gray, beneath whitish. Legs covered with whitish hairs, brownish at ends. Antennæ blackish, with small white annulations at base of each joint; club above blackish, tipped with light brown, below light brown down to joint. Wings above dark-brownish gray, with white and grayish-white spots, hind margins with a fringe of dark brownish-gray. Hind margin of forewings edged with a dark line, just within which, in interspaces, is a row of indistinct darkish spots, absent in some specimens. The dark brownish-gray covers marginal

area, and is dusted and irregularly shaded with grayish scales. On costa one-fourth distance from tip to base, between the subcostal nervules, three (sometimes two or one) small white spots. Across centre of wing, extending from edge of costa across end of discoidal cell down to submedian nervule, a whitish band of consecutive spots, of irregular form and varying distinctness, sprinkled more or less with brownish scales. In some specimens this space shades off into ground colour, in others the edges between spots and ground colour are distinctly marked, and bordered with a darkish line. In centre of cell, an irregular whitish spot of same character; between this spot and the spot at end of cell, and below submedian nervule, an irregular whitish spot, dusted more with brownish scales. Base dark brownish-gray, with some grayish scales. The suffusion of the ground colour is more marked in some specimens than others, rendering an accurate general limitation of the spots difficult. Some specimens show a slight yellowish tinge on white spots. Ground colour of hindwings a blackish-brown, of more distinct character than the ground colour of forewings. Costa white. Hind margin edged with a dark line, within which, in interspaces, is a row of white specks, sometimes absent, which, at anal angle, are transversely elongated, forming an indistinct line from inner margin to submedian nervule. Within these, one-third distance to base, a row of brownish spots, extending from costa to inner margin, parallel to hind margin, but not in line, and the one near centre larger than the others, and drawn nearer to cell. Within these, across centre of wing, a prominent whitish band, forming an extension of the same on forewing, but of purer white, ending at submedian nervule. Basal area of ground colour, but toward inner margin, covered with light grayish hairs, which extend along margin to anal angle. Beneath general colour is grayish-white, with a very slight yellowish-brown tinge, and showing shadows of the markings above. Costa of forewing marked with darkish-brown and white, reflecting markings above. Hind margin edged with blackish-brown, and within, covering one-third of marginal area, darkish-brown, with a row of white specks in interspaces. Costa of hindwing white, same as ground colour. Hind margin edged with a line of blackish-brown, shading off into ground colour. In space below submedian nervule, the dark markings of upper side show more prominently than elsewhere.

Described from twelve specimens in my collection, taken near San José del Cabo, in Lower California, by Mr. M. Abbot Frasar, 1888.

MELANISM AND HUMIDITY.

BY J. W. TUTT, F. E. S., WESTCOMBE HILL, LONDON, ENGLAND.*

At different times considerable attention has been paid to the general darkening in colour of our British insects, compared with Central European and with American forms. In Britain, many species become much darker (some absolutely black) on various parts of the West Coasts of Ireland and Great Britain, and, as a general rule, the more humid districts produce the darker specimens, *e. g.*, *Acronycta (Viminia) euphorbiæ* var. *myricæ*, *Xylophasia polyodon* vars. *infusata* and *nigra*, *Viminia rumicis* var. *salicis*, etc. We find, moreover, that certain geological strata are more prone to produce dark varieties than others, *e. g.* *Gnophos obscurata* on peat, etc., becomes quite black; and in manufacturing districts, where the surfaces of fences, trees, etc., get much darker than is normally the case, insects which rest on them also become darker, to wit, *Amphidasys betularia* var. *doubledayaria*, *Hybernia marginaria (progemmaria)* var. *fuscata*, *Eupithecia rectangulata* var. *nigrosericeata* and *Boarmia repandata* var. *nigra*, (a magnificent form from Huddersfield, in which the whole area of the wings is intensely black). In excessively moist districts, those insects which rest on the ground, trees, rocks, etc., are those which are chiefly affected, because here, the ground, trees, rocks, etc., becoming permanently darkened by rain (*vide* "Entomologist's Record," Vol. I., pp. 123, 124), the darker specimens are thus preserved by "natural selection." Where the geological stratum is naturally dark in colour, "natural selection" acts much in the same way. In manufacturing districts the atmosphere is polluted with carbon particles, and when the rain* falls the impurities are brought down with it, but when the water evaporates the solid matters are left behind, and thus surfaces of trees, etc., are artificially darkened. There is no doubt that the great agent in effecting the darkening of insects, which rest in such places, is "natural selection," aided, of course, by the tendency that the surfaces of certain objects have to become darker when continuously wet or damp. The intimate connection between humidity and melanism is well illustrated by the fact that at high altitudes (where the humidity becomes greater) melanism again shows itself, as in

*Editor of the "Entomologist's Record and Journal of Variation."

the case of *Viminia euphorbiæ* var. *montivaga*, an Alpine form, closely resembling our var. *myricæ*. In Dr. Staudinger's trade lists, too, most of the Alpine forms are spoken of as vars. *obscura*, *suffusa*, *unicolor*, etc.

Our northern latitudes give us, generally, forms more than usually pallid, and which rarely present any tendency to variation in the direction of melanism. As, however, melanic tendencies were first noticed in connection with specimens from a high altitude, it became the usual thing to associate melanism with a low temperature, until the Western shores of the British Isles, with a comparatively high temperature, were found to produce some of our most intensely melanic forms, and it was then found that melanism was accompanied by humidity rather than by a low temperature.

To get reliable results from actual experiment is difficult, as a certain phase of melanism is frequently found to accompany degeneracy and change of constitution (*vide* "Entomologist's Record," Vol. I., pp. 236, 237, 272) brought about by inbreeding. Besides, great care must be taken in experiments, to see that species are chosen in which a natural hereditary tendency to vary does not exist. Mr. Merrifield's experiments, the results of which were read before the Entomological Society of London in December last (*vide* "Entomologist's Record," Vol. I., pp. 267, 268), appear to be open to these objections.

It seems to me that the exciting cause to variation must act in the active larval stage, and not in the comparatively quiescent pupal stage, and an experiment (?) of which I have lately heard, designed to test my theory of humidity, in which some pupæ of *Selenia illustraria* were practically kept in water for a week or two, whilst others were kept very dry, only serves to show how hardy the pupa is, and how difficult to kill. Experiments of this kind partake of the ridiculous and make science look foolish.

As my series of papers on this subject will take some time yet to finish, I should be very thankful if any American entomologists could give me information with regard to the matter, especially as to the general tendency of insects to become (1) more than usually pallid in dry, open areas at a high latitude, and (2) darker in humid districts at either high or low altitudes.

PREPARATORY STAGES OF ARCTIA RECTILINEA, FRENCH.

BY G. H. FRENCH, CARBONDALE, ILL.

Egg.—Diameter, .03 inch; height, .03 inch; blunt conic; smooth. When first deposited white; after a few days yellow. Duration of this period, five days.

Young Larva.—Length, .07 inch. Cylindrical; head a little larger than body; six rows of tubercles bearing long hairs. Colour of body and hairs white; head black; a geminate black spot on top of joint 2. Duration of this period, three days.

After First Moulting.—Length, .12 inch. Cylindrical; eight tubercles to each joint; pale reddish; the tubercles darker red than the body, from each a few hairs, those on the back black, lateral white; head black; two spots of the same on top of joint 2. Duration of this period, five days.

After Second Moulting.—Length, .20 inch. Cylindrical; head a little smaller than body; pale dull brownish, perhaps a dark dull amber; a dorsal pale stripe in which is a whitish spot in the top of each joint; a paler subdorsal stripe, but lacking the white spots; dorsal tubercles black; the dorsal space a little darker than the sides; lateral tubercles concolorous or scarcely darker than the ground; spreading tufts of hair from the tubercles, the dorsal black, the lateral gray, all short; a few hairs, one to each tubercle, on posterior part of the body that are slightly longer than the others. Duration of this period, five days.

After Third Moulting.—Length, .35 inch. Cylindrical; head a little smaller than the body; eight tubercles to each joint; the dorsal moderately elevated, the lower lateral less so, a gradation from one to the other; tuft of short spreading hairs of unequal length from each; the centre of tuft slightly longest; the central hairs on posterior part of the body a little longer than the others. Ground colour lilac-grey; a dorsal and subdorsal line of sordid white; dorsal tubercles black, with the black extending as a border along the upper side of subdorsal line; the two next tubercles dull pale orange, grey tipped; the fourth ground colour, with the tip darker; ground colour outside of tubercles, and lines spotted with black; head and thoracic feet black; hairs as before; prolegs smoky, light at tip. Duration of this period, three days.

After Fourth Moulting.—Length, .50 inch. Marked very much as before but the ground colour darker; dark gray, in some small examples almost black; the dorsal tubercles shiny black, the lateral yellow-brown;

dorsal line very pale yellow, almost white; reddish tinted between the joints; subdorsal line duller; head black. Duration of this period, four days.

After Fifth Molt.—Length, .65 inch. Marked much as before but darker; ground colour lilac-grey, but so obscured by the black, enlarged dorsal tubercles and mottlings as to be almost black; lateral tubercles as before; dorsal stripe bright creamy-white; legs and head black; prolegs orange ochreous; lateral hairs grey, dorsal black.

Mature Larva.—Length, .95 inch. Cylindrical; ten tubercles to each joint; a small one close to the dorsal stripe, each with a tuft of spreading hairs that are studded with points like the forked point of a lightning rod, but shorter in proportion to the hairs. Colour mostly as at the beginning of the stage; the dorsal tubercles show orange on the top; the subdorsal line paler than the ground colour; abdomen and feet pale. Duration of this period, eleven days.

Chrysalis.—Length, .55 inch. Diameter through joint 1, .16 inch; through joint 3, .18 inch; length of wing cases, .28 inch, reaching almost to posterior part of joint 5; head rounded; two tubercles above the origin of the antennæ that are hairy, also two hairs each to two lesser tubercles between the origin of antennæ; terminal joint conical, scarcely any depression to cremaster; a terminal series of spreading hooks; smooth; thorax and wing cases very slightly corrugated; a slight raised ring to anterior part of each abdominal joint. Colour, brown-black. Duration of this period, from eleven to twenty-two days.

This species, like most of the *Arctians*, is a general feeder, but eats some things in preference to others. Among the several plants put into the breeding cage, clover seemed to be preferred, and they were fed upon that through most of their growth. As will be seen by the figures given, the time from the egg to the imago is from forty-eight to fifty-nine days. The eggs were deposited July 16, 1889, and the last moths came out September 12 the same year. There is with us an earlier brood of the moths coming out in May, making three broods in a season, though in the northern part of the United States, if it is found there, there are probably only two broods. The last brood of larvæ, like its allies, hibernates, and of course this lengthens the period from egg to imago over that of the two summer broods. Like other *Arctia* larvæ, these are very active when disturbed, running rapidly and hiding under the food in their cage. They also hide in this way when not feeding.

Among a large number bred, the males were nearly constant in their markings, varying slightly in the size of the spots near the outer margin of the hindwings and occasionally with the beginning of a transverse line inside the first one on the forewings, shown by a little bending in of the pale on the costal margin so as to sometimes touch the subcostal vein. Some of the females were of this type, but many of them varied from this by having less of the pale colour on the forewings, even to the partial or total obliteration of the inner of the two transverse lines. The tendency with such examples would be to a blending and enlarging of the black spots on the terminal border of the hindwings, and a blending of these with the black of the edge, making a nearly solid terminal border. The red on the hindwings was constant, there being no appreciable difference in this respect between the sexes, as there is in *Nais*, nor in light or dark examples of either sex. The dark examples would have the black on the abdomen a little more prominent than on the light. The characteristic marks, straight transverse lines on forewings and veins pale, were constant whatever the other variations might be. In size, my specimens were small from being underfed, as a result of a great many larvæ crowded together in a single breeding cage. If they had been separated as much as they naturally would be in feeding in the open fields they would have been as large as caught specimens.

TWO NEW SPECIES OF CANADIAN PIMPLINÆ.

BY W. HAGUE HARRINGTON, OTTAWA.

Xorides caryæ, n. sp.

Female.—Length 11 to 16 mm. Black with yellowish-white markings. Head swollen, interior orbits, interrupted opposite antennæ, and palpi white; face below antennæ punctured, between antennæ and ocelli polished; antennæ slender, black. Thorax with the pectus and pleuræ finely punctate, polished; disc of mesothorax transversely rugulose; metathorax rounded, faintly sulcate medially and rugosely punctured and aciculated; sides of prothorax, two lines on mesothorax, two spots, sometimes confluent, on scutellum, the post-scutellum, the tegulæ and a broad stripe on pleura, continued on middle coxa, yellowish-white; legs, including coxæ, pale rufous or honey-yellow, anterior ones paler, the anterior coxæ, stripe on middle coxæ outwardly, second joint of trochanters and the knees yellow; tibiæ and tarsi piceous or blackish, the former with a

pale line within; wings hyaline, nervures and stigma black. Abdomen with first segment rugosely sculptured, the segments becoming smoother toward apex of abdomen; incisures of joints whitish, venter banded with white; ovipositor 8 mm. in length, or hardly as long as abdomen.

Male.—Differs from female as follows: Face below antennæ and the scape beneath yellow; anterior coxæ and most of prothorax below yellow; abdomen long, slender and polished, with the tip of segments narrowly white. Length 16 mm.

Described from 4 ♀ and 2 ♂ taken in June and July on felled bitter-hickory (*Carya amara*). The females were ovipositing, and probably are parasites of *Saperda discoidea* or *Dorchaschema nigrum*.

The American species, all of which occur in Canada, may be tabulated as follows:—

Abdomen entirely black..... *X. occidentalis*, Cress.

Abdomen with white markings;

Ovipositor long..... *X. vittifrons*, Cress.

Ovipositor short,

Pleura black..... *X. borealis*, Cress.

Pleura with white band..... *X. caryæ*, n. sp.

Xorides canadensis, Prov. (Nat. Can., VII., 248), = *Xylonomus albopictus*, Cress.

Xorides vittifrons, Cress., has been found in about the same numbers, as *X. caryæ*, but upon old maples infested with *Dicerca divaricata*, *Xiphydria albicornis*, *Tremex columba*, etc.

Xorides borealis, Cress., was described from Hudson Bay region; a ♀ which I refer to this species differs from the original description in having the posterior femora rufous instead of black.

Xorides occidentalis, Cress., is found in Vancouver Island.

Xylonomus canadensis, n. sp.

Female.—Black; length 22 to 26 mm; expanse of wings 30 to 33 mm. Head large, face and vertex rugulose, cheeks aciculated, clypeus small with sutures obscurely rufous; antennæ with annulus on joints 10-14. Thorax subopaque above and strongly punctured, pleura and pectus coarsely punctured but shining; mesothorax flattened or slightly depressed medially, aciculated and with slight median carina; scutellum punctured, shining; metathorax with two discal carinæ enclosing a narrow oval area, lateral carinæ indistinct except at base near spiracles; rugosely punctate and with small posterior tubercles; legs black, knees white, four anterior

tarsi white with terminal joint black, posterior tarsi with terminal joint black, base of first white, remainder piceous; wings faintly clouded, stigma, except white spot at base, and nervures black. Abdomen opaque, with first segment suddenly widened and sides subparallel beyond spiracles, basal segments rugulose, with margins polished, becoming smoother toward apex; ovipositor as long as body, rufous, sheaths black.

Male.—Length 17 to 20 mm.; expanse of wings 24 mm. Differs from female in having antennæ entirely black and more slender, and the anterior tibiæ have a white line externally.

Described from 4 ♀ and 2 ♂ captured at intervals since 1878 on fences, bridges, etc.

This species looks very much like *X. stigmatærus*, Say (and a specimen was so determined for me by Provancher), but is abundantly distinct by its stouter abdomen and differently coloured tarsi, and its more robust and opaque appearance.

The American species may be tabulated as follows:—

Prothorax above with lateral tubercles;

Wings with a fuscous band.....*X. australis*, Cress.

Wings hyaline, legs black..... *X. Rileyi*, Ashm.

Wings hyaline, legs partly red.....*X. humeralis*, Say.

Prothorax above without tubercles;

Abdomen with lateral white spots.....*X. albopictus*, Cress.

Abdomen with tips of segments white.....*X. insularis*, Cress.

Abdomen entirely black,

Legs entirely black.....*X. cincticornis*, Cress.

Legs black and white.

First segment of abdomen slender...*X. stigmatærus*, Say.

First segment of abdomen stout....*X. canadensis*, n. sp.

Legs ferruginous.*X. frigidus*, Cress.

Abdomen rufous,

Pleura red.....*X. pulcher*, Ashm.

Pleura black.....*X. calidus*, Prov.

Uniformly ferruginous.... *X. californicus*, Cress.

Obscure rufous, legs black.....*X. floridanus*, Ashm.

The following are the species recorded from Canada: *albopictus* (Ont. and Que.), *calidus* (Ottawa), *frigidus* (Hud. Bay), *humeralis* (Ont. and Que.), *insularis* (V. I.), *stigmatærus* (Ont. and Que.), *canadensis* (Ottawa).

Provancher described *calidus* from a specimen which I sent to him, and although I cannot now remember the insect, the description shows that it is very close to the species since described by Ashmead as *pulcher*. Perhaps the latter may be only a variety.

NEMATUS PALLIDIVENTRIS, FALLEN—A FRESH IMPORTATION.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

In September of last year I discovered the larvæ of a species of *Nematus* feeding upon a willow introduced from Russia by the late Mr. Charles Gibb. Like others of the genus these larvæ were gregarious and threw up the hinder parts of the body when disturbed. They were full fed and buried themselves on September 24th. The flies appeared in the end of March. The following is a description of the insect:—

Full-grown larva.—One inch long; head dark brown; body pale green above with numerous black dots, pale greenish-yellow underneath; anal segment yellow.

Pupa.—Enclosed in a dark brown cocoon, less compact than that of *N. Erichsonii*.

Imago.—Length of body four lines; expanse of wings six and a-half lines; head and thorax black; antennæ brown; ocelli prominent, stand out like black heads; legs honey-yellow, tarsi of hind legs brown; abdomen pale orange, with a dorsal line of triangular spots—a spot to a segment—the obtuse angle of one spot approaching the middle of the base of the next, and so on to the end.

I submitted the perfect insects to the Reverend Abbé Provancher, and he has kindly informed me that after careful examination, and comparison of them with specimens of his own collection, he has come to the conclusion that the species is *Nematus pallidiventris*, Fallen, of Sweden, France, etc., and that it is a new addition to our Hymenopterous fauna. The insect, he says, is very near to several of our American species but identical with none.

Should this new importation become established in this country, it will be interesting to watch its progress.

NOTES.

A CORRECTION.

In Entom. Amer., Vol. VI., p. 173, in my description of *Euchaetes conspicua* there is erroneously inserted: "This insect comes near *E. cada-verosa*, Gr.," etc., etc. This should read: "This insect comes near *E. abdominalis*, Gr. It is easily recognized by its conspicuous costal lines. *E. abdominalis* is a Florida insect, whilst this seems to be the Colorado representative." Entom. Amer. having ceased to appear, you will confer a favour on me by publishing this in your esteemed paper.

B. NEUMOESEN.

NOTE ON AMMOPHILA ROBUSTA.

Sept. 20, 1890, I was collecting along the sunny side of a railroad embankment, where several species of digger wasps were plentiful. I stopped to watch the operations of a female of the above species. She was opening a filled-up hole, and soon pulled out a larva resembling that of the cabbage *Plusia*, nearly grown. She laid it three or four inches from the hole, and was standing over it, apparently resting, when another wasp of the same species alighted about six inches away, and, without an instant's hesitation, attacked No. 1, which had turned to face the assault. The fight which ensued was of the most spirited character. They "clinched" at the first onset, and remained in that position, their ventral surfaces in close contact, and the body of each closely embraced by the fore and middle legs of the other. One had grasped the neck of the other with her mandibles, and both were striving to use their stings, their abdomens being curved so as to bring these weapons into favorable position. These details I gathered one at a time, for they did not lie still by any means, but went rolling, scratching, and buzzing down the side of the embankment. On account of grass stubs (the vegetation had been burned off) their progress downward was not rapid, and after nearly a minute they were about two feet from the starting place. Neither seemed to have gained any advantage. At this point a third specimen arrived, and threw herself upon the other two. The fight was now more vigorous, if possible, than before. After a few seconds one released herself and flew away. A second soon followed suit. The third, apparently under great excitement, dashed wildly about, seeming to be looking for the larva before mentioned. From this I supposed her to be the one I first observed.

She passed within an inch of it several times, but seemed not to see it. After a minute or two one of the other combatants (as I suppose) alighted and resumed the fight, but soon left again. At this time, as I feared that the last one was about to leave also, I captured her. Whether the hole was of her own making in the first place, or belonged to one of the other contestants, or to none of them, I had no means of ascertaining; but there was evidently a bold attempt at robbery somewhere in the incident.

Brookings, So. Dak.

J. M. ALDRICH.

EXCURSION.

The entomologists of New York, Brooklyn, Newark, Philadelphia and localities near these cities are invited to attend the second annual field meeting to be held under the auspices of the Entomological Societies of the cities at Jamesburgh, N. J., on July 4th, next. Jamesburgh is on the Amboy Division of the Pennsylvania R.R., and may be reached from N. Y., *via* Monmouth Junction, at 7.20 a. m.; Newark, 7.50 a. m.; Philadelphia, Broad St., 6.50 a. m.; Camden, 7.00 a. m. Later trains leave N. Y. *via* Rahway and Philadelphia, on the Long Branch Division, but it is urged that the early train be used, as this will bring the party into Jamesburgh at the same time. All those desiring or expecting to attend will please notify one of the members of the committee, from whom also further information can be obtained. The notification is important, in order that proper arrangements may be made at Jamesburgh. Committee:—C. P. Machesney, 65 Broadway, N. Y.; Dr. Hy. Skinner, Amer. Ent. Soc., Logan Sq., Philadelphia; Prof. J. B. Smith, New Brunswick, N. J.; H. W. Wenzel, 1117 Moore St., Philadelphia, Pa.

A CANNIBAL CRICKET.

On September 11th, 1889, I observed, on a grassy slope, a short distance north of this city, a large ♀ black cricket, *Gryllus neglectus*, feeding on a recently killed ♂. I observed her carefully for a few minutes. There was a large wound on the side of the abdomen of the ♂, and she was greedily eating the semifluid and soft parts. She was not easily alarmed, being very intent on her meal; but, when I disturbed her with the handle of my net, she seized hold of her gentleman friend and lugged him away several inches and again resumed her meal. On the same slope, a few yards away, I observed another ♀ gnawing at the thorax of what most likely was a ♂.

I failed to determine whether the ♂'s had died a natural death, or had been butchered by their wives. I had not noticed this cannibalistic habit before, but this may account for the many fragments of this species always common towards the fall season. I have often noticed the cannibalistic habit of the larvæ of *Pyrameis cardui*, and other butterflies while feeding in captivity. I never knew them to kill each other, but if one got injured so that the bioplasm flowed out, the others seemed to relish it very much, and continued to feed on it until completely exhausted.

WM. BRODIE, Toronto.

NOTE ON AMBLYOPONE PALLIPES, HALD.

In 1885 among material sent to Abbé Provancher was a curious ant, of which two examples had been for some time in my collection, obtained apparently by moss-sifting. The Abbé expressed astonishment at the occurrence of such a species in Canada, stating that it belonged to the genus *Amblyopone*, and that it would be the type of a new species which he proposed to call *A. canadensis*. He subsequently (Add. Faun. Hym., p. 240) described it as the worker of *A. binodosus*, believing it to belong to the same species as a male formerly described by him (Nat. Can., XII., p. 205), as a braconid under the name *Arotropus binodosus*.* During subsequent seasons I searched carefully for this species without success, and almost despaired of determining its habitat. This season, however, I have been more fortunate, and on the 19th April was much pleased at finding one worker under a stone about two miles west of the city. A few days later—30th April—on the opposite side of the Ottawa, near Hull, I found in a rotten log a colony composed of several workers and about a dozen larvæ. Consigning four adults to my killing-bottle, I placed the larvæ and their remaining guardians in a box with a quantity of the damp, rotten wood in which they were found. A vigorous search in the vicinity resulted in the discovery of two similar colonies in another log, which were also taken. Should I not succeed in obtaining females and males from the larvæ then obtained, I will hope to do so by searching in June in the same locality. The ants are very slow in their movements, and walk with the quadrate flat head held horizontally, and with the long mandibles open, thus seeming much larger than killed specimens, in which the head is deflexed. The larvæ resemble those of *Myrmica*, but are not so pubescent as the only species, *M. laevinodis*, Nyl., of which

* Cresson in his list refers *Arotropus binodosus* to the genus *Ponera*.

I had larvæ for comparison. An examination of my workers by Halde-
mann's description of *A. pallipes* convinces me that they belong to that
species. Haldeman states that the species is found in stumps in June.

W. HAGUE HARRINGTON.

BOOK NOTICES.

ANNUAL REPORT OF THE EXPERIMENTAL FARMS: Ottawa: pp. 314; 1891.

The Director of the Experimental Farms of the Dominion of Canada has recently issued his report for the past year, and a very interesting "blue book" it is. The record of experiments with two-rowed barley is particularly valuable and important at the present time, and concerns everyone who is interested in the welfare and prosperity of this province. The reports of the Agriculturist, who treats especially of Dairying, of the Horticulturist, Chemist and Poultry Manager, are all useful and instructive; but the one which especially interests us is, of course, that of the Entomologist and Botanist, Mr. James Fletcher. His share of the report occupies over fifty pages, and is illustrated with some wood cuts of noxious insects, and nine beautiful full-page plates of various useful grasses. The insects treated of are the American Frit Fly (*Oscinis variabilis*), the Cabbage Maggot (*Anthomyia brassicæ*), the Diamond-back Moth (*Plutella cruciferarum*), whose larvæ attack the leaves of cabbages, the Mediterranean Flour Moth (*Ephestia Kühniella*), the Pea Weevil (*Bruchus pisi*), the Strawberry Weevil (*Anthonomus musculus*), and the Vancouver Island Oak Looper (*Ellopiæ somniaria*). In each instance Mr. Fletcher fully and carefully describes the mode of attack, and then gives the most satisfactory remedies. It is hardly necessary to tell our readers, who are familiar with Mr. Fletcher's work, that these articles are as complete and as accurate as is possible in a limited space. It is very cheering to find (p. 169) that the mill that was so badly infested with the *Ephestia* moth year before last (of which the writer was an eye-witness), has been completely cleared of the pest by scrupulously carrying out, though with no little labour and expense, the directions of the entomologist. In spite of this example, it is surprising to find that the proprietors of other mills and feed stores in the same city are too apathetic and careless to take any measures to exterminate this insect when it appears on their premises. They will soon find that such neglect means utter ruin to their business, unless they take warning in time. The remainder of

Mr. Fletcher's report is almost entirely devoted to the subject of Grassés, of which he has been cultivating for the sake of experiment over a hundred different kinds.

C. J. S. B.

THE BUTTERFLIES OF NORTH AMERICA: by W. H. Edwards. Third series; Part XI.

It is hardly necessary to do more than chronicle the issue of a new part of this magnificent work. The beauty and accuracy of the plates, and the excellence and value of the descriptive letter-press are too well known to need any further commendation. The part now before us illustrates and describes the complete life history, in all its stages, of *Apatura flora*, Edw., *Satyrus Meadii*, Edw., *Chionobas chryxus*, Doubleday, with its variety *Calais*, Scudder. The last mentioned species is of peculiar interest to us, as it is found throughout the Rocky Mountains from Colorado to Canada. A most graphic account of its habits is given by Mr. Bruce, who has observed the insect for several years past. Why is it that every North American Lepidopterist does not possess himself of a copy of this noble work? It can hardly be the cost, for the numbers appear at such long intervals that a very little self denial even on the part of the impecunious would suffice for their purchase. While the subscriber would get a joy and treasure for life, let him think what a gratification and help it would be to Mr. Edwards to have his subscription list trebled, as it should be.

C. J. S. B.

CORRESPONDENCE

DONATIONS TO LIBRARY.

Dear Sir,—I have much pleasure in acknowledging the receipt of the following valuable addition to the books in the library of the Entomological Society of Ontario:—A generous donation from its President; Manual of Geology, Dana; Principles of Geology, Lyell; Elementary Geology, Hitchcock; Geology of the Globe, Hitchcock; Geology and Mineralogy, 2 vols., Buckland; Mineral Resources of Canada, 1890; Geological Survey of Canada; Geological Survey of Indiana, 6 vols., with maps; Geology of Canada; Principles of Zoology, Agassiz & Gould; Humboldt's Cosmos, 5 vols.; Humboldt's Views of Nature; Naturalist's Note Book; Evenings at the Microscope, Gosse; Year Book of Science and Art, 2 vols.; Annual Reports of Maine Board of Agriculture, 7 vols.

J. ALSTON MOFFAT, Librarian.

Mailed June 4th.