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BUTTERFLIES COMMON TO NORWAY AND ARCTIC NORTH AMERICA.*

BY F. M. WEBSTER, WOOSTER, OHIO.

In his "Fortegnelse over Norges Lepidoptera" (Christiania Videnskabs-Selskabs Forhandling for 1893, No. 13), I r. W. H. Schoyen, State Entomologist of Norway, has given us a list of 1267 species of Lepidoptera that inhabit his country, tabulated to show the Provinces in which they occur, and the exact latitude over which each species is known to be distributed. The interest which this list possesses for the American entomologist is in the number of species it contains that are common to both countries. As studies of this nature are of much interest to the student of geographical distribution, but unfortunately out of the reach of many, I here give a list of such species as occur with us, their distribution being given both in America, as far as I am able to do so, and in Norway according to the information contained in Dr. Schoyen's list.

It will aid us considerably in understanding the subject, to keep in mind an idea of the topography of Norway, stretching as it does from lat. 58° to 71° , and throughout this distance consisting of a narrow stretch of country lying between a mountain range and the Arctic Ocean. Northward from about $62^{\circ} 30'$ the provinces extend from the sea inland to the mountains, but south of this a range of mountains extends through near the centre with provinces lying both to the east and to the west.

Papilio machaon, Linn. This is the only species of the genus included in the list, and occurs in all but six of the eighteen provinces of Norway, ranging from the extreme south at lat. 58° to $70^{\circ} 18'$, the unoccupied area, however, being the central and the very extreme northern parts of the country. In North America, var. *Aliaska*, Scudder, is quite common in Alaska, from whence it extends eastward to Hudson Bay at about $51^{\circ} 30'$, though I find no proof of its holding this latitude to the

*Read before the Ohio Academy of Science, Dec. 28, 1893.

Pacific Coast. *P. machaon* has been reported as far south as the north-western United States, probably about lat. 48° or 49° , by Dr. Hagen and Prof. Henshaw.

Pieris rapæ, Linn. This is found in ten provinces, thu. covering a less area than the preceding, and ranging from 58° to $69^{\circ} 30'$, or from the extreme southern to within one and one-half degrees of the northern extremity. In America it extends from the Atlantic Coast to the Rocky Mountains, and from about lat. 30° to 48° and possibly beyond.

Pieris napi, Linn., (cum *v. nepææ*, Esp., and *bryoniæ*, Ochs.) This has a still wider range in Norway, occurring its entire length from 58° . to 71° . and in all but one of the provinces, this being Stavanger, at the south-west and coastal. With us, *bryoniæ* is found from Alaska eastward to Newfoundland. In his recent work, "Brief Guide to the Commoner Butterflies of the Northern United States and Canada," Mr. S. H. Scudder has considered this species under the specific name *oleracea*, Bois., of which he says: This northern species occurs throughout all but the southern parts of our region, though in scanty numbers except in mountainous districts; it appears, however, to be absent from the prairies west of the Mississippi river, and wherever it has come in contact with *P. rapæ*, it has become relatively rare. Prof. French calls my attention to *napi* being given in Mr. Edwards's list of 1884, from Michigan, and Prof. Blatchley has since recorded it from northern Indiana, about lat. 41° , which is probably about its southermost limit, east of the Rocky Mountains.

Colias palæno, Linn., (*v. Lapponica*, Stg.) This is almost as widely diffused in Norway as is the preceding, occurring in all but four of the provinces and ranging from 58° to $70^{\circ} 25'$. It is rather a curious fact that provinces where it is not recorded as occurring, Stavanger, South Bergenhus, North Bergenhus and Romsdal, all lie in the south-western part of the country, along the coast, while inland it is found in precisely the same latitude. With us *C. palæno* is found in Labrador.

Colias hecla, Lef. The Norway distribution of this species is limited to three provinces, Nordland, Tromso and Finmarken, the range being from $66^{\circ} 50'$ to 70° , these provinces being the three northernmost. In North America the species is distributed from Alaska to Greenland, its southern boundaries being as yet undefined. In case *C. Meadii* and *C. elis* should either one prove to be varieties of *C. hecla*, then Mr. Thomas

E. Bean's record of its occurrence at Laggan, Alberta, $51^{\circ} 25'$, will be the southern limit on the Pacific coast for the latter, while the former extends to Colorado, at least so far as we now know.

Vanessa antiopa, Linn. This is recorded as occurring 58° to 70° , and in all but two of the provinces, Stavanger and North Bergenhus, on the south-western coast and included in the area over which *Colias hecla* is reported not to inhabit. However, as the two provinces are separated by South Bergenhus, in which the species is recorded as being present, we are led to suspect that it may yet be found in one or both of these now unoccupied provinces. With us the species occurs throughout North America.

V. atalanta, Linn. Dr. Schoyen records this from eleven provinces, and ranging from $58^{\circ} 38'$ to $63^{\circ} 26'$. With us this is as widely distributed as the preceding.

V. cardui, Linn. This, in Norway, occurs in two-thirds of the provinces, and ranges from 58° to $69^{\circ} 40'$. In America it is as generally distributed as the preceding. In Norway the area where it is not recorded comprises the south-west coast provinces.

Argynnis chariclea, Schn. This appears to occur in only a single and at the same time the most northern province, ranging only from $69^{\circ} 20'$ to $70^{\circ} 42'$. In America, it ranges from Labrador, Hudson Bay and Gulf of St. Lawrence on the east, to probably about lat. $51^{\circ} 25'$ on the Pacific Coast, no where, according to Mr. Edwards, extending into the United States.

A. polaris, Boisd. This has in Norway a very little wider range than the preceding, occurring in only two provinces, Tromso and Finmarken, and covering area between 69° and $70^{\circ} 25'$. In regard to the distribution of this species in North America, the only records to which I have access give the habitat as Arctic America, Greenland and Labrador.

A. freija, Thbg. The Norwegian range of this species is much wider than that of the preceding, occurring, as it does, in eight of the eighteen provinces, and over an area extending from $59^{\circ} 35'$ to $70^{\circ} 25'$, being absent in the extreme southern and also the extreme northern portions. Of these ten provinces where it is not recorded as occurring, one is located in the central (coastal), three south-eastern (inland), two southern (one coastal and the other adjoining inland), two south-western (coastal), and two western (coastal), and presumably the extreme north coastal part of Finmarken, the northernmost territory of the country. In

America this species is considered as synonymous with *A. freya*, Thunb. With us it occurs from Alaska to Labrador and westward to the Rocky Mountains, which range it follows southward to Colorado, about lat. 39°. It is probable that in southern Norway it is also confined to the mountain regions.

A. frigga, Thbg. Dr. Schoyen's list restricts this to four provinces—Akershus, Buskerud, Tromso and Finmarken. The first two are northern coastal, the last two southern inland. The range is from 59° 56' to 70° 40'. With us it is recorded as inhabiting Arctic America and Labrador, and from Alaska south along the Rocky Mountains to Colorado.

Erebia disa, Thbg. This is recorded as inhabiting but two provinces, Finmarken and Nordland, the former the northernmost and the latter in the central portion of the country, the two being separated by the province of Tromso. The range is limited to from 66° 50' to 70°. In America, we have the variety *mancinus*, Db-Hew, which appears to be quite common in northern Alaska, whence it extends to the Rocky Mountains in British America, with the southern limit not yet defined.

The idea of giving the latitude of the occurrence of species is, it appears to me, much better than giving the name of some out-of-the-way place that is not included on even a small portion of our own maps, to say nothing of those to which entomologists of other countries have access. The name of the place is all well enough, but where the latitude can also be given it will render the statement as to location much more intelligible, both at home and abroad, and this too despite any variation in the matter of isothermal lines.

TRYPETA SOLIDAGINIS, FITCH, AND ITS PARASITES.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

In April of last year I found on the banks of the Ottawa River, at Como, Province of Quebec, a number of very fine stems of a species of Golden-rod. These stems were bare and dry, and bleached by the winter storms. Their attraction for me lay in this—nearly every one of them was burdened with a fine large Trypeta-gall. On some of them two such galls were to be seen. I measured one of the excrescences, and found it to be three inches and five-eighths of an inch in circumference. The galls of the same kind that I have found at Quebec have not been nearly

so large nor so abundant. I took a number of the Como galls home with me, and in due time obtained a good supply of perfect specimens of *T. solidaginis* from them.

The species is very fully described by Loew in his "Monograph of the Diptera of North America," Part I., p. 82 (Smithsonian Miscellaneous Collections, April, 1862). To those who have not access to this work, the following brief description of the insect may be acceptable:—

Size.—Expanse of wings, eleven-twentieths of an inch. Length of body, six-twentieths. Width of thorax, two-twentieths.

Head.—Face, whitish. Eyes, bronze-yellow. Antennæ, yellow, short. Mouth-opening wide.

Thorax broad and convex, set with short yellowish hairs, has dark-brown longitudinal stripes. Scutellum, convex and blunt. Wings, large, umber-brown at the base, and then having an umber-brown, zig-zag, scroll-like band; the hyaline interstices being finely reticulated, more or less, with brown. The legs are flavescent—the femora being somewhat darker.

Abdomen broad at the base, and then gradually tapering to the extremity—the segments being marked with short, whitish hairs. The borer of the female is very distinct. It is flat, of a reddish-brown colour, and tipped with black.

The gall produced by this insect is a pithy gall—it is filled up with the cellular tissue of the plant. Why the wounds caused by some insects should produce galls of this nature, and those caused by others should produce hollow galls, is one of the mysteries of Nature that science has not yet cleared up.

In the Trypeta gall, the short, plump, yellow larva lies snugly ensconced, closely surrounded by the vegetable tissues. It gradually tunnels a way of exit for the fly; and then, as the spring draws near, undergoes the pupal change. The pupa is about five-twentieths of an inch long, oval, ochreous, but darkening to brown at the head. This brown portion is ruptured when the fly makes its escape.

I have raised from the galls two kinds of parasites, viz:—*Eurytoma gigantea*, Walsh, and the males (called by Walsh, *Pimpla calebs*) of *Pimpla inquisitor*, Say.

Eurytoma gigantea is a very remarkable insect. It is described by Walsh in the 2nd Vol. of the "American Entomologist and Botanist," p. 300, from two females "captured at large."

The specimens I have vary greatly in size. The largest of them measure five-twentieths of an inch in length, with an expanse of wings of seven-twentieths.

Head, black, deeply and closely indented (like a thimble) and set with short white bristles. Eyes, round, prominent and set high up in the head. Ocelli very small. Antennæ 9-jointed (8 in the flagellum). Walsh gives the proportions of the joints very accurately as 14, 3, 6, 5, 5, 4, 4, 4, 6. Palpi black.

Thorax, black, more coarsely punctured than the head. Wings hyaline, veins honey-yellow. Legs, black—the hindmost and middle pairs have the knees and extremities of the tarsi yellowish-white; the first pair have the tibiæ and tarsi honey-yellow.

Abdomen, in the female, large, compressed laterally, and ending in a long spur turned upward; black, smooth and polished.

The male, which was unknown to Walsh, differs from the female in these respects:—It is smaller; the joints of the antennæ, with the exception of the scape and the terminal joint, are more nearly equal; the tibiæ of the first pair of legs are considerably infuscated; and the abdomen is rounded, and diminishes regularly. Around the extremity of the abdomen are some white bristles. The head and thorax are coarsely punctate as in the females, and the abdomen is polished and glabrous.

It was too late when I obtained the galls to find the larvæ of *E. gigantea*; but I discovered several pupæ. They occupied the cells of the *Trypeta* larvæ, and were at first of a pure white waxy appearance. The form of the fly was clearly outlined in them. They gradually darkened till the flies were ready to appear.

Concerning this species, Mr. G. C. Davis, of the Michigan Agricultural College, writes to me, "I am quite sure the chalcid is *Eurytoma gigantea*, although it varies slightly in colour markings.

Pimpla inquisitor, Say. The male of *P. inquisitor* (*P. cælebs*, Walsh, Trans. St. Louis Acad., III., 141) is a very elegant insect, slim and graceful. Its length is three-tenths of an inch; expanse of wings, five-tenths; length of antennæ, two-tenths. *It has a white face*, in which it differs from the female; and the palpi are white. The first joint of the antennæ is black and much larger than the other joints, which are dark-brown. The other parts of the head are black, rough and thickly set with short whitish bristles, as are also the thorax and abdomen.

The first and second pairs of legs are orange-red, with whitish tarsi. The third pair have the femur orange, with black at the extremity. In this pair the tibia and tarsus are beautifully banded with black and white.

I obtained 10 males from about 50 *Trypeta* galls, but not one female—the females, however, are not scarce in these parts. At least half the galls were parasitised by the foes above described.

SOME NOTES ON THE COLLECTING SEASON OF 1893.

BY J. ALSTON MOFFAT, LONDON.

After the long, steady and severe winter we had in this locality, every one hoped for an early spring; but in that we were disappointed, things generally being no further advanced at the end of May than they usually are in the middle. June came in warm, but with such continuous rains as to prevent collecting to any extent. Towards the end of the month the weather became more favourable and insect life appeared in profusion; belated species mingling with some that seemed to have emerged before their time. During the first three weeks of July one might have collected all day and night with profit, and as that was impossible, one could see that opportunities were being lost which only occur now and again after long intervals. August was hot and very dry, which seriously affected vegetation and had a correspondingly injurious influence on autumn collecting.

Of the Diurnals, the most notable to me were, *Limenitis ursula*, quite plentiful but difficult to secure; *Pieris oleracea*, abundant in one locality; *Papilio cresphontes* was reported in July, and during August it was frequently seen. On the 8th, I took a trip to Windsor and Detroit. On the way I saw many fine fresh specimens feeding on flowers by the way-side. At Windsor and Sandwich, several were observed, but at Belle Isle they were numerous. I saw six of them feeding on one flower-bed at the same time. It was about the only large butterfly on the wing there at that time. Toward the end of the month battered specimens were seen on the streets of London. On the 26th, I captured three broken specimens that had been flitting about a prickly-ash bush in Mount Pleasant Cemetery. On the 17th of October, I found a number of larvæ on that same bush, and took three of them. On the 21st, the largest of them pupated, the others perished for want of food. I visited that bush on the 20th, the larvæ remaining had about doubled their size, but had a greasy look; there had been some hard frosty nights. On the 13th of February, 1894, that pupa gave forth the imago, a female, extremely small, measuring three inches in expanse of wing, and one and three-fourths from the front of the head to the end of the tail on hind wing. A number of reports have been published of the appearance of *cresphontes* last summer in new localities, or in increased numbers in old ones, indicating that it is spreading north and west and becoming more firmly

established where it has obtained a foothold ; but it may be periodical in its habits, and 1893 may have been with it also an exceptional year.

In the Heterocera, I secured several good things which I had never taken before. *Acronycta grisea*, a single specimen, and there was but one example of it in the Society's collection. *Xylomiges confusa*, a single specimen ; of this also there was but one in the collection, and that in very poor condition.

On the 31st of August, whilst strolling in a bit of woods to the east of the city, I saw a conspicuously bright gray moth resting on the trunk of a tree. Upon close inspection it proved to be new to me. When I removed it from the spreading-board I compared it with what I thought it most resembled, but the nearest approach that I could find to it was *Platycerura furcilla*. Shortly after I had occasion to examine the D'Urban collection, and whilst doing so my attention was arrested by a specimen labelled *Audela acronyctoides*, which recalled to mind my new moth, and upon comparing them they were found to be identical, except in freshness. Mr. Grote in his notes on the D'Urban collection (CAN. ENT., Vol. IX., p. 27), remarks : "The specimen is in poor condition, but its ornamentation being marked, the species is quite recognizable." That is a correct description of it as it is to-day, and my find is a fresh and perfect duplicate of the type, and a really handsome insect. Prof. Smith says in reply to my enquiry : "*Audela acronyctoides* is by no means a common insect ; on the contrary, it is decidedly rare, and there are only a few specimens known in collections. It has been taken in a number of localities, always single specimens only, and generally very early in the season."

Some of the late Geometers were quite abundant. From the 19th to the end of August I secured about twenty *Semiothisa caesaria*, Hulst. I found them resting on the trunks of tamarac trees, whilst later on *Petrophora truncata* was quite plentiful. In the early part of October I took over three dozen *Epirrita dilutata*, Bork. On the 9th I secured twenty-seven of them on the same trees from which I took the *Caesaria*. The day was cool, and they sat close ; being very conspicuous objects, I secured in about an hour's time all I saw of them, except one ; it was sitting on the sunny side of a tree and arose as I approached it, when a Phoebe bird gave chase and had it before it could reach another resting place.

Endropia duaria and *Ellopia fervidaria*, although appearing every season to some extent, were also unusually plentiful, and some dark coloured and heavily marked forms of them were obtained.

Although the season was not uniformly good throughout, yet it proved in the end to be one of the best I have had in many years.

The following names are new to the Canadian list:—

Sarothripa Lintneriana, Speyer. Determined by Prof. Fernald, was sent to him by me in mistake as a micro.

Ædemasia nitida, Pack.

Dasylophia interna, Pack.

Panthea propinquilinea, Grote, or sp. nov. This specimen I took in 1892. I thought at the time that it was an indistinctly marked *P. furcilla*, but upon further investigation I concluded that it required authoritative determination, so I sent it to Prof. Smith, who returned the specimen with the following remarks about it:—"No. 37 is exceedingly interesting and is somewhat different from anything that I have ever seen before. It comes nearest to *Demas propinquilinea*; but I never saw before one quite so well marked as this is. All the specimens from this region are a good deal more powdery and darker with very little contrast in maculation. I would not be at all surprised if a good series of both species would prove the Canadian form distinct."

Hadena vulgaris, G. & R.

Oncocnemis viriditincta, Smith. This is a species that I took a few specimens of at Hamilton, many years ago. It was given a name provisionally and placed with the named material. I had known for long that it was out of place, but forgot it when sending for names. So to avoid that again, I placed a specimen with the unnamed material, and it went to Prof. Smith, with others, in December last. When the Professor sent me the names of the others, he pronounced this one to be an "oddity," saying "It reminds me of some West Indian species," and suspected that it must have been a transient visitor. But upon assuring him that I had taken four of them, that I had seen more of them than I captured, and that they were not all taken in the same year, and on sending to him a male specimen for further examination, he wrote to me thus:

"I find on a study of the specimen this time received, that it is an *Oncocnemis*, and further it looks remarkably like a species which I received from Mr. Bean, from McLean, British Columbia, and which I called *viriditincta* from the beautiful greenish tinge of the scales covering the surface. Looking at this specimen to-day I find that this greenish or mossy appearance is rapidly disappearing, and that in an old specimen I can understand that there will be little or none of it to be seen." Whilst farther on he remarks: "It is certainly somewhat interesting and peculiar that you should have found at Hamilton the same species under what it seems to me must be widely different conditions. The matter is of further interest because this makes the second species of this genus which has been found in what may be called the Eastern States, all the others coming from the western plateaus or from the mountains." As a coincidence, I may state that the three or four specimens of *Oncocnemis Saundersiana* which I have taken were secured in the same locality, and also feeding on the Golden-rod.

Hydræcia inquesita, G. & R.

Semiothisa caesaria, Hulst.

Pyrausta futilalis, Led.

Cacœcia semiferana, Walk.

Lophoderus mariana, Fern.

Tortrix pallorana, Rab.

Cenopsis diluticostana, Wlsm.

Exartema versicolorana, Clem.

Penthina impudens, Wlsm.

Sericoris albiciliana, Fern.

Semasia radiatana, Wlsm.

Phoxopterus apicana, Walk.

" *Goodelliana*, Fern.

Cryptolechia obsoletella, Zell.

NOTES ON SOME SCALE INSECTS OF THE SUB-FAMILY
DIASPINÆ.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEX.

The following notes are intended to throw further light on the affinities of certain little-known species, which I have lately examined :—

(1.) *Chionaspis major*, Ckll.—Found on Heliotrope at Antigua by Mr. C. A. Barber. The ♀ resembles that of *Diaspis lanatus*, but may be distinguished from it without difficulty. There is only one pair of lobes, and these are very large, elongated, and crenate on both sides; they touch one another at their bases, but diverge toward their tapering extremities. There is a small spine near the outer edge of each lobe. On the margin beyond the lobes are three spine-like plates, then a shallow notch, then three more plates, then another shallow notch, then a series of from five to eight spine-like plates, mostly large, one especially so. The produced margins of the segments cephalad of this bear spine-like plates, the first counting from the caudal end having nine, the second 5, the third 8, the fourth 4 or more, the fifth 4 or more small ones, and the sixth only rudiments.

This insect is not allied to the common West Indian *Chionaspis*, *C. minor*, Maskell, but belongs to the group of *C. salicis*, L., etc. The scale is about 4 mm. long, oval, white with brownish exuvix.

(2.) *Diaspis cacti*, Comst. n. syn. *opuntia* (*opunticola*), Newst., Ent. Mo. Mag., 1893, pp. 188, 280.

Mr. Wickham has sent me some specimens found in a greenhouse at Iowa City, Iowa (coll. M. F. Linder), which lead me to advance the above synonymy. They present all the characters of *cacti*, and in addition the numerous "spinnerets or pores," and the elongated pores, which form the specific characters of *opunticola*. I cannot believe that there is a distinct species, *D. cacti*, resembling the present one in all other respects, but lacking these pores, and must assume that Comstock's description was so far imperfect. My variety *opuntia* (Journ. Inst. Jamaica, Vol. I., p. 256), from Jamaica, looks different owing to the much paler exuvix (paler, no doubt, because less exposed), but I can see nothing to distinguish it as a species from *cacti*. It has the pores of *opunticola*.

Mr. Newstead's scales differed also a little in colour from typical *cacti*, so that three colour-mutations may be distinguished thus :—

(1.) Exuvix not strongly contrasting with scale, . = *opuntia*, Ckll.

(2.) Exuviae strongly contrasting.

(a.) Scale grayish-white or greenish, = *cacti*, Comst.

(b.) Scale pale yellowish-brown, = *opunticola*, Newst.

The mut. *opunticola* is from Demerara.

I quite expect that *D. cacti* will itself prove to be a synonym of *D. zalyptroides*, Costa. The colour character given by Comstock will not hold, as I found *D. cacti* v. *opuntiae* had the ♀ sometimes (in February) orange, sometimes pale yellow. The other characters, of the grouped glands, are surely also variable.

(3.) *Aspidiotus fimbriatus*, (Maskell). Syn. *Diaspis* (?) *fimbriata*, Maskell, Trans. N. Z. Inst., 1892 [publ. 1893], p. 208. Found on *Eugenia* in Australia by Mr. Koebele.

Mr. Maskell has kindly sent me specimens, and I am convinced that the species belongs to *Aspidiotus*, and in that genus to the group of *A. nerii*, *destructor*, &c. This reference is borne out by the scale, and also by the terminal portion of the female, which is quite unlike that of any *Diaspis* known to me. The somewhat elongate form of the female is not of any generic significance, or at all events, cannot be considered to outweigh the structural characters of the terminal portion, which are entirely those of an *Aspidiotus*. Unfortunately the male scale is unknown.

(4.) *Aspidiotus dictyospermi*, Morgan. There is an *Aspidiotus* which I found on *Cycas* at King's House, Jamaica, and Mr. Campbell found abundantly on stems of rose at Castleton Gardens in the same island, that is apparently identical with Morgan's *dictyospermi*. The scales look like those of *A. aurantii*, but the shape of the female is as in the majority of the genus, which will distinguish it at once from either *aurantii* or *articulatus*.

The colour of the ♀ is pale yellow.

The terminal portion of the ♀ agrees well with *dictyospermi*. There are three pairs of lobes, the middle pair much largest, and notched without, the second also notched, the third very small. Between the lobes are scaly plates. Cephalad of the third lobe, the margin presents a pair of elongated plates, though not so long as in Morgan's figure of *dictyospermi*. Beyond these are two small plates. There are conspicuous elongated sacs near the bases of the lobes, somewhat after the manner of *A. mimosæ* and *A. smilacis*. The anterior lateral groups of glands are of about three each, the posterior lateral of two.

The scale is red-brown, with covered exuviae to one side of the centre,

first skin nipple-like, shining. In regard to the scale, our insect does not very well agree with Morgan's account of *dictyospermi*, but there may be variation in this respect; in fact, Mr. Newstead has already indicated that there is, by describing the peculiar variety *arecæ*. It may be convenient also to distinguish the present form by a name, *jamaicensis*; so the varieties of *A. dictyospermi* can be tabulated thus:—

- (1.) Scale elongate-oval, greyish-white, . . = *dictyospermi*, Morg.
- (2.) Scale circular or nearly so, reddish or orange-brown.
 - (a.) Nipple-like prominence surrounded by a depression, beyond which is a strong circular ridge, . = *arecæ*, Newst.
 - (b.) Without any conspicuous depression or ridge, = *jamaicensis*, Ckll.

On examining the form *jamaicensis*, one can see the characters which, if much more developed, would give rise to *arecæ*; and there can be no doubt that if it should become necessary to make two species out of the above forms, they will be *dictyospermi* and *arecæ*, with *jamaicensis* as a variety of the latter.

A. mangifera, Ckll., from Jamaica, has a pale scale, more like that of typical *dictyospermi*; its affinity with *dictyospermi* is evident, and I should not be surprised if it ultimately becomes necessary to sink it under that species as a variety. Mr. Maskell, however, to whom I sent specimens of *mangifera*, wrote that the species appeared to him to be a valid one.

There is another scale insect, which in the female presents an extraordinary resemblance to *A. dictyospermi*, and that is *Diaspis pinnulifera*, Maskell, found in Fiji and Demerara. But the form of the male scale, as described by Maskell, will at once separate this from any *Aspidiotus*.

(5.) *Aspidiotus punica*, Ckll.—Jn. Inst. Jamaica, 1893, p. 255. The typical form of this species has the scale slightly raised, snow-white, with orange-brown exuviae. The ♀ is almost circular, plump, orange with the hind end slightly brownish. In the orange, plump ♀, it resembles specimens of *A. rapax* found on guava. The median lobes are large and elongate, close together, and notched without; the second pair is small, the third practically obsolete. In the region of the lobes, but not beyond, are some scale like plates; and beyond the rudiment of the third lobe is a conspicuous spine. The margin, beyond, shows one or two spines. There are four groups of ventral glands.

In the specimens on cocoanut from Dominica (the type being from

Jamaica) the second pair of lobes was also practically obsolete. The ♂, from Dominica, has well-developed wings; it is dull yellow, with blue-black eyes.

So far, the species is distinct and easily recognized; but there are some allied forms, concerning which it is not easy to come to a sound judgment; I will discuss these under the head of *A. diffinis*.

(6.) *Aspidiotus affinis (diffinis)*, Newstead. Ent. Mo. Mag., 1893, pp. 186, 280. This is evidently very near to *punicæ*, but it differs in its high, convex, greyish-brown scale, and in the absence of plates and grouped glands. The presence of grouped glands has been shown by Mr. Newstead to be an uncertain character in *A. zonatus*, Frauent., and I have found it equally so in *A. destructor*, Sign., but the other distinctive features seem of importance.

There is a scale found in Jamaica, which I had named in MS. *Aspidiotus punicæ* var. *lateralis*, but which I now believe must be referred to *diffinis*. The following description will serve for its recognition:—

♀ Scale 1 mm. diam. or a little over, convex, rounded, circular, or nearly so, varying to oval, dull brownish-white, varying to brown, with covered brown exuviae, resembling those of *punicæ*, but placed away from the centre. Scale leaving a white mark when removed from the plant.

♀ Nearly circular, terminal portion yellow, the rest variegated pink and blue in a peculiar manner. The lobes and plates as in typical *punicæ*.

♂ Scale smaller, elongate with rounded ends and parallel sides; exuviae away from the centre.

Hab. on stems of *Jasminum pubescens*, Parade Garden, Kingston, Jamaica, Sept., 1892, collected by F. N. DaCosta.

It will be seen that this var. *lateralis* resembles *diffinis* in the scale, but differs in having distinct scale-like plates.

On a tree in East street, Kingston, Jamaica (not identified, but has pinnate leaves, leaflets 13, oblique, tips obtuse, emarginate), I found numerous scales which seemed also referable to var. *lateralis*. They were massed together on the petioles and stalks, mixed with a few *Asterolecanium pustulans*. The scales agree exactly with *A. diffinis* as described by Newstead, but most of them are parasitised, so that I could not get very good examples of the female insect. Little bright red mites were running about amongst them. The female, in this form, is bright yellow to pale yellow, not pink and blue as in the *Jasminum* specimens. The lobes are as in typical *punicæ*, and there are distinct, though narrow, serrate plates. I failed to see any groups of ventral glands.

For the present, it will suffice to distinguish two forms of *A. diffinis*, thus:—

(1.) Plates wanting; form inhabiting Demerara, = *diffinis*, Newst.

(2.) Plates present; form inhabiting Jamaica, = *lateralis*, Ckll.

Whether these really constitute a distinct species, or should be considered varieties of *punica*, must be left for future decision. The name *punica* was published about three months before *affinis*, which pre-occupied name was later altered to *diffinis*.

(7.) *A. biformis*, Ckll. This scale seems to be common on cultivated orchids in Jamaica and Trinidad; it should be looked for in conservatories in this country.

♀ Scale about 2 mm. diam., circular to broadly-oval, depressed, surface granulose; exuviae nipple-like, dark red-brown, placed on one side of the centre. Colour of scale dark brown to black.

Conspicuous white patches are left when the scales are removed.

♀ With three pairs of lobes, the first two pairs moderately large, well-developed, with parallel sides; the third pair more or less rudimentary. Scale-like plates between the lobes. On the margin, cephalad of the lobes, is a pointed projection, having a spine on each side of it.

♂ Scales much smaller than those of the female, narrow, elongate, with the exuviae at one end.

This species might be confounded with *A. ficus*, but the form of the male scale will distinguish it at a glance.

(8.) *A. juglans-regia*, Comst. Prof. C. H. T. Townsend, when Entomologist of the N. Mex. Exp. Station, found a species of *Aspidiotus* on some young plum trees at Las Cruces, N. Mex. The trees were thereupon destroyed, and the scale, which had evidently been imported, has not been seen in the neighbourhood since.

Some specimens, however, were preserved; and on examining them I concluded that they were *A. juglans-regia*. Not having any of that species for comparison, I sent a few of the Las Cruces scales to Dr. Riley, asking for his opinion. He kindly replied thus:—"The specimen which you send differs from Comstock's *A. juglans-regia*. It has four lateral rows of pores on the anal plate, while there are but three in Comstock's species. The fourth or external row in the New Mexican species is composed of about 20 pores, whereas in Comstock's it is composed of 3 to 8 only."

In these points it resembles Colvée's *A. juglandis*, which has the

four lateral rows of pores, and the external row composed of 16 to 18 pores.

A. juglandis is said to have the scale reddish, in the Las Cruces form it is brown, in *juglans-regiæ* pale grayish-brown. I have been much inclined to suppose that *juglandis* and *juglans-regiæ* are but forms of one species, but have not the material to prove the point. If so, our Las Cruces scale must belong to the same species.

For the sake of distinguishing our form, it may be well to describe it thus:—*A. juglans regiæ* var. nov. *pruni*.

♀ Scale varying from very pale brown to decided brown, second skin sometimes dark brown. Exuviae apparently covered by a fine layer of secretion, mostly rubbed off in our specimens; second skin large, broadly oval or sub-circular, not pointed; first skin more or less exposed, orange. Shape of scale circular or nearly so; diameter, $2\frac{1}{2}$ mm.

♀ Yellow, oval. Median lobes rather large, blunt and rounded, close together, notched outwardly. Second lobes smaller but of fair size, also notched outwardly. Third lobes obsolete. Pairs of spine-like plates at intervals along the margin. Caudolateral groups of glands of from 5 to 7, cephalolaterals of from 6 to 7, median group represented by a single orifice.

♂ Scale, colour of ♀ scale, but smaller and elongate.

. Hab. on twigs of plum, Las Cruces, N. Mex., May 8. (Townsend.)

I do not know any species with which this might easily be confounded, except *A. ancylus*, Putnam, which has a smaller scale, brick-red exuviae, and the second pair of lobes obsolete.

Feb. 21.—I have just received specimens of *Aspidiotus juglans-regiæ*, Comst. from Prof. Morgan, of Baton Rouge, La. He sends it on peach and Japan plum, with the statement that "it is new in this section and is doing considerable damage."

Feb. 25.—Yesterday I found a new variety of *Aspidiotus juglans-regiæ* at Mesilla, N. Mex.:—

Var. nov. *albus*. ♀ Scale flat, $2\frac{1}{2}$ mm. diam, white, with the exuviae orange-red, but covered by white secretion. ♀ yellow, four rows of orifices marking the obliterated segments of terminal portion; ventral glands present, median single, cephalolaterals 9, caudolaterals 10. Marginal spines and plates inconspicuous. On bark of pear trees, not very numerous.

Should this hereafter be considered a distinct species, the varietal name now given may stand for it; but notwithstanding the white colour, which seems quite constant in the Mesilla specimens, I have no doubt in my own mind that the insect is a variety of *juglans regiæ*, with which it appears to agree in all really essential characters.

A REPLY TO MR. W. H. EDWARDS.

BY H. J. ELWES, COLESBORNE, CHELTENHAM, ENGLAND.

I did not suppose that anything I wrote on North American Butterflies was likely to find favour in Mr. Edwards's eyes, but in a long criticism of my paper on *Æncis*, which I have just seen in the CANADIAN ENTOMOLOGIST, there are two or three points on which he has so much misunderstood or misrepresented me that I cannot pass them by, as I shall do the greater part of his remarks, as unworthy of notice.

As to the specific distinction of *Californica*, *iduna* and *gigas*, I could find nothing in Mr. Edwards's own figures or writings to guide me in separating them, and now I only see that he relies on Messrs. Wright and Fletcher, as he has seen none of them in life himself. It is quite possible that there is as much variation in the larva as in the imago, and if there is any invariable character by which they can be known apart, I am just as ready to admit it as in the case of *ivallda*. Only I must wait for Mr. Edwards to show it, which he has not yet done, so far as I am capable of judging.

Next, with regard to *Uhleri* and *varuna*; I quite admit that one and the same species of *Æneis* is not likely to fly on low, grassy plains and on alpine peaks, though I have taken both *Parnassius smintheus* and *Erebia epiptodea* in quite as dissimilar situations. But where did I say that *varuna* was found on alpine peaks? Kananaskis, though 4,000 feet above sea-level, is just such a grassy level valley in the mountains as *Uhleri* frequents in Colorado, and the elevation of 4,000 feet there is, with regard to timber line, equal to about 7,000 or 8,000 feet in Colorado—just the level at which *Uhleri* seems most abundant. It is *Uhleri*, as Mr. Edwards says, and so are the specimens found at other localities farther east in Alberta. If they have a difference sufficient to distinguish them it is for Mr. Edwards to define the range of both and give us something more definite than he has done as differential characters.

Now we come to *Æno* Bvd. a name which I have ignored, because I cannot identify it certainly with any species. Mr. Edwards, having adopted the name on other people's authority, feels bound, I suppose, to support it. But it is not consistent of him after doing so to refuse to recognize the much better evidence I have given for the identification of the name *subhyalina*; simply, as it seems, because he prefers to suppose that the type is not really the specimen described by Curtis. He says that it was described sixty years ago, and "in course of sixty odd years

the chances are against the survival of any particular cabinet insect ! It has a hundred enemies besides the possibility of accident. It is not an unknown thing for the owner of a collection of insects, when a type is destroyed, to attach the label to another example that seems near or pretty near the original." Here, perhaps, we have an explanation of the reason why, as I have pointed out in my reply to his criticism on my paper on *Argynnis* (see CAN. ENT., Vol. XXII., p. 150), I never got any help from Mr. Edwards in identifying so many of his types. But we do not so use our types in Europe, and there is not the slightest reason for assuming, as Mr. Edwards has done on the authority of an anonymous correspondent, that the type of *subhyalina* Curtis, is not the insect described by him. It happens that there was a label in what I believe to be Guénéé's handwriting to the effect that this specimen was the one described by Curtis ; but suppose it was not, what ground has Mr. Edwards for applying the name of a species described from Arctic America (?) to a species now only known to occur on the high peaks of the Rocky Mountains of Alberta, and never re-found by any of the numerous Arctic expeditions which have been out since Ross's time, and have covered a good deal if not all the ground covered by him.

As to my *Æ. Alberta*, Mr. Edwards had better wait till he sees it before saying that it is *varuna*. If he cannot distinguish it from *varuna* by the description, it only shows that either his or our description is bad, and how does he know that the one sent him by Mr. Fletcher was the same species ?

As to the identification of Mr. Fletcher's supposed female of *Macounii* taken at Morley, Alberta, I can only say that there is no question whatever of Mr. Fletcher's veracity, only, how can you tell female *Macounii* from female *nevadensis* ? I referred this very point to Mr. Scudder when he was at my house last year, and he looked at the specimens and said he could not say, but thought that it was just as likely to be one as the other.

Lastly, Mr. Edwards says, and I quite agree with him, that the value of publications such as mine depends much on whether the author is thoroughly acquainted with his subject ; and such acquaintance implies considerable experience as a lepidopterist and study of the forms he undertakes to speak of, etc., etc., and also an acquaintance with the behaviour, habits of flight and localities of the species, either from personal observation or reliable reports of thoroughly good observers. That is

just what I think, too, and I have made two journeys in the west, and a great many in Europe and Asia in search of this knowledge; whilst Mr. Edwards, so far as I know, has never seen an *Ceneis* alive anywhere or any collection of them at all comparable with those I have seen and have studied specially before writing.

As to his criticism on the value of the clasper I do not think he has any practical experience of the matter, but I will leave Mr. J. Edwards to answer him on that point:—

“I desire to say something on so much of Mr. W. H. Edwards’s criticism above-mentioned, as relates to the employment of characters derived from the male genitalia and the comparative table, as these are the points with which I was more particularly concerned in the preparation of Mr. Elwes’s paper on *Ceneis*.

“My business was simply to examine the material upon which the paper was based, and to ascertain how many kinds there were capable of definition with reasonable accuracy; and I endeavoured to give expression to those characters which separate any given kind from all the other kinds under review at that time, and to contrast these characters in a workable form in my “*Conspectus specierum*.” The question of the soundness or otherwise of my work I am content to leave to the judgment of any competent students who may be disposed to make an honest attempt to determine described species of *Ceneis* by the characters there laid down. A comparative table may be very useful to many students without necessarily pleasing everybody. Mr. W. H. Edwards gives it as his opinion that characters drawn from the male genitalia are valueless, but I find in practice that they have a value equivalent to any other morphological peculiarity, and that value is, of course, in direct proportion to their constancy in a series of individuals. Perhaps the best statement of the exact value of these characters, so far as Lepidoptera are concerned, is that by Prof. John B. Smith in his *Revision of Agrotis* (Bull. 38, U. S. Nat. Mus., p. 7.), which I quote here as it is well worth reprinting:— ‘The study of the primary sexual characters is one of the most valuable guides in the recognition of species. The structures are within my experience absolutely invariable within specific limits, and species otherwise closely allied are sometimes well separated by these characters. They have proved invaluable in settling questions of the identity of American and European forms so closely allied as to be considered races, and in several instances they have proved the identity or distinctness of

species when superficial characters left it in doubt. It has removed individual judgment as a factor in many cases and allows a final appeal in cases of difference. There is no universal test character, however, and as with all others so sexual characters sometimes fail. Over one hundred species referred to *Carneades* have so nearly the same form of structure that there is no sufficient variation to have specific value in doubtful cases. In some other groups, however, no two species are alike, and the widest variance within generic limits allows definite specific limitation.'

"As I wrote the description of *Æ. Alberta* and the paragraph immediately following, I may be allowed to point out for the information of anyone who may be disposed to accept Mr. W. H. Edwards's statement that *Alberta* and *varuna* cannot be distinguished from each other, that the former *may* be distinguished from the latter (amongst other points) by the whitish veins on the hindwing below, the absence of fulvous colouring except on the hindwing above, and the presence of a tooth or projection near the middle of the upper edge of the clasp in the male; all which particulars appear, with others, in the description in question."

JAMES EDWARDS, Colesborne, Cheltenham, England."

April 2nd, 1894.

NEW NORTH AMERICAN HOMOPTERA, No. VIII.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

I. *ATHYSANUS ANTHRACINUS*, *n. sp.*

Allied to *A. plutonius*, Uhl. Deep, black, highly polished, tibiæ and tarsi of the anterior and intermediate feet yellow. Length, $3\frac{1}{2}$ mm.

Head shorter and more rounded before than in *plutonius*, closely punctured. Vertex $\frac{1}{3}$ longer on the middle than next the eye, sloping and strongly rounded to the base of the front, median carina very feeble; ocelli and two dots on the hind margin fulvous. Antennæ, the basal joint excepted, pale; about six obscure arcs on the front and the rostrum, excepting its tip, fulvous. Sides of the clypeus parallel, tip feebly rounded. Knees, tibiæ and tarsi of the anterior and intermediate feet pale yellow; slender hind edge of the ventral segments fulvous. Pronotum obscurely wrinkled, more prominently rounded before than in *plutonius*. Scutellum closely punctured. Elytra almost coriaceous, deep piceous black, shagreened; nervures inconspicuous. Wings deep smoky brown, nervures blackish.

Valve of the male rather large, rounded. Plates long-triangular, exceeding the pygofer, rounded at apex and armed with a few tawny marginal bristles. Last ventral segment of the female longer than the penultimate, feebly concavely arcuated either side, the lateral angles quite strongly produced, subacute; pygofer short and thick, blunt at apex and armed there with a few feeble bristles, a little surpassed by the oviduct.

Iowa, Kansas and Colorado. Described from one female and two male examples. The Kansan specimen was captured at Madison, by M. C. Van Duzee. That from Iowa I owe to the kindness of Prof. Herbert Osborn, and the example from Colorado is from Prof. C. P. Gillette. Prof. Osborn's specimen came labelled *Conogonus gagates*, Ashm., and in the National Museum is an example labelled *Scleroracis anthracinus*, Uhler. I have adopted Mr. Uhler's specific name as very appropriate for this deep black little Jassid, but I can find no characters to separate it generically from *Athysanus*. Its highly polished semi-coriaceous elytra are peculiar, but hardly constitute a generic character. This insect superficially resembles *Goniagnathus Palmeri*, but they are very distinct.

2. *EUTETTIX JOHNSONI*, n. sp.

Form of *Paramesus Twiningi*. Bright orange-fulvous maculated with white. Anterior edge of the vertex acute, marked above with six black points and below with an interrupted black line. Length, 4-4½ mm.

Head nearly as wide as the pronotum. Vertex flat, depressed, ¼ longer on the middle than next the eye, anterior edge acute. Front strongly narrowed below. Clypeus a little expanded toward the rounded apex. Pronotum not twice the length of the vertex, sides rather long, obtusely carinated; latero-posterior angles rounded. Valve of the male broad-triangular, apex truncated; plates broad and short, little more than twice the length of the valve, rounded behind with a short obtuse tip, heavily fringed with soft white hairs; pygofer short, truncated, with a few long white bristles. Last ventral segment of the female long, rounded, sinuated next the lateral angles, produced in a short acute tooth either side of a narrow acute median notch. Pygofer broad, tapering suddenly from the apex of the connexivum to the acute tip, which is somewhat surpassed by the stout oviduct, the sides nearly rectilinear.

Colour bright orange-fulvous, paling to almost yellow beneath and on the legs, and marked with yellow on the anterior edge of the vertex, apex

of the scutellum and more obscurely on the sides of the pronotum and tergum. Two spots on the base of the vertex, three longitudinal lines on the pronotum, the lateral broader and abbreviated before, the basal margin of the clavus, and about eighteen spots on the elytra, white; the latter coalescing in places, and forming about four transverse bands; the two transverse veinlets bounding the postnodal areole brown; nervures fulvous, rather strong. Wings faintly enfumed, highly iridescent, nervures brown. Anterior edge of the vertex with six black points, the two median approximate; base of the front with a black concentric line, crossing the temples and interrupted at the middle and below each ocellus. Claws and antennal setæ brown. Tibial spines deeper fulvous. Face with an obsolete pale median line.

The male is a little more deeply coloured than the female, and has the two inner transverse nervures beyond the apex of the clavus brown, and the wings are more deeply fuliginous.

Described from one male and two female examples taken at Philadelphia, Pa., by Mr. C. W. Johnson. This is, perhaps, the most delicately beautiful little Jassid as yet described from our fauna, and it affords me pleasure to dedicate it to Mr. Johnson, who has brought to notice many interesting forms of the *Jassidae* from Eastern Pennsylvania and New Jersey.

This is the smallest species of *Eutettix* yet described. It has nearly the colour and markings of *Paramesus vittellinus*, and the size and form of *P. Twiningi*, and might readily be mistaken for a member of that genus, but the elytral neuration and most of its characters are those of *Eutettix*.

3. EUTETTIX CLARIVIDA, n. sp.

Form nearly of *Eutettix seminuda*. Pale greenish-yellow, anterior edge of the vertex with a distant pair of large black spots and two brown points at the apex. Length, $4\frac{1}{2}$ to 5 mm.

Vertex hardly $\frac{1}{4}$ longer on the middle than next the eye, just $\frac{1}{2}$ the length of the pronotum; marked with an impressed median line on the base, either side of which is the usual impressed area near the outer angle of the disc, and anteriorly is the transverse subapical depression common to this species of this genus. Front $\frac{1}{4}$ longer than wide, clypeus scarcely expanded apically; cheeks as in *seminuda*. Valve of the male broad-triangular, about the length of the last ventral segment; plates about twice the length of the valve, their outer edges distinctly arquated near

the base ; pygofers exceeding the plates, obtuse. Ultimate ventral segment of the female rather long, hind edge rounded with a short, abrupt median projection or tooth, about twice as broad as long ; pygofers broad, a little surpassed by the stout oviduct.

Colour : Entire insect pale greenish-yellow, polished, paler on the head and beneath, tips of the tarsal joints embrowned, extreme apex of the rostrum black, anterior edge of the head with a round black spot placed just above and within each ocellus, and two minute equidistant brown points between these on the apex. Mesonotum and sometimes the basal tergal segments black. Eyes brownish. Elytra subhyaline with strong yellowish nervures.

Colorado. Described from two male and four female examples received from Prof. C. P. Gillette. Except in its want of ornamentation this insect is closely related to *Eutettix seminuda*, Say, like which it approaches *Thamnotettix* in many of its characters. But its broader form, the characters of the vertex and the wide front will indicate its relationship.

4. CICADULA LEPIDA, n. sp.

Very near *C. diminuta*, Leth., but larger, with the front narrower and less tumid below, and with the clypeus broader at apex. Length, $3\frac{1}{2}$ to 4 mm.

Colour pale yellow somewhat intensified on the abdomen and tinged with green on the vertex. Head marked with two points placed near the hind edge of the vertex about midway between the nearly obsolete median line and the eyes, two large transverse spots at apex, on the basal sutures of the front. A vertical mark either side between the ocellus and eye, about three very short frontal arcs, and a spot at base of the antennæ ; all black. Eyes, frontal sutures below the antennæ, tips of the tarsal joints and a row of minute points at the base of the tibial spines, brown. Disc of the tergum, oviduct, claws and tip of the rostrum black. Elytra whitish, pellucid, faintly tinged with yellow at base and smoky at tip ; nervures slender, pale yellow. Wings white. Last ventral segment short, hind edge entire, very slightly rounded ; pygofers bearing a few white bristles at tip, scarcely surpassed by the oviduct.

Described from two female examples, Kansas, July, Prof. F. H. Snow. New York City, June, Mr. E. B. Southwick. Prof. Snow's specimen was taken at electric light, in Dodge Co., Kansas.

ZETHUS AZTECUS IN FLORIDA.

BY WM. HAMPTON PATTON, HARTFORD, CONN

ZETHUS AZTECUS, Saussure (Syn. *Z. Poeyi*, Sauss. and *Z. Slossonæ*, F.)

The male differs little from the female in colour (specimens from Indian River, Fla., Dr. Wittfeld); the described differences being all variations. The male clypeus is often black at base and in middle.

Saussure's description of *Z. aztecus* says, "fronte transversim in lineam elevato." Hence Fox's character of difference for *Z. Slossonæ* is incorrect, and the new name yields to *Z. aztecus*, Sauss.

Z. aztecus, having abdomen black, differs in this (and not in lacking a ridge above antennæ) from *Z. Slossonæ*, Fox.

Z. Poeyi, having abdomen red, agrees in this with *Z. Slossonæ*. The teeth of clypeus are variable.

The spiral antennal tip of *Poeyi* is not sufficiently invariable to hold this species distinct from *aztecus*; and the length of pedicle of second segment is variable in appearance. The colour (also variable) does not differ from *Slossonæ* to *Poeyi*. Hence I unite *Poeyi* to *aztecus* and add *Slossonæ* as a synonym. Occurs in Mexico, Cuba and Florida.

In *Zethus* four divisions are named in Saussure's "Synopsis":

Zethus, Sauss., second abdominal segment subsessile.

Heros, Sauss., clypeus lozenge-shaped, forming on each side an angle.

Zethusculus, Sauss., pedicle of second segment not more than one-fourth length of segment.

Didymogaster, Perty, pedicle of second segment at least one-fourth length of segment.

None of these divisions appear to be sufficiently distinct to be worthy of mention, even as sections. The length of pedicle of second segment is variable in the same species; hence, *aztecus* was placed in *Zethusculus* and *Poeyi* in *Didymogaster*.

Discalius is a synonym of *Zethus*.

NOTE ON ACRONYCTA CRISTIFERA, WALK.

BY A. R. GROTE, A.M., BREMEN, GERMANY.

Thanks to the identifications of Prof. Smith with the British Museum collection which contains Walker's types, we have now a certainty as to the correct names of almost all our species. It is clear from different remarks in the catalogue that under Mr. Butler's rearrangement of the material some shifting of the specimens described by Walker has taken place, and this shifting has equally certainly led here or there to an accidental shifting of label. I suggest as a possible solution to the *Acronycta cristifera* mystery, that the specimen B. Mus. Lists, IX., 230, 1856, marked: "*W. Orillia, West Canada, from Mr. B. 's collection,*" and determined as *Mamestra brassicae* by Walker, may now figure as the "type" of *Acronycta cristifera*, Walk., and the real type of the latter, which I saw in its original place, may have become misplaced.

In 1881, before Mr. Butler had interfered with, or Prof. Smith had seen the British Museum Collection, I examined the sole specimen and apparent "type" of *Acronycta cristifera*, Walk. It was in fair condition, with clean cut wings and somewhat narrow and tufted body parts. It belonged to a species unknown to me, of a seeming peculiar northern type; the specimen was labelled as from St. Martin's Falls, Hudson Bay. I examined it carefully, and in my memory can see the specimen before me now. It was a dark stone-gray species, the concolorous primaries without any warm tinting shaded here and there with whitish, but quite obscurely, and allowing the usual lines and narrowly outlined stigmata to be clearly made out. The stigmata were defined and nearly concolorous, not contrasting. The insect reminded me mostly of the species described by Morrison as *Acronycta aspera*. I judged the specimen to have naked eyes, but had no opportunity of verifying this. The hind wings were concolorous, perhaps a little darker. There was not a trace of any reddish-brown, or brighter shading or colour. The whole insect was of a stony, somewhat fuscous or sordid dusty gray-hue. In my Illustrated Essay I noted this examination of mine as follows: "The type from Hudson Bay is not an *Acronycta*. The abdomen is tufted; the species is dark stone-grey, with kidney-shaped reniform, and seems a Hadenoid form unknown to me," l. c. 38. Under these circumstances I was greatly surprised to find by Prof. Smith's Revision that Mr. Butler had referred the specimen as belonging to *Mamestra lubens*; still more so that Prof.

Smith afterwards confirms the decision. That the specimen considered by Butler and Smith to be the "type" of *crisifera*, Walk., is really *lubens*, I do not doubt. But that this specimen was described by Walker and seen by me, I do not only doubt, but I shall try to show the impossibility of. Let me premise that, so far as I can find out, in every case where I have positively identified Walker's species, after seeing the Brit. Mus. Collection, my identification is adopted and verified afterwards by Prof. Smith, as a study of his synonymy will show. In every case but this; for even where, from the poor condition of the specimen, I only ventured to suggest the identity, as with *A. muraenula*, the supposition is confirmed. Let me also premise that, in the search for "types," Prof. Smith has not stopped to verify the supposed "type" by the description. Yet the description is the sole real authority for the authenticity of the "type." A number of times have I, in print, drawn attention to this fact, that when a supposed "type" contradicts the published description, the "type" must be held to be spurious. Not only does literature bring ample evidence that "types" have been subsequently made, but a mistake in labelling, a changing of the label, may not infrequently occur, and has often occurred as the result of accident. We may go further and say that a description must tolerably well conform to the appearance and character of the specimen, to be accepted as having been drawn up from it. But, in the present case, we may waive all such argument, weakened as it must be by Walker's poor descriptive methods. The description of *crisifera* simply contradicts the supposition that a specimen of *lubens* could have served for its basis. It bears out my independent testimony, written without consulting the B. Mus. Lists, that a sordid, dusky or "brownish" gray insect, without any brighter colouring, was before Mr. Walker. Accessory evidence is that *lubens* is not, so far as known, a northern species at all, not else known in the Hudson Bay collections; while the form I saw had the northern aspect of *Polia aspera*. Again, Mr. Walker's generic references are wild, but there is still some method in them. A moth to be referred by him to *Acronycta* must have something gray, black and white, about it, to say the least. Now *lubens* is not gray after this fashion. It is more brown than gray. It is very dark grayish with generally over all a distinct reddish flush and tinge, especially basally. The reniform spot is upright and yellowish, not kidney-shaped. Beneath it is even brighter coloured, tinged with carmine or bright red. The hind wings are not gray or "cinereous" at all, but

fuscous or smoky. The size is larger. *Lubens* is also altogether a comparatively gaily coloured Noctuid, with violet and purple-brown shadings. It recalls somewhat *Copimamestra brassicae*, but not in any way does it resemble a dead stone-gray species, unicolorous in appearance. The lines are partly yellow; they cannot be described as "black, undulating and denticulated." The type I saw allowed the fine lines, single, if I remember rightly, to contrast and appear as if cut in the wing against the even paler ground colour. The reniform was wide, kidney-shaped, excavated outwardly. But let Mr. Walker speak for himself. That he described *Mamestra adjuncta* and *Xylomiges crucialis* as *Acronycta* is true, but these have at least something of the *Acronycta* livery and colours. *Lubens* has nothing of this, and is well described by Smith in the Revision, p. 233, under *cristifera*. To this I can refer the reader. Here is Walker's description from the British Museum Lists, XV., p. 1654, 1858. The Latin diagnosis I can omit, since it merely translates the English text:

"Male.—Dark cinereous, brownish beneath. Thorax with black bands. Abdomen brownish-cinereous, with high black dorsal crests, tufted along each side, and with a large apical tuft. Forewings with some whitish hairs here and there, with black undulating and denticulated lines; orbicular and reniform spots and a third hindward spot mostly whitish; orbicular large, nearly round; reniform slightly excavated on the outer side. Hind wings brownish-cinereous, with whitish ciliæ. Length of the body 7 lines; of the wings 16 lines. This species much resembles *A. hamamelis*, but is sufficiently distinct. *a.* St. Martin's Falls, Albany River, Hudson's Bay. Prese ted by Dr. Barnston."

Walker's comparison with *Acronycta hamamelis*, though wide of the mark, is only justified by the *Acronycta*-like gray of his "type," which wanted all warm *Mamestra*-like reddish-brown tints. He calls a dark or dusty fuscous-gray, a sordid stone-gray, "brownish-gray." There is not the faintest resemblance to *lubens* in his description, in which species the orbicular is dark centred, and in which character Walker's "type" agreed with his description in being without dark centre merely somewhat paler, more "whitish" than the wing. The type of *cristifera* was not rough and powdery like *lubens*, but nearly smooth. Could any sane entomologist compare *lubens* with *hamamelis*? I think not. There was no trace of purple, yellow, bluish-gray, violet, carmine or reddish-brown in Walker's

"type," and there is none in his description. The type I saw of *crisifera* was evidently a male; what is the sex of the supposed "type," the specimen of *lubens*?

Walker's descriptions, though inadequate throughout, do not ever necessarily contradict his material. They generally vaguely agree, and though inadequate for identification are often sufficient as to the colour and markings of his specimens. With structure he was profoundly unacquainted in the Lepidoptera. But, while making every allowance possible, I submit that he never could have drawn up his description of *crisifera* from a specimen of *lubens*! It is rather his weakness to exaggerate, by not defining, small matters of shading in these sombre insects. He could not have failed to note the centrally spotted orbicular, the "creamy-yellow" upright reniform, the distinctly outlined claviform, the red flush, the blue-gray powderings, the yellowish subterminal line, the carmine tint beneath of *lubens*. Some trace of all these must have appeared in his words. There is none at all! He had a slighter *Polia*-like insect before him, which I saw, but could not locate definitely in my brief study. This specimen must in some way have become exchanged for a specimen of *lubens*, which may now stand there, but cannot in reason be considered his "type" of *crisifera*. I pass over what I believe is the fact, that Walker did not put the word "type" on a label attached to his specimens and that therefore, in rearranging the material, a mistake might readily occur. Were I to see his real "type" of *crisifera*, I should recognize it at once. Error is not out of the question because *lubens* is so strongly marked, as Prof. Smith would have us believe. The "error" is not as to the species, but as to the specimen! Why does not Mr. Smith study the British Museum Lists? Why adopt as infallible the testimony offered by the fact that the specimens in place *now* in the British Museum are really in every case Walker's identical "types"? Is there no margin for error here? It would seem that Prof. Smith has throughout adopted the theory that the specimens shown him as Walker's "types" must and are really always what they purport to be. Yet I have shown in this case that it may not always be so. I can put aside the fact that it is very unlikely that I should have been deceived in the case of so prominent a species, which, as Prof. Smith says, "must have been familiar" to me. Undoubtedly *lubens*, Grt., was well known to me, known as long as most of my moths. For a time, till 1875, I thought the species might be what what was called "*brassica*" in Europe. Is it not possible that this iden-

tical "type" of Walker's was what he called *brassica*? I have not the literature at the moment to refer to. It has no immediate bearing on my conclusion, which is this, that the species I have named in American collections *Mamestra lubens* must retain its name.

I do not belong to the school which would ignore the British Museum Catalogue altogether. As much as any one I have worked out Walker's species and generally adopted his names when earlier. It is true I lose more than any one else by Walker's insufficient descriptions. I do not object to this, for the reason that our main need is a stable nomenclature. This latter cannot be established by the procedure of taking a specimen as Walker's "type" which does not answer his published description. The real basis for our nomenclature is our literature. If *lubens* is dropped for *crisifera*, then this basis is fundamentally attacked. What is called a "type" supersedes it. But labelling a specimen can never constitute a publication. Walker's text must conform always and in every case sufficiently with his supposed "type," and at least not contradict it. In this case the description does not conform and does contradict the assumption of Mr. Butler. There may be other cases, but I have no means to look into them. I am quite willing that Walker's names should be restored and credited to him as if he had fully described his material. That so many of my species should be thus drawn in, is certainly no fault of mine. The labour of comparing Walker's "types" is no greater than that of determining any other lot of specimens; but the labour used in trying to make out his descriptions will in almost every case be always in vain. After I had satisfied myself of this in 1868, I ceased to trouble myself to look through the Catalogues for a possible identification, which, in the best case, would be a doubtful one. It was much better to write recognizable descriptions of our Noctuidæ and run the risk with Mr. Walker. And when all is restored that can be restored to Mr. Walker, it may, I think, be said of my work with justice, that at a time when we in America had no names at all for our Owlet moths, I built up gradually a nomenclature which, for the greatest part, will endure.

Two other points remain to be elucidated. I am persistently credited by Prof. Smith with the description of *lorca* under the name *dodgei*. I have not the literature, but my memory is that I never described such a species, but that Mr. Morrison did. The last point relates to the type of *ferrealis*. I received this from Morrison's late Montana collections. It is very

distinct from *M. stricta (ferrea)*, and I think the type must now be with Mr. Neumoegen. It should be easily recognized. Prof. Smith has seen the types and recognizes the validity of twenty-nine (29) species of N. Am. *Mamestra* described by me. There remains then *lubens* to be reinstated and *ferrealis* to be again recognized, making thirty-one in all. I have lost four others through comparisons with Mr. Walker's "types."

FOLDED WINGS IN FÆNUS.

BY WM. HAMPTON PATTON.

Aside from the wasps distinguished by their folded wings (DIPLOPTERA) and the Chalcidian genus *Leucospis*, there is no record, unless of distant date, of any Hymenopterous insect having the wings folded. In *Coptera* the "longitudinal fold" described by Say is in reality a pleat or ridge: the wings, as I have repeatedly observed in the living insect, being laid flat upon the back and never folded.

I can, however, add from personal observation the Evaniad genus *Fænus*, in which I have uniformly found the wings folded in a manner homologous to that of the hornets and *Leucospis* (*i. e.*, longitudinally through the middle, the fold crossing the median transverse vein and the two recurrents, the posterior half of the wing falling under the anterior half).

The position of the wing-fold is one of great morphological significance, as it indicates the line of separation between the two systems of veins in insect wings. The discovery of this fold in Evaniadæ proves the recently discovered relationship between these insects and the Diplopteryga.

On the eighth of May, 1879, at Waterbury, Conn., I bred a female specimen (of the common small species of *Fænus*) from a larva found in the pith of a dead sumach twig in the preceding month. As no description of the larva of this genus exists, it is doubtful whether the larva found was that belonging to the Hymenopteron or was that of its host. The larva was apodous, of a very slight purple shade, and covered with fine down. There was no cocoon. The pupa is gray, the cast skin almost white, showing the peculiar features of the genus *Fænus*.

BOOK NOTICE.

MISCELLANEOUS ENTOMOLOGICAL PAPERS. BY F. M. WEBSTER:
Feb., 1894.

We have just received a neat pamphlet of 59 pages, which forms Bulletin 51 of the Ohio Agricultural Experiment Station. It is by Prof. F. M. Webster, and, like all his work, shows careful preparation.

The insects treated of in the first part are:—The Asparagus Beetle, the Western Corn Root-worm, the Broad-striped Flea-beetle, Blister Beetles, the Basket Worm, the Cabbage Aphis and the Apple-leaf Louse.

An interesting account of the insects which have been introduced into the State is given under the head of "Some Insect Immigrants in Ohio." There appear to have been two great highways which insects imported from Europe have followed: those which have entered the State at its north-eastern corner and spread westward, and those from Southern Europe which have generally entered by the way of the Ohio Valley and have a more or less restricted northern distribution.

In the article "Insect Foes of American Cereals" the writer is evidently dealing with a subject of which he has made a special study. By patient observation and the application of practical common sense, Prof. Webster has made some important discoveries in Economic Entomology. Not the least of these is the fact recorded in this pamphlet that the Apple Aphis passes part of the year as an injurious enemy on wheat. In fact Mr. Webster says: "So far as my observations go, it is more detrimental to the wheat than to the apple." This is an important discovery, and will doubtless draw the attention of entomologists to this important subject of the "Alternation of Generations" among the Aphides—a line of investigation which has engaged much of the time of Messrs. Riley and Howard at Washington. Speaking of remedies, Prof. Webster says: "It would appear almost visionary to advocate spraying apple orchards with kerosene emulsion in mid-winter to protect the wheat crop, but nevertheless one of the most serious enemies of young fall wheat passes its egg stage on the twigs of the apple during the winter season. I refer to the Apple-leaf Louse, *Aphis mali*, Fab."

"Soon after the young wheat plants appear in the fall the winged viviparous females of this species flock to the fields, and on these give birth to their young, which at once make their way to the roots, where they continue reproduction, sapping the life from the young plants—

* * * * though they are seldom killed outright, these infested plants cease to grow, and later take on a sickly look, and not until the Aphis abandons them in the autumn to return to the apple, do they show any amount of vigour. It is very seldom that the affected plants fully recover at least in autumn; and the result must be to reduce their productiveness the following year." The eggs of the Apple-leaf Aphis are deposited on the twigs and limbs of apple trees late in the autumn; these do not hatch until the following spring; the plant-lice remain on the apple trees for two or three generations, when winged females are produced, which fly to grasses and weeds and there pass the summer. After the young wheat is up in the autumn, the lice congregate on the plants and reproduce rapidly.

The above is briefly the life-history of this insect in Ohio as worked out by Prof. Webster by careful experiments, which are detailed in the Bulletin. At Ottawa this probably may also, to a large extent, be the case; but the Aphis is also sometimes abundant on young apple trees right through the season. It is, however, seldom injuriously abundant in Ontario, although in British Columbia it is to-day one of the most serious enemies of the apple grower.

Professor Webster's papers will doubtless cause many other entomologists to study this insect more closely, when it is probable that further discoveries will be made, perhaps not less interesting than that now discussed.

J. F.

CORRESPONDENCE.

BELLURA DIFFUSA.

Sir,—In Dr. Smith's catalogue of the Lepidopterous superfamily Noctuidæ, found in Boreal America, on page 181, under *Bellura diffusa*, Grote: he states, "I have not seen the type of this species." In the March No. of CAN. ENT., Vol. 26, p. 85, referring to that statement, Mr. Grote says, "Where my type is now I cannot for the moment recollect. It seems not to be in the British Museum." When Mr. Grote, then of Buffalo, identified my specimen, he expressed pleasure at seeing the species again, remarking that he had not seen it since he had first named it; which I understood from what he said was about a year previously, indicating that it was not then in his collection. And the impression left on my mind from his conversation was, that he had seen but one specimen before, and that he had retained it after naming it. All this is distinctly impressed upon my memory, right or wrong, and my stating it may assist Mr. Grote in recalling the transaction, and give him a clue to where the type is now to be looked for.

J. ALSTON MOFFAT.

Mailed May 3rd.