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ON CERTAIN STATEMENTS IN SCUDDER'S "BUTTERFLIES OF NEW ENGLAND."

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

As Mr. Scudder has charged me with blunders of one sort or other, I am compelled to notice the matter, as silence on my part would properly be construed as an acknowledgement that he was right.

I. On p. 1805, the synonymy of *Argynnis* (*Brenthis*) *Freija* is given, closing thus: "*Argynnis Chariclea* Edw., in his catalogues." And on p. 1808, under *Chariclea*: "*Argynnis Freya* Edw., in his cat."

In the text, p. 1807, we read that "*Freija* is a circumpolar species in the strictest sense, being found on the northern shores of both worlds, and in each extending southward to the habitable zone. * * * In the New World it occurs from Alaska to Labrador, * * * and in the Rocky Mountain region as far south as Lake La Hache and Crow's Nest Pass, west of Fort McLeod. It is said by Edwards to occur in Colorado, but the specimens obtained there by Mr. Mead, to which he probably refers, belong to the next species" (*i. e.* to *Chariclea*), "while three from Nepigon, referred by him to *Chariclea*, belong here" (*i. e.* to *Freya*).

On page 1809, under *Chariclea*, we read: "This northern butterfly inhabits circumpolar lands on either side of the Atlantic, but extends much further southward on the western than on the eastern continent, being found * * * not only in Greenland and Labrador, but * * * even (in) Colorado," etc.

Now, although I knew I had not mistaken one of these species for the other, as alleged, I got from Mr. Bruce a pair of the Colorado form, taken by him last summer, and mailed them to Mr. Butler, British Museum, asking which species they were. The reply came two weeks ago, short, sharp and decisive: "Your species is *Freya*; it can by no means be confounded with *Chariclea* * * * It has nothing to do with *Chariclea*."

The Colorado species is *Freya*. The examples taken by Mr. Mead in Colorado, 1871, and of which Mr. Scudder speaks, all passed through my hands, as did the whole catch. I received the butterflies, week by week, through the mails in papers; and, on Mr. Mead's return, we divided the entire lot equally between us. There were many *Freya* (and some of them I have now), but no *Chariclea*; nor has *Chariclea* ever been taken within the limits of the United States, so far as I know. It flies as far to the south as the Canadian Pacific Railway in the Rockies; and I not only have examples taken at Laggan by Mr. Bean, but I have twice had eggs and larvæ from him.*

II. On p. 1863, in the synonymy of *Pamphila* (*Limochores*) *Palatka* it is said that *Pamphila Dion* Edw., CAN. ENT., XI., 238, is the same thing.

*Mr. Scudder says, page 1807, under *Freya*, by which he means *Chariclea*: "To judge from the captures north of Lake Superior, it is a late species, flying late in August and early in September, or at the very close of the season, at that place. Evidently winter must be passed, by the caterpillar just from the egg." I have not learned from Mr. Bean the date of first appearance of *Chariclea* imago, but I received eggs sent by him 4th of August, 1866, and another lot 6th August, same year. Part of each lot hibernated direct from the egg, but part went past third moult and then hibernated. I lost these during the winter. But these last larvæ, had they lived, would have reached imago three or four weeks earlier than the larvæ that hibernated from the egg. This would give the appearance of two broods of the butterfly, and account for some flying in July and others in September.

Under *Chariclea*, p. 1809, by which Mr. Scudder means *Freya*, we read: "Nothing is known of its seasons or history, except that it appears in Colorado early in the season, in May, or early in June, so that winter can certainly not be passed as a caterpillar just from the egg." I have not had eggs of *Freya* from Colorado, but received some from Laggan, sent 6th June, 1886; and again, sent 4th June, 1889. I lost the survivors of the first lot after they had passed the second moult; but those of the last lot (6) reached eight-tenths of an inch in length, and had passed three moults before 2nd July. I thought from their actions they would pupate, but after several alternations of quiet and activity, they finally dropped asleep, and I sent them to Clifton Springs, N. Y., 16th of July, to go in the refrigerating house.

The species *A. Helena* is the representative of *Chariclea* in Colorado, and as that behaves so *Chariclea* might be supposed to behave, if it dwelt in Colorado. Eggs of *Helena*, sent from that State 24th July, 1886, gave larvæ, all of which passed the third moult and then went into hibernation. I lost them during the winter.

I may as well here speak of one other of this group, *A. Triclaris*, found in Colorado and north. I received eggs sent from Laggan, 2nd August, 1889. The larvæ passed second moult and hibernated, and were sent to Clifton Springs 19th September.

The larvæ of all four species are closely like that of *Bellona*. In the first stage, the alternate segments are green and brown, as in *Bellona*, and also *Myrina*. The spines of *Triclaris* are somewhat different from the rest after the first stage, but these others are same as in *Bellona*, so far as I carried the larvæ. Mr. Scudder has tried hard to find characters in the preparatory stages by which to separate the genus *Brenthis* Scudder (not the coitus *Brenthis* of Hubner, by a good deal), but wholly without success; and the same is true of the imago. The small species are merely a group of the genus *Argynnis*. As to two other genera, so called, chipped off from *Argynnis*, viz., *Semno-psyche* and *Speyeria*, there is not a feature in any stage to justify either of them.

Had Mr. Scudder read the two descriptions ever so carelessly he ought not to have made a mistake like this. Also Prof. French pointed out to him the error, and I did the same indirectly through Mr. French. But, nevertheless, he was bound to have his own way. The species *Palatka* was named from a single ♂, 1867, taken at St. Augustine, Fla. In several years this example was an unique. I have it before me now as I write. But in later years *Palatka* has been taken abundantly at Indian River, mostly by Dr. Wittfeld, and is known to all collectors. In the description the expanse is given at 1.7 inch. Omitting all mention of upper side, we come to under side of secondaries, which differs widely from *Dion* in colour and absence of markings, "Under side of secondaries uniform brown, immaculate." *P. Dion* was described in 1879, from the southern shore of Lake Michigan, from Hamilton, Ont., and from Nebraska. It is compared with *Arpa* B. & L. Expands 1.2 inch (that is to *Palatka* as 12 is to 17). "Under side of secondaries ferruginous, of uniform tint, *except that there are two pale rays from base*, one of which passes through cell, the other occupies submedian interspace to margin." These pale rays are a conspicuous feature of this species. *Palatka* is a coffee-brown, solid colour. *Dion* is a red-brown, with two pale bands. On p. 1931, among "Additions and Corrections," are these words: "1715, line 9, the species here referred to as *L. Palatka* is not the *Palatka* of Edwards, but his *Pallas*." I never described a species under the name of *Pallas*. The author has got things in a tangle.

III. On p. 1595, in the excursus "Butterflies as Botanists," we read: "The narrow choice of certain species is, perhaps, indicated in our own fauna of the food plant of *Phyciodes Tharos*. So far as we know it feeds only upon a single species of *Aster*; 'and if your butterfly selects only that,' said the late Dr. Gray, when I told him of this, 'it is a better botanist than most of us.' Only one other plant has been alleged as its food, and that probably by mistake. This special aster the female selected out of many furnished it by Mr. Mead whereon to lay her eggs, and no one has yet reared it upon anything but aster *Novæ Angliæ*. * * * Such restriction of choice, if really true, certainly indicates some keen perception on the part of the butterfly." It certainly would.

Mr. Mead, CAN. ENT., VII., 161, 1875, says: "I prepared a box by partly filling it with earth, and transplanting into this small specimens of *all the common Compositæ* I could lay my hands upon, * * * and

about a dozen ♀ ♀, *P. Marcia* and *Tharos*, were introduced. In a few days I examined the leaves and found six patches of eggs upon one of the plants, etc. The plant proved to be a species of aster, * * * from the leaves I think it will prove to be aster *Novæ-Angliæ*. No eggs were found on any of the other plants." He also says that he afterwards found a brood of young caterpillars upon a plant of this aster in a meadow.

In CAN. ENT. IX. 1, 1877, I related that I was in the Catskills with Mr. Mead when he made the above mentioned discovery, and that I afterwards got eggs for myself by tying the female butterfly over the stems of *A. Novæ-Angliæ*, and brought the larvæ while young to Coalburgh. "On the journey, stopping at several points, I had to give them leaves of such species of aster as I could find, and they ate any and all readily—even German Asters from the garden." Then I related how I repeatedly got eggs of *Tharos* in same way at Coalburgh, W. Va., (where *A. N.-Angliæ* does not grow). I do not know that *Tharos* will feed on any other plants than asters, but they will eat any sort of aster surely.

IV. On p. 1926: "Mr. Edwards tells me that Mrs. Peart observed one case (of *G. Interrogationis*) in which the final egg of a chain had eleven ribs, when all the others had nine. Could a second female have possibly placed an egg upon a chain laid by another!?" I did not know what the author meant to imply by the italicised word and the note of surprise. The observation as to this chain of eggs is mentioned in Part VIII., Vol. 3, Butt. N. A., in the paper on *Interrogationis*, as follows: "I had supposed the number of ribs in all eggs laid by one female was the same, but Mrs. Peart found that, in a string I sent her, the topmost egg had eleven ribs, while all the rest had but nine, as shown on the plate, fig. a¹." The eggs were laid by a single female in confinement, and were put in alcohol and so sent Mrs. Peart. It occurred to me to ask Dr. C. S. Minot, an authority in biology, if he could explain how this could have been, and he replied: "The eggs of insects descend from the ovarian tubes into the so-called uterus, where they lie for some time, and have the shell formed by the secretions of the uterine walls. These walls are thrown into folds, which are characteristic of the genera and species, and the egg shell, so far as its outer pattern is concerned, is a cast, so to speak, of the folds in question. It seems to be quite possible that the number of folds (and therefore the number of ribs on the shell) should vary in different

parts of the uterus. But I doubt if there are any observations on that point at present." That seems a reasonable explanation.

V. *Argynnis Atlantis*, p. 578. It is said: "The early history of this species is almost wholly unknown, the different stages of the caterpillar and the chrysalis never having been adequately described." I had this species from the egg, and described every stage, egg, larva and chrysalis, in CAN. ENT., XX., p. 1., 1888, in the manner usual with me; and as Mr. Scudder has copied my descriptions of other species by wholesale, I am at a loss to see what there is "inadequate" in this of *Atlantis*, or why it is dismissed so curtly.

VI. *Colias Eurytheme*, p. 1126. Under the division of *Eurytheme-Eriphyle* comes the species *Harfordii* H. Edw., and its var. or co-form *Barbara*, and reference is made to the description and life history of same, with plate, in Butt. N. A., V., 3. I showed in the paper cited that the male *Harfordii* comes near *C. Interior* Scudder, a species which the discoverer regards as genuine; and that the var. (or co-form) *Barbara* approaches the *Eurytheme* group, *i. e.* *Eurytheme* and *Philodice*, and I said, "So that the species in certain points resembles species belonging to two distinct sub-groups." Dr. Hagen, Trans. Bost. Soc. N. H., 22, 165, 1883, judged *Harfordii* to be neither more nor less than *Interior*. Mr. Scudder might have compared the genitalia, as he believes in those organs as tests of species, and told us wherein *Harfordii* resembles *Eurytheme*.

VII. *Limenitis Disippus*, called Basilarchia *Archippus*. There is so much in this life history that is at variance with what I myself have observed in West Virginia, that one would seem to be dealing with a distinct species, and that the New England form could not be the same as the Virginian.

Page 261. The protection of the egg from "ants, mites and spiders * * * is undoubtedly in the fewness of their number on one plant. The spider that finds two eggs of a Basilarchia in one day must be an excellent hunter." In this region there is no limit to the number of eggs that may be laid on one tree. The seedling plants of aspen are often full of eggs or larvæ. On one occasion I found four larvæ on four leaves of one little stem; on another I found eleven eggs and young larvæ on a plant not over eighteen inches high, nearly one to every leaf; on another I found nine eggs on a small tree. I once discovered a female oviposit-

ing on a willow of some ten feet high. She laid in my sight at least six on different parts of the tree, and I brought away two of them, the rest I was unable to reach.

I asked Prof. Rowley, at Curryville, Mo., what was his experience in this matter, he says: "I watched a female *Disippus* last August laying eggs on aspen. She flitted here and there, and in the course of about fifteen minutes had laid a dozen eggs; and was busy when I inadvertently frightened her away. Once or twice she returned to the same twig. In searching for cases of this species on New Year's day (1889), I examined but two plants of willow; the first, scarcely four feet high, yielded twelve cases; the other, less than ten feet high, gave me forty-five. In one case, two were found on one twig, not twelve inches apart, on another three. I have seen five larvæ on one small sprout of aspen; seven eggs on another. Once found two young larvæ on one leaf, both on perches, one at the end, the other at the side."

Page 273. "On hatching * * * it eats the apical leaves, and then those next in order, omitting none in its passage down the stem, so that, as Lintner says, its position may be 'at once revealed by the twig upon which it had fed * * * being entirely defoliated from its tip about eighteen inches downward, leaving only the footstalks remaining.'" The fact is that the larva makes its case of the leaf it was hatched on, though, for cause, it will move to another in order to make the case. As to stripping a stem, even the mature larva does not do that to any such extent as is intimated above that the young larva does. It is at all stages a light feeder.

Page 277. "It is a curious thing that we find in the caterpillars of the first brood, no tendency whatever to construct hibernacula; here we have an instinct inherited by alternate generations." On page 1416, speaking of the same caterpillar: (it is) "the caterpillar of the latest brood which constructs a hibernaculum * * *; yet, with this common butterfly, no instance has been given where a caterpillar of an earlier brood showed the remotest tendency towards such action." Now, Mr. Scudder may be right for New England, where *Disippus* is said to be two-brooded only, but in West Virginia the caterpillars of the brood before the last (there being three annual broods) often make hibernacula, and some of the same lot will do this, while others go on to pupa and imago. If this fact has never been recorded before, I put it on record now. Some

of a lot of larvæ also will make their cases after second moult, others after third and in the following spring. Some, but not all, of those which hibernated after second moult, will pass three more moults. There would seem no reason why some larvæ of the first of the three Virginia broods should not make cases, as some of the second (in mid-summer) do. And certainly we could not say positively that they do not; nor do I see how one could say positively that some of the first New England brood do not make cases. The evidence against it is negative only. I have found that caterpillars and butterflies are apt to do just what we would think they could not. I never knew of a larva hibernating after first moult, as it is stated that they "not at all infrequently" do, on page 275; nor do I think the small larvæ, after that moult, would have the physical ability to cut out and weave together a case.

A RAINY DAY ON THE MOUNTAINS.

BY DAVID BRUCE, BROCKPORT, N. Y.

There is a tradition extant in Denver that the sun shines in Colorado nearly every day. This last summer was a woeful exception, however, for, from the middle of April until the end of June, the weather would have been thought respectable only in Labrador, but the unusual wet and cold spring, although it retarded the insects, gave such an impetus to the growth of flowers and herbage on the mountain sides and tops, that, when the hot weather set in, all species of diurnals appeared to be unusually abundant, and every kind seemed to be flying at one time. I had collected for some time with indifferent success during this wet season in the foothills and lower canons, and I made up my mind, despite the weather, to try the higher ranges. So I climbed above timber line one showery afternoon the beginning of June, and spent the night in the same shanty I had occupied on my visit in 1887; the proprietors, two honest miners, welcomed me heartily. The next morning was gloomy, cold mists rolled up from the valley and white clouds collected round the peaks, but I donned a pair of miner's overalls and went out determined to do something. In a drizzle that seemed as much snow as rain, I climbed the sloping sides of Mount Bullion, which was covered more thickly with

vegetation than I had ever seen it before, owing to the frequent rain. I had not searched long before I found several full grown larvæ of *Parnassiuss Smintheus* on Sedum. This was a fair beginning, as I had for several years searched unsuccessfully for this larva. A pretty Arctian larva was also feeding on the same plant (from this I bred *Arctia cervinoides* Strecker). I commenced overturning the smaller rocks, and was soon rewarded by finding numerous larvæ and pupæ, also many small Noctuids. Attached to the sides of larger rocks I found several pupæ of butterflies; these produced in a few days *Melitæa anicia* and *Argynnis Helena*. Under flat stones and in crevices were many species of *Agrotis*, sometimes from ten to thirty individuals crowded together. The ants were swarming under most of the rocks, and they, with the predaceous beetles had destroyed hundreds, as was evidenced by the mutilated wings and empty pupæ. I was so fascinated with my occupation that I forgot all about the weather. After I had filled all my tins and boxes and got very hungry, I worked my way to the cabin again, quiet satisfied and surprised with the morning's work. From the larvæ and pupæ obtained I bred:—

Arctia cervinoides Strecker, five specimens.

Arctia Brucei H. Edw., three specimens.

Arctia sp. (?), one specimen.

A grey *Bombyx*, allied to *Dasychira*, from a tufted pupa enclosed in a cocoon like *Halesidota* but thinner, this came out next day in the box, and I didn't see it until it was spoilt and could not recognize it.

Apatela, two, allied to *Felina*, but larger and darker.

Plusia Hochenzworthi, several.

Agrotiphila Montana, six, the pupa and imago were common under rocks.

Agrotis ochrogaster, four, imagines abundant and variable.

Agrotis, several specimens not yet determined.

Hadena lateritia, one.

Anarta melanopa, common, both pupæ and moths.

On sheltered sides of rocks were several *Glaucopteryx magnoliata*, or a species very like it, and one *G. phocataria*. Larvæ and pupæ of *Melitæa anicia* were not uncommon. *Argynnis Helena*, one pupa, also one of *Pieris calyce*.

The elevation of my hunting ground was about 13,000 feet.

THE NOCTUIDÆ OF EUROPE AND NORTH AMERICA
COMPARED.

(Sixth Paper.)

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

Tribe *Stirini*.

This tribe is, so far as I know, exclusively American. The thorax is elevated, the patagia usually deflected. The eyes are naked; the front embossed; the legs thinly scaled, with a claw on front tibiæ; the abdomen somewhat short and weak, untufted on dorsum; the wings pointed at tips. The genera seem to fall in between *Calpe* and *Plusia*.* They are: *Basilodes*, *Stiria*, *Stibadium*, *Fala*, *Plagiomimicus*, *Acopa*. The genus *Cirrhophanus* probably belongs to the *Heliothini*; we do not know the larva, but the moth is allied to *Chariclea delphinii*, by the Hübnerian character of the pattern of ornamentation. It is probable, also, that *Chamaclea* is best placed among the *Heliothians*.

Folenta, referred here by me (CAN. ENT., XV., 75), based upon an erroneous identification of Mr. Morrison's *Tepperi*, with my *Plag. Richi*, may be related to one of the species figured by Hübner in the "Zutraege," under *Schinia*. I saw the type, but was not able to examine it for generic characters. It seemed to me to be a faded example of a southern form of *Plagiomimicus*, which I possessed, narrower than *Pityochromus*, of a delicate olive green, with a frontal cup-like excavation and a claw on the fore tibiæ. Mr. Smith assures us that *Tepperi* has the fore tibiæ unarmed; consequently, I described my species as *P. Richi*. Finally, Mr. Smith's *Cerathosia* may belong here. This moth has the false appearance of a *Pseudocrypta*. I have shown that it is not a micro. neither is it an Arctian, "next to *Utetheisa*," as stated by Mr. Smith. It has a globose thorax; a frontal horn, thinly scaled legs with a claw on front tibiæ. The shape

*In reference to the question of rank in the Lepidoptera and to a former paper of mine in these pages, I would state that, while from morphological grounds, we must consider the four-footed butterflies as the highest, the sequence *within* the family must be decided on comparative grounds. It may be that the *Satyrinae* are the lowest sub-family group of the *Nymphalidae*, but they must be nevertheless classed with the family. The characters by which the butterflies approach the moths are apparent in all the groups, as might be expected if we consider the moths to represent an older phase of the Lepidoptera. The highest *Nymphalidae* must be sought for in the tropics; but it may be, that the sequence in our North American fauna is to be inaugurated by the Hackberry butterflies.

of the wings is not unlike *Acopa*. The secondaries are 8-veined: vein 5 weaker; costal vein 3-branched; 7 to tip; 7 and 6 a rather short furcation; 8 thrown off from the upper margin of 7 near the base. The frontal horn is impressed on the face. The moth was evidently classed "next to *Utetheisa*," upon Hübnerian characters: the paler, spotted and narrower primaries the bright discolourous hind wings. A superficial resemblance to *Emydia* and *Utetheisa* is thus given. *Utetheisa* has a smooth front and unarmed tibiae, fringed antennae, with two stronger bristles on each joint. *Cerathosia* has ocelli, and is otherwise distinct from the Lithosians, while the curious termination of the generic title (*thosia*?) would seem to be a fragment of the Greek *lithos*. The discovery of the larvæ of *Cerathosia* will probably throw additional light upon the affinities of the insect. In the mean time, I wish to point out that, in its generic characters, this form coincides in many particulars with the Noctuidæ belonging to this tribe, as also to the *Tarachini* in its scaly vestiture.

Tribe *Plusiini*.

The thorax is rather short and square, but globose above, with hairy, somewhat silky covering, which forms, posteriorly, an abrupt tuft. The eyes are naked, lashed in *Plusia*, unlashd in *Telesilla*. The wings are somewhat pointed with full external margins. The tibiae are unarmed. The ornamentation of *Plusia* is remarkable for the silvery or golden middle marks, or sheeny patches. The American species are forty-two in number, exceeding the European thirty-eight; but, probably more remain to be described with us. We have representative species, i. e. *Putnami*, allied to the European *festucae*, while *parilis* is found in Lapland and Labrador. The question whether *ni* can be separated from our *brassicæ*, I have been inclined to answer negatively. The peculiar abdominal tufts speak for the identity of the forms. Among American forms are a greater number of gray and brown species, allied to *gutta*, *interrogationis*, *chalytes*, etc., and are, perhaps on the whole, less showy. Nevertheless, a resemblance may be traced between many species, as between *V-argenteum* and *Mappa*, *Zosimi* and *balluca*, etc. The resemblance is further shown in the species of *Habrostola*, which have the caterpillar 16-footed and the moths without metallic marks, while *Plusia* has 12-footed larvæ. But the most remarkable among the American species of *Plusia* are the three mimetic forms: *thyatiroides* which resembles a

Thyatira, formosa which resembles a *Leptina* and *striatella* which resembles a *Heliophila (Leucania)*. *Behrensia* is a Californian type, allied to *Habrostola*; and *Deva*, an eastern and western genus, as closely allied to *Plusia*.

Tribe *Heliothini*.

The body is untufted, the abdomen rather short, the eyes (except in *Anarta*) naked, sometimes narrowed, the tibiae usually armed, the antennae brush-like. The activity of the species, and several of their characters, suggest a resemblance to the *Agrotini*; so that I have thought of them as flower-haunting Agrotidians, whose bright colors are due to their changed habits and the gay tints of their floral homes. How the colors of the larva may come to resemble those of the plant on which it feeds, how the tints of the moth may copy the corolla in which it hides, has been shown by Prof. Kellicott in the case of *Rhodophora florida*. Several of the European genera are represented in North America by identical or related species. In particular is this the case with the species of Hübner's genus *Heliothis*. As might be expected, the flowery western plains afford a large number of species; while, in Europe, there are some forty species belonging to about thirteen genera, in America we have over 110 species belonging to about thirty-five genera. The species of *Heliothis* seem identical with the European; whether they have been imported with plants (which seems less likely), or are unchanged survivals, I cannot decide. No variety of *armiger* like var. *umbrosus*, which is longer, more of a pale olivaceous, and not dirty ochrey like the type, and which I have taken in Southern cotton fields, seems to be known in Europe. My *Pyrrhia angulata* and *P. stilla* are, beyond any question, distinct from the European *P. umbra*. The pink and yellow *Rhodophora* and *Rhodosea* are peculiar to America; the extraordinary genus *Heliochilus* is said to occur likewise in Aisa. The shiny white genera *Euleucyptera* and *Tricopsis* are peculiarly American. I regard *Nyctophacata (Epinyctis)* as a Heliothian, notwithstanding certain coincidences, mostly in outline, with the *Cucullini*, or again in armature with *Cleophana*. The European genus *Xanthodes* appears to belong here, and we seem to have a representative species in the Texan *X. buxca*, but I have not been able to compare the moths. The white coloured genera *Antaplagia*, *Grotella*, *Triocnemis*, prepare us for the following tribe. Our beautiful western species, *T. saporis*, has a resemblance to the European *Euterpia laudeti*.

Tribe *Tarachini*.

The thorax is squamose, being covered with flattened scales. The legs and wings are also covered with oppressed scales; while the form is, on the whole, like the preceding type. Whether more than the genus *Tarache* (*Acontia*) and *Chamyris* belong here, I am doubtful—*Trichotarache* having a resemblance to the Heliothians, to which *Xanthodes* and *Trileuca* may also belong. The genus *Tarache* has its metropolis in Africa. We have some twenty-two species, while Europe has but six. The species bear a general resemblance to each other from the prevailing white colour, to which *terminimaculata* offers a singular exception. Our most beautiful species, with a resemblance to the exquisite moth *Ciris Wilsoni*, is, perhaps, *Tarache lactipennis* Harvey.

Tribe *Eustrotiini*.

The moths are small, with broad squarish primaries, which have usually somewhat of a tortriciform cut, rounded secondaries, the squamation on the body thin, mixed scales and hair. The eyes are naked, antennæ simple, the form is frail. Boisduval calls these insects "*Noctuophalenidæ*." The caterpillars are 12 or 14-footed. The typical genus *Eustrotia* (*Erastria*) has nine European and thirteen American species. The European genus *Thalpochares*, with twenty-six European species, is but sparingly represented with us. I have been able only to study the neuration of *actheria*, which is an undoubted *Thalpochares*. In this group I have found the neuration useful in separating the genera. From neurational characters I have separated the American forms, related to the European genus *Agrophila*, under *Spragueia*. I have also referred here, under the generic name *Euherrichia*, certain American forms with silvery marks, previously referred to *Eriopus*. The peculiar Californian genus *Annaphila*, with fourteen species curiously resembling miniature *Brephina*, I refer also here. Among interesting American genera are *Exyra*, which is parasitic on *Sarracenia*, the pitcher plants; *Escaria*, a western form, and *Azenia* with large clypeal projection. This tribe, although represented by some of the principal European genera, offers many peculiar American forms, such as *Eripudia*, *Gyros* and *Fruva*. The departure from the European types is perceivable. Consult for the neuration of *Thalpochares* and *Eustrotia* Grote, N. Am. Ent., I., p. 46-47. Also, for the structure of *Erotyla*, *Spragueia*, *Fruva*, *Xanthoptera* and *Exyra*, CAN. ENT., XI., pp. 231-238. For *Euherrichia*, New Check List, 1882, p. 64, (sub. *Herrichia*).

PRELIMINARY CATALOGUE OF THE ARCTIIDÆ OF TEMPERATE NORTH AMERICA, WITH NOTES.

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

(Continued from page 55, Volume xxvii.)

A. stretchii Grt.

- 1875—Grt., CAN. ENT., VII., 197, *Arctia*.
 1883—Neum., Papilio, III., 150, = *intermedia*.
 1886—Grt., CAN. ENT., XVIII., 110, an var *intermedia*?
 Habitat—Texas.

There is no doubt but that Mr. Neumoegen's reference of this species to *intermedia* is correct.

A. superba Stretch.

- 1873—Stretch, Zyg. and Bomb., 227, pl. 9, f. 12, *Arctia*.
 1887—Smith, Ent. Amer., III., 111, *Arctia*.
 Habitat—Vancouver.

A. virgo Linn.

- 1758—Linn, Syst. Nat., I., 501 (ed x.), *Bombyx*.
 1764—Clck.*, Icones, pl. 45, f. 5, *Phalaena*.
 1764—Linn, Mus. L. U., 311, *Bombyx*.
 1767—Linn, Syst. Nat. (ed. xii.), 820, *Bombyx*.
 1775—Fabr., Syst. Ent., 582, *Bombyx*.
 1781—Fabr., Spec. Ins., II., 199, *Bombyx*.
 1787—Fabr., Mant. Ins., II., 129, *Bombyx*.
 1791—Oliv., Ent. Meth., V., 93, *Bombyx*.
 1793—Fabr., Ent. Syst., II., 1, 472, *Bombyx*.
 1793—Gmel., ed. Linn. Syst. Nat., 2419, *Bombyx*.
 1797—Sm. and Abb., Ins. Ga., II., 123, pl. 62, *Phalaena*.
 1816—Hübner, Verzeichniss, 180, *Euplagia*.
 1823—Hübner, Samml. Ex. Schmett. II., pl. 402, *Euplagia*.
 1837—Harris, Cat. Ins. Mass., 73, *Arctia*.
 1841—Harris*, Rept. Ins., Mass., 244, *Arctia*.
 1856—Wlk., C. B. Mus., Lep. Het., III., 608, *Arctia*.
 1858—Duncan, Nat. Libr., XXXII., 175, pl. 19, f. 3, *Spilosoma*.
 1860—Clem., Proc. Ac. N. Sci., Phil., XII., 528, *Arctia*.
 1862—Clem., App. to Morris Syn., 338, *Arctia*.
 1862—Harris*, Ins. Inj. to Veg., ed. Flint, 345, *Arctia*.

- 1863—Saund., Syn. Can. Arct., 6, *Arctia*.
 1864—Grt., Proc. Ent. Soc., Phil., III., 325, pl. 4, f. 4, ♂, *Arctia*.
 1873—Stretch*, Zyg. and Bomb., 74, 126, pl. 6, ff. 1, 2.
 1876—Moeschl., Stett. Ent. Zeit., XXXVII., 296, *Arctia*.
 1878—Graef., Bull. Bkln. Ent. Soc., I., 4, var. of.
 1878—Schaupp*, Bull. Bkln. Ent. Soc., I., 59.
 1881—Graef., Bull. Bkln. Ent. Soc., IV., 58, *Arctia*.
 1883—Hulst., Bull. Bkln. Ent. Soc., VI., 70, *Arctia*.
 1887—Smith, Ent. Amer., III., 110, *Arctia*.

var. *parthenice* Kirby.

- 1837—Kirby, Fn. Bor. Amer., IV., 204, *Callimorpha*.
 1862—Clem., App. to Morris Syn., 339, *pr. var.*
 1863—Saund.*, Proc. Ent. Soc., Phil., II., 28, *Arctia*.
 1863—Saund.*, Syn. Can. Arct., 5, *Arctia*.
 1864—Pack., Proc. Ent. Soc., Phil., III., 116, *Arctia*.
 1864—Grt., Proc. Ent. Soc., Phil., III., 325, =*virgo*.
 1879—Beth., CAN. ENT., XI., 153, *Arctia*.
 1883—Hulst., Bull. Bkln. Ent. Soc., VI., 71, =*saundersiana*.
 1883—Neum., Papilio, III., 149, =*aberr. virgo*.
 1887—Grt., CAN. ENT., XIX, 31, =*virgo*.
 1887—Smith, Ent. Amer., III., 110, =*saundersii*.

Habitat—Can. to Ga., west to Iowa, Mo., Ills., Mich.

An omnivorous feeder, according to records and statements.

A. virguncula Kirby.

- 1837—Kirby, Fn. Bor. Am., IV., 304, pl. 4, f. 6, *Callimorpha*.
 1856—Wlk., C. B. Mus. Lep. Het., III., 609, *Arctia*.
 1860—Clem., Proc. Ac. N. Sci., Phil., XII., 528, *Arctia*.
 1862—Clem., App. to Morris Syn., 338, *Arctia*.
 1873—Stretch, Zyg. and Bomb., 74, 218, pl. 9, f. 5, *Arctia*.
 1879—Beth., CAN. ENT., XI, 153, *Arctia*.
 1881—Coquillet*, Papilio, I., 7, *Arctia*.
 1887—Smith, Ent. Amer., III., 109, *Arctia*.

nais † Saund.

- 1863—Saund., Syn. Can. Arct., 9, *Arctia*.
 1864—Pack., Proc. Ent. Soc., Phil., III., 117, *pr. syn.*
 Habitat—Can., Me., N. Y., N. J., Ills.

Recorded as feeding on *Polygonum aviculare*.

A. williamsii Dodge.

1871—Dodge, CAN. ENT., III., 167, f. 34, *Arctia*.

1873—Stretch, Zyg. and Bomb., 74, *Arctia*.

Habitat—Colorado.

(To be continued.)

CORRECTION OF AN ERROR.

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

Mr. H. J. Elwes has recently published a paper in Trans. Ent. Soc., London, 1889, p. 535, entitled "A Revision of the Genus *Argynnis*," and on page 574 writes as follows:—"I have also specimens of *Arge* Strecker, from Strecker and Mr. Holland, both from Spokane Falls and California, which are, undoubtedly, the same as *Erinna*, which was described in 1883 as a var. of *Eurynome* by Edwards, and in his catalogue of 1884 is put down as a variety of *Montivaga*. If, therefore, he is himself so uncertain of the true position of these forms, he cannot expect others to follow him blindly," etc. On reading this I looked at the catalogue referred to, and sure enough, on p. 30, *Erinna* is set down as a var. of *Montivaga*. How this happened I cannot say, but I suppose by an error of the printer, which was overlooked in correcting the proof. I see the same mistake occurred in the list which closed Vol. 2, Butt. N. A., also dated 1884; but as the list was copied from the catalogue, that is understood. *Erinna* was rightly described by me in 1883 as a var. of *Eurynome*, which, to my mind, it undoubtedly is. Part of my collection is now in possession of Dr. Holland, including *Eurynome* and its vars., and I wrote him to please look at the *Erinna* specimens and tell me what the labels say. I have his reply as follows:—"All the specimens bearing that name are classified in your collection under *Eurynome*, according to your original description. The labels read:

A. Eurynome.
var. *Erinna* Edw.
Type. Spokane Falls."

I therefore suggest that persons using my catalogue should note the correction, and transfer *Erinna* to *Eurynome* on page 29, following *Arge*. Str,

 APPENDIX TO THE NOTES ON INSECT FAUNA OF HIGH ALTITUDES.

BY T. D. A. COCKERELL, WEST CLIFF, CUSTER CO., COLORADO.

Alpine Orthoptera.

Mr. L. Bruner has kindly identified the following Orthoptera, found at 10,000 feet and upwards:—

Circotettix undulatus Thos., near Micawber Mine, Aug. 6.

Ceuthophilus maculatus Scudd., ♂, near Micawber Mine.

Pezotettix dodgei Thos., ♀ and pupa, timber line above Brush Creek, about 12,000 feet, Aug. 5.

Gomphocerus carpenterii Thos., ♀, same locality and date as *P. dodgei*.

Alpine Lepidoptera.

The Rev. G. D. Hulst has kindly identified the following Lepidoptera, from 10,000 feet and upwards in Custer Co., Colo., additional to my previous list:—

Acidalia Californiata Pack., near Micawber Mine, Aug. 6.

Cidaria designata Hüb., Micawber Mine.

Botis plumbosignalis Fernald., near Micawber Mine, Aug. 6.

Euceratia? georgiella Hulst., near Micawber Mine, Aug. 6.

There are a few misprints in my paper, viz.:—P. 39, line 15 from top, for Welsh read Walsh; p. 39, line 16 from top, for pickly read prickly; p. 56, line 9 from top, for *vanessa* read *vanessa*; p. 57, line 9 from top, for Horeshoe read Horseshoe; p. 57, line 10 from top, for Fl. read Fb.; p. 59, line 7 from top, for Horshoe read Horseshoe.

 NOTES.

THE TACHINID PARASITE OF *CIMBEX AMERICANA*.—Mr. L. Bruner, in the report of the Entomologist, Nebraska State Board of Agriculture, for 1888, has an interesting article on that notable pest *Cimbex Americana* Leach, in which he states that although the insect is abundant in Nebraska, he has failed to find that it has any parasite. Last year, however, I obtained a larva of *C. Americana* on willow by Short Creek, Custer Co., Colorado, which produced the puparium of a Tachinid parasite. In "Insect Life," 1889, p. 164, we learn that Mr. Luger has also found a Tachinid parasite of the *Cimbex* in Minnesota, presumably the same species as the Colorado one. It will be curious if it turns out that the parasite is confined to high latitudes and altitudes, while its host is more widely spread. T. D. A. COCKERELL, West Cliff, Custer Co., Colorado,

BOOK NOTICES.

THE CAVE FAUNA OF NORTH AMERICA, with remarks on the Anatomy of the Brain and Origin of the Blind Species. By A. S. Packard, M. D. Vol. IV: First Memoir—National Academy of Sciences. 4 to., pp. 156.

The author of this admirable volume is everywhere known throughout the scientific world from his numerous works, especially on Entomology, and has obtained a deservedly high reputation in Europe as well as in America. This reputation will, we are confident, be, if possible, enhanced by the elaborate monograph before us. It contains many original observations of cave animals, some careful scientific investigations, and a very interesting chapter of philosophic considerations. It is also fully illustrated by a map of the Mammoth Cave in Kentucky, a number of wood cuts and a series of twenty-seven beautiful lithographs, nearly all of them drawn by the author himself. The work begins with a description of the Mammoth Cave and others in the neighbourhood, and gives lists of the various animals found within them; an account of the Wyandotte and other caves in Indiana, Clinton's Cave in Utah, and one in Colorado; a discussion of the geological age of the caves and their inhabitants, the mode of colonization and the source of their food-supply. The second chapter describes the vegetable life of the caves, which is naturally of the most meagre description. Then follows a systematic description and list of the invertebrate animals found in North American caves, among which spiders are the most numerous. Insects are represented by eight species of Thysanura, four of Orthoptera, two of Platyptera, ten of Coleoptera and nine of Diptera—a by no means extensive list, but one that includes some very curious and interesting forms. The beetles of the genus *Anophthalmus* are especially remarkable and attractive to the ordinary entomologist. Lists are also given of the European and North American cave animals, and of the blind, eyeless creatures which do not live in caves, and which, strange to say, almost equal in number their cavernous relatives. The next chapter gives a careful account of the anatomy of the brain and eyes (when partly developed) of certain blind Arthropods. The chief interest of the work culminates in the final chapter where the author discusses the origin of the cave species as bearing upon the theory of evolution. We have not space for any abstract of his views, which are well-deserving of study, but must refer the reader who desires fresh evidence on the subject of evolution to the work itself.

We entirely agree with the author in his closing words: "In the case of too many naturalists the dogma or creed of natural selection has tied their hands, obscured their vision, and prevented their seeking by observation and experiment to discover, so far as human intelligence can do so, the tangible, genuine, efficient factors of organic evolution."

AMERICAN SPIDERS AND THEIR SPINNING WORK. A natural history of the Orbweaving Spiders of the United States, with special regard to their Industry and Habits. By Henry C. McCook, D. D. Vol. I. Published by the Author, Academy of Natural Sciences of Philadelphia, 1889. 4 to., pp. 372.

The author of this sumptuous volume is so well known from his valuable and interesting works on the natural history of various kinds of Ants, and his charming little book, "The Tenants of an old Farm," that any productions of his pen are looked forward to with lively anticipation and keen interest. We are quite sure that no one of the subscribers to this, his latest and greatest work, has been in the least degree disappointed by this first volume of the promised three. Though spiders are not insects, we have no doubt that every entomologist, and indeed every lover of natural history in any of its departments, will deeply enjoy the perusal of this volume. We cannot give a better idea of its contents than by mentioning the subjects treated of. They are, first, the general classification, structure and spinning organs of spiders; the construction and armature of Orbweavers' snares; the characteristic forms and varieties of snares; unbeaded orbs and spring snares; the engineering and mechanical skill and intelligence of spiders; their modes of procuring food and habits in feeding; their fangs and poison bags; their modes of nest making and its development in various tribes; and finally the "genesis of snares." All these different subjects are fully illustrated with more than three hundred and fifty wood cuts. The second volume is to treat of the mating and maternal instincts, the life of the young, the distribution of species, etc.; and the third will be devoted to descriptions of the orb weaving fauna of the United States, with coloured illustrations of a number of species. The whole will form one of the most complete works of the kind in the English language. Entomologists will need to have long purses if they wish to possess all the literature of the day, and to procure for themselves such costly and beautiful books as Scudder's and Edwards's Butterflies and McCook's Spiders. We trust that all who can possibly afford it will aid the authors in their self-sacrificing enterprises by subscribing for their books, but those who cannot do so should us

their influence with their local Scientific Societies and Public Libraries and induce those in charge to purchase these valuable works for the general benefit. We are glad to say that the Public Library in Toronto and our Entomological Society have set a good example in this respect and rendered these works available for many of our readers.

ENTOMOLOGICAL NEWS and Proceedings of the Entomological Section of the Academy of Natural Sciences of Philadelphia. Vol. I., Nos. 1-3.; January March, 1890.

We gladly welcome another addition to the serial publications on North American Entomology. There is plenty of room for this new monthly Magazine, as it takes charge of a field which we and others have been unable to cultivate fully. It is intended to bring before students and workers the news and gossip of the day gleaned from all quarters of the globe; the contents of current literature; abstracts of the proceedings of Societies, etc. We hope that the new venture will have the fullest measure of success, and enjoy a career of long continued prosperity and usefulness.

REPORT ON INSECT AND FUNGUS PESTS. No. 1. By Henry Tryon, Assistant Curator of the Queensland Museum. Published by the Department of Agriculture, Brisbane, Australia, 1889. I Vol., 8 vo., pp. 238.

We have perused with great interest this first work that we have seen on the Economic Entomology of Australia. Some of the pests referred to are very familiar to us here, for instance, the Codling Moth and the Woolly Aphis of the apple tree, while others are species closely allied to those which are very destructive with us. The report takes up the different fruits, vegetables and field crops that are most commonly cultivated in the colony, and describes the insects which especially attack them; as far as possible the life history of each pest is given and remedies are suggested. The work is very carefully and thoroughly done, and will, no doubt, be of great value to the fruit-growers and farmers in that part of the world. Its usefulness would of course be greatly enhanced by illustrations of the insects treated of, but evidently there were difficulties in the way of procuring these that could not at first be overcome. Future Reports will doubtless be made more popular in this way. The author deserves much credit for the valuable book he has produced. We trust that the Queensland Government will give him all the assistance and encouragement possible in the prosecution of his studies in practical entomology, and enable him to continue a work that is of the utmost economic importance.

CORRESPONDENCE.

RARE CAPTURES.

Dear Sir: In my letter with this heading in the March number, p. 60, there is an omission of a word which quite alters my meaning. Line 6 of my letter should read, "I concluded that I had *not* seen it before." I took *Pædisca nisella*, referred to at the same time, last August, about twenty miles north of Hamilton, in the County of Halton. I found it sitting on the trunks of small birch and poplar trees.

J. ALSTON MOFFAT, Hamilton, Ont.

GRAPTA INTERROGATIONIS AT MONTREAL.

Dear Sir: I was somewhat surprised to see the capture of the above species at Montreal recorded as being an unusual and almost unknown occurrence (Feb. number, page 40). In Mr. Caulfield's list, CAN. ENT., VII., 87, *Interrogationis* is given, "Rare; May (hibernated); July to October," and I have always considered it one of those species which are neither rare nor abundant. The first specimen I have any record of was taken by me in Mr. Trenholme's garden, Rosemount Ave., Cote St. Antoine, on Sept. 7th, 1886. In the fall of 1887 it was abundant at Mr. Trenholme's, and a number of specimens (all *Fabricii*) were taken; between that time and the present I know of about 40 other specimens being captured in various parts of the town, and I succeeded in rearing three separate lots of larvæ to imago during last fall, all feeding on elm leaves. The form "*umbrosa*" seems to be much rarer here than *Fabricii*, but a few have been taken by Mr. P. M. Dawson and other collectors. I saw a single specimen of *Interrogationis* at St. Rose, P. Q., July 6th, 1889, but was unable to catch it.

ALBERT F. WINN, Montreal, P. Q.

ERRATA.—The following corrections should be made in Dr. Hamilton's paper on "*Balaninus*" in the January number:—Page 1, line 23, and elsewhere, for "*proboscoideus*" read "*proboscideus*." Page 5, line 33, for "*nostrum*" read "*rostrum*." Page 6, line 34, for "*three first*" read "*first three*."

Mailed April 7th.