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MISCELLANEOUS NOTES ON BUTTERFLIES, LARVÆ, ETC.

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

1. An albino male *Colias Philodice*.

I received this example from Mr. H. E. Wilford, of Batavia, N.Y., last fall. Mr. Scudder, Butt. N. E., p. 1286, says:—"Instances of albinism are confined, so far as we yet know, to the *Rhodoceridi*" (which term he uses to include *Colias*, under his name of *Eurymus*), "and to the female sex." In colour this male is white, with no tint of yellow; the borders of both wings are of median width, and solid—in all respects like the usual border of the yellow male. It was taken at Batavia last summer. Mr. Wilford wrote that at the time albino females were unusually plentiful.

2. An abnormal *Papilio Asterias*.

Mr. David Bruce sent me several larvæ of *Asterias* from Platte Canon, Colorado, 1st August, 1891, and I reared them to imago. One of these butterflies is a male by its body and claspers; female, by its wings. The male *Asterias* has two longitudinal abdominal rows of yellowish spots, sub-dorsal and lateral, and this example shows these rows, and no other yellow markings; the female *Asterias* has not only the same two rows, but a semi-row on either side the mid-ventral line on the three or four last segments. The hindwings are of the usual type of the female *Asterias*, and therefore without the mesial yellow band, which belongs to the male. The forewings are destitute of this yellow band, and also of the extra or discal row of yellow spots to be found in both sexes of *Asterias*. The submarginal row of yellow spots is present, but the spots are very small. So that the only yellow found on the forewing is in these submarginal spots. On the under side of the forewings, however, the extra discal spots are present, and the spots of the submarginal row are as large as is usual in female *Asterias*. Mr. Scudder says, p. 1759: "Specimens showing a mingling of the characters of the two sexes, called

gynandromorphs, are by no means unknown." He mentions seventy-one published examples of such, of which eight belong to the Papilioninæ: "most of these show complete bilateral distinction, the wings of one side being of one sex, of the other of the opposite sex. Dr. W. J. Holland writes me that he has a *Papilio Polyxenes*" (Mr. Scudder's name for *Asterias*) "collected by Mr. Mead, in which the abdomen is female, while the wings have the male colouring." The example I describe above is, then, just the reverse of the one in Dr. Holland's collection, the abdomen being male, the wings female. I hope to get this specimen, as well as the albino male *Colias*, figured in my Volume III.

3. *Papilio Bairdii*.

Mr. Bruce also sent me eggs of *P. Bairdii*, from West Colorado, in 1891, obtained by confining the female over the food-plant; and from these I reared several larvæ to pupa and imago. The butterflies in no way differed from the typical forms. The larvæ were distinctly different from the *Asterias* larvæ, which were feeding at the same time. I have the set of drawings of them by Mrs. Peart, and shall certainly figure the stages in Butt. N. A.

4. New species, *Papilio Hollandii*.

Mr. Bruce obtained in West Colorado three examples, male, of a *Papilio* wholly unknown to me, and which lies between the sub-groups of *P. Zolicaon* and *Asterias*. Like the species of the former sub-group, the abdomen is yellow. In all the members of the other sub-group the abdomen is black, with rows of yellow spots. The upper side of both wings in these examples is not distinguishable from the male *Bairdii*, the yellow bands and spots being of the same character, and the anal ocellus has its sub-oval pupil connected by a black ligament with the marginal stripe. On the under side the facies is quite different from *Bairdii*, by reason of the marginal yellow spots being very large and confluent; the spots of the mesial band very large, fully as much so as on the upper side. The abdomen is wholly yellow, except for a black dorsal stripe and four fine lines beneath, two on either side the venter.

It has been suggested that these might be hybrids between *Zolicaon* and *Bairdii*. I know nothing of hybrid butterflies, and if there is

positive evidence of such a thing in nature, I do not remember to have heard or read of it.*

It would not seem very likely that a colony of hybrids, so numerous as to allow of catching three individuals in one district, would be discovered. Now, I have a female *Papilio*, taken in Arizona years ago by one of the Wheeler expeditions, that must be of the same species as these males from Colorado. The hindwings are wholly wanting, but the forewings are good and agree with *Bairdii*; while the body is exactly like these males, allowing for the difference of sex. This specimen had always been a puzzle to me, and I looked for light on its peculiarities to come some day. I do myself a pleasure in naming this *Papilio* after my distinguished friend, Dr. Holland. Mr. Bruce will probably get eggs from the female of this species next summer.

*Under the heading of "Hybrids" in index to Butt. N. E., I find five pages referred to. On p. 283, we read "that hybrids occur between this species (*Astyanax*) (i.e. *Ursula*) "and *Archippus*" (i.e. *Disippus*) "is rendered probable by the remark of Mr. Mead, who found an *Astyanax* on whose upper surface the blue was supplanted by fulvous," etc.; and also of Grey, who says, CAN. ENT., XI., 17, he possesses "a melanitic form of *Disippus* with all the markings of *Ursula* on the under surface." Now these may be cases of hybridity, and may not. The American species of *Limenitis* are so closely allied that they would seem to be but one remove from a common parent, and as probably as not one of the black species is nearest that parent. These variations in occasional individuals of one species in the direction of another species may be cases of reversion or mere sports. Hybridity is conjectured, not proven.

On p. 289 et seq., is a discussion of the supposed hybridity by wholesale of *Limenitis Posepina* (between males of *Arthemis* and females of *Ursula*, and vice versa). I have shown the improbability of this mixing up in CAN. ENT., XXIII., p. 49, et seq., and that all the phenomena may be accounted for in a different way, with no violation of probabilities.

On p. 445, we read: "Mr. H. Edwards describes a hybrid between *Pyrameis Atalanta* and *Carye*." "The under side is that of *Atalanta*." Mr. Scudder adds here: "Hybrids among butterflies are of extreme rarity." Cases of copulation between butterflies of different species of the same genus have several times been observed and recorded, even of different genera. I reported one in C. E. recently between two of different families, viz., a *Melitæa* and *Chrysophanus*. But I do not know of instances (though such there may be) where such copulation has led to eggs from which the larvæ were bred to pupæ and butterflies produced. In only this way could we be sure of hybridity.

On p. 1212, we read that a *Pieris Rapæ* paired with a *Pieris Protodice* (these at least belong to different subgenera) and the female laid eggs which hatched. But the larvæ all died, and so nothing came of this conjunction.

On p. 1363, under *Papilio Asterias (Polyxenes)*, we are told: "No hybrids are known"; after which it is related that "Mr. Edwards possesses an hermaphrodite" specimen, etc. I conclude, knowing Mr. Scudder's habit of thorough research, that no other instances of possible or probable hybridity have been reported among American butterflies.

5. *Papilio Oregonia*.

Until recently this species was known only in east Washington and Oregon; but the late W. S. Foster, two years ago, took a fine example at Park City, Utah. Mr. B. Neumoegen has sent me for inspection a male taken somewhere in Utah. And, in 1891, Mr. Bruce found several examples in west Colorado. It is evidently a desert species, ranging from Washington to Arizona. In 1890, I had larvæ sent me from east Washington, believed to be of *Oregonia*. But, as they were found on the plants, the sender could not be certain. I saw all the stages from second to adult larva, and obtained one pupa. Of the last two larval stages, I have drawings made under the supervision of Prof. Riley. The larval markings and colours were unlike any *Papilio* larvæ I have known, and I think the species is certainly *Oregonia*; it can be nothing else, coming from that locality. But, as the pupa died before imago, I could not figure these stages on a plate as *Oregonia*. Now, I hope to obtain eggs and begin from that stage, and so get the set of drawings for publication.

6. *Anthocharis Sara* and *A. Reakirtii*.

On March 31st, 1888, I received eggs and larvæ (hatched on the way) of *Reakirtii*, laid 22nd inst. One larva passed first moult, 2nd April; second moult, 4th; fourth moult, 8th April, and pupated on 13th. This pupa gave a true *Reakirtii* imago the next year, 12th April, 1889.

On June 4th, 1888, forty-three eggs laid by *Sara*, in confinement, were sent me by Mr. A. Koebele, but the plant with them rotted, and not more than two larvæ reached me alive on 11th. Mr. Koebele wrote that *Sara*, of May and June, proceeds from eggs laid by *Reakirtii* in March; but that some pupæ went over the winter to produce *Reakirtii* in the early spring; also that the product of *Sara* was *Reakirtii* of the next spring. The dimorphism is as that of *Papilio Ajax*.

It is very common for pupæ of *Anthocharis* to go over two winters. Mr. Koebele wrote me, in 1888, that he then had pupæ of *Sara* and *Cethura* that formed in 1886, and one of the first named he sent me, labelled May, 1886. This, soon after I got it, gave imago *Reakirtii*. I have a living pupa now of *Genutia* of 1890, the only instance I have known in that species. *A. Ausonoides* passes two years in pupa sometimes. Both *P. Rutulus* and *P. Daunus* sometimes pass two years in pupa.

7. Caterpillars that go over two years.

I had a larva of *Cœnonympa Inornata* out of egg received from Mr. Fletcher, at Ottawa, go over two winters. Three larvæ hatched 18th August, 1888. One of these became lethargic after second moult and hibernated. On 6th May, 1889, it passed the third moult; the fourth, 9th June. In July was asleep again, and so passed the winter of 1890, and died in the following spring without further change. Others, of a lot from Montana, hibernated after second moult and pupated the following spring.

A similar habit has been noticed in *Melitæa Anicia*, Doubleday. This species is common on the tops of the highest peaks in Colorado, and so north to and beyond Laggan. Until recently, the lepidopterists of this country were uncertain what *Anicia* was, and the name came to be applied to a rather large red species found in Nevada and California. But Mr. Henry Edwards, on his last trip to London, examined the type specimens in British Museum, and having with him several of his own *Melitæas*, identified the right one, and distributed examples of it to some of his correspondents. It is a small dark and dull species, and is said by Mr. Bruce to swarm in its localities.

I received eggs of *Anicia* from Mr. Bean, at Laggan, 5th July, 1889. The larvæ fed here on Pentstemon, and at once from the egg protected themselves under a common web. The first moult took place on 11th July; the second, on 14th; third, on 20th July; and in August all were asleep and were sent to Clifton Springs. They were received again, 2nd April, 1890, and soon began to feed. On 12th April several passed the fourth moult, and near the end of the month had gone to sleep again. Up to middle of September no change had taken place, but late in the fall they were found to be dead. In a state of nature these larvæ would pass the hibernating period on the ground among leaves and rubbish, but I could not attempt to imitate the conditions without certainty of mould, and so destruction. I wrote Mr. Bean about this experience, and he replied (last of Oct., 1890):—"My four *Anicia* of 1889 still stay with me." Later, 17th Nov.:—"Two of the 1889 *Anicia* went into hibernation alive."

Whether any of the species of *Chionobas* in America require two years between egg and imago has not yet been ascertained. Mr. Scudder, Butt. N. E., is inclined to think *Semidea* has "a biennial cycle"; and

Mr. Fletcher, that *Macounii* (from Nepigon), has that habit. *C. Brucei*, allied to *Semidea*, has with me reached adult larva the first season, and probably the Colorado *Semidea* would behave the same way. But the conditions in Colorado, even on the highest peaks, are not so trying to insect life as on the White Mountains.

8. Food-plants of certain *Colias* larvæ.

The larvæ of *C. Scudderii* and *Nastes* feed on willow. I found those of the former would not touch white clover (or any clover) which the other alpine species, *Meadii*, *Elis*, *Alexandra*, eat, and it occurred to me to try willow. I gave them tender leaves of weeping willow, and they took to it at once. Mr. Bruce saw the female laying on a species of *Vaccinium* at Hall Valley, caught and confined her and got twenty eggs. He told me that he had often noticed the females flying in and out the dwarf willows as if laying eggs. I got the larvæ past second moult and then lost the whole of them.

As to *Nastes*, Mr. Bean, at Laggan, wrote :—"The larvæ feed on willow, and not mountain willow only, but from the banks of the Bow. I don't find any eating *Vaccinium*, but a lot on *Hedysarum* are doing well."

Messrs. Fletcher and Scudder obtained eggs of *C. Interior*, at Nepigon, and distributed part of them. I had fifteen or twenty, and they hatched; but the larvæ refused white clover and several other sorts of leaf which I tried them on, and all starved. I did not then know that willow was a food-plant of any *Colias*. Neither of the gentlemen named had better success than I had. Mr. Bean told me later that the food-plant of *Interior* was *Vaccinium*.

9. *Colias Meadii* and *Elis*.

These species, in their early stages, cannot be separated. The larvæ are precisely alike, even under the glass, so far as I have been able to discover, and they differ in appearance from all other larvæ of the genus observed by me, being thickly coated with short, black bristles, or stiff hairs. There is a basal stripe of pure white, with no red in it, and a sub-dorsal stripe of yellow-white. Many of the imagos of *Meadii* taken at Hall Valley and on the higher levels, in September and October, are very pale coloured (as to both the orange and black), and are undistinguish-

able from examples of *Hecla* from the Arctic Sea, except that the *Meadii* males (as well as *Elis*) have the mealy spot on costal margin of hind-wings, which *Hecla* shows nothing of. If a *Hecla* ever appeared with that spot, I should say the two were forms of one species.

I sent a pair of these to London to be submitted to two of the most experienced lepidopterists there, and asked them to tell me in writing what the species was. I gave no information about the pair, except that they were taken somewhere in America. Both the experts replied that the species was *Hecla*, but they noticed the presence of the mealy spot. In the museum collection, all the male *Hecla* were without that spot, and I cannot learn that it is known in any collection.

These pale examples are not worn but are fresh and evidently not long out of pupa. They must be the product of eggs laid by the earlier imagos the same season. Mr. Bruce wrote 7th Sept., 1890, that he had "just been up Gibson Mountain; elevation 14,000 feet; all barren and desolate. All I saw was two *Alexandra* and three *Scudderii*, half a dozen *Meadii*, a dozen *Arg. Eurynome*, and as many *P. Smintheus*. I send two of the *Meadii* to show you the colour." These were the first examples I had seen approaching *Hecla*, and on calling Mr. Bruce's attention to them, he presently took several others of same type about Hall Valley. That the imagos do sometimes come out the same season the eggs are laid, appears from my experience with larvæ at Coalburgh. On 23rd July, 1888, I received larvæ just out of egg from Mr Bruce; these passed the first moult, 27th; one passed the third moult 9th Aug.; the fourth, 14th; pupated, 19th; and the imago came out 25th August. The rest of the larvæ passed the third moult and hibernated. I sent them to Clifton Springs, N.Y.; got the survivors back in April following, and on 21st and 23rd April they passed the fourth moult; on 5th May one pupated, and gave imago 12th May.

In 1889, on 30th August, or five weeks later than in preceding year, I received eggs. Between the 23rd and 30th of September, all the larvæ were in hibernation after only two moults. The same year a second lot of eggs came 1st September. The larva hibernated after second moult.

In 1890 eggs were received 8th August; nearly all the larvæ hibernated after second moult, but a few went to third and one to fourth, but

all these died before reaching pupa. In all cases observed the larvæ hide themselves in and among the dead leaves at the base of the clover plant, and so hibernate.

Of *Elis*, I received from Mr. Bean, at Laggan, 23rd July, 1889, several larvæ just out of egg, the eggs having been laid 17th. They passed first moult 28th; second, 1st and 2nd August. On 12th one passed third moult. In all, six got through third moult, and shortly after went into hibernation, and were sent to Clifton Springs. Two came back alive 2nd April, 1890, and they passed fourth moult 12th and 14th April. One passed the fifth moult on 24th; was sent to Mrs. Peart, at Philadelphia, and pupated there 4th May; was mailed to me and never arrived. The other larva died before pupa.

On 20th and 22nd July, 1890, eggs and larvæ just out arrived. Nearly all the larvæ hibernated after second moult, but two reached fourth by 20th August. One of these died shortly after that, the other went on to the end of the stage; changed colour for pupation, and then died. But I concluded from this that in native conditions some *Elis* must reach imago the same year in which the eggs are laid, as with *Meadii*.

On 24th May, 1891, I received six larvæ from Mr. Bean which had hibernated at second and third moults. They were sent just as they were taken out of the snow, and were but half awake when I received them. Had not suffered on the journey, though sealed up in a piece of cork and six days on the way. From these were obtained three imagos, 1 ♂ and 2 ♀ ♀, on 28th and 29th and 30th May.

To me *Elis* is a very puzzling species, exceedingly close to *Meadii* in some examples, but considerably different in others. Mr. Bean, who lives in the *Elis* district and has caught multitudes of them and bred from the egg many, is fully of the mind that the species is distinct; and I defer to his judgment.

[TO BE CONTINUED.]

PAMPHILA MANITOBA, SCUD., AND ITS VARIETIES.

BY H. H. LYMAN MONTREAL.

In 1874 Mr. Scudder published his paper on "The Species of the Lepidopterous Genus Pamphila" in the Memoirs of the Boston Society of Natural History, in which the following species were described as new:—Nevada, Colorado and Manitoba, and Sassacus; Ottoe, Juba, Comma of Europe, and Sylvanoides were also treated of.

None of the descriptions are detailed, but are altogether comparative, pointing out the differences between the closely allied forms, and in the case of Manitoba the comparisons instituted are exclusively with the European Comma. The four specimens, 2 ♂s and 2 ♀s, illustrated, are all from the west of the continent, or rather, I should say, from the west and centre. One specimen was from Lake Winnipeg, one from Colorado, and two from British Columbia. The figures show specimens of which the underside of secondaries is dark greenish or greenish-brown, and with considerable variation in the prominence or restriction of the markings.

Though no figure of any eastern specimen is given it is stated in the text that the species had been taken at Riviere du Loup by Mr. Couper.

Since then it has been repeatedly taken on the Lower St. Lawrence by other collectors at Cacouna and Rivière du Loup, Metis, and even as far as Gaspé by myself in 1888.

The form found on the Lower St. Lawrence is very uniform in colour and has the outer third of the underside of the forewings and the whole of the underside of the hindwings, with the exception of the inner margin and hind angle, of a dark brown colour, though occasionally with a slightly greenish tinge.

In 1890, on returning east from a trip over the Canadian Pacific Railway, I stopped for a day at Regina, the date of my visit being August 5th, and as usual devoted a good part of the day to collecting Lepidoptera. Among other things, I collected a good series of males of a Pamphila of the Manitoba group, which was new to me, but only succeeded in securing one female, it apparently being a little early for that sex. During October of that year I paid a flying visit to New York and Boston, taking a few specimens with me for comparison, among them a specimen of this skipper, which I showed to Mr. Henry Edwards, who

said that he did not know it, and thought it must be new. Mr. Scudder said it might be new, but one needed a very full series in that group. I afterwards showed it to Mr. Fletcher, and asked him if he had ever seen that form, and he immediately said "Yes, at Regina." He added that he had sent a specimen to Mr. Eugene Aaron, who had pronounced it to be only Manitoba, but Mr. Fletcher expressed to me the opinion that it was at least a very distinct variety. The point in which this form chiefly differs from Manitoba of the Lower St. Lawrence is that those parts on the underside, which are brown in the latter, are of a very pale greenish-yellow or yellowish-green in the Regina form, but it also differs somewhat above in that the males are usually of a yellower tone while the brown of the female is decidedly darker and the spots of the forewing decidedly lighter, some of them being almost white, than in the Eastern specimens.

Wishing to get further light upon the probable relationship of these forms this year, I took a number of specimens of each with me on a trip to Boston and New York before returning home from a short holiday on the Atlantic Coast, and through the kindness of Mr. Scudder was enabled to examine his original types of Manitoba. One of these agreed exactly with my specimens from the Lower St. Lawrence, while the ones from British Columbia and Colorado were greener, but none agreed with, or even approached the average of the Regina specimens. Mr. Scudder, however, on account of the close similarity of the markings, seemed to be of opinion that the Regina form must be a variety of Manitoba. At New York Mr. Neumoegen kindly allowed me to compare my specimens carefully with the Pamphilas in his magnificent collection, but no specimen was found which at all agreed with the Regina form, and Mr. Neumoegen expressed the opinion that I should be safe in describing it; but in order to guard against all danger of being accused of rashness, I took the specimens out to New Brunswick, N. J., to Prof. J. B. Smith, who very kindly, at my request, dissected the male abdominal appendages of one of the Regina specimens, which upon examination were seen to be practically identical with the illustrations of those of Manitoba, drawn by the late Mr. Edward Burgess, and published by Mr. Scudder. The form would therefore seem to be only a variety of Manitoba, but Prof. Smith expressed the opinion that it might very properly receive a varietal name as a distinct geographical race. Mr. Scudder, however, in his "Butterflies of New England" would seem to

have adopted this form as the basis of his description of Manitoba, as he describes the underside of the hindwings as being, except for the markings, "almost uniformly greenish-yellow," although he has no specimen of the Regina form in his collection.

I am, however, strongly of opinion that the difference between the Eastern specimens and those from Regina is sufficiently great to be worthy of being indicated by varietal names, and if the name Manitoba is to be restricted to the dark-brown or greenish brown specimens, as I believe it was originally applied, I would suggest the name, var. *Assiniboia*, for the light greenish-yellow Regina form. If, however, it is preferred to call the latter Manitoba, I should suggest the name, var. *Laurentina*, for the dark-brown form of the Lower St. Lawrence.

NEW SPECIES OF PYRALIDÆ.

BY GEO. D. HULST, BROOKLYN, N. Y.

Myelois fructetella, n. sp.—Expands 16-18 mm. Head dark fuscous; maxillary palpi fuscous, becoming black on end member. Antennæ and thorax fuscous-gray to dark fuscous; abdomen yellowish-fuscous, ringed with dark fuscous on anterior part of each segment; forewings light gray, heavily marked with fuscous and black; base to basal line, with black scales, which become very heavy within basal line along inner margin; middle field much darkened on posterior half, with fuscous continuing along both lines, broad and black at costa along basal line, and narrow and black at costa along outer line; outer field broadly black along costa outside of outer line, becoming lighter posteriorly and along outer margin; fringe very light gray; basal line white, straight in direction or somewhat dentated, near middle distinct; outer line less distinct, with a large but not deep sinus outwardly at middle; hindwings translucent fuscous becoming darker at edges.

I have four specimens—all females—from Arizona and Texas. The insect very much resembles dark specimens of *Mincola juglandis*, Lc Baron.

Myelois elegantella, n. sp.—Expands 29 mm. Gray, more or less

overlaid with black scales. Forewings, lines white, distinct, edged narrowly on both sides with black, the basal line well out from base with two dentations inwardly at middle, the outer line with a strong subcostal dentation, then finely serrated till near inner margin. The gray of the ground colour is at places much overlaid with the black scales, becoming very distinctly black at middle of basal space, across the middle field and along outer border. The outer edge is black broken by the fine, light gray lines of the veins. Hindwings translucent fuscous, darker on outer edge and with a fine black border line.

The aspect of the insect is much like that of a *Salebria*. Seattle, Wash.

Myelois texanella, n. sp.—Expands 19 mm. Head, thorax and forewings light gray, composed of chalk white with a light mixture of dark scales. Forewings with a blackish space at extreme base near middle; lines faint but distinct, the inner slightly bent near costa, slanting thence outwardly to inner margin, the outer angulated outwardly at middle, rounded inwardly below costa, somewhat dentate above inner margin, outer margin with a series of black triangular points, two black superimposed discal points; all lines white, narrowly edged with black; hindwings translucent fuscous. Blanco Co., Central Texas.

Myelois leucophaella, n. sp.—Expands 22 mm. Head, thorax and forewings uniform dull fuscous-gray; lines of forewings distinct but not sharply defined, both dull white, the basal running obliquely outward from costa with two large dentations, the outer well towards outer border, evenly and sharply dentate below the middle. Hindwings even dull fuscous. Iowa.

Acrobasis cirroferella, n. sp.—Expands 18 mm. Head light gray in front, otherwise fuscous; palpi light gray, dark on last segments; antennæ light gray at base, beyond fuscous. Thorax dull fuscous. Forewings dull fuscous gray, lighter and clearer along costa, on basal and median spaces; ridge of basal scales black, preceded by gray, not extending to costa; a black line begins at costa just above scale ridge, and bending evenly outward and downward, follows then to costa parallel with the scale ridge; outer line very close to border, very nearly lost in the general fuscous colour, but most distinct costally, and only slightly bent medianly in its course. Abdomen fuscous, segments lined. Austin, Texas.

Salebria levigatella, n. sp.—Expands 28 mm. Head and thorax blackish. Forewings smooth, of an even fuscous, the costa more rounded than usual, basal space to basal line of a dull red colour, lines indistinct, the basal faintly discernible, dentate, the outer very faint or entirely obsolete. Hindwings fuscous, darker outwardly. Amherst, Mass., from Dr. C. H. Fernald; also from Wisconsin.

Salebria purpurella, n. sp.—Expands 27 mm. Face and palpi gray, mixed with black; the summit of head stained with reddish. Thorax and abdomen fuscous, with reddish stain. Forewings gray, heavily washed with reddish-purple, the gray being more clear before basal line and along costa before outer line. Basal line near base, apparent only on posterior half, lined on each side with black; outer line very faint and indistinct close to margin. Hindwings fuscous, tinged slightly with reddish near anterior angle. New Mexico.

Zophodia bella, n. sp.—Expands 28 mm. Head and palpi fuscous-gray; thorax fuscous; abdomen fuscous; the segments lighter posteriorly. Forewings gray, clear along costa, washed with fuscous behind subcostal vein, this running in longitudinal lines on the veins and interspaces, being especially distinct on the veins. Basal line suggested by diffuse blackish spots; outer line quite indistinct, oblique from costa, then strongly dentated; a subterminal line of diffuse black spots; two discal dots black, diffuse, the anterior more distinct. Hindwings light fuscous with marginal black line. Massachusetts.

Ocala, n. gen.—Labial palpi long, porrect; maxillary palpi distinct, pencil tufted; tongue long, antennæ bent above base with tuft of scales in bend; forewings 11 veins, 4 and 5 stemmed, 10 separate; hindwings 7 veins, 3 and 4 stemmed, 5 wanting. Abdomen in ♂ tufted. Very near to *Dolichorrhinia*, Rag., and differing principally in the presence of the pencil tufted maxillary palpi and tufted abdomen.

Ocala dryadella, n. sp.—Expands 18 mm. Palpi and head fuscous gray, thorax light fuscous or dirty white, abdomen same colour with heavy anal tufts beneath and on sides in male; forewings fuscous gray, basal line well out near middle of wing, faint, edged outwardly with diffuse broken black, outer line close to margin, indistinct, rounded, serrated; two black discal dots, very small; a comparatively large, oval black spot on basal space near basal line just above inner margin. Hindwings translucent, light fuscous.

Charlotte Harbor, Fla. From Mrs. A. T. Slosson to whose kindness I am indebted for many favours, and to whom I give my grateful thanks.

Diviana nymphaeella, n. sp.—Expands 21 mm. Palpi very long, much exceeding head, the second member especially being lengthened, dark fuscous, whitish in front. Head blackish fuscous, collar blackish. Thorax dull gray. Abdomen lightish gray. Forewings fuscous gray lines indistinct, the basal indicated by a deepening of the dark colour on either side, outer line near outer edge and parallel with it; discal spots distinct geminate, a marginal line of black spots. Hindwings light fuscous. Charlotte Harbor, Fla., from Mrs. A. T. Slosson.

It was my intention to erect a new genus *Palatka* for this species, more especially on account of the very long erect labial palpi, but I have concluded to place it under *Diviana*, which it nearly approaches. I mention this, as I gave the MS. name, *Palatka*, to Dr. J. B. Smith, and on this account the species stands under that generic name in his lately published "List of Lepidoptera."

Chipeta, n. gen.—Labial palpi long, slender, arched on second member, horizontal at end, 2nd member very long, end member short; maxillary palpi small, ocelli distinct; antennæ crenate pubescent. Tongue short, but not obsolete. Forewings long, narrow, oval, 9 veins 5 and 8 wanting, 3 and 4 separate, 10 separate. Hindwings 7 veins, 2 at angle, 3 and 4 stemmed, 5 wanting, 8 distinct. Near to *Tampa* Ragonot; the generic name from Chipeta, wife of Ouray, Chief of the Ute Indians. In Dr. Smith's List of Lepidoptera the genus is under the name *Osceola*, but that is preoccupied, so I change it to *Chipeta*.

Chipeta perlepidella, n. sp.—Expands 22 mm. Palpi, head and thorax dark red. Abdomen yellowish fuscous, with a reddish tinge. Forewings with costa narrowly white, the line not reaching apex, the rest of the wings bright reddish, quite even in colour. Hindwings white, narrow; pointed. Fla.

Lipographis subosseella, n. sp.—Expands 16 mm. Head, thorax and forewings of a dull white colour, rather evenly washed with light fuscous, giving a dirty white appearance, and this all sparingly mixed with blackish scales; line of forewings indistinct, shown rather by a darkening of edges which give a blackish blotch by basal line near inner margin and an even subterminal dark rather broad band. Two discal dots also indistinct. A marginal line of indistinct black dots. Hindwings fuscous, darkest at

edges. Abdomen light fuscous, the segments blackish dorsally, especially anally, the extreme end yellowish. Bahama Is. West Indies.

This species, while not North American, is described, as I have given it to Mr. Ragonot under this MS. name. The generic reference is by Mr. Ragonot.

Paralipsa decorella, n. sp.—Expands 27–30 mm. Palpi and head whitish, collar whitish, thorax light gray, abdomen fuscous gray, antennæ whitish at base becoming fuscous outwardly; forewings gray costally, gray washed with fuscous posteriorly; lines quite indistinct, the basal near middle of wing and strongly dentated, the outer scarcely evident; a black stripe from base at middle reaching out to basal line and much broadening there, forming a diffuse blackish spot along costa towards apex, and the marginal space much stained with dark fuscous; a black marginal line, fringes fuscous. In some specimens there is on the basal and middle fields a faint reddish shading, especially posteriorly. Hindwings light fuscous, beneath nearly even fuscous on all wings. Along costa in ♂ there is concealed a very large tuft of cottony hair, the hair being nearly a quarter of an inch in length, very fine and very dense.

My specimens are from Buffalo, N.Y., and London, Ontario.

Loxostege baccatalis, n. sp.—Expands 22–24 mm. Palpi rather short, dark buff in colour stained with blackish beneath on first and second segments with rather long pure white scales. Front and antennæ buff, slightly stained with blackish; the clypeal tubercle broad, conical, not much extended. Thorax whitish below in front, dull golden yellow above, sometimes slightly shaded with fuscous. Forewings dull golden yellow generally, somewhat washed with fuscous, a little more decidedly on the central field; lines as such indeterminate. On each wing are three sets of dull white spots, all edged with blackish, the outer and inner sides being the heavier, and these in part at least being the broken remnants of the cross lines. All the spots are behind the subcostal space, and in each case the anterior spot begins on that space. The first set is basal, the anterior spot being oval-triangular on outside of basal line, and the posterior larger, quadrate, on the inside of the basal line, not extending beyond the middle of wing. The second set is discal, the anterior quadrate oval, representing the discal spot, the posterior larger, quadrate reaching to vein 1. The third set is on the outer line, the anterior largest of all the spots, quadrate, on inner side of the line. The next is below on outside of line, made into two or three

by the veins, which are fuscous, flattened basally, rounded conical outwardly, the dark edging forming rounded dentations. The third spot is inside the line, posterior to the last, subquadrate rather large, reaching vein 1. Hindwings yellowish, becoming quite whitish translucent basally, and on middle field cross lines quite distinct, the first near the middle, the outer not far removed, and having at the middle three white spots long oval, divided by the veins, and strongly edged all around with blackish. Wings beneath as above, less sharply determinate in markings, the yellow more whitish and more washed with fuscous. Abdomen yellowish, with a narrow line, more whitish on each segment. In the male the abdomen is slender, extended, the genital armour protruded, and with a long tuft of hair on either side of last segment. Blanco Co., Central Texas. Specimens taken in April, July, September and October. The single specimen taken in April is darker than the rest, and there is some variation among all in the size of the whitish spots. The generic reference is from Dr. Smith's new List of Lepidoptera, and so on Dr. Fernald's authority.

NOTES ON NORTH AMERICAN TACHINIDÆ, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.—PAPER V.*

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

The Tachinidæ herein described and mentioned are from the more northern parts of the U. S.; from Colo., Kan., Dakota, Iowa and Minn. to Ills., Mich., Pa., N. Y., N. H. and D. C.

Blepharipeza bicolor, Mcq

A small specimen from Dixie Landing, Va. (D. C.), Sept. 21, is evidently this species. It measures 9 mm.

Blepharipeza exul, n. sp., ♀.

Eyes light brown; frontal vitta light brown, with a reddish tinge; sides of front cinereous; face and cheeks silvery; facial ridges bristly half way up, sides of front bristly, sides of face bristly below frontal bristles; antennæ blackish, first two joints and base of third rufous, arista blackish; third antennal joint little more than twice as long as the

* Paper I. was published in Proc. Ent. Soc., Wash., II.; papers II. and III. in Trans. Am. Ent. Soc., XVIII. and XIX.; paper IV. in Ent. News, III.

elongate second joint ; proboscis blackish, labella large, brownish ; palpi rufous black bristly, rather stout ; occiput silvery-gray, hairy. Thorax blackish, faintly silvery-pollinose, with five narrow black vittæ, the outer pair obsolete in front ; scutellum brownish-rufous, as is also the thorax on hind margin and sides posteriorly. Abdomen dark rufous, a median broad vitta and posterior margins of segments black. Legs black, tibiæ rufous, femora silvery on outside, especially front ones ; claws and pulvilli somewhat elongate, the pulvilli tawny-whitish. Wings grayish-hyaline, yellowish-brown at base ; hind cross-vein strongly sinuate ; tegulæ brownish-fuscous, halteres tawny-brownish.

Length of body, nearly 10 mm.; of wing, $9\frac{1}{2}$ mm.

Described from one specimen ; New Hampshire (C. W. Johnson).

This species differs from *B. adusta* principally in the rufous basal joints of antennæ, the rufous tibiæ, and the brownish wing bases and tegulæ. Seven specimens from N.Y. (Comstock) are perhaps this species. They are 10-13½ mm.; the antennæ are black, inclining to rufous at base ; the frontal vitta dark brown ; the cheeks, sides of face and front much less bristly. The females have two orbital bristles, and the males have the claws well elongated.

Gonia sagax, n. sp., ♂.

Eyes brown ; front almost one-half width of head ; sides of face, cheeks and whole front, including frontal vitta, light golden-yellow ; facial depression silvery-white and about two-fifths width of face ; vibrissæ decussate, inserted a little above oral margin ; sides of face, cheeks and front covered with bristly hairs ; antennæ nearly as long as face, second joint rather short, third about five times as long as second, first two joints same pale yellow as front, third joint clear orange-rufous ; arista brown, second joint distinctly longer than last joint ; proboscis black, tip and base brownish ; palpi yellow, curved and thickened at tip ; occiput blackish, except vertical area yellow, thickly clothed with yellowish-gray hair. Thorax shining metallic-black, posterior corners and margin and scutellum testaceous, scutellum with four pairs of macrochætæ besides a discal pair. Abdomen shining black, bases of segments two to four silvery-white, or slightly golden in some lights, most broadly on anal segment ; first and second segments with a lateral macrochæta and a median marginal pair, third with eight or more marginal, anal with several macrochætæ. Legs black, foot-claws and pulvilli nearly as long

as last tarsal joint, pulvilli smoky. Wings grayish-hyaline, costo-basal portions broadly yellowish; tegulæ nearly white, halteres brownish-yellow.

Length of body, 10½ mm.; of wing, 7½ mm.

Described from one specimen; Ames, Iowa (Osborn).

Pseudogonia ruficauda, n. sp., ♂.

Eyes light brownish; front more than one-third width of head, frontal vitta dark brownish; sides of front brassy-golden, face and cheeks silvery-white, epistoma yellowish, antennæ and arista deep black, first two antennal joints rufous; proboscis black, tip and base brownish, palpi pale rufous; occiput cinereous, thickly yellowish-gray, hairy. Thorax black, silvery-pollinose, leaving four black vittæ, humeri and pleuræ silvery with a brassy tinge; scutellum testaceous, somewhat silvery. Abdomen black, first segment slightly silvery behind, second and third segments more or less thinly and anal segment thickly brassy-pollinose, tip of anal segment rufous; first segment with one lateral macrochæta, second with one lateral and a median marginal pair, third with a marginal row of ten or twelve, anal with a marginal row of about as many; hypopygium black, hairy. Legs black, front femora thick silvery on underside, all femora bristly, middle and hind tibiæ with strong macrochætæ, claws and pulvilli elongate, pulvilli tawny-fuscous. Wings grayish-hyaline; veins on costo-basal portions, also middle portion of marginal cell, pale yellowish; tegulæ white, halteres fuscous.

Length of body, 11 mm.; of wing, 8 mm.

Described from one specimen; Brookings, So. Dakota (J. M. Aldrich).

I refer this species to *Pseudogonia*, Br. & v. Bgst. The second antennal joint is elongate, third two and a half times as long as second; arista geniculate, second joint elongate; sides of face bristly, as in *Cnephalia* and *Gonia*, but the second aristal joint less than half as long as third; proboscis longer than height of head, slim; palpi long, slender basally, thickened apically.

A ♂ specimen from N. Y. (Comstock) differs chiefly in the anal segment being wholly black at tip, not at all rufous; the third antennal joint blackish, rufous at base, arista brown. If these differences are, as I believe, entitled to specific value, the species may be known as *P. obsoleta*. It is 11 mm. long.

Siphoplagia anomala, Twms., Trans. Am. Ent. Soc., XVIII, p. 350.

This species was described from Southern New Mexico. A ♀ specimen from So. Ills. (Robertson) proves to be the same species. It is 8 mm. long.

Plagia americana, v. d. Wulp, Biol. C.-A. Dipt., II., p. 102, pl. 3, f. 19.

A specimen from N. Y. (Comstock) agrees with v. d. Wulp's description in all except that the third vein of the wing is bristly only to small cross-vein, not beyond it. The wing, however, differs from the figure in the origin of the hind cross-vein being considerably below instead of opposite the small cross-vein. I am unwilling to consider it a distinct species without further proof, as it otherwise agrees so closely with the description, though the difference in venation can hardly be varietal.

Plagia aurifrons, n. sp., ♂.

Eyes light brown; frontal vitta and sides of front golden, insensibly shading on sides of face into the silvery of the face and cheeks; front one-third width of head; three orbital bristles, the hindmost one weaker, frontal bristles descending about half way down sides of face; antennæ and arista black, the second antennal joint silvery, the third twice as long as second; proboscis brownish; palpi yellowish rufous, blackish at base; occiput cinereous, gray-hairy. Thorax black, slightly silvery, with five more or less distinct blackish vittæ, the middle one obsolete anteriorly; scutellum black, more or less silvery. Abdomen shining black, bases of segments two to four broadly but faintly silvery, the silvery becoming most distinct when viewed very obliquely; first segment with a lateral macrochæta and bristles, second with a lateral one and median marginal pair; third with about eight marginal, the median two more removed from margin; anal with a median discal pair, a sub-marginal sub-lateral pair, and a marginal row. Legs black, femora and front tibiæ silvery on outside, claws and pulvilli elongate, the pulvilli smoky whitish. Wings grayish-hyaline, yellowish-fuscous along veins on costal half, first vein bristly its whole length, third bristly to small cross-vein, fourth vein with slight wrinkle at bend; hind cross-vein nearly parallel with inner-margin of wing, but its origin considerably behind the point opposite small cross-vein; tegulæ whitish; halteres pale rufous, blackish in middle.

Length of body, 7 mm.; of wing, 5 $\frac{2}{3}$ mm.

Described from one specimen; Pennsylvania, June 4 (Johnson).

Trixa gillettei, n. sp., ♂.

Eyes brownish; frontal vitta brown, narrowed posteriorly; front very narrow behind, wide before; face, cheeks and sides of front silvery-pollinose, latter shading to darker, cheeks with a brown area anteriorly; antennæ and arista blackish, first two antennal joints and base of third rufous; second antennal joint bristly, with a long bristle on front edge, third joint as long as second; proboscis as long as height of head, rather slim, blackish; palpi slender, brownish, rufous at tip, bristly; occiput silvery, clothed with yellowish hairs. Thorax black, slightly silvery, with four (?) indistinct black vittæ; scutellum black, slightly silvery. Abdomen black, more or less deeply silvery-pollinose according to lights, except first segment; first two segments with a lateral pair of macrochætæ, and a median discal and marginal pair; third with a median discal pair, and a marginal row; anal with a more or less regular discal and marginal row. Legs black, claws and pulvilli very elongate; pulvilli tawny-fuscous, claws brown at base, black at tips. Wings grayish-hyaline, tawny at base, without costal spine; tegulæ nearly white, halteres rufous or brownish.

Length of body, 10 mm.; of wing, 9 mm.

Described from one specimen; Colorado (C. P. Gillette).

This species differs from both of Mr. v. d. Wulp's Mexican species described in the *Biologia Centrali-Americana*, *T. obsoleta* and *T. differens*, by having discal macrochætæ on the abdomen.

Miltogramma kansensis, n. sp., ♂.

Eyes light reddish-brown; frontal vitta nearly obsolete, concolorous with front; sides of front, face and cheeks silvery white, the front shading to dark, epistoma and facial depression more or less yellowish; three orbital bristles, continued in front by a row of minute bristles; antennæ orange rufous, third joint about one and a half times as long as second, arista black; proboscis elongate, fully as long as height of head, rather slender, black, base and tip brownish, labella developed; palpi elongate, yellow, filiform, hardly at all thickened; occiput cinereous, black hairy. Thorax silvery, with three blackish median vittæ placed closely together, the middle one obsolete in front, and two heavier vittæ outside them; scutellum black, silvery pollinose. Abdomen red, a median triangle on first segment and a large triangle extending from median portion of base of second to posterior lateral corners of third segment black, anal segment

black; second and third segments silvery-white pollinose basally, anal segment wholly so; first two segments without macrochaetae, third and anal with a marginal row. Legs black, femora silvery on outside, claws and pulvilli quite elongate, latter tawny. Wings almost hyaline, tegulae white, halteres pale yellowish.

Length of body, 8 mm.; of wing, $5\frac{1}{3}$ mm.

Described from one specimen; Kansas, June.

Metopia luggeri, n. sp., ♀.

Eyes light brown; front extremely prominent, frontal vitta obsolete before, blackish behind, the sides of front abruptly black behind and pure silvery-white before; face and cheeks silvery-white; antennae and arista black, third antennal joint very long, fully five times as long as second, nearly reaching epistoma; proboscis blackish, labella brownish, palpi black; occiput cinereous, thinly black-bristly. Thorax black, thinly silvery-white pollinose, with four black vittae; scutellum black, slightly silvery. Abdomen black, almost wholly silvery-white pollinose, except first segment and hind margins of others; first two segments with a median marginal pair of macrochaetae, and some lateral bristles; third segment with a lateral pair and a median marginal pair; anal segment with a marginal row. Legs black, femora more or less silvery-pollinose, claws and pulvilli very short. Wings grayish-hyaline, tegulae whitish, with rust-yellow borders, halteres rufous.

Length of body, $5\frac{1}{2}$ mm.; of wing, $4\frac{1}{2}$ mm.

Described from one specimen; Minn. (Lugger).

Thryptocera americana, n. sp., ♀.

Eyes bare, light brownish; front about one-third width of head, frontal vitta light yellowish; frontal bristles descending a little below base of antennae, four posterior pairs directed backward, two orbital bristles; face, cheeks and sides of front silvery-white, the sides of face extremely narrow, the facial ridges bare except a few bristles next vibrissae, the latter quite strong and inserted exactly on oral margin; antennae as long as face; third joint very wide, rounded, and about two and one-half times as long as second, first two joints light rufous, third joint light brown; arista somewhat rufous, brownish at tip, more or less geniculate, 3-jointed, second joint elongate; proboscis short, fleshy, pale yellowish, labella large; palpi pale yellow, rather long, curved, thickened distally; occiput cinereous above, pale yellowish below, sparsely bristly. Thorax

silvery cinereous, with two narrow concolorous median vittæ reaching scutellum, humeri and pleuræ silvery-white; scutellum pale testaceous. Abdomen pale yellowish rufous, silvery-pollinose, with a median black vitta which widens over most of third segment and all of anal; second segment with a lateral macrochæta and a median marginal pair, third and anal segments with a marginal row; venter pale yellowish at base, darker toward anus. Legs pale yellowish, tarsi blackish, femora and tibiæ hairy and slightly bristly; claws and pulvilli very short. Wings grayish-hyaline; first, third and fifth veins spined their whole length, except tips of two latter; apical cell narrowly open exactly in tip of wing, fourth vein roundly curved at bend, hind cross-vein slightly nearer to small cross-vein than to bend of fourth; tegulæ nearly pure white, halteres yellow.

Length of body, 4 mm.; of wing, $3\frac{1}{2}$ mm.

Described from one specimen; Washington, D. C., August.

Myobia diadema, Wd.

Mr. v. d. Wulp (Biol. C.-A. Dipt., II.) describes this species as having the epistoma "slightly prominent". A ♂ specimen from N. Y. (Comstock), which I refer to this species, has the front golden like the thorax, the face silvery, and the oral margin or epistoma is what I should call "very prominent".

[TO BE CONTINUED.]

GETTING BUTTERFLY EGGS.

BY W. G. WRIGHT, SAN BERNARDINO, CAL.

It is generally understood, I believe, that to get eggs the requisite plant must be also enclosed in the gauze bag with the female insect. Such is often, but not always the fact, and it will lighten the labours of the biologist and simplify his methods if a more correct statement be made. That one genus of butterflies should not use or require living plants to receive their eggs, while others will fret and die without ovipositing if their peculiar plant be withheld, indicates a relationship, or gives a hint as to grouping of genera upon natural lines. But if so, it plays havoc with existing groupings, and will cause the arbitrary to give place to the natural when these things become better understood.

The genera of butterflies, with the living forms of which I am acquainted, and of which the females do not require plants in ovipositing, are as follows:—Parnassius, Argynnis, Euptoietia, Neonympha, Cœ-

nonympa, Hipparchia, Satyrus, Chionobas, and in part, Chrysophanus. Females of all other genera, so far as I know, will die rather than oviposit when their respective plants are not present, and it is necessary also that the plants be bright and fresh; when even slightly wilted the insects will ignore them, and die without ovipositing.

Having thus stated the matter generally, let me now give more in detail the habits of some typical species of both groups as to ovipositing, and my experiences in getting eggs from them. *Parnassius Hermodur*, when ovipositing, alights upon the ground among the grass and crawls about in a restless way at random, dropping egg after egg as they mature indiscriminately upon the bare ground or dead rubbish or wherever they may chance to fall. When thus engaged she is as readily approached as if feeding on flowers. When the ♀ is confined in a bag she is not unruly but remains rather quiet, scattering her eggs about, singly, as they ripen, and most of the eggs attach to the gauze of the bag, to which they adhere but slightly. I have never observed ovipositing of *P. Smintheus*, but believe it to be identical with *Hermodur*, as related. The habits of all the other genera named are the same in this particular, that the eggs are laid singly, and not in masses, as is the habit of some genera.

Different species of Argynnidids have different methods of ovipositing, but none that I know of require a plant. *A. Callippe* goes crawling about on the ground and under bushes like a Parnassian, and oviposits by extending the abdomen down among the dead twigs and dry leaves like a grasshopper. This habit renders the species somewhat difficult to manage in a bag, as the eggs will be pushed down into the ground if possible. Other species, as *Semiramis*, oviposit on the wing without ever alighting, but hovering over suitable places and dropping the eggs at pleasure. The reason for this peculiar habit seems to be to avoid small lizards, which abound and which are alert to seize any flying insect. *Semiramis* is a difficult species to manage in confinement. Lively, vigorous and restless, they take confinement hardly. When ovipositing in a gauze bag they drop the eggs at random, and only a few become attached to the gauze, but most of them drop to the bottom, where they are likely to be lost unless precaution be taken. *A. Leto* also oviposits on the wing. In 1890 I took a fine ♀ *Leto* near Mt. Shasta, in northern California, and as I was on my journey southward and could not well wait to get eggs in the usual way, I put her in a small tin box without any food or plant except a few blades of grass to

serve her as a foothold, and putting the box in a hand-grip carried it home, a distance of 900 miles, and with stops taking five and a-half days. Upon reaching home I opened the box, gave *Leto* sun and air, then fed her with sweetened water, then put her in gauze bag in the open window without any plant in sight or other thing which could remind her of the home she had left so far behind, and she lived several days and gave me a nice lot of fertile eggs. This *Leto* was not fractious, but as she had been shut up in a dark box nearly a week it could hardly be called a fair test. *Leto*, of all Argynnidids, is a strong and tireless flyer, vigorous and full of life and activity, and seldom at rest. It is, therefore, but reasonable to suppose that they would rebel if confined. I have had other ♀ *Letos* in confinement, but out in the open country, and unattended, so that I could not watch them.

Cœnonympas are very gentle and tractable. They worry but little, and remain very quiet. As the eggs mature and become ready to deposit they are stuck on to the gauze singly, adhering rather firmly. These eggs are rather small, but are safely taken in a coarse netted bag, as they are coated with a glutinous substance, by which they adhere at once to any fibre, and so do not fall away and get lost. The greatest difficulty I have had with *Cœnonympas* is in the matter of shade. A little too much shade and she will not lay her eggs; a little too much sun and she incontinently dies. A piece of thin muslin makes a better shade than a leafy twig.

One would think from the Ornithoptera-like shape of the wings of *Chionobas* that they were of rapid flight, wild, and generally unreasonable. But such is not the case. They are very gentle, flying about but little, and usually returning to the spot they started from, where they settle down again slowly and deliberately. I have found *C. Gigas* to be easily handled in captivity, and have got eggs without difficulty. In the interior of Vancouver Island I took a ♀ upon the top of a high hill, and immediately put her in a bag and laid it down on the grass by the side of a big rock where it would be sheltered from the cold wind, and with no shade from the sun, as it was not hot at that height, and did not go to it again for thirty-six hours. Then, when I went to it I was delighted to see some eggs sticking to the gauze. I could not remain any longer, nor could I return another day. So I took a small tin box and carefully put the bag, insect, eggs and all together in it and tied it to my belt for safety in going away through several miles of dense thicket, and so carried it to my hotel,

and thence by rail to Victoria. There I removed the eggs already laid, and placed the bag in the sun in the open window, staying the gauze with pins to keep it steady in the breeze, and so I got another lot of eggs in the middle of the city and without plant or other accessory

Of genus *Chrysophanus* I can speak but with some doubt. Some of the species, as *Gorgon* and *Xanthoides*, appear always to oviposit like the Argynnids upon the ground or among dry rubbish, while *Helloides* always uses a plant, *Polygonum aviculare*, or in Alaska, where this polygonum does not grow, on some allied plant.

It is thus seen, in short, that these enumerated genera of butterflies which require no plant are most of them easy to manage, and that they can be safely and readily carried a long distance alive and well, and eggs afterward obtained at the home of the student, with little trouble; and that course I advise in all such cases. On the other hand those butterflies which require a plant on which to deposit their eggs are more difficult to handle, because you have not only the butterflies to manage but must provide a fresh plant as well. Yet the difficulties are not so great as is feared. I have found it best, usually, when a suitable ♀ is caught, to tie the bag at once upon a living plant, and then put in it the ♀, and arranging suitable shade leave it for a day or two. These plant-loving butterflies all lay their eggs upon the plant, and not upon the bag, except accidentally. Ants, birds and boys must be guarded against—a trio of terrors. I do not use a large bag; one large enough to hold a quart or two is large enough, either with the plant or without. It is not best that the butterfly should be able to fly about and flutter in its bag; they become much more quiet and reasonable in a small one.

The plant problem is often the one most difficult of solution. Cuttings from delicate plants and such as speedily wilt and perish, can be carried home in a tin box in which they will keep fresh for several days. In that way I have gotten eggs and raised larvæ in my laboratory when the plants grew ten miles away, by going once a week for fresh cuttings. But some cuttings wilt immediately if exposed to the air. To avoid this, put the cuttings into a glass fruit jar, then put in the ♀ and shut it up tight. The closing of the jar prevents the plant from wilting, and by that method I have had good success in getting eggs, notably from the large *Papilio Rutulus*, and in raising larvæ. This *P. rutulus* gave me no end of trouble to get eggs in the open air, but oviposited freely when shut up with willow twigs in a half-gallon fruit jar.

When you know months beforehand what plant you will require, it is best to transplant them to your own grounds, and so have them at hand fresh and growing. By such means I have successfully handled, both for eggs and for larvæ, such species as *Cotias eurydice* and *Lycæna sonorensis*, both of which species it would seemingly have been impossible to manage otherwise.

Breeding is the touchstone which tests all species of butterflies, and by it must they all stand or fall. The larva is as much the individual life as is the imago, and we cannot thoroughly know a species unless we have seen its earlier as well as its later stages. Therefore anything which simplifies the management of the early stages is of interest to the biologist.

CORRESPONDENCE.

PROF. J. B. SMITH'S LIST OF LEPIDOPTERA.

Dear Sir: Prof. French in the January number criticises in some points Prof. Smith's catalogue of the Catocalæ in the *New List of Lepidoptera*. As I was primarily responsible for the list of the Catocalæ, will you and Prof. French kindly allow me an explanation? 1st. Prof. French says "var. *Virens* is not a variety of *Cordelia*, Hy. Edw., but of *Amasia*; and *Cordelia* is not the one figured by Dr. Strecker, pl. 9, f. 12." But *cordelia*, Hy. Edw., is a synonym of *amasia*, Ab. & Sm., and Dr. Strecker's figure is not *amasia*, Ab. & Sm. The error comes from the fact that Abbott & Smith figured two species as ♂ and ♀ of *amasia*, the description being of the upper one only. The insect represented by the lower figure of Abbott & Smith was distributed by Mr. Grote, and figured by Dr. Strecker as *amasia*. Of course the name attaches to the figure described, as afterwards Guenee located it, calling the lower figure *connubialis*. The lower insect I afterwards described as *sancta*, regarding Guenee's name as without authority, as the description was from a picture. Whether I was right or not I will not here say, but the insect distributed by Mr. Grote, and figured by Dr. Strecker as *amasia*, is either *connubialis*, Gn., or *sancta*, Hulst; while the *amasia* of Abbott & Smith is the *cordelia* of Hy. Edwards, as Mr. Edwards afterwards acknowledged to me. *Virens* was put as a variety of *amasia*, Ab. & Sm., because Prof. French thus located it, and I supposed he meant *amasia*, Ab. & Sm. 2nd. Prof. French says "there is no good reason for separating the two forms of *relecta*." I am not sure what he

means by the "two forms of *retecta*;" but if he means *retecta*, Grt., and *luctuosa*, Hulst, then, in view of what he says after, *luctuosa* becomes a variety of *retecta*, Grt. 3rd. Prof. French says "*Flebilis* is not a variety of *retecta*," etc. "Dr. Strecker's figure, pl. 9, f. 4, is not *flebilis*, but a small form of *Desperata*," etc. Dr. Strecker does not call figure 4 *flebilis*, but a variety of it. It is, however, except in the black dashes, as near as can be the exact counterpart of pl. 9, fig. 3, which is *flebilis*, taken from Mr. Grote's type. Also these two, save in the black dashes, are the counterparts of pl. 9, fig. 2, which is *retecta*, and which is from Mr. Grote's type. Having seen the types of both *retecta* and *flebilis* I can bear witness that the figures are very excellent. Mr. Grote had among his types of *retecta* one or more specimens of *luctuosa*, Hulst, but his description is of the form figured by Dr. Strecker. 4th. I am glad to learn more of *Ululume*, Streck. I have seen the type, have one of the specimens from which the description was made, and so know the insect. At the time of publishing my synopsis in the Brooklyn Bulletin, Vol. VII., 1884, pp. 13-56, I regarded it as a variety of *lacrymosa*, as did also Dr. Strecker. Let me add that very few of all the so-called varieties of the U. Catocalæ are varieties in the scientific sense. They are simply colour variations, and the continuance of their names is, in the majority of cases, only a convenience, and without scientific authority.

GEO. D. HULST, Brooklyn, N. Y.

SECTION F OF THE A. A. A. S.

Dear Sir: In the January (1892) number of the Botanical Gazette, Dr. B. D. Halsted, Secretary of Section F of the Association, suggests the formation of a Botanical Section, to be separated from Section F. This is a matter in which entomologists have some interest, and concerning which it might be well to have an expression of opinion. All who have attended recent meetings of the American Association must have noticed what a remarkable development of interest there has been in both botany and entomology, and how crowded were the programmes, not only of Section F, but of the Clubs. At the Washington meeting the writer was on the Sectional Committee, which passed on the papers offered, and even after excluding all of doubtful value or interest, it left so many that a proper presentation was out of the question. A most interesting series of papers on parasitism in insects was read at breakneck speed, and not a word of discussion was allowed. I myself had three papers, for which I had prepared charts in illustration, and which

presented the results of original work. I barely had time to hurry through the abstracts, and could not even explain my charts. The botanists occupied fully one-third of the time of Section F, and had a large programme for the Club besides. The entomologists had many papers before the Club which were well worthy of presentation to Section F. Botany is quite sharply separable, has a sufficient number of members to present a full programme as a section, and would leave Section F for zoology in general with more time for the proper discussion of papers. As matters now stand, papers are grouped—botanists desert Section F when entomological papers are read, and entomologists usually do as much when botanists hold forth. In the orderly evolution of the Association botany is entitled to a separate section, and entomologists should aid the botanists in securing the necessary action at the next meeting.

JOHN B. SMITH, New Brunswick, N. J.

NOTES.

ADDITIONAL NOTE ON AMBLYOPONE PALLIPES, HALD.

On page 138, Vol. XXIII., is mentioned the finding, in rotten logs, of colonies of this species. The fate of the specimens taken on 30th April may be related. Unfortunately the individuals then taken were not counted, but they consisted of workers and larvæ, the latter being more numerous. The box was examined on 1st June and it was found that many of the larvæ had formed cocoons, and that the remainder were feasting on a green caterpillar, which had been dragged down into the nursery. The larvæ were thickly scattered over it, evidently sucking the juices from it, and it was much shrunken. On 21st June another examination was made and a census taken of the inhabitants, which numbered 27 adults (all workers), 23 pupæ (in cocoons) and 48 larvæ. There were also a number of empty cocoons. On 5th July the numbers were reduced to 23 workers, 11 cocoons and 15 larvæ, and, what was a surprise to me, about 30 eggs, cylindrical in shape, with rounded ends and about twice as long as wide. On 13th July there were 23 workers, 7 cocoons, 13 larvæ and about 15 eggs. When I left home shortly after this the box was placed outdoors, and during my absence the insects all died or wandered off. I was disappointed in not obtaining specimens of the ♀ and ♂, and regret that the colony was not housed so that continuous observations could have been made of the inmates and the doings.

W. HAGUE HARRINGTON, Ottawa.

Mailed March 9th.