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The Canadian Entomologist.

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No. 8

To the Editor of the Can. Ent. :

DEAR SIR,—I send you some remarks by Dr. A. Speyer upon certain forms and species of *Pamphila* which I recently submitted to him. I had especially called Dr. Speyer's attention to the *Comma* group, and as will be seen, he has very kindly compared them with *Comma* and its varieties, and gives his views at length. I have italicised certain portions of the paper, to which I desire to call particular attention; and have appended some notes of my own, written after carefully considering the views of Dr. Speyer, and a re-study of the forms spoken of. The excellent translation of Dr. Speyer's paper was made by Chas. E. Aaron, A. M., of Philadelphia, at the instance of his son, Mr. E. M. Aaron, Curator of the Am. Ent. Soc.

Yours truly,

Coalburgh, W. Va., 1st July, 1883.

W. H. EDWARDS.

REMARKS ON THE HESPERIDÆ SENT TO ME BY MR. W. H. EDWARDS, OF COALBURGH, W. VA., IN JAN., 1883.

In order to be able to decide with some degree of certainty the question whether *Pamphila Nevada*, *Manitoba*, *Colorado*, *Juba* and *Sylvanoides (Columbia)*, proposed by Mr. Scudder as distinct species, are, together or separately, specifically different from the European *P. Comma* L., there would be need of a much larger suite of well preserved specimens of these forms than have been placed at my command; and perhaps even such a suite would not have sufficed to establish a conclusion, but observation in the field alone would justify a final decision. What I have to say upon the subject, on the basis of the inadequate material on hand, is as follows:

It was my especial wish, in addition to the large number of specimens at my command of the typical *P. Comma* of Middle Europe, and of its

Arctic variety *Catena*, to be able also to compare specimens from the Asiatic part of its boreal faunal range with the American representatives of this widely diffused species.

Dr. Staudinger had the kindness to send at my request from his rich collections a supply of these from widely separated regions of Northern, Middle and Eastern Asia (from Amasia, Lebanon and other provinces, and from the Amoor country). There are among them interesting forms, differing more or less, and in some instances very materially, from the Middle European type. *The expectation that perhaps one or another of these might be identical with an American form, has not been realized.* Occasionally, it is true, an approach occurs, *but for the most part their variations from the type lie in a different direction than toward the American forms.* They afford, however, ample evidence of the great variability of the species under the pressure of various climatic and other external conditions.

In the structure of the body,¹ and in the form of the antennæ, palpi and legs, I have been able to find no difference between Scudder's species and *Comma*. I was unable to examine the male abdominal appendages. The coloration of the under side varies considerably, but offers no available characteristics for the separation of individual forms. Sometimes the secondaries are distinctly veined. Also as to the bright or dull colors of the square spots, their extraordinary variation of size, the presence or absence of their black border, no exact forms can be defined, as all these pass into each other by imperceptible gradations.

Juba differs from *Comma*, as also from its American congeners, in several particulars. I compare four specimens of this form (one pair from Utah and another from California), all unfortunately more or less worn and mutilated. They answer well to Scudder's description and illustration (Mem. Boston Soc. of Nat. Hist., vol. ii., p. 349, pl. x., figs. 19, 20), except that the primaries of the female are more pointed than shown in fig. 20. (1). *Juba* is larger than *Comma*. (2). It has a somewhat different outline of wings, a long, slightly concave costal margin and a more oblique border of the primaries, which causes the apex of the wings to project more prominently. (3). The ground color of the primaries is a bright orange, especially in the female; the brown marginal band very dark, and toward the lower end much more sharply defined than in *Comma*. It presents on the inner side strong rounded or toothed projections, while the bright ground-color on the branches of the median vein

and of the dorsal vein extends far into it. On the upper side of the secondaries the orange forms on the dark ground very broad macular bands. (4). The discal stigma of the male is longer than in *Comma*, proportionately narrow, its upper end pointed and distinctly bent, not so straight as in *Comma* and in the other American species. (5). In the female, two dark-brown spots, separated by the second nervule, stand out very prominently on the bright ground in the disk of the primaries, and between them and the dark margin is a broad space of clear orange. In *Comma* ♀ the two spots are also present, but mostly united, and cohering with the dark spot below the apex of the wings; but the two spots are not so dark nor so sharply defined and prominent as in *Juba*, and they are separated from the dark margin, not by a broad bright space, but usually only by a narrow macular band. The under side of the secondaries is in *Juba* as strongly sprinkled with fuscous as the variety *Catena*, and has also equally large, bright, white checkered spots. In one female (from California), the arrangement of these spots corresponds with *Comma* (*Catena*); in the other three, the row of spots is more irregular and broken, while the spot between the 4th and 6th nervules is quite separated from the 6th cell, and is placed nearer to the margin. In two specimens (male and female) the spots are united. Evidence is thus afforded that the form and order of these spots, even in specimens undoubtedly closely related, are subject to great variation.

Juba is in any case a very well-marked local form of *Comma*. If a comparison of a sufficiently large number of specimens should prove the above mentioned differences, or even a part of them, to be constant, then *Juba* might even claim to rank as a species. It is probable however that transitions will yet be found.

The few specimens of *Nevada*, *Colorado* and *Manitoba* which I am able to compare (2 of *Nevada*, 7 of *Colorado* and 2 of *Manitoba*) of course justify no positive decision as to Mr. Scudder's assumption that they are true species. I can only say that their differences are not clear to me, and that the examples sent to me, as well as Mr. Scudder's figures, give me the impression rather of varieties than of specifically distinct forms. Henceforth I will class them together in order to compare them, as a whole, with *Comma*.

In the size, shape, color and markings of the upper side of the wings, as well as in the form of the discal stigma, I find no variation from *Comma*; but in one particular none of the compared American insects

entirely agree with European and Asiatic Comma, namely, in the shape and arrangement of the white spots on the under side of secondaries. The interrupted row of spots beyond the middle of the secondaries in typical Comma consists, as is well known, of six more or less quadrangular spots separated by the nervules, two of which, often somewhat larger and oblong in shape, stand below the costal margin in cellules 7 and 6, one (a double spot) between nervules 4 and 6 opposite the middle cell, and also one in cellules 3, 2 and 1, which last usually has an appendage turned toward the inner angle. These spots form two rows which meet at an angle of from 65° to 90° , in the vertex of which stands the spot between nervules 4 and 6. The three upper spots always, and the three lower ones usually, form a straight row with the spot standing in the vertex of the angle; sometimes these lower spots stand somewhat out of line and farther from the spot in the vertex. The size of the spots varies in individual specimens very considerably; sometimes they become so small that they stand widely separated from each other, sometimes so large that they entirely meet. Rarely one of the spots is wanting (that in cellule 1 or in cellule 7). In the American specimens, on the other hand, the greatest variation in the form, size, number and arrangement of these spots is presented, even in such as Mr. Scudder includes in the same species (e. g. Colorado); and not one of them shows the form and arrangement of the spots as described in typical Comma. Even the two sexes in these forms seem to differ much more strongly than in Comma, which shows scarcely any recognizable difference between the male and female, except that in the latter the spots are usually larger than in the male. A second noteworthy difference between European Comma and its American congeners is that in the former the fringes on the under side are always spotted with fuscous, at least (in secondaries) on their lower half, while in the American forms the fringes are as a rule unspotted. Yet this distinction is not invariable, for two of the specimens submitted to me (a male of Colorado and one of Manitoba) have spotted fringes. There exists then, so far as I can discover, only the difference drawn from the under side of secondaries, which, if it were constant, would suffice to separate the American forms from Comma. But that it is constant appears to me somewhat improbable, on account of the very great variability which is shown in the shape, number and arrangement of the square spots in the American specimens of these forms; and *Juba* (as above remarked) gives a direct proof that we can not rely upon this feature. A second proof is furnished by Mr.

Scudder's figures of *Manitoba*, one of which, fig. 10, does not differ in any respect from many forms of European *Comma* in the character of the rows of spots, while the remaining figures (and still more decidedly my two natural specimens) deviate therefrom. We also conclude from Scudder's descriptions that in this point *Manitoba* can scarcely, if at all, be separated from *Comma* by any constant difference.

Finally, concerning the two specimens numbered 18 and 19, and labeled *Sylvanoides*,* I have first to remark that they, especially the female, do not agree well with Scudder's figures and descriptions. According to the latter, "two transparent spots" are said to be present in the female on the primaries, to which Scudder gives especial prominence as a characteristic feature (p. 352. plate x., fig. 21). In my female specimen (which is quite perfect) no transparent spots are to be seen, but the spots have exactly the color and form of those in *Comma*. *In fact this female entirely resembles an average small Comma female, with this difference, that the fringes are unspotted, and that the spot in cellule 7 on the under side of secondaries is wanting.* The latter difference is probably only an accidental one, as Scudder's figure shows this spot. *If I had taken this specimen here, I would have regarded it as without doubt an unimportant variety of Comma,* and I am inclined to believe that specimens may be found on Vancouver Island which do not differ from the female of typical *Comma*. *Even the differences of the male do not appear to me of sufficient importance to make it possible to regard this Sylvanoides as anything more than a local form of Comma.*

I know Boisduval's description of his *Hesperia Sylvanoides* only from Morris's translation (Synop. Lepidop. N. Am. 1862, p. 107). Judging from this I should be much inclined to doubt that *Sylvanoides* Bdv. and the earlier *Columbia* of Scudder are the same species. Had Boisduval himself had such specimens as those now under discussion, he would probably not have regarded them as specifically different from *Comma*, but if he had done so, he would certainly have likened them, not to *Sylvanus*, which they resemble very slightly, but to *Comma*. Not one feature in the description of the male butterfly can be applied to Scudder's species.

The result of my comparisons may be thus summed up, namely: *that among the examples of Scudder's four species transmitted to me, not one*

* i. e. *Sylvanoides* Sc., but not of Bois. The latter — *Sonora* Sc.—W. II. E.

is found which agrees perfectly with European *Comma*; and, on the other hand, that the existing differences appear to me of too little importance, and above all not sufficiently constant to make it possible on the strength of these to declare the American forms specifically different from *Comma*. *Comma* is in a high degree under the influence of various external life-conditions, and, as both the American and the Asiatic forms prove, a species varying in different directions. Whether any one of these local forms has already sufficiently established itself to be able to rank as a distinct species, others, who are equipped with more abundant materials, will be able to decide with more certainty than myself.

2. The insect No. 37, sent to me as *Amblyscirtes Libya* Scud., does not belong to *Amblyscirtes*, and in general not to the group *Pamphilinæ*, but to *Pyrginæ*. (On this point you will please compare my paper in the *Stettin Entomol. Zeitung* for 1879, p. 484). It appears to me that it would be best to include it in the genus *Pholisora*.

3. No. 38 (labeled *Pholisora Nessus* Edw. - *Spilothyrus notabilis* Strecker) certainly stands most nearly related to the European species of *Spilothyrus* Dup. (whose older name, *Carcharodus*, Mr. Edwards will doubtless reject on principle as one of Hübner's), but it deviates from these in a few very essential points. The club of the antennæ is not oval, but much more slender than in the former, quite crescent-shaped as in *Nisoniades*; the outline of the wings is another point; the primaries are slightly rounded on the inner margin, somewhat incurved at cellule 16, and projecting bluntly with their posterior angle, which has long indentations, none of which is the case in *Spilothyrus*. The sharply indented secondaries are distinctly incurved between nervules 4 and 6. The covering of the body is close and smooth, not so hairy as in *Spilothyrus*, etc. If several similar species should be discovered, these differences would justify the erection of a separate genus; until then *Nessus* may stand with *Spilothyrus*. The male will probably be furnished with a costal fold.

As *Spilothyrus* differs from *Pyrgus* in nothing but the small transparent spots on the wings and the strongly indented secondaries, I have not separated the seven European species generically from *Pyrgus* (compare *Stettin Entomol. Zeitung*, 1878, pp. 179 and 188), but have only characterized them as its first group. Acquaintance with this American representative would incline me to concede their erection into a genus.

4. All the remaining species (Nos. 20-36)* properly belong to Pamphila. Only *Viator* (20, 21) differs from the type of the genus somewhat in the outline of the wings; the secondaries are broader and their border seems to be somewhat wavy. Also the last joint of the palpi is longer than usual. This species will necessarily stand at the beginning or at the end. As for the rest, I can pronounce no decision as to the most judicious order of succession of the species, as I possess no American Pamphilas, having handed my earlier collection over to Dr. Staudinger.

NOTES ON DR. SPEYER'S PAPER.

BY W. H. EDWARDS.

1. Contrary to my expectation, the Asiatic forms of the *Comma* group are not so near the American as are the European. Dr. Speyer tells us that the former vary from typical *Comma* in a different direction from the latter. If the American are derived from the European, or the reverse, the Asiatic ought to lie between the two, apparently.

2. I am satisfied that *Juba* should rank as a species. Dr. Speyer gives sufficient reasons for this, and examination of many examples confirm this view. I have a beautiful variety of *Juba* (male) sent me by Prof. Snow, and taken by him at Los Vegas, N. M., in 1882. The upper side is darker—more fuscous and less fulvous—than any other example I have seen, and secondaries beneath and the apical area of primaries are densely dusted with golden-green; the spots white and somewhat smaller than in the type. I call this var. *Viridis*.

3. As to *Manitoba*, *Colorado* and *Nevada*, Dr. Speyer points out that in these three forms the shape and arrangement of the spots on hind wings are not the same as in the typical *Comma* of Europe. So far as I can discover, on examining a considerable series of each of these forms, from divers localities, the differences are constant. In the matter of the spotted fringes spoken of, Dr. Speyer says these are *always* found in *Comma*. In the American forms they are sometimes present, but do not appear in all

* *Viator*, *Byssus*, *Pittacus*, *Deva*, *Ocola*, *Eufala*, *Panoquin*, *Fusca*, *Nerea*, *Phylace*.

the forms of which examples are under view ; and where they do appear seem rather to be exceptional, the rule being against the spots ; thus,

Of *Colorado*, 1 male, 1 female have spotted fringes, 3 males, 5 females, not.

" <i>Nevada</i> , none	"	"	"	6	"	6	"	"
" <i>Manitoba</i> , 2 females	"	"	"	5	"		"	"
" <i>Columbia</i> , none	"	"	"	6	"	1	"	"
" <i>Idaho</i> , "	"	"	"	3	"	3	"	"

This last, *Idaho* I describe as follows : Upper side of both sexes like the palest, or most yellow-fulvous, examples of *Colorado*. Under side yellow, or gray-yellow (*Colorado* is described by Mr. Scudder as from olivaceous to griseous-green) ; the spots white, and as in *Colorado*. This form comes from Oregon, Washington Terr. and California. I consider that it may properly be called a variety of *Colorado*.

The occasional presence of the fringe spots in the American forms of this group may be sufficiently accounted for on the theory that the European, Asiatic and American forms are of co-ordinate value, and inherited these spots from their common ancestor. In the American they have disappeared, but occasionally the character is recovered by reversion. Mr. Scudder's types are distinct enough, in case of *Manitoba*, *Colorado* and *Nevada*, and I think we shall have to consider them as so many species. As they are not varieties of *Comma* they can stand alone. Dr. Speyer notices that in all these forms the two sexes seem to differ much more strongly than in *Comma*, "which shows scarcely any recognizable difference between the sexes, except that in the female the spots are usually larger than in the male" Certainly that is a strong point also ; and I find the differences spoken of to be constant.

4. As to *Columbia*, etc., later called by the same author *Sylvanoides* Bd. (It was, however, *Sonora* Sc. which Boisduval had named *Sylvanoides*.)

Of this form, I have 7 males, 1 female, and one male and the female bear Mr. Scudder's own label, and this female was the one submitted to Dr. Speyer. Mr. Scudder points out two characters by which *Columbia* may be identified. 1. The patch of brown on lower side the stigma in male. 2. A quadrate transparent spot in the lower median interspace of fore wing of female, and a partially transparent triangular patch next above this. And adds : "These are not given with sufficient distinctness on the plate." On the plate is a white space in each of these patches, which so far represents the transparency, I suppose.

As to the first character, the brown patch behind the stigma ; it is present in my type male, but in the other males it is wanting ; in 3 there is a slight duskiness behind the stigma ; in 3 there is nothing even of this. Yet on the under side these males all agree with the type in color and in the peculiarities of the band of spots on secondaries.

2nd. The female has nothing whatever of the transparency mentioned. These two patches or spots are precisely like the two above them and against the cell, so far as color is concerned, all being simply fulvous. Mr. Scudder continues : " Beneath, a silvery white (male) or pale (female) slender belt of small quadrate spots, similar to that of *P. Comma*, bent at a little less than a right angle, the portion at right angle to the inner border straight and continuous, the other portion sometimes broken, sometimes continuous and straight. This species has only been taken, and rarely, in California." My type male was from Vancouver's Island, the female from California. The other males are from Wash. Terr., Brit. Col. Arizona.

It is of the female mentioned that Dr. Speyer says it " entirely resembles an average small *Comma* female, with this difference, that *the fringes are unspotted, and that the spot in cellule 7 is wanting.*" But as Mr. Scudder's figure shows the spot, this difference Dr. Speyer regards as accidental, and continues : " If I had taken this specimen here, I would have regarded it as without doubt an unimportant variety of *Comma*. Even the differences of the male do not appear to me of sufficient importance to regard this *Sylvanoides (Columbia)* as anything more than a local form of *Comma*."

Dr. Speyer sent me a typical male and female *Comma*. Of the male, the color of under side of hind wings and apex of fore wings is greenish-yellow. Every one of my *Columbia* males and the female (which Dr. Speyer notices) lacks the spot in cellule 7, which is present in both these *Comma*. This spot is present in Mr. Scudder's figure of the female (fig. 22), but not of the male (fig. 23), and I apprehend that it is in the female figure by a mistake on the part of the lithographic artist, and was overlooked by Mr. Scudder. None of my males are of the color of *Comma* on under side, all being brown, not green, and on all, the spots at the angle of the band are suddenly reduced, and are small ; whereas in the *Comma* they are large. The band in each of these forms has a distinct character of its own. The under side of the female *Columbia* is nearer to the female *Comma*, but more yellow, less green ; the spots are confu-

ent, as in the male, and not separated, as in the *Comma*; the spots are clear and silvery white, not yellowish, as in the *Comma*. As before said, the spot in cellule 7 is wanting, and there are no fringe spots to either sex. Examining the other American forms as to the presence or absence of the spot in cellule 7, I find that in *Juba* all examples have it; in *Colorado*, *Manitoba*, *Nevada* and *Idaho*, most do not have it, but some of each sex in each form do. It is often reduced to a mere point which is confluent with the spot in cellule 6. It scarcely does more in this case than cross the nervule, and does not merit being called a spot.

Considering the lack of this spot in *Columbia*, the peculiar shape of the band of spots, the color of under surface, and the unspotted fringe, and the differences in color and marking between the sexes, I must regard this as a distinct species from *Comma*, as in fact, at a considerable distance from *Comma*, and it has differences from the other American forms to entitle it to stand alone. Its peculiarities are important, and, so far as appears, permanent.

5. Besides the three forms of *P. Colorado* is another as distinct as any of them, which comes from California and Nevada. I have 2 males and 2 females taken by Mr. Baron in north California, and 3 females by Mr. Morrison in Nevada. Same size and shape as *Colorado*, bright yellow-fulvous on upper side, the sub-apical spots of primaries placed as in the allied forms, but not so distinct, not well defined. On the under side, the color is grayish-yellow; the spots of both wings scarcely lighter than the ground (not white, therefore, or even light); the band on secondaries slight, and often macular; in one of the Nevada examples it is altogether wanting, except for a dot near outer angle. This form cannot be ranked with any of Mr. Scudder's, and is apparently constant. I call it species *Oregonia*.

7. Dr. Boisduval described a species as *Ruricola*, which has hitherto been unrecognized by American collectors, so far as I am aware. He says: "Size of *Lineola*, the wings a little more sinuous, almost the same yellow, with a narrow brown border; the fore wings having the stigma as pronounced as in *Sylvanus*, marked lengthwise by a fine whitish line. Under side of the wings yellow, with all the surface of secondaries and the apical area of primaries a little more green than in *Sylvanus*. Described after the male only. Ann. Soc. Ent. de Fr., 2 Ser. x. 316, 1852. I have found among Mr. Baron's collections a single male of this species, agreeing in all respects

with Dr. Boisduval's description. The spots of secondaries are pale yellow, very large, making a confluent band. I should place *Oregonia* between this species and the *Comma* group.

I tabulate these species as follows: 1. RURICOLA; 2. OREGONIA; 3. COLUMBIA; 4. COLORADO; 5. COLORADO var. IDAHO; 6. NEVADA; 7. MANITOBA; 8. JUBA; 9. JUBA var. VIRIDIS.

There is a recent description of what is called PAMPHILA CALIFORNICA n. sp. Mabilie, Ann. de la Soc. Ent. de Belg. v. 27, p. 68, taken from one male only, and which lacks definiteness. I can find nothing to which it applies. Of the under side, it reads: "the secondaries are ochraceous, and one or two points of a pale yellow color can with difficulty be distinguished among the nervules." So that it cannot be one of this group we have been considering.

NOTES ON THRIPIDÆ, WITH DESCRIPTIONS OF NEW SPECIES.*

BY HERBERT OSBORN, AGRICULTURAL COLLEGE, AMES, IOWA.

The family Thripidæ, though possessing many characters of peculiar interest, and being of no little importance economically, has received but very little attention from American Entomologists, either systematic or economic. With the exception of a few notes upon their habits, and descriptions of some four or five species by Dr. Fitch, and also a few notes by Mr. Walsh and Prof. Riley, concerning their food habits, scarcely anything has been written of our native species.

Without going into a discussion of the classification of the group, or the peculiar characters which seem to ally it to different orders, it will be sufficient here to state that the wings are entirely membranous and folded flat upon the back, which, with the general conformation of the body, would seem to place it with the *Homopterous* division of the *Hemiptera*. The mouth parts, however, are free, composed of both mandibles and maxillæ, and the maxillæ and labium are palpigerous—characters very

* Read before the Iowa Academy of Sciences, Sept. 5, 1882. Since this paper was read, Mr. Theo. Pergande, of Washington, has kindly examined my specimens and corrected some errors which had crept in, on account of my scanty literature on the subject and lack of types.

diverse from those of the group just mentioned. These differences have led some authors to separate the group into a distinct order, the *Thysanoptera*, while others have considered them an aberrant family of *Hemiptera*, others of *Orthoptera*, and still others of *Pseudo-Neuroptera*.

The most obvious characters are the minute size, the species nearly all ranging between one and two millimetres in length, and being very slender; the long narrow wings with broad fringes, folded flat on the back; the 2-jointed tarsi without ungues and terminating in a vesicle, and the beak-like mouth parts pointing backward, but composed of free mandibles and maxillæ, the mandibles being styliform.

The European species have been carefully worked by Mr. Haliday, to whom we are also indebted for the only systematic arrangement of the genera. His synopsis enumerates over forty species, and doubtless our American species are quite as numerous, for without there having been any apparent effort to collect them, a fair beginning has been made upon this number.

Dr. Fitch described four species in his reports on N. Y. Insects, and I understand that his notes contain MS. descriptions of two other species. The former are *Phlæothrips mali*, *P. caryæ*, *Thrips tritici* and *Colcothrips trifasciata*. Prof. Riley mentions a species (6th Rept. Mo. Insects, p. 50) as *Thrips phylloxera* of his MSS. Dr. Packard has described a species infesting onions (New and Inj. Ins. Little Known, 1870), and Prof. Comstock *Limothrips poaphagus* infesting heads of grass. Other descriptions may have been published of which I am not at present aware, and I have collected three species in this State which seem to be undescribed, beside two species which are known.

The *Thripide* frequent the blossoms of various plants, but their presence has been variously interpreted by different authors. In Westwood's "Classification" they are spoken of as feeding upon the plant tissues, and numerous instances are cited of their injuries to vegetation.

Dr. Fitch found his *Phlæothrips mali* gouging into young apples, and his *P. caryæ* in galls on hickory leaves, but doubted their agency in forming the galls. On wheat he states that *T. tritici* injures both blossoms and the growing kernels of wheat. Mr. Walsh held the opinion that Thrips are carnivorous and very beneficial in their attacks upon plant lice and other insects, and argues that they are found in blossoms and on other parts of plants simply in search of their prey. Prof. Riley describes the habits of his *Thrips phylloxera* as attacking the Grape Phylloxera.

If these observers have been correct in interpreting what they saw, we must admit that different species of the group possess different food habits, a point which should be admitted only on the strictest testimony, for while instances do occur where certain species in a distinct group differ in habits from the others, it is of rare occurrence—a fact more fully appreciated when we consider the intimate relations between structure, whereby groups are defined, and habit, these having naturally a mutual correspondence, whether we consider the habit necessitated by the structure or the structure a result of progenitary habit.

So far as the anatomy is concerned, it seems to me much in favor of a vegetable diet. Carnivorous insects as a rule are furnished with strong mouth parts, and are able to thrust them forward from the head, even if their normal position is otherwise. In *Thripidae* the mandibles are slender, styliform, and apparently weak and poorly adapted to the capture of prey, and the mouth parts pass backward under the prothorax. Owing to the minuteness of the insects positive observations upon their methods of feeding are difficult. I have watched them with a lens, and noticed that they thrust the mouth parts down upon the surface of a petal or other portion of the blossom, much as a fly does in sucking up sweets, but have never been able to see them actually puncture the tissue. I have noticed them in apple blossoms, however, where the petals were unopened and no other insects were present, and in these blossoms 80 per cent. were injured by punctures upon the styles and other parts, but particularly the styles, and all the evidence pointed to the Thrips as the cause of injury. Should the observations of other entomologists prove this to be a general habit, it has great economic importance, and shows that insects may have a far different influence than *assisting* in fertilization of plants, which we have come to consider as one of their benefactions, for whereas much has been written concerning the fertilization of plants by insects, comparatively little has been written upon the prevention of fertilization which they may cause.

Although I have observed Thrips in many situations beside the blossoms of apple, cherry and plum, as well as in blossoms of catalpa, asparagus, clover, potato, timothy grass, and a number of ornamental plants, I have never found evidence of their attacking insects. At one time I found a single individual near a colony of *Aphis maidis*, but nothing to indicate that it was attacking the lice.

The observations of Walsh and Riley must certainly be considered

conclusive for the species they noticed, but I cannot think they will hold for the group, but rather that they are departures from a normal habit, the Thrips in those cases finding the soft-bodied, sluggish plant lice preferable to the plant tissues lying beneath them,—the habits of the plant lice making it less necessary for the predaceous insect to be specially adapted to seizing and retaining them. Indeed, may it not be that they seek rather the juicy exudation from the bodies of these insects than to destroy them?

PHLŒOTHrips NIGRA, n. sp.

Length 1.75–1.80 m.m. Width .37 m.m.

Black, distal portion of anterior tibiæ, proximal joint of all tarsi and joints 3 with base of 4, sometimes 3–5, of antennæ, yellowish. Head from above quadrangular, longer than broad, front convex with lateral angles obtusely rounded. Antennæ sub-approximate, third joint yellowish and the two following ones more or less pale, especially at base; joints nearly equal, 8th short and small, sparsely set with hairs. Prothorax short, broad, lateral borders converging toward the head; meso and meta-thorax together as long as broad, converging slightly toward the abdomen; abdomen tapering, caudal segments sparsely fringed with hairs; tube fringed at end. Anterior legs larger than the others, with tibiæ and tarsi yellowish, set with a few very minute hairs; posterior tibiæ with spines at the distal extremity.

Wings without veins, perfectly membranous, no minute hairs on the surfaces; anterior pair with a row of three spines near the costal border at the base; fringe at base wanting; very long on both borders and at apical portion of posterior border composed of two rows, the additional one of finer ciliæ.

Differs but slightly from *P. mali* Fitch, that species being purple-black, joint three of antennæ white and the tibiæ and tarsi not yellow. Possibly this may prove only a variable form. Collected from heads of red clover. Ames, Iowa.

CHIROTHrips ANTENNATUS, n. sp.

Length 1.10 m.m. Width .25 m.m.

Black, except joint 3 of antennæ, which is paler.

Head small, narrowed in front, and here entirely occupied by the bases of the large peculiar 8-jointed antennæ, the basal joints of which are very broad, short and inserted in large concavities of the front; joint 2 is large, irregularly trapezoidal, with the acute angle outward; joints 3

and 4 irregular, ovate, with an elongated papilla extending from the outer anterior portion; joints 5 and 6 slightly smaller, 7 and 8 minute; in some cases traces of a ninth joint can be seen; joints 5-8 are more hairy than the others; 3-6 dilated; ocelli placed far back on the vertex; prothorax converging rapidly to the anterior border, where it is equal in width to the occiput, broader at posterior border than long; a few spines at posterior angles. In front of mesothorax, forming a girdle, is a narrow thickened portion, which at the sides, with an amplification of 150 diameters, is seen to be thickly set with very short pointed spurs; mesothorax short and broad; metathorax slightly narrower; legs nearly equal, anterior ones a little more robust and with few scattered hairs, intermediate and posterior ones more hairy and with tibiae on distal portion, and the tarsi, spiny. Wings slender, sword-shaped, anterior pair smoky, with two longitudinal veins, costal fringe not more than half as long as inner, beginning near the base with strong spines, a few spines situated on the veins; posterior wings hyaline, a thickened line (vein?) along the middle. Both wings with minute short hairs scattered over the membrane; abdomen tapers suddenly after seventh segment, a few hairs on anterior segments, becoming longer and more numerous caudad.

Collected at Manchester, Delaware Co., Iowa, where it was very abundant in heads of timothy grass. July 10th, 12th, 1882.

THRIPS STRIATA, n. sp.

Female. Length 1.15 m.m. Width .25 m.m. Whitish with yellow and blackish markings.

Head rounded in front, appears marked with transverse striae and dusky border posteriorly; antennae approximate, whitish at base, gradually becoming more dusky toward the apex, where they are nearly black. Eyes large; ocelli near together and well up on vertex. Thorax with elongated dusky patches forming a broken subdorsal stripe each side; on the prothorax these extend latero-cephalad and are broken into spots; abdominal segments 1-6 are dusky on tergum, except at the sides, seventh has dusky spot in centre, apex slightly dusky and surrounded with black spines; thorax and abdomen tinged with yellow at the sides. Hairs scarce and fine, except at end of abdomen. Legs concolorous with body, with dusky patches on dorsal aspect of femora and tibiae, sparsely set with fine hairs. Wings unmarked, fringe and spines wanting at base of costal border, no discal spines; both wings covered with very minute hairs.

I do not know what is the food plant of this species, the only specimen I have being caught on the leaf of a book I was reading in the Zoological Laboratory (fourth floor of building). It probably flew in at an open window. Taken Aug. 11, 1882.

THRIPS TRITICI Fitch. Trans. N. Y. Ag. Soc. for 1855, page 540.

Male, length .75-.80 m.m.; width .20 m.m. Female, length 1.10-1.20 m.m.; width .25 m.m.

Color yellow, thorax tinted with orange; antennæ with dusky annulations.

Head from above nearly square, eyes occupying anterior angles. Antennæ approximate at base, joint 2, apical half of 4, and 6, dusky; joints 3 and 5 dusky at apex, the antennæ appearing annulated under low power of microscope. Head, thorax and abdomen with few stiff hairs. Legs concolorous with body, all the tibiæ with two spines at distal end, distal joint of tarsi a little dusky, proximal joint of hind tarsi with two spines. Wings narrow, hyaline, fringes whitish; anterior wings have costal fringe of shorter ciliæ than posterior ones, and the ciliæ are intermixed with shorter, stiffer, spiny hairs, which at base replace the fringe; two rows of blackish spines on upper surface of wing corresponding to subcostal and median veins. Posterior wings with no discal spines; ciliæ of anterior edge shorter and more spiny than those of posterior. Both wings have numerous rows of very minute hairs on the surface. The males are shorter and smaller than females, with wings reaching beyond the tip of the abdomen instead of nearly to it, and there are some strong spines near the tip of the abdomen.

This species is the one most abundant in this locality, and the one upon which most of my observations have been made. Dr. Fitch speaks of the antennæ as widely separated at base, and his figure (a very poor one) makes them particularly so, which led me to think I had a distinct species; but Mr. Pergande has kindly compared my specimens with the type and pronounces them identical.

HACKBERRY PSYLLID GALLS.

BY PROF. C. V. RILEY.

In reply to the questions raised by the Rev. Thomas W. Fyles on p. 84 of the May number, permit me to say :

1. That to speak of "THE parasite of *Phylloxera vastatrix* and THE gall insect of the nettle tree," as he does in the heading to his communication, is inaccurate, since there are many of each.

2. Besides a number of Cecidomyid galls on *Celtis*, I am acquainted with more than a dozen Psyllid galls upon the plant. The insects producing these galls mostly belong to a new genus which, in a paper that I have prepared on the Psyllidæ of the U.S., is called *Pachy-psylla*. It belongs near *Diaphorina* Loew and *Catophya* Loew, and is characterized by the short, stout antennæ, short, obtuse frontal cones, convex back, vertical rugoso-punctate head and pronotum, and by the wings being parchment-like, twice as long as wide, and having the marginal cells very long and sub-equal. Only two of these have been referred to by name in print (not properly described) so as to be recognizable, chiefly through their galls, viz. :

Psylla venusta O. S. (Stettiner Ent. Zeit. 1861, p. 422) and *P. celtidis-mamma* Riley (Johnson's Un. Cyclopædia, 1876, article Gall-insects). *P. celtidis-grandis* Riley of the same article being synonymous with *venusta*. The first-mentioned is a very large insect producing a large swelling of the



Fig. 6.

GALL OF *PACHYPSYLLA VENUSTA*.—*a*, gall fully formed; *b*, do., forming; *c*, do., in section. (After Riley.)

petiole, or of the base of the leaf, open on one side and so well described by Osten Sacken, in the article above cited, that Dr. Hagen should have seen that it could not apply to Mr. Fyles's description of his gall (p. 198, vol. xiv) which applies very well to *c-mamma*, though one-half inch is



Fig. 7.

GALL OF *PACHYSYLLA C-MAMMA*.—*a*, leaf with galls from under side; *b*, section of gall showing cup-like depression, and insect in cavity; *c*, pupa—*b*, *c*, enlarged. (After Riley.)

His description of said gall can apply only to *c-mamma*, which is, moreover, the most common of the many galls upon the leaf; and, like all the other species on the leaf, is closed and not open as in *c-venusta*. The accompanying figures, which I have had on hand for many years, will at once show the difference between the galls *celtidis-venusta* and *celtidis-mamma*.

In reference to the genitive of *Celtis*, the best botanical works cite the term as of Greek origin—*Græca obscura*, as Linnaeus puts it. Hence the genitive *celtidis* which, Latinized, becomes *celtidis*. See also *Celtideæ* Endlicher; *celtidifolium* DeCandolle. I am not surprised at Mr. Fyles's question, however, as some fifteen years since I was inclined to use the genitive *celtis*, which would, also, be justifiable. Prof. G. I. Goodale has

rather more than its average length. That said description does not apply to *venusta*, there can be, however, no doubt whatever. From a single specimen of the insect sent me by Mr. Fyles, my determination was confirmed. *P. c-mamma* so closely resembles another species (*P. cucurbita* M.S. mihi), however, that without the galls it would be difficult, if not impossible, to separate them—a not uncommon occurrence among gall-making species. It was because of this fact that I expressed, in a letter to Mr. Fyles (Feb. 24th), a qualified opinion, urging him to send specimens of the galls, which he failed to do.

been kind enough to send me, through Dr. Hagen, the following from Wittstein: "Celtis L. Celtis nach Plinius (eine der Lotus arten) von Greek "*Kellein*" (antreiben), Greek "*Keltis*" (Peitsche). Die zweige dienen zu Peitschen stielen." The reference to my "infallibility" is beside the question.

GENERAL INDEX OF THE THIRTEEN ANNUAL REPORTS OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

This useful work, covering the period from 1870 to 1882 inclusive, has recently been issued. The compiler, E. Baynes Reed, Esq., Secretary-Treasurer of the Society, has spared no pains or labor in making the index complete in every particular. It is uniform in size with the Reports, and covers 35 pages. Beginning with a summary of the illustrations used and of the orders illustrated, there follows a detailed list of all the figures used in each of the thirteen Reports. The second part consists of a classified list of the insects illustrated, while the third part is a general index which is very full and complete, and will be of much value to all who may have occasion to consult its pages. A copy will be mailed to each member of the Society.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Annual Meeting will be held at the rooms of the Society, Victoria Hall, Clarence St., London, on the evening of Wednesday, October 3rd, at 8 o'clock. It is hoped that a large number of members will be present. Any one having papers to present will please communicate with the Secretary, who will arrange for the reading of communications sent by absent members.

CORRESPONDENCE.

TRYPETA CERASI, L.

A black cherry tree imported from Gilgenau, Eastern Prussia, in 1873, had first fruit in 1881. I did not find larvæ in the cherries in the last two years. In 1883 the fruit was smaller than usual, perhaps because they were very abundant: larvae and pupae are very common in the fruit. I do not find this species in Loew's Monograph, nor in O. Sacken's Cata-

logue. In Loew's *Trypetine* (in fol.) p. 45, it is *Rhagoletis cerasi*: in Schiner, *Herina frondescentie*, L.

The larva and pupa are not different from those of *Trypeta* (*Spilographa*) *cerasi*, received by Prof. Rosenhauer from Europe. Of course this can not be an evidence in a family, where all larvae and pupae are so similar one to the other. I will try to raise them, but as Rosen. states in his Monograph that the imago appears eleven months later, we have to wait till June, 1884, for the fly. Nevertheless I like to draw attention to the fact. Loew states that the larva lives in cherries, in *Lonicera xylosteum* and other *Lonicere*, and in *Berberis vulgaris*, after Frauenfeld. Rosenhauer found it in *Lonicera tartarica*, and this shrub is also present in my garden for 13 years, always much eaten by a Tentid larva, but not as far as I know, by a *Trypeta*. I do not find mentioned any larva in the fruit of the cherry in the American literature.

Cambridge, Mass., July 29, 1883.

DR. H. A. HAGEN.

Dear Sir: I enclose some beetles sent me from a house at Cold Spring, on the Hudson River, New York. I am unable to answer the question put to me as to what they are. My friend says: "The house here is full of them: we kill them by thousands with insect powder. They are found behind the paper on engravings and everywhere, thousands being under the carpets, but the carpets are not cut." My only excuse for troubling you is as a subscriber of some years to your excellent ENTOMOLOGIST.

G. H. VAN WAGENEN.

Rye, Westchester Co., New York.

[The insects have been submitted to Dr. G. H. Horn, of Philadelphia, for determination, who says they are specimens of *Galeruca xanthomelacna*.—ED. C. F.]

PLANOSA LARICIS.

Last season I found four cocoons of this interesting species on the white pine, and this season twelve more were found. The females agree well in color with that figured by Dr. Fitch, but the males are much darker. Some of them are wholly black, except a few long, white hairs on the sides of the thorax. I am not aware that this species has been found on pine before.

ROBERT BUNKER.