

The Canadian Entomologist.

VOL. XIX.

LONDON, SEPTEMBER, 1887.

No. 9

SOME NORTH AMERICAN TACHINÆ.

BY BARON OSTEN SACKEN.

[The following paper was left by Baron Osten Sacken [O. S. had left Washington on Embassy about ten years earlier], with his collection of Diptera, in the charge of Dr. H. A. Hagen, of the Museum of Comparative Zoology, Cambridge, Mass., by whom it has been sent to us for publication. The description of the last species, *Tachina theclarum*, is by S. H. Scudder.—ED. C. E.]

Tachina (Exorista) futilis Say., MSS. ♂, ♀. Palpi, antennæ and legs black; face, front and last abdominal segment with a brassy-yellow reflection. Length, 7-10 m.m.

Bottom of the antennal foveæ silvery gray; the lower part of the cheeks likewise; front, lateral parts of the face and the orbit of the eyes below and behind (genal and occipital orbit) brassy-yellowish, the coloring of the front being of a more saturate yellow than the lateral parts of the face; above the antennæ, in the middle of the front, a brown stripe, attenuated posteriorly; it bifurcates on the vertex, enclosing the grayish ocellar triangle; the hind plane of the head (occiput) gray. The row of frontal bristles consists: 1st, of three bristles pointing backwards, the uppermost of which is placed on the top of the vertex; 2nd, of three shorter bristles pointing forward; 3rd, of four or five bristles which form diverging rows, descending on both sides of the antennæ, the last being a little below the end of the second antennal joint. Between the frontal bristles and the eyes, the front bears numerous little hairs; between these rows on the ocellar triangle is the usual pair of bristles pointing forwards. The females have three supernumerary pairs of larger bristles; the first is placed behind the upper corner of the eye, the two others between the frontal row and the orbit of the eye. Among the above described smaller hairs, immediately below the last bristle, the brassy-yellow color of the face shows a brown, changing spot, visible in an oblique light only; below this place, the lateral parts of the face are smooth; a short distance above the oral margin there is, on each side, the usual long bristle; above it, some shorter hairs reach to about one-quarter of the

distance between the long bristle and the root of the antennæ. Antennæ black; second joint with a grayish pollen, and with a crest of short, stiff bristles; third joint long, with parallel sides, more than three times the length of the second, not quite reaching the edge of the mouth. Eyes distinctly pubescent.

Ground color of the thorax bluish black, almost concealed by five stripes of gray pollen, with intermediate black lines; the gray stripes are especially apparent when viewed obliquely from the posterior end of the body; in this light the median stripe appears bifurcate posteriorly; the next pair abbreviated posteriorly; the lateral pair very broad anteriorly, over the humeri. Scutellum bluish-black, with gray pollinose reflections; its tip faintly brownish; on the hind edge there are six bristles, the intermediate pair being the shortest; above this pair, on the plane of the scutellum, another similar pair. Pleuræ, grayish pollinose.

Abdomen black, marmorate with silvery gray; the fourth segment brassy-yellow. The whole abdomen is covered with dense short hairs; a pair of longer bristles near the hind margin of the first and second segments; a row of such bristles on the hind margin of the third segment, and a double row at the end of the fourth. Legs black; pulvilli brown; knees slightly brownish.

Wings: the first posterior cell open (closed by the prolongation of the costal vein, however, which nearly reaches the apex of the wing); the distance between the tips of the second and third veins is a little longer than that between the third vein and the apex of the wing; the elbow of the fourth vein without stump of a vein (a very minute one in one of the specimens); the great cross vein oblique, parallel to the last section of the fourth vein; small cross vein (in most specimens) opposite to about the middle of the distance between the tips of the auxiliary and first veins.

Bred from *Vanessa atalanta* (T. W. Harris and S. H. Scudder). Numerous specimens.

Tachina (Exorista) blanda, n. sp. ♂. Gray, thorax with four black stripes, the lateral ones broken in the middle; palpi and legs reddish; second and third abdominal segments with an additional pair of macrochetæ in the middle. Length 7 m.m.

Distribution of the frontal bristles as in *E. futilis* ♂, that is, on each side, beginning with the vertex, three longer bristles pointing backwards, three

shorter bristles before the antennæ, and three or four bristles descending on the face, alongside of the antennæ. On the ocellar triangle, a pair of bristles pointing forward. Between the row of frontal bristles and the eyes, a few scattered microscopic hairs; sides of the face bare. Front, face and posterior orbit silvery white. Frontal stripe brown, rather narrow, enclosing posteriorly the grayish ocellar triangle. Antennæ black slightly tinged with brownish red on the two first segments; the third segment is very long, almost reaching the edge of the mouth. Only a few short bristles above the usual long oral bristle. Palpi, reddish yellow. Eyes pubescent.

Thorax gray, with a slight yellowish tinge from an oblique point of view; two slightly divergent black lines do not reach beyond the middle; two lateral black stripes are interrupted at the suture and prolonged beyond it to the hind border; these lateral stripes are broadest in the middle and end in a point, anteriorly and posteriorly. Scutellum gray; two pairs of large macrochetæ each side; a third intermediate, very small pair, on the apex.

Abdomen gray with, a slightly yellowish tinge, especially on the last segment; somewhat marmorate, with blackish crossbands on the hind margins of the segments, and a longitudinal blackish line; the crossbands appear more distinct and broader from an oblique point of view; the longitudinal line disappears when viewed sideways from above. A pair of macrochetæ on the hind margin of the first segment; two pairs on the second segment, one in the middle, the other on the hind margin; on the third segment, a pair in the middle, and the usual row on the hind margin; two rows on the fourth segment.

Legs: coxæ and femora reddish; tibiæ reddish-brown; tarsi brown. Pulvilli unusually large; ungues?

(The wings in the described specimen are injured.)

A single specimen, bred from *Cynthia cardui* (C. V. Riley.)

This species is like *E. futilis* in the distribution of the bristles on the front and in the structure of the antennæ. It differs in the presence of an additional pair of macrochetæ in the middle of the second and of the third abdominal segments; also in the comparative smallness of the intermediate pair of macrochetæ on the apex of the scutellum.

Tachina (Exorista) hirsuta n. sp. ♀. Palpi, antennæ and legs black. Length 7 m.m.

Distribution of the frontal bristles like that in *E. futilis* ♀; that is,

besides the usual row of bristles on the front, there is a second row of three bristles on each side, between the first row and the orbit of the eye; the upper bristle of this second row is placed near the upper corner of the eye, alongside of the upper bristle of the first row; the second and third bristles are inserted lower down on the front. The usual inner row of frontal bristles consists of three bristles on the vertex, pointing backwards, the upper one of which is the longest, and of six bristles below them, descending rather low on the face, considerably below the end of the second antennal joint. The pair of bristles on the ocellar triangle is present. Above the usual long bristle on each side of the oral border there is a row of small hairs, ascending along the ridge of the face, but not reaching the level of the lowest bristle of the frontal row. Antennæ black, third joint with parallel sides, broader than in *E. futilis* and *E. blanda*, but at the same time shorter, as it does not reach the oral border. First half of the arista remarkably stout; its basal joint long and distinct. Palpi dark brown or black. Face and front silvery; oral margin pale; frontal stripe brown; ocellar triangle blackish, grayish pollinose. Eyes pubescent. Thorax bluish-black, grayish-pollinose; two sub-parallel, soon interrupted, black stripes in the middle, and two less definite lateral stripes, black. Pleuræ black, with a light-grayish pollen. Scutellum black, grayish-pollinose, its hind margin yellowish; the two lateral pairs of macrochetæ rather long and strong; the intermediate one small; a pair of small macrochetæ on the disc. Abdomen black, marmorate, with grayish-silvery reflections, especially on the anterior borders of the segments; a pair of macrochetæ on the hind border of the first segment (I believe that I perceive them in my only specimen, although its abdomen is so much crowded against the scutellum that this character is not easily discernible); on the second segment, a pair of macrochetæ in the middle only; on the third, the usual row of macrochetæ along the hind border; on the fourth, a number of macrochetæ, giving it a bristly appearance; the smaller hairs of the abdomen are more erect, longer and bristle-like than in *E. futilis* or *E. blanda*. Feet black. Wings nearly as in *E. futilis*.

Bred from *Pieris rapæ* in April (Lintner).

Tachina deilephila, Riley MSS. ♀. Palpi yellowish; antennæ and legs black; face and front silvery; abdomen red on the sides; venter red. Length 7 m. m.

Face and front silvery, the latter with a blackish-brown stripe; ocellar

triangle enclosed in the bifurcation of this stripe ; the remaining portion of the vertex blackish ; the rows of frontal bristles, on both sides of the frontal stripe, are short and inconspicuous superiorly, and only of moderate length near the antennæ. Of the three uppermost pairs of long bristles pointing backwards, which exist on the vertex in *E. futilis*, only the upper one is present ; the lowest bristle of the rows is nearly opposite the end of the second antennal joint ; there are but a few very inconspicuous hairs on the lower part of the front, between these rows and the orbit ; nearer to the vertex, these hairs become more dense ; a bristle above the upper corner of the eye (corresponding to a similar bristle in *E. futilis* ♀,) is present ; the pair of bristles pointing forward on the ocellar triangle is also extant. Below the bristles the face is smooth, with but a few almost microscopic hairs ; a short distance from the oral margin, there is on each side, the usual long bristle, above it some shorter hairs do not reach very high on the face. Antennæ black somewhat reddish on the incisure between the second and third joints ; third joint with parallel sides, much shorter than the corresponding joint of *E. futilis* and not reaching the edge of the mouth by about one half of its own length. Eyes distinctly pubescent ; palpi yellowish.

Thorax black, with the usual five stripes of gray pollen on the dorsum ; scutellum with a brownish tinge, grayish-pollinose ; bristles placed as in *E. futilis*. Abdomen blackish in the middle, reddish on the sides and at the tip ; the red on the second and third segments occupying as much of the breadth of the dorsum as the black ; the fourth segment is red, with elongated blackish spot in the middle of its base ; all the segments with silvery-gray reflections. A row of bristles along the posterior margin of the third and on the fourth segments ; the pairs of longer bristles on the first and second segments, which exist in *E. futilis*, are wanting here. Venter red, densely clothed with black hairs. Venation of the wings as in *E. futilis* ; but the costal vein is not prolonged beyond the tip of the fourth vein ; the great cross vein is distinctly bisinuate.

Bred from *Deilephila lineata* (C. V. Riley).

Three specimens.

The presence of only a single pair of long bristles on the top of the vertex, pointing backwards, and the absence of the pairs of macrochetæ on the first and second abdominal segments, prove that this species belongs, if not to a different genus, at least to a different section of a genus than *E. futilis*.

Tachina theclarum, parasitic on No. 30 (*Thecla inorata*). Mr. W. Saunders. From life. Length 5 m.m.

Back of head steel gray, covered with short blackish hairs; front pale or whitish slate color, with darker reflections and with a vertical broad, blackish, frontal band; on either side a slightly curving row, outwardly concave, of black, curving, tapering bristles, directed upward, extending down the front from the summit to below the base of the antennæ; outside of the middle of this row a pair of similar downward directed bristles; a pair of downward directed bristles near the middle of the summit. Antennæ dark slate color. Eyes rich brown, covered with exceedingly delicate, short, white pile.

Thorax above dark brown with a hoary bloom, covered by frequent, erect, short, black hairs, and infrequent, decumbent, backward directed, large, black, tapering bristles; metanotum edged broadly behind with reddish brown; thorax and abdomen beneath piceous; covered profusely with long black hairs. Abdomen above shining piceous, first joint immaculate, second and third, especially latter, silvery or nacreous at base, obscure in the middle, fading out posteriorly; fourth segment nacreous at extreme base only; all profusely covered with long black hairs; second segment with a pair of erect, slightly curving, very long and tapering subdorsal bristles at the posterior border; third segment bristling with a transverse row of similar bristles, a dozen or more in number.

Legs black; claws black; pulvilli pale or colorless; tongue testaceous; covered profusely at tip with rather long colorless hairs; labial palpi blackish-brown.

SOME NOTES ON THE GENUS *COLIAS* WHILST ALIVE IN THE IMAGO STATE.

(Being extracts from a paper read before the Entomological Society of Ontario, Oct. 20th, 1886.)

BY GAMBLE GEDDES, TORONTO.

The paper which I have prepared to read upon the genus *Colias* differs from any that I have consulted up to the present time, in that it treats principally of the habits of the different species during lifetime in the imago state.

During the last ten years gigantic strides have been made by lepidop-

terologists in breeding the different species of this perplexing family, and their efforts have been crowned with such success that only a few remain about which nothing is known of the primary stages. It is about the life habits in the perfect state of some of these that I propose to address you, and if my paper does no good, it certainly cannot do any harm, as you will see by the subjoined list of my captures of the different species of Coliadae that I have a right to express an opinion in this particular direction. Every entomologist knows that the only true way of ascertaining *bona fide* species in any family of diurnals is by breeding from the egg and noting the different stages of metamorphoses, and although so much has been accomplished in this genus *Colias* by enthusiastic collectors, yet a great deal remains, and where we have not the means at hand to watch the progress of an insect from its earliest stage, we must content ourselves with the appearance first, and next, the habits of the perfect examples that are thrown in our way.

The extreme difficulty of obtaining eggs and carrying or forwarding them from long distances is only too well known to active collectors in outlandish places in our vast Dominion, and my personal opinion has been, and is, that when I have captured what I know to be a rare or a doubtful female of any kind, the correct thing is to kill it and pack it safely in cotton wool and paper, and not to run the risk of attempting to take the eggs and breed the insects. The fact of keeping the insects alive in a box with the food-plant and travelling by stage or on horseback, as my principal journeys have been made, almost compels the insect to damage its wings, and to such an extent that it will be difficult to recognize.

By enclosing what I supposed to be the food-plant of the butterfly with the female, I have lost, on many occasions, specimens which I would like to possess now.

There are other risks to be run. The females may or may not lay eggs, and these eggs may or may not prove fertile, and the young larvæ may or may not live after they come to light (this I regret to say has been my great trouble), and in every event I have always regretted the fact that I had not killed and preserved the female.

One instance I may here give of the few specimens of *C. Elis* which I was fortunate enough to take. Of this species I did not take many examples, and I have always congratulated myself since upon the fact that the few I did take are now safe in the hands of our leading col-

lectors, who possess really good representative collections, and fine examples are to be seen in the National Museum of the Geological and Natural History Survey of Canada, at Ottawa.

The variations in the appearance of the live females in the Coliadæ are most puzzling, and were it not for the similarity in the flight of several distinct forms of the same species, I fully believe the nomenclature of this genus would be even larger to-day than it already is. I beg to call your attention, as an example, to *Colias Christina*, Edw.

The variations in size, in colour, and in the markings generally, are so great, that had not several of the numerous forms been actually taken *in coitu*, it would be hard to make a collector believe that they were one and the same species.

The females of *Col. Christina*, as far as my experience goes, may be better compared to common "ribbon grass" than any other diurnal I have come across—by which I mean to say, that as it is a difficult matter to find two blades of grass exactly alike, so it is with the females of *Col. Christina*. The shades run from a pale green (the colour of *Actias luna*,) to lemon colour, and from lemon colour to bright orange, and the discal spot on the primaries is almost obsolete in some, whilst in others great uneven blotches of black or dark brown appear. When I captured this species in very large numbers in 1883, whilst collecting for Mr. Henley Grose Smith, of England, I was passing through what is known as the Red Deer River country, about seventy miles from Calgary, in the North West Territories. I was quite under the impression that I had discovered a number of new species, and that I could on my return home include a large proportion of my entomological acquaintances in describing and naming after them these peculiar butterflies. Imagine my surprise, when after referring about twenty-five or thirty of these females to Mr. W. H. Edwards, they all came back labelled *Col. Christina*, ♀.

I now give a list of the different species of *Colias* with which I am tolerably familiar, having captured specimens of each myself :

C. Christina, Edw., including southern form *Astrea*, Edw.

- ♂ quick of flight, like *Eurytheme*, and difficult to capture ;
 ♀ short flights and slow of movement in the air. (Mr. W. H. Edwards has already figured *Col. Christina* in his excellent work on the butterflies of North America, but I have since

heard from him with pleasure that he is going to give a number of varietal forms in the new volume now being published; the plates will be for the most part figured from examples captured by me in 1883-4.)

C. Scudderii, Reak.

♀ Slow of movement, like *Christina*, and easily captured.

C. Occidentalis, Scud, including southern form *Chrysomelas*, Hy. Edw.

A lively insect, only taken when the sun was hottest and the day brightest.

C. Edwardsii, Behr.

No notes taken.

C. Alexandra, Edw.

♂ very lively, short flights; ♀ not observed.

C. Eurytheme, Boisd.

Winter form *Ariadne*, Edw.

“ *Keywaydin*, Edw.

All the different forms of this insect are the liveliest I came across in the North West Territories.

C. Hagenii, Edw.

Very like the above, and almost impossible to catch on the wing, from the zig-zag movement in flying, and its long flights, often flying high in the air. Was taken in 1886 by me, at Kakabeka Falls, Lake Superior.

C. Philodice, Godt.

C. Interior, Scud.

Apparently a lazy insect; easy of capture. Very few taken in 1883 and 1884.

C. Elis, Streck.

♀ has a remarkably short flight, dropping suddenly to the ground, getting itself entangled amongst the grass and foliage; not alighting, as most *Coliads* do, where they can be seen, on a leaf or on a flower.

C. Elis is a new species described by Mr. Herman Strecker, after my return from the Rocky Mountains, in 1884. At present nothing is definitely known about the male of this species, although two forms of the

female have been described—an orange and an albino. Until the males are obtained from the egg, or until some collector at the summit of the Rockies, or some other range of mountains, take the male and female *in coitu*, the male will remain a matter of doubt.

My own humble opinion is this: If the female—albino variety—is *Elis*, as described by Mr. Stecker, the chances are that there will be lemon colored males as well as orange, and that these males were taken by me in 1884. There are other species of *Colias* that have both lemon colored and orange males—such as *C. Christina*—upon some of which not a vestige of orange can be discovered.

ON THE POSITION OF *COLIAS HAGENII*, EDW.

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

In *Papilio*, 3, 159, 1883, I described *COLIAS HAGENII* as a new species. I related that Mr. T. L. Mead had brought this butterfly from Colorado, in 1871, and that we both were then satisfied that it was not *Philodice*; that in the summer of 1883, Mr. H. W. Nash, at Pueblo, Col., had sent me some chrysalids of this form, and I noticed that the dorsum was marked by two longitudinal lines, which seemed to indicate sub-dorsal lines in the larva, and which are not present in the larva of *Philodice*; that I wrote Mr. Nash to observe as to that, and he soon replied that the larvae he then had on hand did show sub-dorsal lines such as are characteristic of many larvae of *Eurytheme*; that I had been unable to get live eggs from Pueblo subsequently that year, owing to the heat which destroyed them *en route*, but that Mr. Nash had made observations on the ground, and sent on larvae in alcohol which showed broad sub-dorsal bands, that, he said, in life had had red running through them. That other larvae showed white sub-dorsal lines only, and still others had no trace of such bands or lines, any more than *Philodice*. All which was like *Eurytheme*, except that in that species the red was not within the band, but over it in broken bits; and also under the bands in *Eurytheme* were often black points. The larvae of *Eurytheme* in these varieties are figured in *But. N. A.*, vol. 2, plate 21.

I did not at the time describe the species, but mentioned it as the form

common in the Rocky Mtns., from Colorado to British Am., which was between *Eurytheme* and *Philodice*.

In another paper in same volume of *Papilio*, p. 173, I said of *Hagenii*: "The color is yellow, lighter than is usual in *Philodice*, but varies in that respect, many being very green, and a large percentage, especially of the females, are not yellow, but of a peculiar shade, a sort of buff-yellow (better chrome-yellow), a shade not seen in *Philodice*. Considerably more than half the females, as reported by Mr. Nash, are of this buff-yellow, and the males frequently show more or less of it, and occasionally have a flush of orange. The markings of *Hagenii* resemble those of *Eurytheme* and *Philodice*, in the discal spots, the extra-discal points on both wings, the patch at outer angle, the shape of the black borders; but there is a closer resemblance in the borders of the females to *Eurytheme* than to *Philodice*, these being very wide, and on hind wings nearly reaching the cell, completely enclosing more or less definite yellow spots." I also repeated what Mr. Mead had said, after a season spent in Colorado, 1871, that "if there could be such a thing as a yellow *Eurytheme*, this was it."

From 1883 to the present time I have embraced every opportunity to get eggs of *Hagenii*, laid by the females in confinement, and as will be seen, have raised many broods. Now I will give the results.

1. On May 11, 1884, received eggs of the first brood of the year. (I say here that invariably the females that laid eggs have been sent with them). From these obtained, between June 8th and 15th, 14 butterflies, 10 males, 4 females, all *Hagenii*.

2. June 7, 1884, received eggs of second brood of the year. Result, between 6th and 9th July, 15 butterflies, all *Eurytheme*, 11 males, 4 females. Three of these females were albinos.

3. June 27, 1884, received eggs. Result, 12 butterflies, 8 of them *Hagenii*, 3 males, 5 females, 4 *Eurytheme*, females.

4. 29th August and 3rd Sept., 1884, received eggs. Result, 1st to 3rd Oct., 5 *Hagenii*, 2 males, 3 females.

5. This same year, 1884, I raised a brood of larvae from eggs of *Eurytheme* received 27th June. Result, 9 butterflies, 6 being *Eurytheme*, 3 males, 3 females, and 3 *Hagenii*, 2 males, 1 female.

6. 1885, May 18, received eggs of *Hagenii*. Result, 13th to 18th June, 35 butterflies, all *Hagenii*, 20 males, 15 females. The females of this brood were very large and most of them were deep colored.

7. 1886, 31st July, received eggs of *Hagenii*. Result, 28th to 30th August, 3 males, 2 females, all *Hagenii*.

8. 1887, 11th May, received eggs of *Hagenii*, the first brood of the year. Result, 9th to 14th June, 22 butterflies, all *Hagenii*, 15 males, 7 females.

9. 1887, 24th June, received eggs of *Hagenii*, the second brood of the year. Result, July 16th to 22nd, 16 butterflies, 3 males, 13 females, all *Hagenii*.

10. 1887, 5th July, received eggs of *Hagenii*, the second brood of the year. Result, July 27th to 29th, 18 butterflies, 17 being *Hagenii*, 14 males, 3 females : 1 *Eurytheme*, female.

So that I have bred nine broods from eggs of *Hagenii* and one from eggs of *Eurytheme*, and the result has sometimes been unmixed, all the imagos being of the form of the mother, at other times mixed, part *Eurytheme* and part *Hagenii*. There have been no examples which were doubtful ; all were either distinctly one form or the other. None of the first brood of any year (1884, 1885, 1887) gave mixed results, all coming out *Hagenii*, from eggs of same. But of the second brood of the year (eggs of *Hagenii* June, butterflies of July), the results were mixed. Of the later broods (imagos out in Sept. and Oct.), the result was *Hagenii* alone, but the examples in each of the late broods were too few to make the test satisfactory.

Therefore this species *Eurytheme*, heretofore known to manifest itself in three distinct forms, *Ariadne*, *Kecwaydin* and *Eurytheme*, now becomes four-formed, *Hagenii* ranking with the others.

I have parted with none of these bred butterflies, and so am able to have them all before me as I write : and can state that : 1. There is a remarkable uniformity in the color of the males, and in the width of the marginal borders. The color is lemon-yellow. Every one of the June and July imagos has a broad border on each wing, and the outlines of inner side of same are essentially alike. Nearly all these outlines may be described as erose, and only two may be called dentated. As a rule, the borders of hind wings are black, while those of fore wings are densely dusted with yellow. Every male has an orange discal spot on hind wing. Now all this is very unlike *Philodice*, in which species there is no end of variety in color, in width of borders and their inner outline, and in the color of discal spot.

As to the females, there is not one of the June and July broods but has a very broad marginal border to fore wings; and a broad one to hind wings, more or less completely enclosing a series of spots of the color of the yellow ground of wing. In *Philodice*, that sort of border to hind wing is the exception, and there is great variation in its border, and in the length of it, as well as the breadth; while in *Eurytheme* form of the species that sort of border is the usual. As to color, most of the females are lemon-chrome, many very deep, others lighter, running into lemon-yellow. The darker examples could not be matched in any series of *Philodice*.

I have but five examples of the last fall brood of the butterfly, which came from pupae 1-3 Oct. The two females that laid the eggs which produced these stand by them, and are lemon-chrome in color, with broad borders to hind wings. All the five butterflies are small as compared with those of the early broods; the males have narrower borders, and very large orange spots. The three females have a narrow border to hind wing, extending from upper branch of sub-costal to second branch of median; the color is lemon-yellow, but the hind wings are very green, and much dusted with fine gray scales, more so by far than any of the June brood. In fact, there is the same sort of difference between these October examples and those of June and July as there is between the orange forms *Ariadne* and *Eurytheme*; that is, the form *Hagenii*, so far as I can judge by the examples under view, is itself seasonally dimorphic.

On the under side, the June and July butterflies, males, are all chrome-yellow over both wings, and of a very uniform shade throughout the series; all have sub-marginal points or patches on both wings, a patch at outer angle of hind wing. The uniformity is remarkable on this surface as compared with *Philodice*. Whereas the October butterflies are pale colored, whitish-yellow, the hind wings densely dusted gray; the females still paler, still more heavily dusted; and all have great discal spots. So that the dimorphism is borne out by the under as well as the upper side. Further observations are desirable on this fall brood, and I hope this season to be able to make them.

Colias Eurytheme, as well as *Philodice*, *Alexandra*, *Meadii*, *Harfordii*, hibernates in larval stage, but if the larvae are kept in a warm room, they often will go on to pupation, reaching chrysalis even in mid-winter. I suppose my larvae of September would naturally have hibernated in Colorado, and in such case the butterflies from them would have come from chrysalis in early spring. That would make the dimorphism

of this yellow form run parallel with that of the orange, of which *Ariadne* is the winter and *Eurytheme* the summer form. (In *Philodice* there is no seasonal dimorphism discernible.)*

Polymorphic forms of butterflies are especially interesting biologically, for they may be regarded as species in the making. It is conceivable, for example, that each one of these forms of *Eurytheme*, under certain conditions, might become separated from the other, and breed true to its own type. In other words, come to be a species, and I doubt not, very many species of butterflies have come to be in this way.

I have said that none of my bred males have had orange in the wings. But I have two males, one taken by Mr. Morrison, in south Colorado, the other by Mr. Nash, at Pueblo, which have a pretty strong shade of the chrome color on fore wings that characterises so many of the females.

Hagenii is known to fly throughout the Rocky Mountain region from Colorado to British America. I had many examples from Mt. Judith, Montana; others from Bismarck, Dacotah, and along the boundary line of B. America, in same Territory. Mr. Morrison also brought examples from Montana, but I know not what part. So several have been sent me from San Bernardino, by Mr. Wright and Mr. Hulst, and I think it probable the yellow form accompanies the orange over much of the territory occupied by the latter. On the plains to the east of the mountains, these would have been regarded as *Philodice* by collectors.

The yellow male figured in But. N. A., vol. 1, on plate of *Colias Kee-waydin*, fig. 7, is *Hagenii*, a very small example. Mr. Henry Edwards is quoted in the text as writing that "the male of the new species (*Kee-waydin*) is constantly subject to run into the lemon-yellow variety."

As to the larvæ, they vary greatly; some having no trace of a sub-dorsal band; others have a slight yellow line in place of band; others have decided yellow lines or narrow white bands. Not one of my bred larvæ has had a sub dorsal band with red in or running through it. On the other hand, Mr. Nash has sent me several nearly mature larvæ which produced *Hagenii* butterflies, in which either the white sub-dorsal band with red line through it was present, or a white band without red. In one letter Mr. Nash writes: "Out of 24 nearly full grown larvæ of this *Colias* that I have, 14 have the sub-dorsal line, but none a distinct white

* Mr. Nash informs me that form *Ariadne* often flies at the end of the season, at Pueblo, the temperature having permitted the larvæ to mature.

line (band) with red running through it, as had the one that changed to the chrysalis which I last sent you."

I happen to be feeding now two mature larvæ of *Eurythme* from eggs sent from Colorado by Mr. D. Bruce, and these vary as does *Hagenii*. One has a mere trace of sub-dorsal band—a line; the other a continuous yellow band one-third the width of the white basal band, and with no red or black about it.*

As will have been seen, I have been under great obligation to Mr. Nash for the interest he has taken in these experiments, and the aid he has rendered in these four years. If I have succeeded in raising ten broods from eggs to imago, I have failed in as many more, from one cause or other, principally, however, the destruction of either eggs or young larvæ in the mail, owing generally to the summer heat in transit, but the trouble to Mr. Nash was all the same. In spite of miscarriages he persevered in obtaining and forwarding eggs, and felt as anxious as I did to establish the true position of this form *Hagenii*.

I lost some of the first of the broods by disease which attacked either larvæ or chrysalids, sometimes destroying every example of one or other. This led me to give up breeding in glasses for this species, and try the larvæ on clover growing in pots. I kept half a dozen pots ready, with a sod of white clover in each, and when young larvæ were received placed them on the leaves, and covered the whole with a muslin bag. When the leaves were much eaten, the larvæ were transferred to a second pot, and so on to maturity. In this way I have avoided disease completely, and it was little trouble to take care of the larvæ, beyond getting the pots ready. White clover is preferable to red, I find for such purpose, as being low growing with smaller leaves. Many species of *Colias* also decidedly prefer white to red clover. The same mode of treatment has been successful with other species of *Colias*. It is necessary to watch for small spiders, which may be on the plant, but I do not often lose larvæ from this cause. Of course I intend in due time to give one, and perhaps two plates to *Hagenii*, after I have learned all I can about its dimorphism.

* These larvæ have since writing the above produced *Eurythme*, the one with yellow s. d. band an orange male.

ON SO-CALLED REPRESENTATIVE SPECIES.

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

The species of our insects having near allies in the better known or earlier known European fauna, have been called "representative" by the elder Agassiz. And this term would be sufficiently exact and useful did we not associate with it the somewhat metaphysical sense, that these forms were separately created and owe their resemblance to the arbitrary will of the Creator. But the fact is that they are allied in blood, and we have found that they were once indistinguishable members of a common fauna. But now the American forms can be picked out with more or less certainty, in their several stages, by experts, and, where this can be done, the question comes up as to the designation to be employed. Shall we call them *varieties*, geographical if you will, or *species*? For my part, having studied so many of these forms, I would give them separate specific titles. For the reason, that "we may regard theoretically all species as only relatively stable; practically we have to find out the cycle of reproduction and be guided by these results in our nomenclature."* And, further, because in one and the same fauna, species are so recognized and so named, differing as slightly from each other as do these so-called "representative" species inhabiting different continents. I would call, then, our Copper butterfly *Chrysophanus Americanus* and not *phleas* var. *Americanus*. Only where the insect intergrades, interbreeds, is the term variety, I think, admissible. As a matter of fact, our American "representative" species do neither. I cannot too often insist that we, as entomologists, are here to discriminate, to talk about and illustrate the differences we find in insects, not to lump and to obliterate. From observed distinctions are born those wider conclusions to which all science tends. We need facts bearing upon each other. Here is a difference between the English and the German mind. The latter is too apt to be satisfied with the mere accumulation of learning, the compilation of literary data, catalogues, the *machinery* of science. Forgotten papers, interesting but barren incidents, a penurious dwelling on an undigested mass of detail, these often suffice for the learned German. But the English mind uses all this as a workman does his tools. Darwin came, and the before useless stores of facts were used to open our minds to the state of things about us.

* *Grote*.—The Hawk Moths of North America, p. 13.

The particular point here, however, is that these "representative" species vary *unequally*. There are all sorts of resemblances, stronger or weaker. Among the *identical* species I have referred to *Scoliopteryx libatrix*, and this is a remarkable species from its isolated structure. It is a Xanthid form, so peculiar that it has no quite near ally, and it is the same in Hudson's Bay Territory as in Europe. I have reared it from the thistle near Buffalo. Species which have such strong characters in tuftings and cut of wing are surely the same, and I have thus no doubt that our tufted cabbage *Plusia* is the same as the European, whether it was imported or whether, like *Scoliopteryx*, it is an unchanged survival. Only a certain judgment is necessary, arising from the handling of much material, to decide these points. It is a question of the *kind* of difference, not the apparent quantity. Smaller or less obvious characters are sometimes valid ones, while larger and prominent features are invalid. I should never describe as a species a form of the yellow species of *Rumia*, because black and yellow spotted insects, and especially *Geometridæ*, are prone to vary very much. Experience is especially needed in species-making. It is a little odd to notice, in this matter of varieties, how anxious some writers are to draw in the species of others, even when they absolutely do not know them, and how indifferent they are about drawing in their own varieties. They remind me of those people in ancient times who were so attentive to the wanderings of Ulysses and so oblivious of their own. My own mistakes have been sufficient to make me cautious. I do not forget that I described *Catocala sinuata* as a species distinct from *C. coccinata* Grote. But it seems to be better, when one is not quite sure, to claim the species at first, rather than describe as a variety what may turn out, in the long run, to be an independent form, having its cycle of reproduction perfectly distinct, and nowhere in the round of its life falling in with the circle of its neighbor.

ON THE GENERA ALLIED TO HOMOPTERA.

BY A. R. GROTE, A. M.

I have (CAN. ENT., vol. xv.) shown the different structure of the tibiæ in the genera of N. Am. *Noctuidæ* allied to *Homoptera* Boisid. But sometime previously I pointed out that this name was used for a section of Hemiptera, and that for this and other reasons we should probably be thrown back upon *Pheocyma* of Hübner.

This genus seems to differ by the middle and hind tibiæ being spinose. While *Ypsia* is so indifferently founded by Guenée that he gives no character at all except a presumed larval one, I find that *Umbrina* Grote, and *Undularis* Drury, differ by the tibiæ being unarmed. In the related genus *Matigramma* the middle tibiæ alone seem spinose, at least in my *rubrosuffusa* they are so. But this is not the *type*, which must be studied for this character. Again, I have many years ago proposed to distinguish *Zalc* by the generic character of the body tufts. Finally, the otherwise amply distinct genus *Homopyralis* has the slender tibiæ unarmed. It is evident, therefore, that good and valid characters separate the genera allied to *Homoptera*, or rather *Phocyma*, and that my *Ph. unilineata* and the rest may be arranged by the tibial armature, although superficially so much resembling *Ypsia*. Guenée takes no note of this, and seems quite at a loss in this group of the Owlet Moths. I had myself very little material in my collection of these genera, and I neglected their exact study accordingly.

It is with much pleasure that we have just learnt of the appointment of the Rev. George W. Taylor, of Victoria, Vancouver Island, B. C., as Honorary Provincial Entomologist of British Columbia. Mr. Taylor has been an active member of our Society for some years, and has done much good work, not only in Entomology, but in general Natural History, by working up the little known but exceedingly interesting fauna of Vancouver Island. He is one of the best Conchologists in the Dominion, and has the finest collection of British Columbian shells extant. His knowledge of Ornithology and Botany will materially enhance the value of his work as Provincial Entomologist, and his appointment cannot but result in great benefit to the farming community of the Province. We tender our sincere congratulations, not only to Mr. Taylor, but also to the Minister of Agriculture and the Provincial Legislature, for the wisdom that has been displayed in the choice of an incumbent for this important office. There are many "first-class pests" which require attention in our Pacific province already, and doubtless, now the Canadian Pacific Railroad is completed, many others from the east may be expected to be introduced by that means, and it is only by having the services of a trained scientific student at their disposal, to identify the marauders, and give information concerning the habits and best means of remedying their attacks, that the farmers can hope to protect themselves against the injuries yearly inflicted by insects.

ON THECLA FALACER AND INORATA.

BY A. R. GROTE, A. M.

The object of this note is to draw attention to a paper printed at Demopolis, Ala., Dec., 1870, in which I endeavored to reply to Mr. Scudder's objections to our determination of Hübner's Plate of *calanus*. I say: "The chances are against Hübner's having figured both sexes of the usually unspotted *T. inorata* with the spotted secondaries of *calanus* nob. Leconte has certainly figured *T. inorata*, and, as we stated before, Boisduval has used the specimen of Godart's *T. falacer* (*T. Edwardsii* Auct.) while furnishing the text. Boisduval considered Leconte's Plate as representing a form of *T. falacer*, and erroneously so, as Leconte figured for the first and only time *T. inorata*." Prof. Saunders afterwards describes the larva of *inorata* in CAN. ENT. I conclude that the two species are correctly separated and named by us in Trans. Am. Ent. Soc. I., 172, and give the synonymy. I wish to draw attention to this paper of mine, to state that, in any case, Mr. Scudder's version of Hübner's Plate is *uncertain*, from the similarity of the two species. Also, that we, having been the first in print to separate, name, and describe the two, our determination, being certain, should henceforth obtain and have priority as regards these two species of *Thecla*. The paper above referred to is now out of print, but is in several libraries and was generally distributed.

[NOTE.—Mr. Scudder writes in reply to our enquiry, that "there is not the slightest doubt as to what species Hübner figured under the name of *calanus*; it is certainly the *inorata* of Grote & Robinson." . . . "for the proper synonymy of these species, see Buffalo Bulletin, 1876, p. 110."—EDITOR *per* J. F.]

BOOK NOTICES.

The following publications have been received:—"Belostomidae and some other Fish Destroying Bugs," by George Dimmock; "Maple Sugar and the Sugar Bush," by Prof. A. J. Cook; "Entomologica Americana," vol. iv., Nos. 1, 2 and 3; "The Conchologists' Exchange"; Journal of the Columbus, Ohio, Horticultural Society; Bulletin of the Iowa Agricultural College, Botanical Department; Proceedings of the Natural Science Association of Staten Island; "The Owl," Glen Falls, N. Y.; "Science Gossip," Chatto & Windus, London, England; "The Prairie Farmer"; "The American Agriculturist"; "The Ottawa Naturalist;" etc.

CORRESPONDENCE.

CARABUS AURATUS.

Dear Sir: Mr. Grote's reference, in your June issue, to Dr. Harris's observation on *Carabus auratus*, deserves some attention. The "Insects Injurious to Vegetation" was one of my early helps to an introduction to Entomology, and in reading the passage referred to, I was led, in my inexperience, to speculate upon the probability of meeting with the beautiful beetle mentioned.

Many years ago Mr. P. S. Sprague showed me the specimen itself in Dr. Harris's collection, now in the care of the Boston Natural History Society, and told me that he had been led to surmise that this was Dr. Harris's first insect capture, and that it had been the means of turning his attention to the study and observation of insects, with the excellent result so familiar to us all. It is hardly necessary to say that the identification was correct, but the specimen was an entirely accidental introduction, and did not perpetuate its species.

It seems to me that it would be very desirable if those having a knowledge of the accidental occurrence of foreign insects in our country would publish the particulars.

F. BLANCHARD, Lowell, Mass.

PAPILIO CRESPHONTES.

Dear Sir: On May 8th, I observed four caterpillars of *Papilio Cresphontes* about two-thirds grown feeding on the Lombardy Poplar (*Populus dilatata*). The *Cresphontes* has been increasing rapidly since its first appearance in this locality in 1878. Its caterpillar has hitherto seemed to be restricted to plants of the Rue family. Leaving the Orange of the Southern States, it came north to feed upon the Prickly Ash (*Xanthoxylum Americanum*) and Hop-tree (*Ptelea trifoliata*). Both these being scarce in this locality, it has taken to the Lombardy Poplar. It may be remarked that *Populus* is botanically widely separated from the *Rutaceae*.

W. P. SHANNON, Greensburg, Indiana.

June 27, 1887.

THE ANNUAL MEETING.

The Annual Meeting of the Entomological Society of Ontario will be held in London during the month of October. The exact date is not yet decided upon, but it will be announced in our next issue.

Mailed Sept. 17.