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DESCRIPTIONS OF TWO NEW SPECIES OF MELITAEAS BELONGING TO NORTH AMERICA.

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

I. *M. BRUCEI*.

MALE.—Expands from 1.5 to 1.7 inch. Upper side brown-black, marked with spots of red and yellow in transverse bands ; there are three well marked varieties, in one of which red predominates, som. times almost to the exclusion of yellow ; in another red and yellow, much as in other allied species ; on the third much yellow, very little red ; in all the spots are small, so that the black surface is more exposed than in many species.

1. The red form. The spots dull ; the common marginal row wholly red, the submarginal row sometimes red on primaries, sometimes red partly replaced by yellow, and secondaries always red and yellow ; the third row is red and yellow on primaries, red on secondaries, the fourth row just the reverse of this ; at end of cell on primaries a short red and yellow band, in the cell four spots, red and yellow alternately, from the arc, the yellow ones very small ; on secondaries, a red stripe along upper side of cell, two small yellow spots in cell ; fringes black at ends of the nervules, yellow in the interspaces.

2. The spots of the second row red and yellow on primaries, yellow on secondaries, of the third yellow on primaries, red on secondaries ; of the fourth red and yellow on primaries, yellow on secondaries ; the two next costa sometimes red on the posterior side ; the yellow spots in cell of primaries large, and a large yellow patch below cell.

3. Nearly all spots yellow ; the marginal red ; no other red on secondaries, or a mere trace of it indicating the spots of the third row, which are otherwise suppressed ; the submarginal row of primaries represented by a few scales only, as are also the spots in cell.

On the under side all these forms agree ; primaries dull red, almost without black ; the marginal spots a deeper red, the next two rows yellow ;

the submarginal obsolete on lower half; a yellow patch subapical on costa, another outside arc of cell; the two cellular spots yellow, dusted red.

Secondaries have all the spots clearly defined; the marginal row red, the second row of yellow lunules; the third wholly red; the fourth yellow, the spots of upper half elongated and cut unequally by a black line from costa to lower discoidal nervule; beyond to base red, with a straight row of four confluent spots from costa to submedian, and a fifth at end of cell.

FEMALE.—Expands 1.7 to 1.8 inch.

Varies as the male, but some examples still more widely, the yellow spots being very large. On the under side as in the male, except that some examples have the red submarginal spots of secondaries slightly edged with yellow; in the more yellow upper side examples the yellow edging to these spots is broader, and even sometimes extends along the marginal side.

This small *Melitaea* has long been known in collections, but till recently I myself have seen few of them, and knew nothing of its localities or habits. Mr. Bruce, who took great numbers of examples, says: "I found it only on high mountain tops (in Colorado); this was strictly the rule. These tops are in most cases extensive plains covered with flowers, chiefly yellow *Compositæ*, and the *Melitæas* in question sit on every blossom in numbers, and are very sluggish—or rather I may say, they sit and cling tightly to the flowers to prevent the brisk wind, that is generally blowing at this elevation, from taking them away. I have never seen them down the slope lower than a few hundred yards. It is an abundant species on the Snowy Range at not lower than 12,000 feet, and must appear early in June, as many of my specimens taken early in July are rather worse for wear."

The species comes also from Montana, Washington Terr., and British America, in the Rocky Mts.

2. *M. TAYLORI*.

Male.—Expands from 1.6 to 1.8 inch.

Upper side brown-black, the costal margin of primaries next base dusted yellow; marked with red and clay-yellow spots disposed in transverse bands; the hind margins have a common row of red spots, almost

confluent on primaries, and a submarginal row of yellow, usually very small on primaries; on same wings a third row of large yellow spots, and a fourth row red, or sometimes red partly replaced by yellow; around the end of cell and to lower median nervule a yellow row, sometimes obsolete below cell, the remainder appearing to branch from fourth row; in the cell four spots, red and yellow alternately from the arc, and a yellow patch below cell. On secondaries the third row is of large red spots, the fourth of large yellow; a red stripe along upper side of cell and at end; two yellow spots in cell and another below; fringes blackish at the ends of the nervules, white in the interspaces.

On under side the spots are repeated, enlarged, nearly concealing the black ground on both wings; and on primaries are as distinctly defined as on secondaries, the red bright; the spots of common marginal row confluent, of the submarginal large, crescent; the red spots of third row on secondaries have each a slight yellow edging except on the posterior side; next comes a black line, and a row of narrow red spots entirely across wing as in *Rubicunda*, separated by a black line from the dorsal row of yellow spots; thence to base red, with four yellow confluent spots crossing the area from costa to submedian, and a fifth at outer end of cell.

FEMALE.—Expands 2.7 to 1.8 inch.

Like the male on both surfaces.

The preparatory stages of this species were described by me in CAN. ENT., vol. xvii., p. 156, 1885, as of *M. Rubicunda*, H. Edw., but a better acquaintance with both forms makes it certain that they are distinct species, though closely allied. *Taylori* is considerably the smaller, more constant to one type, the spots of under side not light yellow, as in *Rubicunda*, but either white or white with a mere tint of yellow. *Rubicunda* is a very variable species in all its markings.

I have named this *Melitaea* for the Rev. Geo. W. Taylor, of Victoria, by whose kind aid very much knowledge has been gained of Vancouver butterflies. I received larvæ from Mr. James Fletcher, Sept., 1884, sent him by Mr. Taylor.

These were in hibernation, lived through the winter, were fed on *Chelone glabræ*, the plant of *M. Phaeton*, and some of them pupated and gave butterflies. I related in the paper spoken of that one larva, soon after waking in spring of 1885, became lethargic, and on 23rd May I returned it to the ice box. On 6th July, I brought it to my room, but

after two days, as it had eaten nothing, though it had changed its position, I returned it to the ice box, where it was in good condition on 20th Aug. The larva died some weeks later, instead of passing the second winter as I thought it perhaps might do. Of the extent of territory on the main land occupied by *Taylori*, I am unable to speak.

NOTES ON DANAIIS ARCHIPPUS.

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

Now that the observations of my young friend, W. D. Marsh, on this species, have been given in the CAN. ENT. (xx., p. 45), I think no reasonable person can doubt that it is at least three-brooded in New England, and that the late butterflies hibernate there. Very late in the fall of 1887, Mr. Marsh saw individuals flying, long after severe frosts had been felt, and still later, he had butterflies come from pupæ. These late fliers are the hibernators. And early in the spring a hibernator had been seen at Amherst. It seems that Rev. H. W. Parker, when a resident at Amherst, some years ago, saw a hibernated *Archippus*, 12th May, 1871, as appears by his notes published in Am. Nat., vol. vi., 115. This mention had been lost sight of, but has recently been re-discovered by Mr. Scudder, who called my attention to it. Of course this settles the matter, taken together with the observations of Mr. Marsh, as to *Archippus* hibernating in Mass.

Mr. Marsh has stated, and it is an original observation on his part, so far as I know, that a great destruction of *Archippus* larvæ takes place in the fall, owing to the prevalent custom in New England of cutting the grass a second time. Were it not for that, probably hibernated imagos would be as abundant in the spring as they are in West Virginia.

I asked Miss Emily L. Morton, residing at Newburgh, N. Y., to make observations there on *Archippus*, for Newburgh is in sight of the hills of New England, and it is not to be supposed that the behavior of any species of butterfly would be different at Newburgh, in the latitude of Northern Connecticut, from what it would be inside the bounds of New England. Miss Morton wrote me that she had taken hibernated *Archip-*

pus on 3rd, 4th May (1887), at lilac blossoms, and that at the date of writing, June 27th, fresh males of the first brood of the imago were flying. Mr. Marsh says that at Randolph, Vt., far to the north, a fresh male was seen a week later, on 4th July.

On 16th August, Miss Morton wrote that a new brood of the butterfly was flying in abundance. Mr. Marsh says that at Randolph, 2 ♀, 1 ♂, perfectly fresh, were taken 11th August.

On 20th Sept., Miss Morton wrote: "Fresh examples are emerging every day now, and there are numbers of them in the clover field." Mr. Marsh says: "From 30th Sept. to 15th Oct., butterflies from pupæ bred from said larvæ emerge, and besides, many pupæ were found in the fields and the imagos came from them." So running parallel to Miss Morton's account.

On 9th Oct., Miss Morton again wrote: "On 6th and 8th of this month, we saw numbers of perfectly fresh examples of *Archippus*. We caught several, and in some the wings were still quite fresh, showing their recent advent from chrysalis. On none were there any signs of age." And she adds: "These are doubtless the hibernators." Mr. Marsh had imagos out of bred pupæ so late as 29th Oct. and 4th Nov.; and saw butterflies on the wing on 5th and 13th Oct. The history is identical in New England and eastern New York.

Years ago I followed up the life history of *Archippus* carefully in West Virginia, and in *Psyche*, vol. 2, p. 169, 1878, and *CAN. ENT.*, xiii., 211, 1882, I showed that the hibernators of this species came out of winter quarters as early as other hibernating butterflies, and with them gathered about the first blossoms of the year, which here are on the wild plum and cherry trees; that eggs were to be found, and old females were to be seen ovipositing on milkweeds but just out of ground; that in a very short time the old hibernated individuals had totally disappeared, undoubtedly dying soon after laying their eggs, as is the invariable rule with butterflies; that within a month a generation fresh from pupae was flying; and that so, certainly three, possibly four, generations of the butterfly followed the hibernators. In fact, that the habits of *Archippus* were in no way abnormal, nor was the species so long lived as others where there is but one brood per year in descent from the hibernators (as for example, in *Grapta Faunus*).

I made observations myself here at Coalburgh last season, to some extent, on this species. I found an egg 10th May, on an *Asclepias* but

four inches high. On 27th May, I found a pupa hanging to the outer side of a rail, as I crossed the railway to my garden. I then, in the fall, searched daily for eggs, to see how late they were to be found. On 2nd Sept., I found 2 eggs; on 4th, 1; on 8th, 1; on 10th, 1; on 14th, 1, and saw the female lay this egg; on 16th, found 3; on 20th, 2; on 22nd, 1. I found no eggs later than this. Mr. Marsh found larvæ up to 30th Sept., though he obtained no eggs apparently later than 5th Aug. But the eggs to produce his late larvæ must have been laid early in September. On 26th and 27th Sept., I had occasion to drive many miles, and saw great numbers of the fresh butterflies flying about the *Actinomeris* flowers. My last imago, from one of the eggs found, was 12 days in pupa and came out 11th Oct. So that the butterflies were coming out of pupæ later, if anything, at Amherst than they were at Coalburgh.

It had been said that no one ever found an *Archippus* egg in New England, or on very young *Asclepias* plants, that could have been laid by an hibernator, though thousands of plants had been searched, at different localities, by many persons. Negative evidence is no evidence at all in such a case. If one thousand plants had failed to produce an egg, the one thousand and first plant nevertheless might have it. The hibernated females are very few, as there is every reason to believe, after hearing of the wholesale destruction over large areas of country of the late larvæ; and *Asclepias* plants are exceedingly plenty in the spring, thousands of them to one *Archippus* egg, no doubt. So that a person might very possibly look all day and not find an egg. And on the other hand, the first plant touched might have an egg on it. That the eggs are there is sufficiently proven by the resultant butterflies.

ON THE NATURE OF SEASONAL DIMORPHISM IN RHOPALOCERA.

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

In studying the seasonal variation exhibited by various species of butterflies, I have been struck by the fact, that whereas in most instances the form emerging in the spring is darker and smaller than the summer brood, there are also exceptions to this rule, in which the vernal emer-

gence is the lighter. Take, for instance, the genus *Pieris*. The vernal broods of *P. napi* and *P. protodice* are distinctly more dusky than those which have undergone their whole metamorphosis in a single season; but, on the other hand, the spring emergences of *P. rapæ* and *P. brassicæ* are wont to be pale, and the spring-emerging *P. virginiensis* is pale, and as Mr. W. H. Edwards remarks ("Papilio," 1881, p. 97), more like the summer than the winter form of its progenitor *P. napi*. In Japan, it would appear ("Entomologist," 1888, p. 24,) that the vernal form of *P. napi* is less dusky than the summer emergence.

Hitherto it has been held by the majority of Entomologists that the darkening of vernal forms was due to the cold to which the pupæ were subjected during the winter, and this view seemed to receive ample confirmation when Mr. W. H. Edwards proved experimentally that cold applied to pupæ did produce darkening of the forms.

Supposing, then, that cold is the sole cause of the darkness of vernal broods, why are not *all* vernal broods dark, since they have all been subjected to a greater amount of cold in the pupa-stage than the summer ones?

It seems to me that this question is unanswerable on the supposition that duskiess is the simple effect of cold, and I have therefore been led to seek another explanation of the phenomenon.

On one occasion, I bred a specimen of the European *Geometra papilionaria* Linn., and paid particular attention to the appearance of the pupa before emergence. I noted that although there could be no doubt that the vital organs of the body were gradually formed during a considerable period before emergence, the wing-pigments did not begin to be developed until the last few days. First of all the pigment appeared brown, and only just before emergence did it assume the vivid green characteristic of the insect.

Now suppose that *G. papilionaria* were a species hibernating in the pupa-state, how would cold effect the formation of the wing-pigment? Obviously, not at all, since the pigment is not called into existence until a short time before emergence, that is to say, not until the warm spring sun has wakened the sleeping pupa into new life.

I have not had the opportunity of making careful observations of a similar kind with the pupæ of *Rhopalocera* since I began to pay special attention to the subject, but I think it will generally be accepted as a fact

that the wing-pigments are not formed until a short time before emergence. In all the cases of which I have recollection this has been so.

But I imagine that the ratio between the growth of the wing and the metabolism of its pigment is not always the same, nor is that between the wing-formation and the growth of the vital and reproductive organs constant, and herein I believe lies the key to the solution of the problem.

Rapid metabolism produces darkness of colour, while slow change accompanied by growth gives rise to a larger expanse of wing, on which the pigment is paler, lighter, and often more brilliant.

The vital and reproductive organs of a butterfly will develop *sooner and at a lower temperature* than the pigment of the wings; and hence in a country where the winters are cold and the summers hot, the hibernating pupæ will have reached a nearly full development by the time the warm weather comes on, except as regards the pigment of the wings. This will undergo very rapid metabolism to be ready by the time of emergence, and the result will be a dusky and small winged form. On the other hand, if the spring comes gradually, and the winter is warm, the wing-pigment will develop more slowly, the wings will have longer to grow, and consequently the vernal brood will be paler even than that of the summer.

And this is precisely what we find; *Pieris virginiensis* is a *pale* spring form taking the place of the *dark oleracea-hyemalis* of the more northern portion of the continent, while *P. rapæ* and *P. brassicæ*, which do not exhibit dusky vernal broods, are natives of Europe, where the winters are milder and the advent of spring more gradual than in North America.

It may here be objected, why are not tropical species, whose development is often excessively rapid, uniformly dusky or black? That they are in many cases darker than their representatives in more temperate regions will I think be admitted, but I would point out that they are not by any means in the same position as North American vernal forms. The vital organs must in any case take a certain time for development, which is always longer than that necessary for the metabolism of the pigment. So that in the case of any summer brood, however rapidly developing, the temperature being high enough to allow the development of the pigment at the same time as the organs of the body, it has ample time for sufficient metabolism—less indeed than in the case of a warm and gradual spring, but more than in that of a frigid winter and quick coming summer, where

emergence must rapidly follow the first wakening to life by the hot rays of the sun.

So I believe that sudden warmth after a period of prolonged cold, and not the cold itself, is the cause of the duskiess of North American vernal forms of Lepidoptera, and I will not hesitate to advance the same reason for the darkness of Arctic species, and of Mr. W. H. Edwards's specimens which he experimentally subjected to cold. I cannot prove anything as yet, but I put forward this theory, which has commended itself to me, in the hope that your readers, who have had much more experience in practical entomology than I, may be able to put it to the test, and either prove its accuracy, or propose some other which may serve better to explain the facts.

I believe there is a phase of melanism caused by moisture, quite distinct in its nature from the duskiess dealt with in the present paper, but I have already dealt with this question elsewhere ("Entomologist," 1887, p. 58,) and need only point out the distinction here. It becomes every day more evident, in dealing with colour-variation, that different colours do not necessarily denote essentially different pigments, and seeming identical colours may be quite unlike in their composition, though we at present do not know precisely what that is.

CAPTURES MADE WHILE TRAVELLING FROM WINNIPEG TO VICTORIA, B. C.

BY REV. W. J. HOLLAND, PH. D., PITTSBURGH, PA.

It was my privilege last summer to accompany the expedition sent out by the National Academy and the U. S. Navy Department to Japan for the purpose of observing the total eclipse of the sun which took place upon the 19th of August, 1887. The route selected by our party was the one just opened to the far East over the Canadian Pacific R. R., and I was the first passenger booked in Chicago for Yokohama, and my colleague, Prof. Todd, was the first passenger booked in Boston for the same port, over the new line. We left Winnipeg on the morning of June 13th, and were borne westward without any detention until the 15th, when,

owing to the fact that the railroad bridge at Duthil had been partially carried away by a freshet in the Bow River, we were compelled to lie at Canmore Station for about twenty-four hours. The delay was rather acceptable to me, as it enabled me to do a little collecting in a region wholly new to me. We reached Vancouver upon the evening of June 17th, and on the morning of the 19th were courteously permitted by Captain Marshall, and Captain Webber, the Naval Superintendent of the Can. Pac. R. R., to go to Nanaimo, on Vancouver Island, where the "Abyssinia" took on her coals. Upon the morning of the 20th, while the "black diamonds" were being poured into the hold of the great ship, I took refuge from the dust and discomfort which prevailed on board, and with the assistance of a couple of Indian lads, spent two hours in collecting specimens a few hundreds of yards from where the ship was tied up to the shore. My captures consisted exclusively of Coleoptera. I saw a specimen of *Argynnis*, and a fine male of *Papilio Eurymedon*, but neither came within reach of my net, and after giving chase for a moment, I reverted to the more profitable task of gathering the beetles, which appeared to be abundant. The result of my collecting at Canmore and at Nanaimo is given in the accompanying lists. I am indebted to my good friends, Dr. John Hamilton of Allegheny, and Dr. Geo. H. Horn of Philadelphia, for the determination of the Coleoptera.

Species Collected at Canmore, June 15th, 1887.

LEPIDOPTERA.

- | | |
|---|---|
| 1. <i>Papilio zolicaon</i> , Boisd., 1 ex. | 9. <i>Chionobas Chryxus</i> , |
| 2. <i>Colias</i> var. <i>occidentalis</i> ♂ 1 " | Dbly.-Hew., 1 ex. |
| 3. <i>Thecla Irus</i> , Godt., 4 " | 10. <i>Nisoniades Icelus</i> , Lint., 3 " |
| 4. <i>Lycæna antiacis</i> , Bdl., 13 " | 11. <i>Heliothis</i> , sp., 2 " |
| 5. " <i>amyntula</i> , Bdl., 7 " | 12. <i>Rheumaptera</i> , sp., 1 " |
| 6. <i>Phyciodes Montana</i> , Behr., 1 " | 13. <i>Eupithecia</i> , sp., 1 " |
| 7. <i>Argynnis Freya</i> , Thnb., 2 " | 14. <i>Nephopteryx</i> , sp., 1 " |
| 8. <i>Erebia Epipsodea</i> , Butl., 1 ex. | |

COLEOPTERA.

- | | |
|--|--|
| 1. <i>Pterostichus Lucasii</i> , Dej., 1 ex. | 4. <i>Acmacops pratensis</i> , Laich., 3 ex. |
| 2. <i>Trichodes ornatus</i> , Say, 2 " | 5. <i>Saperda tridentata</i> , Oliv., 1 " |
| 3. <i>Dichelonycha Backii</i> , | 6. <i>Lepyrus gemellus</i> , Kirby, 1 " |
| Kirby, 39 " | |

At North Bend Station, B. C., after lunch, I succeeded in taking before the train started four specimens of *Cicindela Oregona*, Lec.

My search for Lepidoptera and Coleoptera at Canmore was interfered with by the presence of larger game, and I was so much engrossed by the chase of a lynx that I neglected my entomological opportunities, as I have now occasion to regret, inasmuch as the lynx in the end proved missing.

List of Coleoptera taken at Nanaimo, June 20, 1887.

- | | |
|---|---|
| 1. <i>Notiophilus Sibiricus</i> , Mots., | 24. <i>Corymbites fallax</i> , Say, 1 ex. |
| 1 ex. | 25. " <i>inflatus</i> , Say, 1 " |
| 2. <i>Pterostichus lustrans</i> , Lec., 1 " | 26. <i>Chalcophora angulicollis</i> , |
| 3. <i>Amara fallax</i> , Lec., 1 " | Lec., 9 " |
| 4. <i>Harpalus rufimanus</i> , Lec., 1 " | 27. <i>Dicerca tenebrosa</i> , Kirby, 1 " |
| 5. <i>Anisodactylus Californicus</i> , | 28. <i>Buprestis aurulenta (lauta)</i> |
| Dej., 1 " | Lec., 33 " |
| 6. <i>Silpha Lapponica</i> , Hbst., 1 " | 29. <i>Melanophila longipes</i> , Say, |
| 7. <i>Coccinella sanguinea</i> , Linn., 5 " | 10 " |
| 8. <i>Anatis Rathvoni</i> , Lec., 1 " | 30. " <i>Drummondi</i> , |
| 9. <i>Psyllobora taedata</i> , Lec., 3 " | Kirby, 18 " |
| 10. <i>Scymnus Phelpsii</i> , Crotch, 1 " | 31. <i>Chrysophana placida</i> , Lec., |
| 11. <i>Trogosita virescens</i> , Fab., 24 " | 1 " |
| 12. <i>Peltis Pippingskoeldi</i> , | 32. <i>Podabrus piniphilus</i> , |
| Mann., 3 " | Esch., 2 " |
| 13. <i>Adelocera profusa</i> , Cand., 1 " | 33. <i>Telephorus Curtisii</i> , Kirby, 1 " |
| 14. <i>Alaus melanops</i> , Lec., 1 " | 34. " <i>divisus</i> , Lec., 1 " |
| 15. <i>Cardiophorus tenebrosus</i> , | 35. <i>Clerus sphaeus</i> , Fab., 7 " |
| Lec., 1 " | 36. <i>Ptilinus basalis</i> ♂, Lec., 1 " |
| 16. <i>Elater apicatus</i> , Say, 1 " | 37. <i>Ceruchus striatus</i> , Lec., 2 " |
| 17. " var. <i>phoenicopterus</i> , | 38. <i>Asemum atrum</i> , Esch., 3 " |
| Germ., 1 " | 39. <i>Tetropium velutinum</i> , Lec., 2 " |
| 18. <i>Agriotes Thevenetii</i> , Horn, 1 " | 40. <i>Xylotrechus undulatus</i> , Say, 1 " |
| 19. <i>Dolopius lateralis</i> , Esch., 2 " | 41. <i>Rhagium lineatum</i> , Oliv., 1 " |
| 20. <i>Melanotus fissilis</i> , Say, 1 " | 42. <i>Leptura obliterated</i> , Hald., 1 " |
| 21. <i>Limonium Californicus</i> , | 43. " <i>chrysocoma</i> , Kirby, 1 " |
| Mann., 1 " | 44. " <i>scripta</i> (var. <i>a</i>) |
| 22. <i>Athous vittiger</i> , Lec., 1 " | Lec., 2 " |
| 23. " n. sp. (<i>fide</i> Dr. Horn) 1 " | 45. <i>Syneta albida</i> , Lec., 1 " |

46. <i>Haltica bimarginata</i> , Say, 23 ex.	53. <i>Anaspis atra</i> , Lec., 8 ex.
47. <i>Phellopsis porcata</i> , Lec., 1 "	54. " <i>rufa</i> , Say, 1 "
48. <i>Eleodes cordata</i> , Esch., 7 "	55. <i>Eurygenius campanulatus</i> , Lec., 1 "
49. <i>Iphthimus serratus</i> , Mann., 5 "	
50. <i>Platydemia Oregonense</i> , Lec., 4 "	56. <i>Rhynchites bicolor</i> , Fab., 3 "
51. <i>Helops pernitens</i> , Lec., 1 "	57. <i>Annlesia granicollis</i> , Lec., 1 "
52. <i>Cistela variabilis</i> (var. <i>c</i>) Horn, 1 "	58. <i>Sciopithes obscurus</i> , Horn, 1 "
	59. <i>Dorytomus luridus</i> , Mann, 2 "
	60. <i>Orchestes canus</i> , Horn, 1 "

While lying in the harbor of Victoria for a few hours, during which I did not have the privilege of going ashore to collect, I climbed to the main-top of the steamer, and while sitting at the cross-trees a specimen of *Pachyta liturata*, Kirby, came flying toward me and settled on my arm. It was promptly captured and tied in a corner of my handkerchief, and is now embodied in my collection. Numerous specimens of *Melanophila longipes* also came on board and sought refuge in the seams between the planking of the deck. I caught a dozen or more, and for two days afterwards, when fully six hundred miles off the coast, a stray specimen would now and then turn up upon the spray-swept deck of the vessel.

The success which attended my efforts to collect at Nanaimo reveals the richness of the locality. I was absent from the steamer about two hours, from 7.30 a. m. until a little before 10 a. m. My collecting was all done in a little clearing made by an Indian for the purpose of planting a few rows of beans and potatoes. The area covered did not exceed 75 yards square. The sun was shining brightly, and about the trunks of the freshly fallen fir trees and under their bark the Buprestidæ and Elateridæ were particularly abundant. It was with pleasure that I recognized *Trogosita virescens* in this high northern latitude, as heretofore it has been represented in my collection mainly by specimens from Florida. Most of the specimens have dark blue elytra, but a few have the typical green. I trust at some future day to be able to explore patiently and thoroughly the length and breadth of Vancouver Island and the coast of British Columbia lying to the East and North.

STRAY NOTES ON MYRMELEONIDÆ, PART 4.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from vol. xx., page 74.)

8. *Brachynemurus Carrizonus* Hag., n. sp.

Yellow with black lines ; face yellow, above with a transversal narrow black band, separated by a yellow crescent from the antennæ, and by a narrow yellow line between the antennæ from the vertex ; a faint median black line goes from the black band nearly to the clypeus ; labrum yellow ; palpi short, pale yellowish, maxillary with apical joint, cylindrical, black except on tip, the two preceding joints with a brownish mark in the middle ; labials a little longer, apical joint hirsute, black shining except on base, fusiform, thickened, the apical third thin, pointed ; on the inflated part an ocellus like spot. Antennæ not fully as long as head and prothorax, strong, clavate, black, faintly annulated, the two basal joints shining brown below, yellow above, club luteous ; antennæ of female shorter, club broader ; vertex elevated, rounded, yellow, before a yellow transversal band ; above two black transversal bands, the last one dilated behind on each side of the middle to a larger triangular or square spot ; one specimen with the anterior band interrupted in the middle. Prothorax little longer than broad, rounded before, yellow with four black longitudinal bands, the internals approximate ; space between the externals with a yellow band, or divided in two elongate spots ; the two externals sometimes broader near the head, and a little divergent ; one specimen has the externals reaching only the transversal furrow. Mesothorax black, with two anterior yellow dots and some near the wings, two yellow angular bands divided from behind on the disk ; the hind part yellow with two black approximate anterior spots ; metathorax similar but the yellow predominant ; sides of thorax black with yellow marks.

Abdomen slender, of male longer than wings, very finely clothed with white hairs, black, the two basal segments above yellow with a broad black median band, the following similar, but the black band broader ; the last four segments black ; appendages pale with long black hairs, as long as the last segment, slender, a little incurved ; the last segment below at the end with numerous long black hairs ; it can not be ascertained if among the hairs is a triangular plate ; abdomen of female a little shorter

than the wings, the yellow lateral marks on all segments ; genitals yellow, superiors split with two transversal rows of strong black spines ; below two very small cylindrical appendages.

Legs short, yellowish, strongly sprinkled with black and with black hairs, tip of tibia, of third and apical joint of tarsus black, fourth entirely black ; spurs brown, incurved, as long as the two basal joints.

Wings hyaline, pterostigma small, yellowish white, interiorly a dark dot ; only the last costals before it forked ; venation dark, largely interrupted with white ; along the mediana and submediana the costals marked with dark, also the base of the small forks on the apical and hind margin of the front wings.

Length of body, male 35 m.m. ; female 25 m.m. ; exp. al., 45 to 50 m.m.

Habit., Carrizo Springs, Dimmit Co., Texas, just on the border of Mexico ; two males, three females.

It has the appearance of a smaller form of *B. peregrinus*. A larger male, length 38 m.m., exp. al. 60 m.m., is apparently just transformed, with the colors not yet finished, from Tusco, Arizona. I can not separate it from the Texan species.

9. *Brachynemurus Sackeni* Hag., n. sp.

Yellow, variegated with black ; face yellow, with two oblique ovoid black spots near the antennæ ; labrum yellow ; palpi brownish, maxillary with the last joint cylindrical ; labials little longer, last joint fusiform and black on the basal half, with a few hairs ; antennæ longer than head and thorax, black, faintly annulated, clavate, more luteous on tip, below dull, the two basal joints brown shining ; vertex elevated, rounded, black with whitish hairs in front ; yellow with two lacerated black spots on top, which unite anteriorly, surrounding a median heart-shaped yellow spot, two yellow dots behind it, sending to occiput on each side a fine black line ; a black dot near each eye. Prothorax as long as broad, yellow, with two black median lines, separated by a fine yellow line, which is enlarged behind ; on each side a black interrupted line, and a similar one shortly before the side margin, which is clothed with white hairs ; below a black band near the side margin ; mesothorax blackish-fuscous, on each side a yellow maculose band, and some dots ; besides three small black shining dots on each side ; the posterior middle part bright yellow, with three

black dots behind, and two in the anterior corner similar to the ocellus-like spots of *M. conspersa*; metathorax yellow, divided by black cross lines; sides largely black; thorax between the wings and legs black with many yellow spots and stripes. Abdomen of male slender, longer than wings, densely clothed with long black villosity; black, each segment with a large yellow spot in middle, a yellow band at the apex, and a yellow band, except on the three last segments, on base; appendages, long 4 m.m., full as long as the two last segments, thin, cylindrical, a little incurved, clothed with long black hairs; between and below a short pyramidal tubercle with longer hairs. Abdomen of female similar, as long as the wings; genitals with a row of black spines, appendages brownish.

Legs very slender, short, pale, hairy, sprinkled with black, femur and tibia with a more or less distinct black ring at base and before tip; tibia with the three last joints black at tip, fourth nearly entirely black; spurs brown, as long as first joint.

Wings slightly fumose; pterostigma whitish after a darker spot; only few of the costals forked before it; venation black, largely interrupted with pale; some transversals near the mediana and submediana, and the small forks near tip and hind margin more or less fumose; hind wings less marked; venation and hind margin villous.

Length of body, male 35 m.m.; female 25 m.m. Exp. al. 40 to 50 m.m.

Habit.—Texas, Dallas, Boll, and Waco by Belfrage, May 3 to 7; June 10. California, San Francisco, O. Sacken and Austin; Tucson, Arizona. Seven males and two females.

Two females from Colorado, sub-alpine, July, length 35 m.m.; exp. al. 58, can not be separated from the males, except the larger size; the description agrees fully, the legs and wings are stronger marked; the abdomen is as long as the wings, the genitals with a row of strong black spines, the small appendages yellow. The greatest breadth of the wings is 9 m.m. where it is of the males only 6 m.m.

10. *Brachynemurus longipalpis* Hag., n. sp.

Pale yellow, marked with black; face very pale yellowish, with a small black median spot above; sometimes between the eyes and the base of the antennæ a faint black stripe and another one on the inner side of the base of the antennæ; labrum pale yellow; maxillary palpi pale, of com-

mon size and shape; the apical joint longer than the others, cylindrical, tip a little pointed, light brown; labial palpi of unusual length, longer than the head, about 3 m.m.; second joint about thrice the length of the last maxillary joint, much stronger, hairy, a little incurved, suddenly thickened above just before tip, where it is brownish; last joint as long as the second, strongly clavate before the short, fine, cylindrical tip, hairy, yellowish inside, externally brown, blackish on the club. Antennæ nearly as long as head and thorax, strong, thicker to tip, fuscous, annulated with yellowish, the two basal joints and basal half of antenna below yellowish; vertex elevated, pale yellow, on top a transversal black line interrupted in the middle, where is a black spot, and a second transversal line formed by four black spots, besides some black dots near the occiput. Prothorax a little longer than broad, narrowed before and rounded; pale with whitish villosity; two fuscous longitudinal bands, approximate and reaching the front margin; on each side, more distant, a fuscous band, ending in the transversal furrow with a black spot; below along the side margin a black stripe; mesothorax pale yellow with short black bands, forming three forks, open behind, and a similar on the hind middle part; metathorax with a black cross; sides of the thorax yellow, with a black maculose longitudinal band. Abdomen of male considerably longer than the wings, slender, with whitish villosity, intermixed with brown hairs on the apical half, fuscous below, above with a broad yellow band, divided by a fuscous line on the segments 1 to 4; a yellowish median line on the three last segments, and some lateral marks; appendages very short, cylindrical, going downwards, a little divergent, yellow with a black stripe above, strongly clothed with black hairs. I can not find below them any middle part or plate. Abdomen of female as long as the wings, blackish-fuscous, with two yellow dorsal bands from the third segment to apex; genitals light brown with a row of strong black spines; below two short cylindrical appendages with long black hairs. Legs short, pale yellow, moderately sprinkled with black, with strong black spines and on the interior of the anterior femora with white spines; tibia with a fine black ring near the base; tip of tibia and all joints of tarsi black; spurs brown, strong, as long or a little longer than the two basal joints. Wings hyaline, pterostigma white after a brown spot; costals simple, a few forked before the pterostigma; veins fuscous interrupted with pale, near the submediana fumose, forming a more or less visible longitudinal dark line; near the

hind margin and along the gradate veins parallel to tip slightly fumose; venation and hind margin villous; hind wings hyaline.

Two females from Nevada have more variegated front wings; nearly all the oblique veins below the submediana, the forks along the hind border are more infumate, which makes the wing look strange; the femurs of hind legs fuscous.

Length of body, male 38 m.m.; female 26 m.m.; exp. al. 48 to 52 m.m.

Hab., California, Cap San Lucas, by Xanthus de Vesey; Humboldt Station, Nevada, July 29, by O. Sacken. Of the 9 specimens before me, 7 are from California (one female), all alike; the two females from Nevada are stronger colored, but otherwise not different. The great length of labial palpi is a character not to be found in another species.

NOTES ON LYCAENA PIASUS, BOISD.

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

This is in California the first butterfly to emerge in the spring, appearing in February, though it is the accepted representative of the Eastern *Neglecta*, which is not the first to appear there. *Piasus* is double brooded; the second brood coming in the latter part of April, and between it and the first brood a few days intervene when no *Piasus* are seen. Both broods are very fond of water, being always found on damp sands of wet places, and at the brookside crossings. They are also often seen feeding on willow blossoms. A large series gives a uniform expanse of 1.1 inch. I can detect no difference in the markings or size of the two broods.

The larval food-plant of *Piasus* is the buds of *Adenostoma fasciculatum*, an anomalous genus which has no representative, even approximate, in the Eastern States. The Spanish name is "chamiso," which is Anglicized into "chemise." It is a heath-like plant, 4 to 6 feet high, resembling a juniper bush more than any other Eastern plant. Every part of it is brittle, dry, and rather resinous, burning freely when quite fresh and green. The leaves are very small, round like pine needles, and evergreen; they grow all along the stems in little bunches or "fascicles," whence the specific name. The flowers are minute, profuse, in dense terminal racemes on the tips of the twigs, white, scarcely or not at all fragrant, though forming one of the chief sources of honey in the country,

and it is notable that while the plant is abundant and flowers so profusely as to whiten the landscape, the seeds have never been found. It grows upon the dry hillsides and covers uncounted square miles of waste land.

This plant, growing at a distance from the usual haunts of *Piasus*, is that butterfly's food plant. While the flower buds are as yet but in their merest infancy, the female *Piasus* of the first brood deposits her eggs, singly, on the bud and between it and the stem. The female of the second brood finds the flowers in blossom. The egg is white, round, flattened, with a depressed point in the center, like other *Lycaena* eggs.

While *Adenostoma* is entirely foreign to any plant in the Atlantic States or Europe, it is placed by botanists in the Order Rosacæa, and among eastern plants those nearest it are: *Alchemilla*, "lady's mantle;" *Agrimona*, "agrimona," and *Poterium*, "burnet," though all of these are very unlike in appearance to *Adenostoma*. It is possible that the buds or the immature seeds of other Rosaceous plants might feed *Piasus* larvæ, as cherry, plum, strawberry, etc.

CORRESPONDENCE.

WIND-VISITING MOTHS.

Dear Sir: I have given in the CANADIAN ENTOMOLOGIST a preliminary list of those moths which do not breed continuously in our North American Territory, as defined by Leconte. It has been my theory, stated in numerous papers within the past fifteen or twenty years, that a number of species of moths, found as moths within our limits, are wind visitors. I have been at some pains to point out that the Cotton Worm Moth is, so far as the Central Cotton Belt is concerned and the territory north of this, only a summer breeder, and that it is winter-killed over the larger portion of our continent over which it flies. I ascertained, while in the employ of the Agricultural Department, that, on the coast of Georgia, the earlier or later appearance of the Cotton Worm depended, at least in some seasons, upon the average direction and force of the wind. No continued observations could be taken, but as the general course of the wind is from south to north during the summer, what I heard agreed with my previously published conclusions. My theory as to the Cotton Worm has been ingeniously covered up in his Reports by

Prof. Riley, but I refer to my statements in print and to the fact that the line of continuous breeding is yet unfixed, while it is the primary object to be ascertained by practical entomologists. On page 56 of this volume, Mr. Smith "dissents from the idea" that certain Sphingidæ or Hawk Moths determined from our territory by Mr. Edwards should be taken into our fauna in papers on our fauna. He demands that the right should be made clear by ascertaining that the insect breeds within our territory. I agree with Mr. Edwards that we should take all species found within our territory into our lists and treat them as belonging to our southern fauna, until it is proved that they do not breed with us; and *then* with the remark that they do not breed, but are merely wind-visitors as moths. How can we pass over such a fact, as their being found with us, in silence? Again, seeing the large extent both of our territory and of our ignorance of the conditions under which our moths live, how can we pronounce whether or no these moths may not be summer breeders, or occasional breeders? Who knows that *Philampelus typhon* does not breed seasonally in Arizona? Mexican moths are probably more often found in Texas than we have yet any idea; and Cuban in Florida. Mr. Roland Thaxter has bred the Spanish moth, *Euthisanotia timais* in Florida. This is quite a pronounced tropical form. The moth in numbers is beaten by the wind into the light-houses on the coast at least as far north as New Jersey, probably much higher up. We must keep a busy record of the habits of these moths to understand their geographical distribution and their habits. Any ignoring of them in monographic works will tell against the completeness of such works, while the moths, unhindered by the defects in our literature, will wing their way northward and become at least adopted citizens of our domains every summer. As to the Hawk Moths, the Blue and Green Hawk (*labruscæ*) has been taken in Missouri and in New Jersey. Tropical species of the Owlet Moths allied to *Erebus odora* have been taken so far north as Wisconsin, coming up the valley of the Mississippi. I refer the student to my general paper on the Geographical Distribution of our Moths in these pages, and I earnestly hope that all our wind-visitors will be catalogued, described and put on record, since it seems to me we can get no complete picture of our fauna without them. The limit of their continuous breeding must be ascertained, as also of their summer migrations. Do not our ornithologists take into their works and

distinguish between continuous residents, summer breeders, and birds of passage? These moths are our birds. The ornithologists have already a trinomial nomenclature, which we may come to use in time. After awhile the most self-important classifier will come to appreciate the fact, that the laws of Nature are of general application, and that the value of Natural Science is tested by its ability to broaden our views and widen our understanding. It is clear we must compare our results with those reached in other branches of Natural Science.

A. R. GROTE, Bremen, Germany.

A RARE MOTH.

Dear Sir: Permit me, in the pages of your valuable journal, to record the capture here of an interesting moth,—the rare and beautiful *Hepialus auratus*, Grote. Towards the close of last July, while strolling through a cool shady ravine at Lancaster, near this city, I came upon my treasure resting upon the leaf of a wild gooseberry bush that grew on a knoll, surrounded by as rich a growth of vegetation as nature can well produce in this latitude. As it hung to the leaf with its wings steeply closed over its back, and the tip of its long body elevated, it was a very difficult object to detect; and in the deep shade in which it occurred, greatly resembled a yellow, partially dead, leaf. The well known larvæ of *Grapta progne*, which feed on this plant, derive perhaps some protection from a similar coloring. May not this circumstance indicate the gooseberry as the food-plant of the golden *Hepialus*? The type specimen of this species was taken by the late Mr. W. W. Hill in the Adirondacks, July, 1877, and was described by Mr. Grote in the CAN. ENT., vol. x., page 18. As I find no reference to the capture of another example, I presume the present to be its second recorded occurrence.

E. P. VANDUZEE, Buffalo, N. Y.

CELIPTERA BIFASCIATA, BATES.

Dear Sir: Mr. John B. Smith has compared my types of *Celiptera bifasciata*, described as a new species in the CAN. ENT., May, 1886, page 94, and informs me that it is evidently identical with *Phurys vinculum*, Guen.

J. ELWYN BATES.

Mailed May 2nd.