

A Chrysalis.

My little Maedchen found one day
A curious something in her play,
That was not fruit, nor flower, nor seed;
It was not anything that grew,
Or crept, or climbed, or swam, or flew;
Had neither legs nor wings, indeed;
And yet she was not sure, she said,
Whether it was alive or dead.

She brought it in her tiny hand
To see if I would understand,
And wondered when I made reply,
"You've found a baby butterfly."
"A butterfly is not like this,"
With doubtful look she answered me.
So then I told her what would be
Some day within the chrysalis:

How, slowly, in the dull brown thing
Now still as death, a spotted wing,
And then another, would unfold,
Till from the empty shell would fly
A pretty creature, by and by,
All radiant in blue and gold.

"And will it, truly?" questioned she—
Her laughing lips and eager eyes
All in a sparkle of surprise—
"And shall your little Maedchen see?"
"She shall!" I said. How could I tell
That ere the worm within its shell
Its gauzy, splendid wings had spread,
My little Maedchen would be dead?

Today the butterfly has flown—
She was not here to see it fly,—
And sorrowing I wonder why
The empty shell is mine alone.
Perhaps the secret lies in this:
I too had found a chrysalis,
And death that robbed me of delight
Was but the radiant creature's flight!

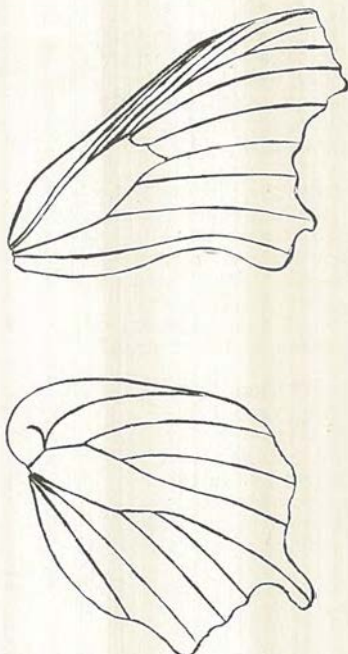
—MARY EMILY BRADLEY.

GENUS *POLYGONIA*, HUBNER.

The Angle-Wings. Fig. 67.

Butterfly—Medium sized or small, characterized by the more or less deeply excavated inner and outer margins of the fore wings, the tail-like projection of the hind wings at the extremity of the third median nervule, the closed cell of the fore wings, and the thick covering of scales on the upper side of the palpi, while on the sides and tops of the palpi there are but few scales. They are tawny on the upper side, spotted and bordered with black; on the under side mimicking the bark of trees and dead leaves, often with a C-shaped silvery spot on the hind wings. The insects hibernate in the butterfly form in hollow trees, under bark and leaves, and like places.

Early Stages—The eggs taller than broad, tapering upward from the base. The sides are ribbed. They are laid in clusters or in a short string-like series. The caterpillar is cylindrical, adorned with rows of branching spines. They feed upon the nettle, elm, hopvine, and other plants

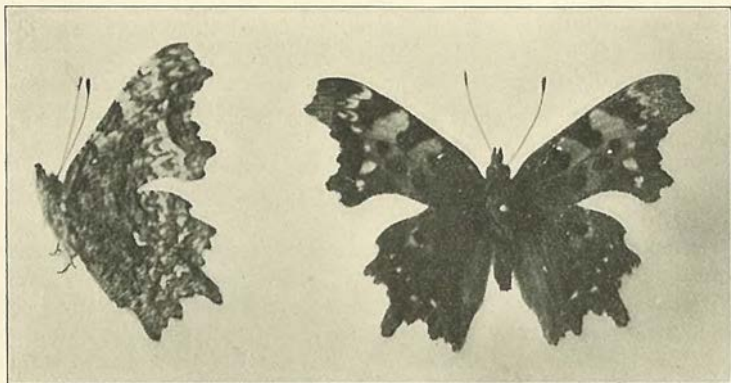
Fig. 67. Venation of *Polygonia*.

Key to Species.

- | | |
|---|-------------------|
| Small, under side crossed by a pale gray or white band | <i>gracilis</i> . |
| Under side marked with dark and pale shades, heavy black border above | <i>faunus</i> . |

Under side paler, yellowish brown	zephyrus.
More decided markings than the last	satyrus.
Under side pale purplish gray	hylas.
Under side very dark, paler irroration	silenus.

THE FAUN.

Polygonia faunus Edwards. Fig. 68.Fig. 68. *Polygonia faunus*.

Butterfly—Upper surface fulvous, dark, the hind wings darker. Next the apex of the fore wings, the base of both wings, and the inner margin of hind wings dusky. Border of wings broad and dark brown or black, in the fore wings dentate at the apex, and bordered within by a series of sub-obsolete tawny lunules. There are two spots and a bar in the cell, and a bar at the end, but there are only three round spots between the cell and the posterior angle, the lowest supplemented by a shade above it. The spots are very dark or black.

Hind wings with dark ferruginous next the border, shading toward the middle, a series of paler spots next the border and an irregular roof of black spots across the middle.

Under side of both wings dark brown on the base, with an irregular common blackish band across the middle, darkest on its outer edge and within the abdominal margin, where its outline is obliquely serrated. Beyond this band the color is pale brown mottled with grayish white, which is clearest on the fore wings. The whole surface is clouded with vinous, and more or less crossed by fine abbreviated streaks of brown. Apex of fore wings yellow-brown, with three small lanceolate ferruginous spots, the lower enclosing a blue or green point. The outer margin of both wings, below these, is bordered by a series of confluent blue-black, sometimes olive-green spots following the outline of the wing. Within these is another series of rounded spots of the same color. On the disk of the hind wings is a white G varying in form.

Early Stages—The mature larva is one and a quarter inches long;

head black, with two branching horns and a few scattered white hairs. Upper side of joints 2 to 6 brick-red, stripped transversely with blue, yellow and black, a few white hairs on joint 2. There are four branching yellow spines, with black tips, on joints 3 and 4, and six on joints 5 and 6. Joints 7 to 12 are white, with a faintly marked black stripe along the back, each joint with three transverse yellow bands and two oblique black spots. These joints have each seven spines, all white except the one next the lowest, which is brown. Last two joints black, with seven and four spines respectively. Sides red, with two black bands, the lowest spotted with blue.

The chrysalis is grayish brown. Head with two bi-forked horns, the outer point very short; thorax with an elevated keel-like ridge on top, with a small tubercle on each side.

The food plants are gooseberry, currant, willow and birch.

Distribution—It is found from New England south to the Carolinas and west to the Pacific.

The collection at the University embraces specimens from Missoula, Sinyaleamin Lake, Flathead Lake, Swan Lake (many).

At Swan lake, August 20, 1903, *faunus* was abundant at Bond's cabin, but was very hard to take. It was flying about the lake shore and around the cabins of Bond and Groom, forest rangers, in common with *Vanessa J. album*, *Vanessa californica*, *Polygonia satyrus* and *P. zephyrus*. Although quite abundant comparatively few were taken. Brandegee has taken it at Helena.



Fig. 69. *Polygonia faunus* on the left, black satyrus in the middle, *zephyrus* on the right, under side of wings.

THE SATYR.

Polygonia satyrus, Edwards. Fig. 69.

Butterfly—Expanse 1.75 to 2.00 inches, 45-51 mm. Tawny or fulvous above. Wings with dark brown, almost black border. A row of lunules of lighter color than ground work within the black border. General color much lighter than *faunus*. Inside of the lunules is a wash of reddish brown, almost making a line across both wings, more conspicuous on

hind wings. Bases of wings brownish black. Under side of wings dark, with light mottlings and marblings. Apex of fore wings lighter. The light markings make a band across the wings, the inner margin of which crosses the middle of the wings. A light patch usually on costa of fore wings, between light band and base. Wings deeply excised. Legs and feet light colored. Antennae ribbed below, with black clubs, the ends of which are of the same color as the upper surface of wings.

There are two forms. One is very dark below, almost black, with a white open C like in *faunus*. The other is much lighter below, the color being a dark brown, the spot on hind wings forming a G, larger. The under surface is broken by darker brown patches extending crosswise of the wings. Above the wings are lighter and the black spots much smaller.

Early Stages—The caterpillar feeds on the nettle.

Distribution—From Ontario to the Western part of the United States. It has been collected in the state by Elrod at Missoula, at Sinyaleamin and Swan lakes; by Cooley at Bozeman, September, 1899; by Brandegees at Helena.

THE ZEPHYR

Polygonia zephyrus, Edwards. Fig. 70.

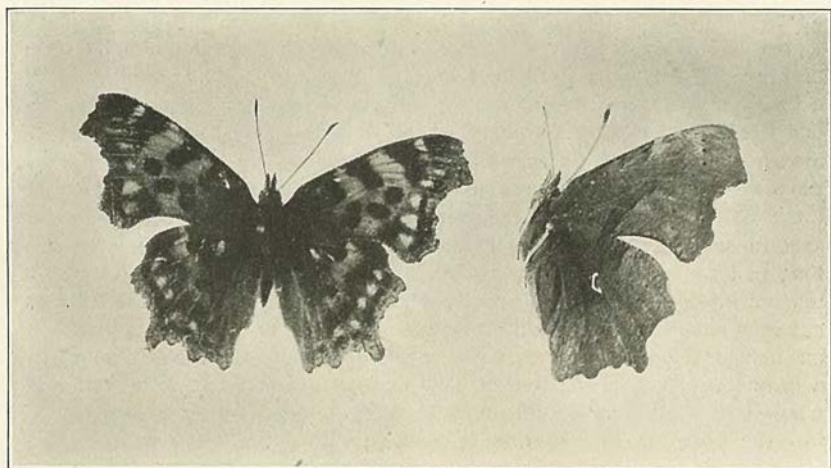


Fig. 70. *Polygonia zephyrus*.

Butterfly—Upper side of wings similar to *faunus* and *satyrus*, fulvous, marked with yellowish toward the outer margins, the dark markings upon which are not as heavy as in the other species. Below the wings are much paler than in *faunus* or *satyrus*, reddish brown, marbled with darker brown lines; the band across the wings is quite light, the female with a row of small light yellowish spots pupiled with black.

Distribution—Rocky Mountain region from Colorado to California, and from Oregon to New Mexico (Holland). Taken in Montana by Cooley

at Bozeman, by Wiley at Miles City, Brandegees at Helena, and by Elrod at Missoula. One worn specimen from Bear Paw Mountains belongs to this species.

THE GRACEFUL ANGLE-WING.

Polygonia gracilis, Grote and Robinson.

Butterfly—A small species, rather heavily marked with dark or blackish on the upper side. The wings on the under side are very dark, crossed about the middle by a pale gray or white band, shading off toward the outer margins. This light band serves as a means of easily identifying the species. Expanse, 1.75 inches, 45 mm.

Early Stages—Unknown.

Distribution—The species has been found on White Mountains in New Hampshire, in Maine, Canada and British America, as far west as Alaska.

While the species is recorded as having a western distribution it has not been taken by the writers in the state, nor is it reported in the other collections.

THE SILENUS ANGLE-WING.

Polygonia oreas, var. *silenus*, Edwards.

Butterfly—Expanse, 2.2 inches, 56 mm. Primaries moderately incised; slightly dentated; tail long, broad and straight; a prominent dentation between tail and inner angle, which last is much pronounced. Upper side deep red-fulvous, clouded with brown-ferruginous next base of each wing and on disks, and spotted with black, hind margins have a broad cinnamon border of nearly uniform width, black with a ferruginous tint; on the inner side a series of separate, pale fulvous spots, yellowish next apex of primaries, irregular in size, lanceolate; primaries have a large sub-apical ferruginous patch on costal margin, another near inner angle, a broad black spot from costa covering the arc, two oval spot in cell placed transversely and sometimes confluent, two others in first and second median spaces, and a large sub-ovate spot on sub-median interspace extending partly over the one next above. Secondaries have the entire costal margin brownish-black, a large irregular black patch on disk between upper branch of the sub-costal and the median nervure; a brownish-ferruginous patch at base of the upper median nervules; the whole extra-discal area suffused with ferruginous, passing imperceptibly into the marginal border; fringes fuscous, with a very little white in the emarginations.

Under side mostly in shades of black or black-brown, the entire surface, except where deep black prevails, covered with fine abbreviated streaks darker than the ground; apex of the primaries faintly tinted with olivaceous; costal margin brown, with a few gray scales near apex, a whitish patch beyond extremity of cell and a smaller one nearer base; base of primaries brown, of secondaries brown next costa, black towards abdominal margin; the disks crossed by a common, broad, black band, very irregular in its exterior outline, on lower part of secondaries merging into the black basal area, outside the band, on primaries and upper part of secondaries, grayish-white for a little space, densely streaked,

and beyond to margin blackish-brown; the extra-discal points nearly or quite lost on the dark ground; sub-marginal crescents black, obsolescent, often wanting altogether; in the cell of primaries three elongated, narrow, deep black spots, two of which lie along the costal nervure, separated by a very small interval, and each edged by a velvety black line; the third along median nervure, illy defined without such edging; the spot on disk of secondaries dead white, bent at right angles; the lower limb straight, thick abruptly sloping to a point by the cutting away of its upper side; the upper branch narrower, slightly curved, nearly as wide at top as elsewhere and ending bluntly; fringes with the white area more extended than on upper side.

Body above black, covered with ferruginous hairs, below black, sometimes with a gray shade; legs gray-brown, palpi black at base and in front, with whitish hairs at sides, ferruginous at top; antennae black above, fulvous below; club black, fulvous at tip.

Female expands from 2.1 to 2.3 inches. In shape very like the male; upper side dull yellow-fulvous, the spots large; under side more brown than black, the extra-discal area to margin pretty uniform in shade, the ground being dark gray, nearly lost in the denseness of the brown streaks; sub-marginal points and crescents obsolescent; silver mark of same shape as in the male, often quite as heavy.

Early Stages—Larva unknown.

Distribution—Found in California, Washington, Vancouver Island, and Montana. We have not taken it.

THE TORTISE SHELLS.

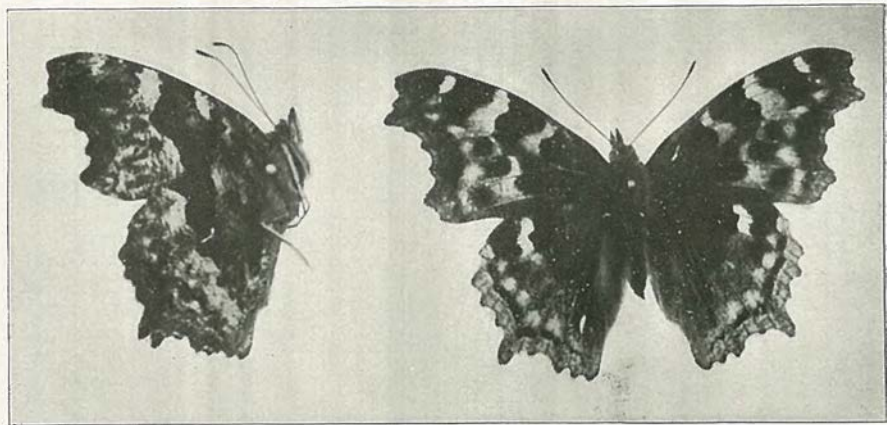
Genus *Eugonia* Hubner. Fig. 71.

Butterfly—Medium sized insects, wings above generally some shade of black or brown, marked with red, yellow or orange. The head is moderately large, eyes hairy, palpi more or less scaled, prothoracic legs feeble and hairy. The cut shows the wing venation. The cell of the primaries may or many not be closed. The cell of the secondaries is open. The fore wings have the outer margins more or less deeply excavated between the extremities of the upper radial and the first median veins, at which points the wings are rather strongly produced. The hind wings have the outer margin denticulate, strongly produced at the extremity of the third median nervule.

Fig. 71. Venation of *Eugonia j. album*.

Early Stages—The eggs are short, ovoid, broader at the base, ridged at the summit. They are generally laid in large clusters upon the twigs of the food plant. The mature caterpillar is cylindrical, adorned with long, branching spines in longitudinal rows. It feeds upon the elm, willow, and poplar. The insects hibernate in the imago form, and are among the first to appear in the spring.

THE COMPTON TORTISE. *Eugonia j. album*, Boisduval Leconte.
Fig. 72.

Fig. 72. *Eugonia j. album*.

Butterfly—Expanse of wings, 2.50 to 2.75 in., 64 to 70 mm. Upper surface dull yellowish, dusky at base, washed more or less with rusty brown, especially on the basal half. Outer border of fore wings dull black with a double crenate line and two more or less large costal bars—one at the end of the cell, and the other between the cell and a white sub-apical

patch; a black spot in the cell with three black spots below the cell, the one nearest the base of the wing quite large.

The hind wings have a black and brown border a little within the margin, the yellow outside sprinkled with brown atoms; a large black space below the costa, beyond which is a whitish patch.

Under side grayish brown, the usual darker band across the middle which on the hind wings is but little darker than the base; beyond this greenish white the whole surface finely reticulated with brown lines. There are the usual three elongate patches edged with dark brown in the cell of the fore wings. The submarginal row of ashy-blue lunules between these and the median band. The lunules do not reach the apex of the fore wings.

Early Stages—The mature larva is two inches, 50 mm. long, head with black markings on the sides, thickly set with little points and with short spines; somewhat cordate, the vertices surmounted by two shining black, thick spines, verticellated near the tip. The dorsal and subdorsal rows of spines shining black except at the base, which is reddish, with long branches, those of the anterior joints more thickly branched than the others. The super- and sub-stigmatted row reddish tipped with black.

The chrysalis is one inch long, of a beautiful color, delicately reticulated, with six golden spots on the back.

The food-plant is not known, but Prof. Fernald's surmise is that it may be willow. The butterfly hibernates, the new brood appearing about the middle of August.

Distribution—It is a northern form, being found in Pennsylvania upon the summits of the Alleghanies, and thence northward to Labrador on the east and Alaska on the west. It is always a rather scarce insect, says Holland. See note accompanying the genus. It is occasionally found at Missoula. Around the biological laboratory at Flathead lake it is often captured. At Schultz's cabin, which is along Aeneas trail over the Swan range, it is quite common, but Bond's cabin at Swan lake is the greatest collecting field in the state, perhaps in the country, for this species. Hundreds were taken here in two or three days in August. 1903. Wiley has one specimen from Miles City, July 15, 1892.

THE CALIFORNIA TORTOISE-SHELL, *Eugonia californica*, Boisduval.
Fig. 73.

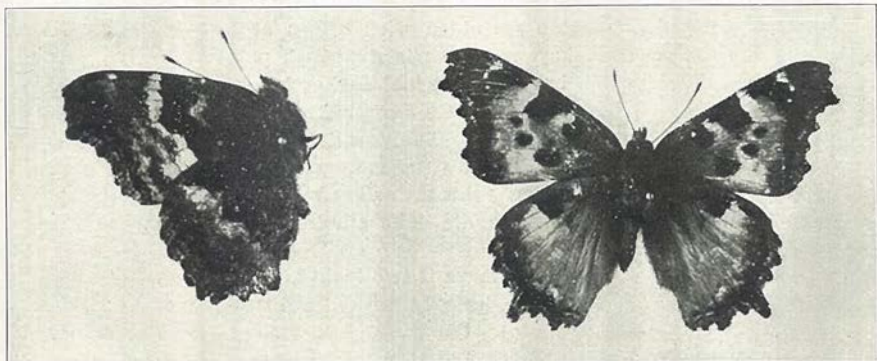


Fig. 73. *Eugonia californica*.

Butterfly—Similar in general shape and appearance to *E. J. album*, but easily distinguished by the following peculiarities.

Color—Deep fulvous, spotted with black and having a black border. A black bar across the cell. On the underside dark brown, with a light border. The entire surface marked with fine lines. Expanse 2.00-2.25 inches, 51-57 mm.

Early Stages—The caterpillar feeds upon *Ceanothus*.

Distribution—It ranges from Colorado to California and as far north as Oregon, east to Miles City.

In 1900 *californica* was quite common up Hell Gate canyon near Missoula, many having been brought in late in May and early in June. August 20 it was still abundant at Swan Lake, giving evidence of two broods. It is not infrequent about Flathead lake, and evidently covers much unexplored western territory. Wiley reports it at Miles City. In 1903 the earliest butterfly at Missoula was a *californica* taken February 19.

Eugonia J-Album in Western Montana.

"This insect is generally rare," writes Holland in his Butterfly Book. In several places in the western part of the state it may be taken in large numbers. At the upper end of Echo Lake, next to the Swan range, we have never failed to take it during our annual pilgrimages to the summit of the range, MacDougal mountain. The old submerged cabin in the lake is a safe refuge. The cabin on the bank, now deserted, offers a safe retreat from enemies save the human entomologist, who finds here a great opportunity for capturing a rare specimen.

But it is at Swan Lake that **Eugonia J. album** flourishes in its splendor, magnificence and abundance. This beautiful little sheet of water lies cradled between the Swan and Mission ranges. At its upper end, on the eastern shore, are three cabins. The cabins are along the trail which leads up the lake, through the Swan river forest above the lake to the wagon road leading to Ovando, Missoula, and other places. A clearing of a few acres is around the cabins. Dense woods come to the clearings on all sides. In August the sun is intensely hot in the small open patches about the cabins. About these small log huts, seeking the shade of the rude porch or the interior of the stable, **Eugonia J. album** was to be had by the dozens. They would alight on the logs of the buildings, the stumps in the clearing, the fence rails, and the bark of the living trees. After alighting they remained perfectly quiet, so that one could carefully adjust the net over them, and with a quick jerk scoop them into the net. In this way a half dozen were often fluttering in the net at once. It was practically impossible to capture them on the wing, so quickly can they dodge and so swiftly do they fly.

When the butterflies alighted on the bark of the fir, cottonwood or birch, upon which they were generally taken, they were almost invisible. It was interesting to see them remain in the same quiet attitude on the top rail of a fence or the skinned log in the cabin, where they were very conspicuous, as on the trunk of a tree where they were invisible. Protective resemblance was in this species beautifully illustrated, and those who made the trip to Swan Lake in August, 1903, will not soon forget how the insects were controlled by instinct.

Other insects were out, and were captured. **Eugonia californica** was much less common than **E. J. album**, while an occasional **Polygonia faunus** was picked up. The western admiral was rare. Robberflies were out in abundance, as were also bees. Two species of flies were captured which mimic bees, and a dozen species of butterflies were found in greater or less abundance. Nowhere in Montana have we seen more butterflies at one place or captured more in one day than at Groom's cabin at the upper end of Swan Lake, when the species under discussion was taken in such abundance.

In early August, 1904, another visit was made to the cabins at Swan Lake. **J. Album** was in much less abundance, and difficult to take be-

cause of the great number of baldfaced hornets which seemed to have possession. Not a *Polygonia* was seen.

In 1905 *album* was scarce. Its place was taken by the bald-faced hornet. This latter insect practically prevented butterfly collecting.

MOUNTAIN SWARMING OF VANESSA CALIFORNICA.

During an ascent of Mount Shasta, made in August, 1889, a most interesting occurrence was noted in the flight of countless myriads of butterflies (*Vanessa californica*) at an altitude far above snow-line.

In our early morning climb of August 29, of the above year, we had left our horses at half past 4 o'clock, at what is known as "Horse Camp," at very near snowline, where there were many small snowfields close about us. Our progress was very slow and tedious, being all of the time over loose, sliding fragmentary rocks, or the almost smooth, hard-frozen surface of the icy snow, and which latter did not soften till long after the sun had swung high enough to shine full upon it. Some little time after daylight, but long before we could see the sun, as he was hidden from us by the high crest of a sharp ridge on the southwest aspect of the mountain (our ascent being made from Sissons, west of the mountain), a few signs of insect life were seen in the shape of "snow-fleas," two or three large-winged grasshoppers, and, occasionally at first, a butterfly. The last two were stiffened by the cold as if they were there from the day previous. The latter insect increased much in numbers as we ascended, and were many of them found in among and under the loose stones as well as a few upon them.

At perhaps half past 9 we came to a point upon which the sun had long been shining, and here they were flying in the air, the flight being in a south-easterly direction. From here they seemed to increase very rapidly in numbers up the remainder of the ascent to well toward the summit. The latter was reached at 11:20 A. M.; the temperature was noted at 42 Fah. in the open air. We remained here about a half hour, then passed down by way of the Hot Sulphur Springs, and then out on the southerly face of the mountain. We again encountered our beautiful friends at not farther than six or eight hundred feet below the extreme peak, and now in countless numbers, filling the air with their flashing wings, and all passing in the same direction as observed during the ascent—towards the southeast. This strange sight continued until we seemed to pass below them, at an altitude of between 11,000 and 12,000 feet. The fact of its being a continuous flight of these insects across the mountain in one direction during the warm part of the day—a period of nearly five hours—is beyond question. That it was in progress one or more days previous to that upon which I observed it is an easy deduction from the fact of the numbers of the insects found among the rocks and stones while yet stiffened by the cold of the night air. How much longer it may have continued I had no means of knowing.

Where they could have come from, in such vast numbers, and what brought them to such a high altitude, is of course a matter of pure speculation.

I had no means of preserving specimens of these insects except to

place them between the leaves of a notebook; in this way some were kept for identification. A gentleman whom I met a few days later pronounced the species to be *Vanessa milberti*, but after presentation of the account of the flight, with the specimens, before the Biological Society of Washington it was determined for me by Mr. Howard as *Vanessa californica*.—C. L. Hopkins in *Insect Life*.

THE MOURNING CLOAK; THE CAMBERWELL BEAUTY, *Euvanessa antiopa*, Linnaeus. Fig. 75.

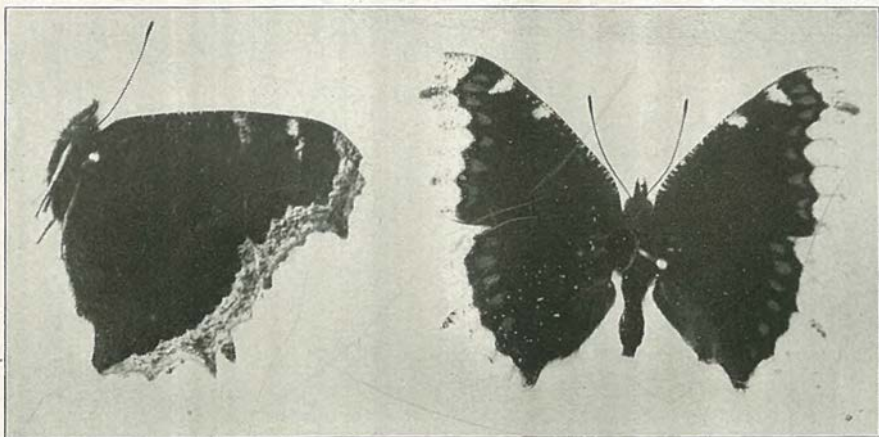


Fig. 75. *Euvanessa antiopa*, upper and lower surfaces of the wings.

Butterfly—Expanse of wings, 2.5 to 3.5 inches, 64 to 90 mm.

Upper surface rich dark maroon-brown the border yellow sprinkled with brown, and preceded by a black band containing a row of blue spots. The costa is mottled with yellow and contains two yellow patches.

Under surface traversed by numerous fine black abbreviated lines, the outer margin pale buff sprinkled with brown, and preceded by a series of confluent gray, blue-black-edged lunules.

Early Stages—The female deposits the eggs in a cluster round the twigs of willow, elms, or poplar near the petiole of a leaf, upon which the young larvae may feed. The mature larvae are two inches long, black, minutely dotted with white which gives them a grayish look; with a dorsal row of brick-red spots. Head black, roughened with small black tubercles. The spines on the body are black, rather long, slightly branching. There are four on joints 2 and 3, six on joints 4 and 5, and seven each on joints 6 to 12. The last joint has two pairs of short spines, one behind the other.



Fig. 74. *Euvanessa antiopa*, just emerging from the chrysalis.

The chrysalis is dark brown or gray, with two rows of spines along the back of the abdomen, two on the head in front, three on the edge of the wing-covers on each side, and a thin prominence on the middle of the thorax.

Distribution—Generally over the North Temperate Zone. It has

been taken at Missoula, McDonald and Sinyaleamin lakes in the Mission mountains, Flathead lake, and Swan lake. At Missoula *antiopa* and *milberti* are the first signs of spring. Branedgee has collected it at Helena, Wiley at Miles City. It is a handsome ornament for a collection. Tolerably common in the mountains near Big Sandy. Collected by Coues along the 49th parallel in 1874.

Stridulation in *Eu Vanessa Antiopa*.

Although the sound made by this butterfly without doubt is the expression of certain emotions, be it of anger or of love, since it is not made by the emissions of the breath, we cannot, I think, consider it more than elementary voice, and in the present instance a singularly erratic development of its elements. It may be that

"In Lorransise ther notis be
Full swetir than in this contre,"

for English entomologists are I believe, generally of opinion that the sound which butterflies make is caused by their rubbing their wings together in their ardor. In the Entomologist's Monthly Magazine for February, 1877, page 208, I find the following notice:

"In 1872, a female *antiopa* came into my possession in a hibernating condition, and in that state she would, when disturbed, partially expand her wings, and at the same times was produced a grating sound, which seemed to come from the base of the wings.—A. H. Jones, Shrublands, Eltham."

Let anyone now take a dried specimen of this butterfly from the cabinet and grasping the fore wing by its front edge rub it backwards and forwards over the hinder one, so that the bases meet, but being at the same time careful not to crumple the wings and so produce a false sound. We will then without fail hear the sweet secrets of *antiopa*, which are beautiful and delicate in expression, recalling the trickle of the brooklet.

I may notice that *Vanessa* butterflies are renowned and well-known as stridulators on account of their large size, but that nearly all butterflies rub their wings together when under the influence of the emotion of love, and since it is the result of friction to produce a striated surface, many of these smaller ones must have organs of sound too fine for human sense. My own researches have always been circumscribed from a want of adequate microscopic power.—A. H. Swinton in *Insect Life*.

MILBERT'S TORTOISE SHELL, *Aglais milberti*, Godart. Fig. 76.

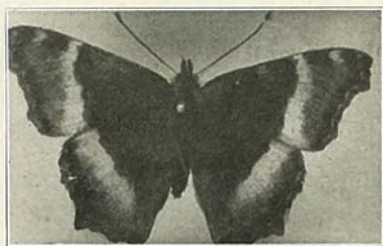


Fig. 76. *Aglais milberti*.

Butterfly—Expanse of wings 1.6-2.55 in., 40 to 65 mm. Upper surface brownish black, with a broad fulvous band between the middle and outer margin, paler on its inner edge. On the fore wings the pale band contains a black patch on the costa, with a white spot on one or both sides. There are two fulvous spots in the cell. The border is composed of two parts, the inner black, the outer a black brown, crenate line on each side of which it is a little paler. The black on the hind wing supports a row of violet lunules. Underside dark brown with the usual wavy lines and spots; the outer half yellowish brown with a submarginal of gray blue lunules which are black edged.

Larva—The mature larva is a little more than an inch long, with a black head sprinkled with minute whitish dots, from which spring pale hairs. The body is nearly black above, with small white dots and pale hairs, which give it a grayish color. The spines are arranged as in *antiopa*, and are black and branching. It has a greenish yellow lateral line above which is a broken line of brighter orange yellow shade. The larvae are found on the wild nettle, and there are two broods in a season.

Chrysalis—The chrysalis is .8 of an inch long, 20 mm., slightly angular, the frontal beaks short, conoidal; thoracic projection forming nearly a right angle; dorsal spines but little elevated.

Distribution—It ranges from the mountains of West Virginia northward to Nova Scotia and Newfoundland, thence westward to the Pacific.

This tortoise-shell butterfly is one of the first harbingers of spring. Usually it is the first butterfly seen about Missoula, where it is rather common. It is usually quite abundant around the biological laboratory at Flathead Lake, but in the summer of 1903 but very few were seen. Brandegee has collected it at Helena, and Wiley reports it rare at Miles City. At Swan Lake it is occasionally seen, probably about the same in numbers as at Flathead Lake, owing to their close proximity. Coubeaux says it is very abundant all over the country about Big Sandy. Taken by Coues at Chief Mountain, August 22, 1874.

THE LADY BUTTERFLIES, Genus *Vanessa*, Doubleday. Fig. 77.

Butterfly—Medium-sized insects; the wings on the upper side are some shade of black or brown, marked with white, red or orange. Head rather large, eyes hairy, palpi more or less heavily scaled. The cut shows the venation of the wings. The outer margin of the wings is dentate. The wings are not angulate, as in *vanessa*, but are more rounded. The ornamentation of the under side tends to become ocellate, or marked by eye-like spots. Some are ocellate.

Egg—This is broadly ovoid, being much like the egg of the genus *Vanessa*.

Caterpillar—In its mature form it is covered with spines.

Chrysalis—It is much like *Eu Vanessa*.

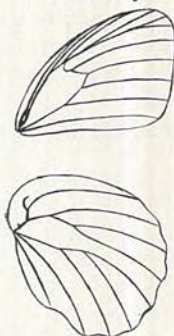


Fig. 77. Venation of *vanessa*.

Genus VANESSA.

Key to Species.

1. Ground color black, band on fore wings and outer margin of hind wings fulvous
Ground color fulvous. atalanta
2. Five eyespots on underside of hind wings 2.
Four distinct eyespots on hind wings; black bar across middle of the cell of the primaries; tawnier ground color than cardui cardui.
caryae
Hind wings with two large ocelli underneath huntera

THE RED ADMIRAL. *Vanessa atalanta*, Linnaeus. Fig. 78.

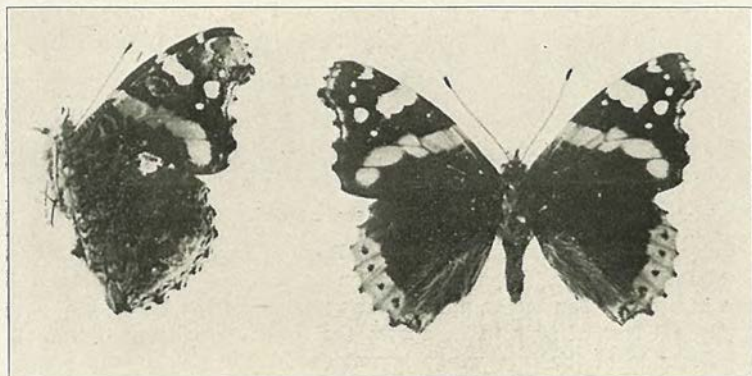


Fig. 78. *Vanessa atalanta*.

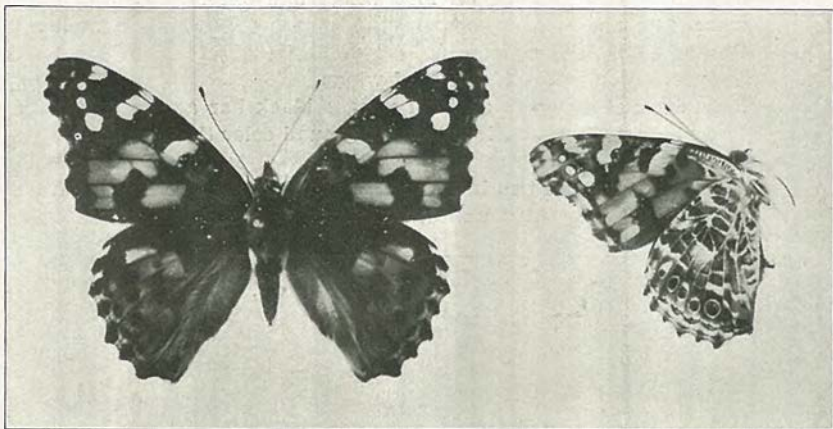
Butterfly—This butterfly is brown above, with a fulvous band on the outer margin of the hind wings, containing brown spots. The fore wings are also crossed by a fulvous band, which begins at the posterior angle and passes through the cell. There is a white bar beyond the cell, also a marginal row of about five spots, the fourth from the costa being the largest. The spots of the upperside reappear on the underside, but the brown is marbled with gray, blue and green and there is a sub-marginal row of spots on the hind wings. Expanse 2.00 to 2.25 inches, 51 to 57 mm.

Early Stages—The eggs are green, barrel shaped. The young larva is greenish brown, and furnished with ten rows of black curved hairs. In reaching maturity it passes four moults. The mature larva is 1.3 in. long, cylindrical enlarged in the middle and of a velvet black color, sprinkled with fine velvet points. The chrysalis is from .85 to .95 of an inch long, cylindrical. The dorsal tubercles are gilded. The color is usually gray. The food plants are nettle and hop.

Distribution—It is found in the United States generally. During the summer of 1903 it was taken sparingly at the Biological Station at Flat-head Lake. It has not been seen at Missoula. It is not in the collections of Wiley, Cooley or Brandegees, and must be very rare in the state. It is reported by Dyar from the Kootenai country.

THE THISTLE BUTTERFLY or THE PAINTED LADY. *Vanessa cardui*.

Linn. Fig. 79.

Fig. 79. *Vanessa cardui*.

Butterfly—*Pyrameis cardui*, or the Painted Lady, has an upper surface of fulvous color, the apical portion of the fore wings being black. There is a white bar in the apical black portion of the fore wings and a submarginal row of four white spots; the inner ones being the smaller. The underside of the fore wings is red except the apical part which is marked as above. The hind wings have a submarginal row of five black spots. Both wings have a border, the hind wings having a broken one. The underside of the hind wing is marbled with brown, gray and white. The ocelli contain blue. The inner row of the margin is blue or lilac. Expanse of wing 1.75 to 2.5 inches, 45 to 64 mm.

Early Stages—The mature larva is 1.5 in. long, cylindrical, rather robust. The general color is a delicate lilac. Between the joints are two lines of bright yellow. The space between the yellow occupied by two narrow black lines and one white one. There are seven rows of tubercles from which arise branching spines. The head is black, stigmata black with some black spots over the body.

Distribution—Most widely distributed of all known butterflies, being found in almost all parts of the temperate regions of the earth and in many tropical lands in both hemispheres. It is double brooded and hibernates in the butterfly state. Found all over Europe, North America, in Africa,—save in the dense jungles of the Congo,—in South America, in Australia and in many islands of the sea; at some times scarce and then at seasons it fairly swarms. (Holland.)

One of these swarms visited Montana in the spring of 1899. During late May and early June there were hundreds and thousands everywhere in the western part of the state, noted especially at Missoula and Helena. So abundant were they that they were noticed by all, and considerable alarm was felt by some lest there should occur later an outbreak of an insect pest. Happily this did not occur.

It abounds about the biological laboratory at Flathead lake, and specimens showing great variation have been captured. Brandegee has taken it at Helena and Wiley at Miles City. It is abundant in extreme ends of the state. Cooley reports it abundant at Bozeman. It seems to be everywhere one of the most common insects. It is known among entomologists to be the most widely distributed of all butterflies, so far as present knowledges goes. Its food plants are thistles, (*Carduus*), *Urtica*, (nettle), *Oniscus*, (plumed thistle), and *Altheca* (marsh mallow). Coubeaux calls it abundantly around Big Sandy. Collected by Coues along the 4th parrallel in 1874.

THE WEST COAST LADY. *Vanessa caryae*, Hubner. Fig. 80.

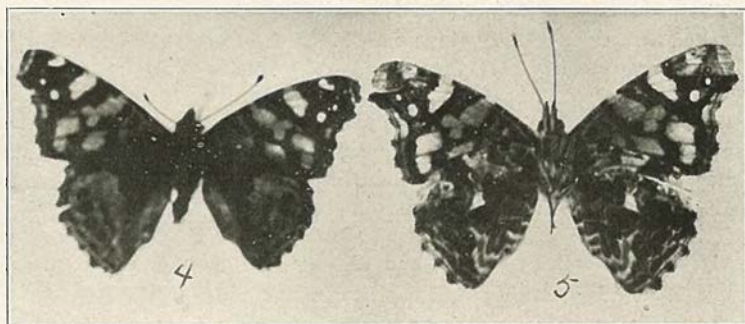


Fig. 80. *Vanessa caryae*, 4 upper, 5 lower surface.

Butterfly—It is distinguished from *P. cardui* by absence of the roseate tint peculiar to that species. It has a complete black bar across the cell in the primaries. Expanse 2.00 in.

Distribution—It ranges from Vancouver to Argentina; found as far east as Utah. Two specimens have been taken at Missoula. As it has been taken by no one else Missoula is perhaps as far east as it will be found.

HUNTER'S BUTTERFLY, *Vanessa huntera*, Fabricius.

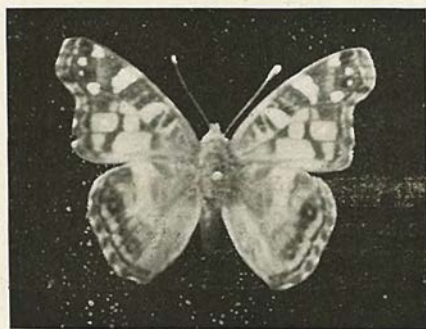


Fig. 80a. *Vanessa huntera*, natural size.

Butterfly—Expanse, 2.00 to 2.25 inches, 50 to 64 mm. Upper surface fulvous; a little tawny at base, the apical portion of the fore wings black, this continued as a border to the posterior angle. The apical black contains an oblique fulvous bar beyond the cell, and the submarginal dots as in *atalanta*, the first two blended, and one farther down in the fulvous. Besides this there are five triangular black marks, two of which are in the cell. The border of both wings consists of three more or less distinct lines, the inner on the hind wings in the form of a shade. The apical portion of the border on the fore wings is washed with lilac; and there is a gray-blue bar at the anal angle. Hind wings have a submarginal row of five black spots, the second and fifth pupiled with blue. Costa black.

The under side of fore wings is red, except the apical portion, which is marked as above. Hind wings marbled with brownish black and white, with two large ocelli. By these it is easily distinguished. The outer border is four black lines, with violet between the two inner.

Early Stages—The mature larva is 1.25 inches, 32 mm, long, the body velvety black, between the joints four transverse lines of pale yellow alternating with narrow black lines. The food plants are *Gnaphalium*, *Antennaria*, *Artemisia*, and allied species.

Distribution—From Nova Scotia to Mexico. In the state it is reported only by Campbell Carrington and William B. Logan, of the Expedition in 1871, locality not given.

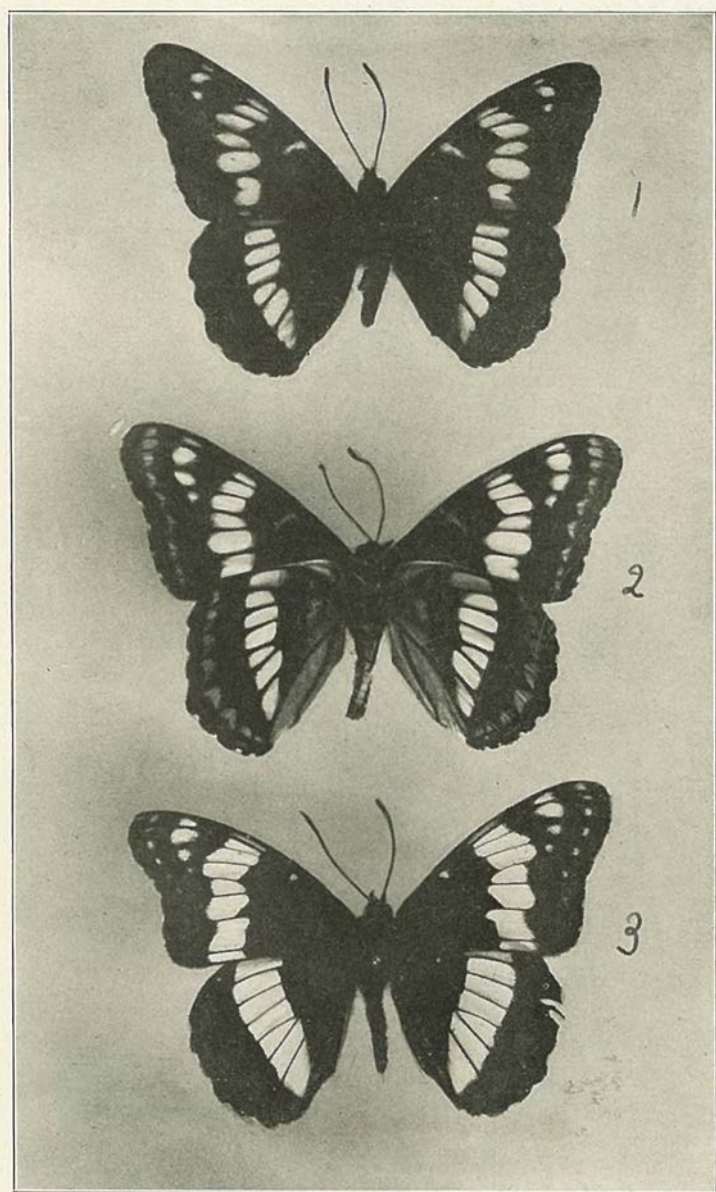
THE MONARCHS, Genus *Basilarchia*, Scudder.

Butterfly—Head large; the eyes are large and naked; the antennae moderately long, with a distinct club; palpi compact, stout, produced, densely scaled. The fore wings are sub-triangular, apex well rounded, the lower two-thirds of the outer margin slightly excavated. The first two sub-costal nervules arise before the end of the cell. The hind wings are rounded, crenulate.

Early Stages—Eggs nearly spherical, the surface pitted with large hexagonal cells. The mature caterpillar is cylindrical, the second segment with two prominent rugose club-shaped tubercles; they are strikingly mottled or spotted. Chrysalis suspended by a stout cremaster. They feed upon the leaves of various species of oak, birch, willow, or linden. Three species are found in the state, to be separated from each other by the following key.

Key to species.

- | | | |
|---|-------------|----|
| 1. Ground color fulvous or mahogany | archippus | |
| Ground color black. | | 2. |
| 2. Both wings with broad white bands. | | 3. |
| Wings without broad white bands. | astyanax. | |
| 3. Yellowish white bar near the end of the cell of the fore wings, apex and upper margin, of the same, reddish. | lorquini | |
| Bar and red color absent, and a submarginal series of white spots present. | wiedemeyeri | |



3. *Basilarchia wiedemeyeri*; 2, lower surface, 1, upper surface of *Basilarchia lorquina*.

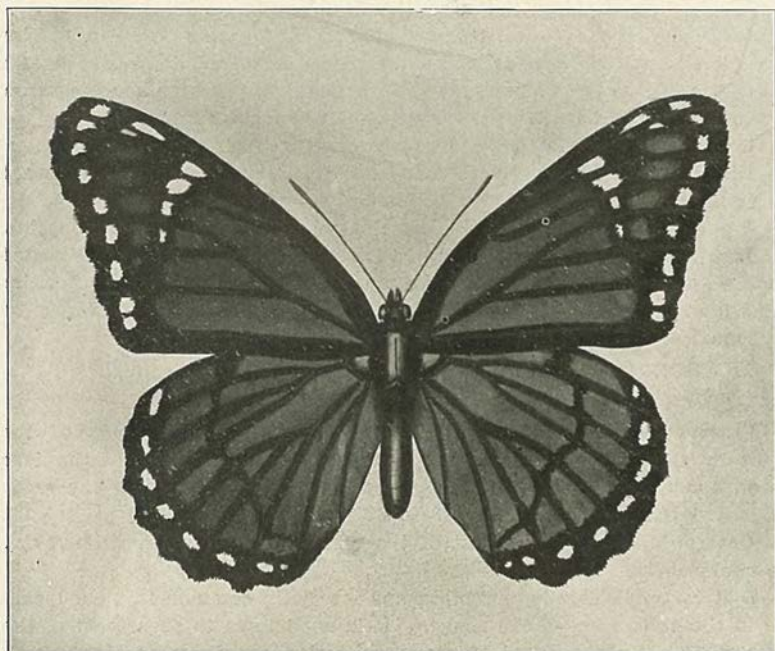
THE VICEROY, *Basilarchia archippus*, Cramer.

Fig. 81. *Basilarchia archippus*, From water color drawing by Mrs. Edith Ricker.

Butterfly—Upper surface fulvous, the lines black; on the fore wings a dark triangular patch, containing three white spots on the costa beyond the cell, continued to the posterior angle in a narrow line. A black line crosses the hind wings about two-thirds of the distance from the base. Outer border black containing a row of white spots, and there are two ante-apical white spots; the lower one quite small. Underside similar to upper, paler fulvous. The fringes are black, spotted with white.

Early Stages—The larva feeds upon willow, popular, balm of gilead, aspen, and cottonwood. It is two or three brooded.

Distribution—Found over nearly the whole of the United States as far west as the Sierra Nevada Mountains, and has been found sparingly even to the Pacific coast, near our northern boundaries.

B. archippus is injurious to the oak and to the wild plum.

This species mimics the Monarch butterfly *Anosia plexippus*, so abundant in the eastern states. The Monarch is sparingly found in the western part, rather abundant east. The eastern milkweed is gaining a footing along the railroads, and with it the Monarch is probably on the increase. The writer has not taken the Viceroy west of the range, but Mr. E. N. Brandegee has some specimens from Gold Creek, west of the range, which he collected and which the writer has seen. Cooley reports it as occasional near Bozeman, while Wiley calls it rare and local about Miles City. Douglass collected one specimen at Fish Creek.—Coubeaux has collected it at Big Sandy.

WIEDEMEYER'S ADMIRAL *Basilarchia wiedemeyeri*, Edwards.

Plate VII. Fig. 3.

Butterfly—It may be distinguished from *B. lerquina* by its wings being crossed with white bars instead of cream ones, and the absence of a bar at the end of the cell and the yellow apex; it has a submarginal row of white spots on both wings. Expanse 3.00 inches, 77 mm.

Early Stages—Caterpillar feeds upon cottonwood.

Distribution—The insect is found on the Pacific slope and eastward to Montana, Nebraska and New Mexico.

We have not yet taken this species west of the Rocky Mountains, although it is not uncommon east of the range. Brandegee has collected it at Helena, Cooley at Mystic Lake, and Wiley at Miles City. Douglas found it at Madison lake and Jasper Mountain. Taken at Big Sandy by Coubeaux.

LORQUIN'S ADMIRAL, *Basilarchia lorquini*, Boisduval.

Plate VII, Fig. 1, upper, Fig. 2, lower surface.

Butterfly—Easily distinguished from all the other species of the genus by the yellowish white bar near the end of the cell of the fore wings, and the reddish color of the apex and upper margin of the same wings. Expanse, 2.25-2.75 in., 56 to 62 mm.

Caterpillar—The food plant of the caterpillar is poplar, willow, and the choke-cherry.

Distribution—This is a western species, quite common in most localities in the state west of the range. It is not known to occur east of the range. The University of Montana collection embraces specimens collected by Elrod at various places in the Mission Mountains, at Flathead and Swan lakes, at Missoula, and on Mt. Lo Lo.

BUTTER FLIES ON CHIMBORAZO.

"Even butterflies are found at sea at great distances from the coast, being carried there by the force of the wind when storms come off the land. In the same involuntary manner insects are transported into the upper regions of the atmosphere, 16,000 or 19,000 feet above the plains. The heated crust of the earth occasions an ascending vertical current of air, by which light bodies are borne upwards.

When Bonpland, Carlos Montufar and myself reached, on the 23rd of June, 1802, on the eastern declivity of the Chimborazo the height of 19,286 English feet, we saw winged insects fluttering around us. We could see that they were Dipteras, but it was impossible to catch the insects.....The insects were flying at a height of about 18,226 feet..... Somewhat lower down, at about 2,600 toises (16,680), also therefore within the line of perpetual snow, Bonpland had seen yellow butterflies flying very near the ground.—Humboldt in "Aspects of Nature."

THE WOOD NYMPHS, THE MEADOW-BROWNS. SUBFAMILY

Agapetinae.

The butterflies belonging to this subfamily are for the most part of medium size, and are generally obscure in color, being of some shade of brown or gray, though a few species are brightly colored. The markings consist almost entirely of eyelike spots, dark pupiled in the center with a point of lighter color, and ringed about with one or more light circles. They are possessed of a weak flight. Most of them are forest living insects, though a few inhabit the cold and bleak summits of mountains and grassy patches near the margins of streams in the far North.

The family includes chiefly brown butterflies whose markings consist almost entirely of eyelike spots. Some of the western species are brightly colored. The insects are easily recognized by their having some of the veins of the fore wings greatly swollen at the base.

The larvae are cylindrical, tapering more or less toward each end. The caudal segment is bifurcated, a character that distinguishes them from all other American butterfly larvae excepting those of some of the emperors (*Chlorippe*).

The Chrysalids are rounded; in some cases the transformation takes place beneath rubbish on the ground without any preparation of cell or suspension of the body. Nearly fifty species have been described from America north of Mexico.

Key to Genera.

- | | |
|---|-----------------------------|
| 1. Eyes very hairy | 2. |
| Eyes naked or nearly so | 3. |
| 2. Outer margin of hind wings angled | <i>Enodia</i> |
| Outer margin of hind wings evenly rounded | <i>Satyrodes</i> |
| 3. Upper surface of fore wings with eye spots | 4. |
| Upper surface of fore wings without eye spots | 5. |
| 4. Spots ordered by some shade of red | <i>Erebia</i> , P. 113 |
| Spots bordered by some shade of yellow | <i>Cercyonis</i> , P. 105 |
| Spots light, color ochreous | <i>Coenonympha</i> , P. 114 |
| Spots bordered by white or gray | <i>Neominois</i> , P. 121 |
| 5. Lower surface of hind wings mottled | <i>Oeneis</i> , P. 119 |

Genus *CERCYONIS*.

(The Wood Nymphs.)

Key to species.

- Fore wings with or without a buff band, but with two ocelli alope
 No buff bands, fore wings with two ocelli on fore wings and one
 on hind wings, both showing above *syvestis*, var. *charon*

THE COMMON WOOD NYMPH, *Cercyonis alope* Fabricus. Fig. 83, 84, 82.

Butterfly—Expanse of wings 1.75 to 2.00 inches, male. Upper surface blackish brown, darkest over the basal area; outer margin consisting of two fine parallel lines, a little within which is a black stripe. The fore

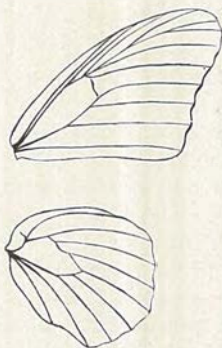


Fig. 82. Venation of *cercyonis*

wings have a transverse yellow band beyond the cell, sometimes a little ochraceous, and often more or less encroached upon by the brown ground. On this area are two ocelli, round, black, or variable size, and with or without a central point, which is white with blue scales. Behind the cell is a blackish indistinct sexual dash in the males. The hind wings have a small ocellus in a yellow ring near the anal angle (often wanting).

Underside yellow-brown; the band enlarged and of a paler color; the ocelli repeated, enlarged; the marginal lines distinct; the brown area covered with abbreviated darker streaks, which over the base and disks form somewhat concentric broken rings, limited without by a common dark stripe. On the fore wings it is irregularly sinuous from margin to margin, throwing out a rounded prominence against the cell, followed by a rounded sinus on the median interspace. Across the middle of the cell, and below it, a dark stripe; the extra discal area less streaked. The ocelli vary from none to six, the full number being most often present, disposed in two groups of three, the middle one of each group the largest; all black, rounded, in narrow yellow rings, and with white dots in the center edged by blue scales.

Female—This differs from the male in the band being generally

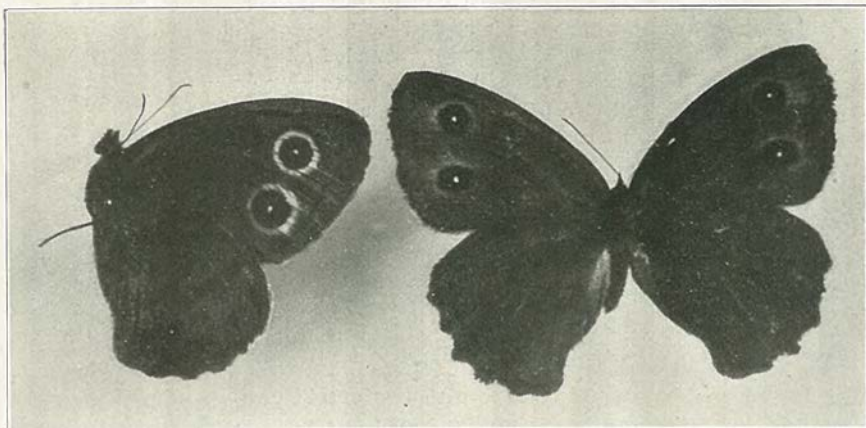


Fig. 83. *Cercyonis alope* var. *nephele*, right figure upper surface, left figure lower surface.

broader, clearer, and well defined on both edges, the ocelli well developed, with occasionally additional black points on the hind wings corresponding to the ocelli on the under side. A larger percentage than of the males have no ocelli on the under side of the hind wings.

The above description applies to typical form *alope*. Variety *olympus*, Edwards, differs from the above as follows: The males are

almost black. The ocelli are very small and without wings, but in some examples there is a faint russet or yellowish tint about them, and perhaps on the space between them. On the under side the rings are russet or ochraceous on both wings, and there is a perceptible bronze reflection on the underside of the hind wings, especially in the males.

This form is said to occur from Illinois to the Rocky Mountains, and is found abundantly in Montana. However, many specimens with the broad buff band, as in typical *alope* are found also, see Fig. 85. *Olympus* and *nephele* are now given as synonyms, so *nephele* occurs from New England to the Rocky Mountains. Five varieties for this species are recognized.

Early Stages—The egg is conical, marked by about eighteen vertical ridges, lemon-yellow in color, hatching in from fourteen to twenty-eight days. The mature larva is 1.25 inches long, cylindrical, robust, thickest in the middle, with two sharp, conical, divergent tails; color yellow-green, head vivid green. Chrysalis is a little more than half an inch long, cylindrical. The butterfly emerges in fourteen days. The larva feeds on meadow-grass, and the butterfly is found mostly in the open fields or open woods.

Var. *nephele*—Largest of the forms, with buff bands. *Ariana* is also found in Montana. This is a decidedly dwarfed form, and one that is quite dark. The ocelli are small and well defined.

This species is abundant during July and August around Flathead Lake. In searching for insects *nephele* skirts the roadside by the open woods or undulates through the woods in graceful flight. It becomes so abundant that catching it becomes tame. The specimens show great variation; the species is recognized as being exceedingly variable. At Missoula it is quite common; Brandegee has taken it at Gold Creek, and Wiley at Miles City. Coubeaux has many specimens from Big Sandy. Coues collected from boopis at Chief Mountain July 21, 1874, a single specimen.

THE DARK WOOD NYMPH, *Cercyonis sylvestris*, var. *charon*. Edwards.

Fig. 84.

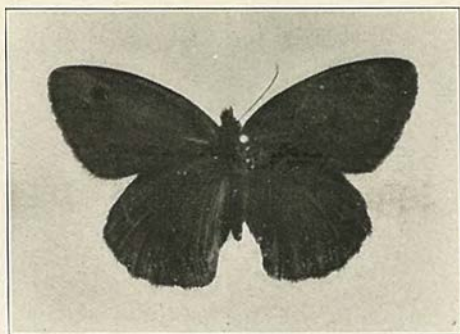


Fig. 84. *Cercyonis sylvestris*, var. *charon*.

Butterfly—Expanse of wings, 1.50 to 1.75 inches. The male is dark in color; the female is paler. There are two eye-spots on the fore wings in the usual location, indistinct on the upper, distinct on the lower side of the wings. The under sides of the wings are variable. In the type they are dark; in other specimens they are paler. They may or may not have ocelli on the secondaries. Both the fore and hind wings are abundantly and evenly marked by little striae, and crossed on either side of the median area by obscure, irregular, transverse dark lines, either one or both of which may be wanting in some specimens.

Early Stages—The caterpillar is green, cylindrical, tapering before and behind, marked with longitudinal pale-yellow lines. The chrysalis is green or black, striped with narrow white lines. The larva feeds on grasses.

Distribution—It is found in the Northwest, ranging from British Columbia as far as Mexico. In Montana it has been taken abundantly by Wiley at Miles City and Sandstone. Brandegees has taken it at Mt. Ascension near Helena. Allen has specimens from Dillon. Coues collected it in 1874 at Frenchman's river and Chief Mountain.

Collecting Butterflies in Montana.

July 22, 1903, was a hot day. For several days the sun had been warm. We were camped on the bank of Bigfork or Swan river at its outlet to Flathead Lake. Our little laboratory, constructed especially for out door work, had been a scene of activity within, but no one could stand it long in the swamps or woods on account of the mosquitoes. For two days the little fellows had been especially persistent and villainous. This was taken to be a sign that they would soon go, as they were starving. The sun dries up the ponds and they cannot drink nor lay eggs. Vegetation becomes dry and parched, and does not supply nourishment. A few hot days, followed by a wind, and it was predicted they would go. This had come. Donning my coat containing papers, vials, corks, gloves, and other necessary material, and accompanied by my dog, I started for butterflies.

Two or three *Arygnnids* had been seen, which were very much wanted. Half a dozen other species were on the wing, but all species were doubtful, i. e. could not be named from seeing the specimen flying.

The field sought was the tamarack forest. The beautiful and stately trees filled the slope of the lake near the laboratory. An occasional Douglas spruce or yellow pine added to the charm of the tamarack forest. A wagon road wound through the timber, affording a sunny opening in which the insects love to sport. On either side the tall conifers towered heavenward. A breeze was blowing. The murmur of the pines as they swayed gently at their tops was music to the ear. The timber was not dense. The sun filtered through the leaves and between the treetops, making alternate patches of light and shade. In the forest, therefore, it was thought the airy creatures would sport, where the sun's rays were tempered by the shadow of trees, where the breeze would be less likely to blow against their delicate wings, and where they would be unmolested.

The delicate blue bells nodded in the underbrush. Mariposa lilies were on the wane, but an occasional late one showed its delicate cream colored perianth here and there. The twin flower was in bloom, making a carpet where other vegetation was lacking. Service berries were ripe, the blue-black berries hanging in clusters from every bush. *Spiraea* was gorgeous, just coming into full bloom. A fringe of rock maple, dogwood, *spiraea* and service berry lined the road, while through the timber they were scattered in great profusion.

It was a day for birds. The brilliant plumage of the Louisiana tanager flashed in the sunshine as he flew from tree to tree. The call of the western Phebe was heard on every side. The long-tailed chichadee cheerily sang from the bushes by the roadside. Upon an old bole a flicker was calling to his mate, and alternately with his call drumming loudly on the dead tree. While sitting on a log and drinking in the sweetness of the bird music mingling with the sighing of the pines the loud call of

the pileated woodpecker was heard in the distance; for this shy and handsome bird, the largest of our woodpeckers, is still not uncommon in the woods of Montana. I could not mention all the birds seen and heard. One hundred and forty species have been found in this vicinity. On that day the woods were alive with birds, sweet with their melody and with the odor of flowers. It was a walk of solitude, but I was by no means alone.

In a thick cluster of service berry my dog flushed a ruffed grouse with young. The little fellows could fly a little, and would rise into the top of a little birch or alder and pipe their alarm in great consternation. Their



Fig. 85. Where Leto abounds, near the University of Montana Biological Station, upper end of Flathead Lake.

somber coats blended beautifully with the surroundings. If one saw a bird alight it was plainly visible. But when once the eye was turned elsewhere and returned to the spot the motionless bird blended with the light and shadow of the forest and with the bark of the trees. Had the little fellows remained quiet they might have passed unnoticed. They will learn, if some pot hunter does not kill them too early. The mother flutters around and makes a great fuss, while the young are scurrying away to places of safety.

Scarcely had I left the laboratory when a beautiful *Eurymus* was seen flying over the bushes by the river bank at the entrance to the forest. Occasionally the delicate butterfly was seen, and I longed to have it.

Carefully I followed until the time was favorable for a sweep, when it was safely landed, much to my delight. *Eurymus alexandra* is not abundant here, but is often seen sailing gracefully over the tops of the dense bushes, out of reach but aggravatingly near. It was a perfect specimen, the only one seen or taken during the day.

I started before two. Along the road I went slowly, seeking the Argynnis. They were out. Such beautiful and dainty creatures they are. *Leto* was out in all its glory, but my captures were few. I simply could not do it. I was too awkward, slow, or something. They would not rest. Again and again their course would be near me and I would try, only to fail with an AH, and sigh of regret. Beautiful, dainty, delicate creatures, sporting in the open forest, flitting from open sunshine where the resplendent colors show in all their glory to the shadow of the forest where they may have a little respite. Their gaudy colors make them conspicuous a long distance off, and their large size makes it possible to detect them and distinguish them from others. Of the size of cybele of the east, which was my early delight, it lends a charm to the forest superior in some respects to that given by music of birds or odor of flowers. Gorgeous in array, gentle in movements, short of life, its life history unknown, what wonder that it has charm. The day was too hot for *Leto* to be in the open. I sought, but in vain. A return to the forest brought its company. Its flight is rapid and undulating. Rarely did it rest. Pursuit into the forest beyond the road was impossible because of brush, fallen logs, stumps and stones. Again and again I made a desperate sweep for a dark female or a more brilliant male. Thrice was I successful, but many times did I fail. But one sweep was granted. With the swish of the net through the air it was off in that peculiar zigzag course common to most butterflies, the angles of flight and the lines of flight as sharp and as numerous as the zigzag lines on the wing. It was not so abundant as formerly, for annually it has been taken near the laboratory for five seasons.

Other Argynnis were out. *Hesperis* and one I took to be *atlantis*, but which may prove to be different, were on the wing. The time to take *pie* is when it is passing. The time to take butterflies is when they are to be had. There is no more fatal error than to fail to take specimens because they are plentiful. They may not be so to-morrow. Every naturalist will no doubt recall irreparable losses because he failed to take specimens when they were to be had, but delayed for a more convenient season.

Atlantis was abundant. It is not so large nor so gorgeous as *Leto*, but is nevertheless beautiful. The underside of the species captured is dark buff with a slight submarginal band. It was abundant. It seemed to be especially fond of resting on *Spiraea lucida*. It rested often, and was not difficult to capture. The afternoon's catch resulted in 23 specimens of this and *Hesperis*. *Atlantis* was frequently interrupted in its rest on *Spiraea lucida* by *Phyciodes tharos*. Whenever a *tharos* was near it would invariably fly to the *atlantis* on the shrub. They would arise together and circle about before separating. Frequently the two were taken together. *Tharos* was invariably the aggressor. Whether it

dislikes Atlantis or not was not apparent. It appeared more a curiosity move, but was not displayed toward the others.

Phyciodes tharos was abundant, and had been several days. Light, graceful and delicate, it rested airily on the broad white umbels of the *Spiraea*, when it would spread its wings to their fullest extent and fan them gently up and down. Its flight is more graceful and undulating than that of the *Argynnis*. It moves more slowly, keeps in the open, and for that reason was not difficult to capture. It was taken while waiting for others to appear.

Lycaena melissa, the orange-margined blue, was less abundant along the roadside than on former days. It is a delicate little butterfly of wondrous beauty in color. It expands only about an inch. The males are blue-violet above with a delicate fringe or border of white scales to the wings. The female is dark brown with eye spots on the wing margins, surrounded by orange, giving the appearance of an orange band. It is underneath that the gorgeous colors appear. The spots with their border of gold and dust of silver, on a light grey background, and set out in contrast to the pure white brush like margin, call for admiration from all. Along the roadside they slowly flitted, mostly males, but now and then a female, occasionally seeming to hobnob with *tharos*, but always in graceful contrast to the more swiftly moving *Argynnis*. They were easy to take, but previously many had been captured.

A single Lorquin's admiral *Basilarchia lorquina*, was captured as it was being gently wafted along a side road by the breeze.

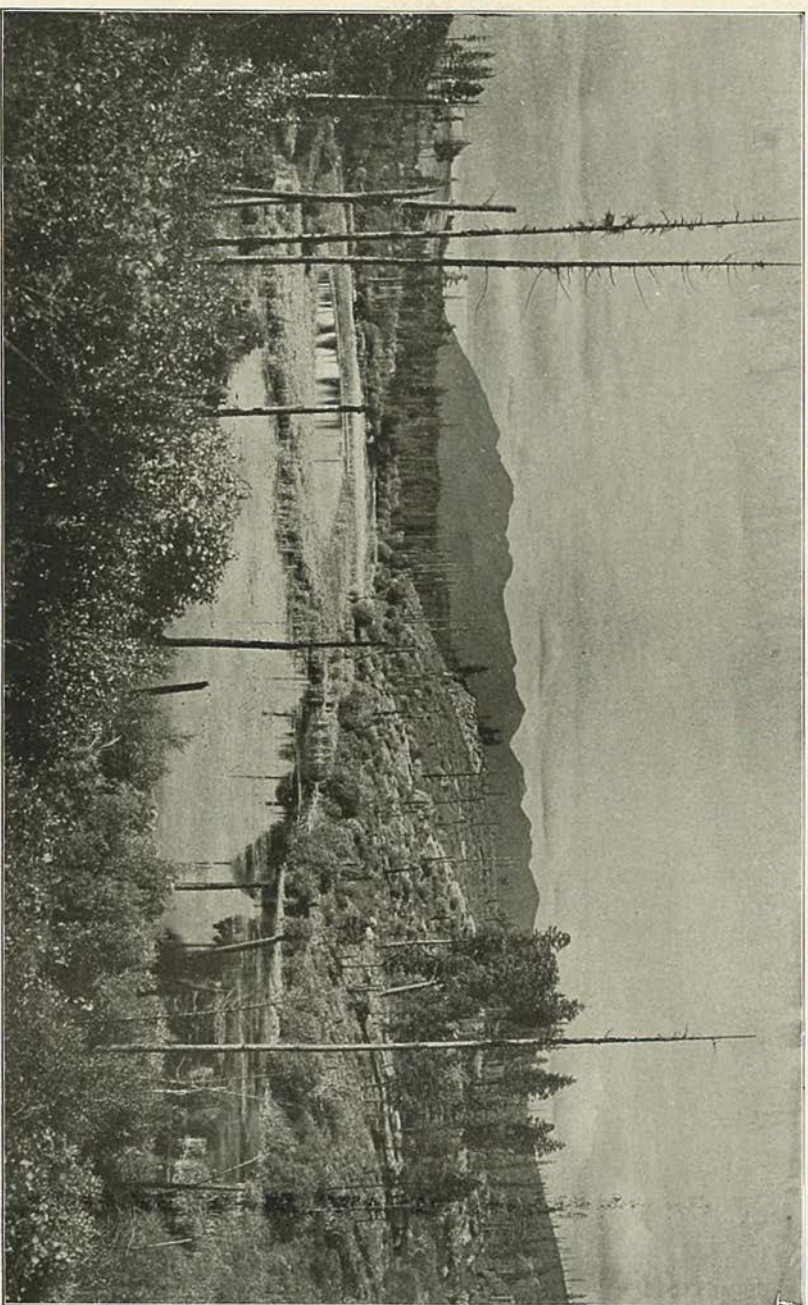
Down among the red cedars along the rocky lake shore a female *Parnassius smintheus* was resting on a weed. She was royal in her array of delicate red, creamy white and drab gray. Upon the hilltop one must usually search for *smintheus*, for it is an alpine species, among the rocky summits where grow the sedum and saxifrages. It is rather surprising to find it at the level of the lake, about 2,900 feet, yet on several previous occasions it has been seen and captured.

Shortly after four in the afternoon the trees were casting longer shadows, and already the cool of evening was being felt in the woods. The sun in the insects' god. When it shines all is life and activity. The whirr of the beetle's wings is heard, and the bumble bee hums from flower to flower, flies and gnats fill the air, dragonflies and damselflies skim the surface of the water, and butterflies disport themselves on airy wing. But when a passing cloud obscures the sun, or evening approaches, every form of insect life, except the mosquito and gnats, seems to feel the depression, and goes to cover. Where or what the cover is, who can tell? Two hours of brief collecting, and the work of the afternoon was over. The net result was forty butterflies and two moths, embracing the following species: *Colias alexandra*, *Argynnis atlantis*, abundant; *Argynnis leto*, less common; *Lycaena melissa*, quite common; *Phyciodes tharos*, common; *Basilarchia lorquina*, a single specimen; *Parnassius smintheus*, a single specimen; *Argynnis hesperis*, rare; a small black butterfly, of undeterminable species, two specimens; total, forty specimens, eight species.

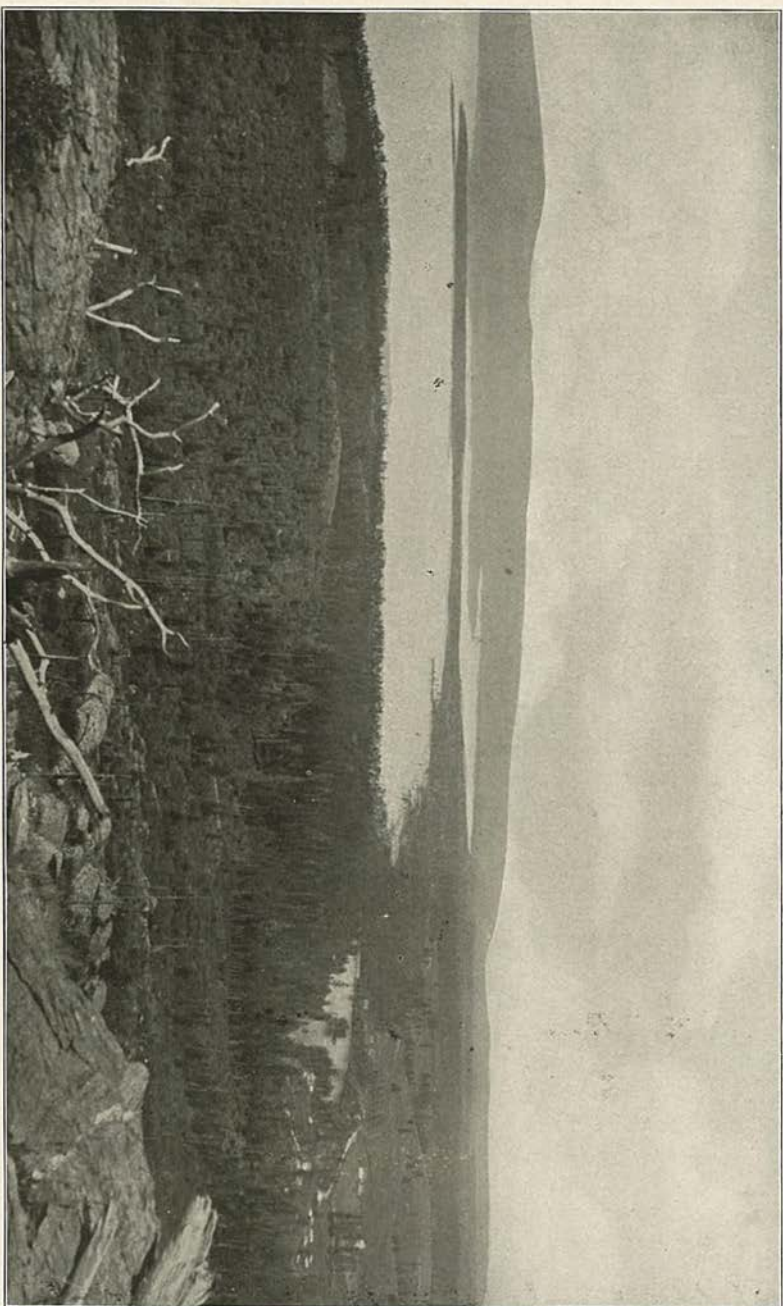
This was a good day. Many and many a day in Montana has resulted in a third of this catch. Both species and specimens are lacking in



Among the butterflies, University of Montana.



Daphnia Pond, near the University of Montana Biological Station. A fine collecting field.



Upper end of Flathead Lake, showing collecting field.

Genus *EREBIA*, Dalman.

"The Alpines."

Key to Species.

Wings dark brown, ocelli pupiled with white and surrounded with red.
epipsodea.

THE COMMON ALPINE, *Erebia epipsodea*, Butler.

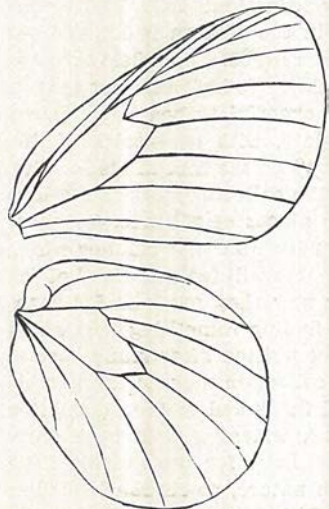
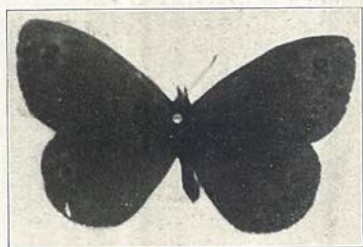
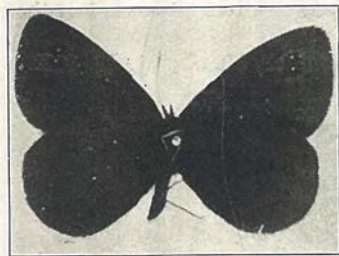
Fig. 86, 87.

Butterfly—The wings are dark brown, almost black, pupiled with white, and broadly surrounded with red near the outer margin of the fore wings, and with three or four ocelli on the upper side of the hind wings. The spots on the upper side reappear on the under side, and in addition the hind wings are covered by a broad, curved, median blackish band.

Early Stages—The caterpillar feeds on grasses.

Distribution—It ranges from New Mexico (at high elevations) northward to Alaska. It is common on the mountains of British Columbia. The collection in the University of Montana contains specimens from Sinyaleamin lake and McDonald lake in the Mission Mountains, Flathead Indian Reservation, the Tobacco Root range, Geyser Basin and Missoula.

It has been collected by Brandegee at Helena, and reported common. It has been taken by Cooley at East Flathead in Park county, at Shields river, Park county, at elevation 6,400 feet, at Mystic lake, Gallatin county, at 6,700 feet, and at Bozeman.

Fig. 86. Venation of *Erebia epipsodea*Fig. 88. *Erebia epipsodea*, lower surface.Fig. 87. *Erebia epipsodea*, upper side.

This butterfly is one of the early spring insects. The earliest about Missoula are *Aglais milberti* and *Eugonia californica*. Before the hot days come on *Erebia epipsodea* seems to be at its best. The last of May and the first days of June are the times when it is at its best. Its flight is like *Cercyon*, and the species is easily recognized by its flight.

Genus COENONYMPHA, Westwood.

The Ringlets.

Small Butterflies. The costal, median and sub-median veins are all strongly swollen, as may be seen in figure 89. The palpi are very heavily clothed with hairs, the last joint quite long and porrect. The antennae are short, delicate, gradually but distinctly clubbed. The eyes are naked. Both wings on the outer margin are evenly rounded.

This genus is distributed throughout the temperate regions both of the old and new world, and includes in our fauna a number of forms, the most of which are peculiar to the Pacific coast. They are very variable as to the number of spots and ocelli, and vary greatly in the color of the under side. It is no infrequent thing to find the ocelli and spots differing on the two sides of the same insect.

Key to species.

Upper side bright glossy ochre-yellow; no markings above save by the transparency of the wings
ochracea

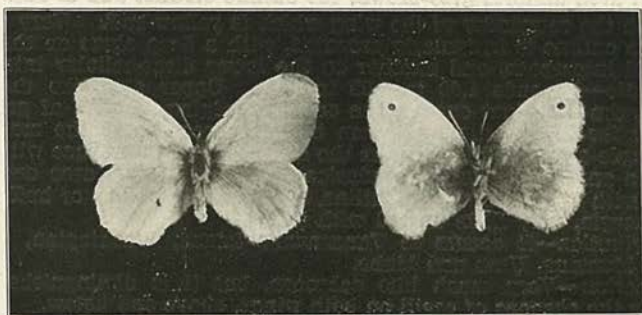
Upper side fuscous, immaculate; under side a shade paler, much irrorated with gray scales.
haydeni

Upper side pale ochre-yellow, immaculate
elko

Upper side ochrey-brown, lighter in the disk of all wings.

tiphon, var. laidon

THE OCHRE RINGLET. *Coenonympha ochracea*, Edwards. Figs. 90 and 91.



Figs. 90 and 91, upper and lower surfaces of *Coenonympha ochracea*.

the hind margin; abdominal margin and base dark gray; near the hind margin and parallel to it is a series of six black dots, sometimes obsolete, usually with white pupil and broad yellow iris; near the base two irregular pale brown spots, and midway between the base and hind margin a sinuous interrupted ray of same color, extending nearly across the wing. Female like the male.

Early Stages—Unknown.

Distribution—Ochracea has a wide range, from Lake Winnipeg in British Columbia to Kansas and west to California.

This dainty little insect is abundant about Missoula in early spring. In May and early June it sports along the open hillsides, being most abundant in mountain gullies where moisture lingers, or along the banks of streams.

The university collection embraces specimens from McDonald lake in the Mission Mountains, Missoula, New Chicago, the Tobacco Root range, and the Ruby Mountains. It is common about Helena according to Brandegee. Wiley has it in his collection from Miles City, and Cooley has collected it at Forsyth and Bozeman. Coubeaux reports it moderately common in Bear Paw Mountains. Coues collected it along the 49th parallel in 1874.

Remarks:—Dr. Henry Skinner, in his revision of the American species of the genus *Coenonympha*, Trans. Amer. Ent. Soc., Vol. XXVI, says of this species: "That is quite a variable species. The upper side differs very much in different specimens in regard to the distinctness with which the spots below show through on the upper side. The color of this species, in conjunction with the distinct ocellus on the primaries below, serve to distinguish it from all others." He calls *C. brenda* Edwards a synonym of *C. ochracea*, and says it is only a much spotted ochracea. "If we give names to all the variations of ochracea we would have six names for the species."

THE RINGLESS RINGLET. *Coenonympha elko*, Edwards.

Butterfly, *Maïe*—Expanse, .95 to 1.00 inch, 25 mm.

Upper side pale ochre-yellow, immaculate; fringes concolored. Upper side of primaries nearly same ochre-yellow over basal area and part of disk, limited without by a slightly sinuous and crenated edge of deeper color, much as in the allied species; outside this, slightly ochraceous next the inner angle, but yellow-buff over apical area. The secondaries have the basal area uniform grey-brown, the outline distinct and in strong contrast with the remainder of the wing which is yellow-buff. Very slightly gray; the outline is irregularly crenated, with a deep sinus on the upper sub-costal interspace, and another on the lower disco-cellular interspace.

Female—Expands 1.00 to 1.02 inches. Upper side like the male. Beneath, the area just outside the crenated edging on disk of primaries is yellow for a little distance, then tinted ochraceous to the margin, in one example a minute black dot in the disco-cellular interspace with white center, in another no dot; secondaries as in male, basal area one shade of gray, with distinct crenated outline, and beyond a yellow or buff ground to the margin, very little dusted with gray.

Distribution—It occurs in Vancouver's Island, Washington, Oregon, Nevada, Montana, Utah and Idaho.

Remarks:—Very much like ochracea, but it is distinguished from others by the absence of ocelli on both wings, above and below. According to Edwards ampelos and elko are same. He has found two specimens with spots on the secondaries.

THE PLAIN RINGLET, *Coenonymph tiphon*, var. *laidon*, Borkh.

Butterfly—This butterfly was described by Edwards as *C. inornata*. Dr. Buckell called attention to its resemblance to the European form. His view is confirmed by Dr. Skinner in his recent paper previously referred to. The following is Edwards' description of *inornata*, and therefore of *laidon*.

Male—Expanse, 1.40 inch, 35 mm. Upper side ochrey-brown, lighter in the disk of all wings; costal margin of primaries and abdominal margins of secondaries grayish, no spots above or below; fringe gray, crossed by darker lines. Under side: primaries same color as above, from base to beyond the middle, then a transverse sinuous ray of paler color, and beyond this to hind margin grayish; sometimes this ray disappears, the basal color extending nearly to the apex; secondaries gray, with a slight grayish tinge, darker from base to middle, and this shade separated from the paler margin by a transverse tortuous interrupted ray, the course of which is parallel to the hind margin.

Female—Wholly dull ochrey-yellow, marked as in the male.

Dr. Skinner adds: "This species is readily distinguished by its rich dark color, being the darkest of all the species except *haydeni*. Like all the other species it has ocelli. Mr. Edwards' specimens were evidently devoid of ocelli, as he says 'No spots above or below.'"

Distribution—The species occurs in Montana, Minnesota, British America and Newfoundland. Examinations show the collections to have one from Mount Lo Lo by Elrod and one from Miles City by Wiley. Collected by Coues in the mountains along the northern border in 1874.

HAYDEN'S RINGLET, *Coenonympha haydeni*, Edwards. Fig 92.

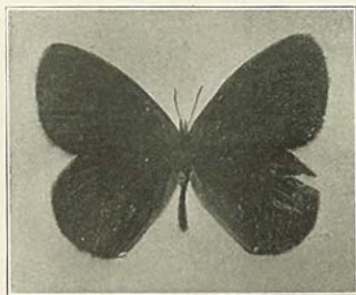


Fig. 92. *Coenonympha haydeni*.

Butterfly, Male—Upper side entirely of a bright glossy ochre-yellow, without any spot or mark, except what is caused by the transparency of the wings; base of both wings dark grey; abdominal margin of secondaries pale gray; fringe pale gray, crossed by a darker line. Under side. Primaries same color as above; costal margin, apex and base grayish; near the apex a round, sometimes a rounded-oblong, black spot with white pupil and pale yellow iris; this is preceded by an abbreviated, pale yellow, transverse ray. Secondaries light reddish brown, grayish along

Butterfly, Male—Expanse, 1.60 inches, 40 mm. Upper side fuscous, immaculate; under side a shade paler, much irrorated with gray scales; primaries immaculate; secondaries have a complete series of black ocelli along the hind margin, one in each interspace; each ocellus narrowly ringed with ochraceous, and having a minute white pupil.

The female is like the male in markings, but in color quite different, as it is light yellowish-brown.

Distribution—The species has been found in Montana, Idaho, Colorado and Wyoming. The University of Montana has but one specimen at present writing, collected by Douglas in the Tobacco Root range. Cooley has taken it at Mystic lake, 6,700 feet elevation, in Bridger canyon, along Shield's River, at East Flathead in Park county, and at Bozeman.

List of Butterflies taken by H. R. Morrison in Dakota and Montana, 1881.

1. *Papilio zolicaon*, Bois.
2. *Pontia* (*Pieris*) *protodice*, Bois.
3. *Eurymus* (*Colias*) *philodice*, Godart.
4. *Eurymus* (*Colias*) *eurytheme*, form *keewaydin*, Edw.
5. *Argynnis cybele*, Fab.
6. *Argynnis aphrodite*, Fab.
7. *Argynnis nevadensis*, Edw.
8. *Argynnis Edwardsii*, Reak.
9. *Brenthis* (*Argynnis*) *myrina*, Cram
10. *Euptoieta claudia*, Cram.
11. *Lemonias* (*Melitea*) *acastus*, Edw.
12. *Phyciodes carlota*, Reak.
13. *Phyciodes tharos*, Drury.
14. *Basilarchia* (*Limenitis*) *wiedemeyerii*, Edw.
15. *Pasilarchia* (*Limenitis*) *disippus*, Godt.
16. *Coenonympha tiphon*, var. *laidon* Bork (*inornata* Edw.)
17. *Cercyonis* (*Satyrus*) *alope*, var. *nephele*, Kirby.
(*nephele*, var. *olympus*, Edw.)
18. *Cercyonis* (*Satyrus*) *meadii*, Edw.
19. *Cercyonis* (*Satyrus*) *sylvestris*, var. *Charon*, Edw, (*charon*).
20. *Cercyonis* (*Satyrus*) *sylvestris*, Edw.
21. *Oeneas* (*Chionobas*) *varuna*, Edw.
22. *Uranotes* (*Thecla*) *melinus* (*humuli*).
23. *Thecla liparops*, Bois & Le Conte, (*strigosa*, Harr).
24. *Thecla acadica*, Edw.
25. *Mitoura* (*Thecla*) *damon*, Cramer, (*smilacis*, Bois).
26. *Gaeides* (*Chrysophanus*) *dione*, Scudder.
27. *Epidemia* (*Chrysophanus*) *helioides*, Bois.
28. *Chalcidia* (*Chrysophanus*) *rubidus*, Edw.
29. *Cupido* (*Lycaena*) *saepiolus*, Bois.
30. *Rusticus shasta* Edw., (*Lycaena lupini*, Bois.)
31. *Rusticus* (*Lycaena*) *melissa*, Edw.
32. *Rusticus* (*Lycaena*) *acmon*, West.—Doub.
33. *Cyaniris* (*Lycaena*) *ladon*, Cramer (*pseudargiolus*, Bois.)
34. *Cyaniris* (*Lycaena*) *ladon* (*pseudargiolus*), form *violacea*, Edw.
35. *Everes* (*Lycaena*) *comyntas*, Godt.
36. *Pholisora* (*Ancyloxypha*) *lena*, Edw.
37. *Oarisma* (*Thymelicus*) *poweschiek*, Parker.
38. *Erynnis* (*Pamphila*) *pawnee*, Dodge.
39. *Erynnis* (*Pamphila*) *uncas*, Edw.
40. *Limochroes* (*Pamphila*) *manataaqu*, Scudder (*cernes*, Harris.)
41. *Euphyes* (*Pamphila*) *vestries*, Bois, var. *metacomet*, Harr. (*metacomet*, Harr.)

42. *Phycanassa* (*Pamphila*) *vitellus*, Fab. (delaware, Edw.)
43. *Ambliscirtes* *vialis*, Edw.
44. *Pyrgus* *montivaga*, Reak. (*tesselata*, Scud.)
45. *Scelothrix* (*Pyrgus*) *scriptura*, Bois.
46. *Thanaos* *perseus*, Scudder.

This list of 46 species is given by W. H. Edwards in the Canadian Entomologist, Vol. XIV, p. 6, 1882. As here given the nomenclature used in this work has been used. Where the names used by Edwards are different from those used in this book they follow immediately and without commas, in parentheses. Where parentheses do not occur the Edwards names and names used by us are the same.

From this list it is impossible to tell which specimens were collected in Montana and which in Dakota. The species which are not included in this work are Nos. 20, 25, 26, 41, 42, and 43. Whether these are to be included in the lost from Montana is yet to be determined.

Genus *OENEAS* HUEBNER.

The Arctic.

Butterfly—The antennae are short, the eyes of moderate size; The front full, protuberant; the palpi slender; the fore wing somewhat produced at the tip; with the outer margins rounded and the hind margins slightly, if at all, sinuated. The nervules of the fore wings are slightly dilated toward the base; the hind wings are elongated, oval, and the outer margins evenly rounded. The color of these butterflies is some shade of brown; the outer margin is generally lighter than the base of the wing, and is marked with black spots, sometimes pupiled with white. The wings are generally marbled and mottled on the under side, and sometimes crossed on the middle of the hind wings by a broad band of darker color. The fringes are brown, checkered with white. The eggs are ovate, spherical, marked with sculptured ridges. The caterpillars are pale green or brown, marked by darker stripes upon the back and on the sides. The chrysalids are stout, very slightly angulated, and are formed, so far as we know, unattached under stones and at the roots of grasses.

The genus contains insects belonging to the Arctic fauna, which are formed in the far north or dwell upon the lofty mountain summits where the season is short. Of the large number of species formerly recognized but seven are retained, the others being placed as sub-species or varieties. At the present time but two are recorded from the state, although we should expect *nevadensis*, and possibly *macounii*.

Key to species.

Dark brown color, covering basal and median areas; a broad band of lighter shade on outer margin; under side mottled with white and brown. chryxus

Smaller, lighter in color; under side mottled with brown and black

varuna

THE CHRYSXUS BUTTERFLY. *Oeneas chryxus*, Westwood. Plate X.
also Plate 1.

Butterfly—Expanse, 1.75 to 2.25 inches, 44 to 57 mm. Light brown above, usually with darker color on the basal and median areas of both fore and hind wings, leaving a broad band of lighter color. A narrow dark brown or brownish black outer margin on both pairs of wings. Outer edges fringed with dashes or crescents. Edge of costa usually mottled. Wings on under side beautifully mottled with white and dark brown, a heavier band of almost black crossing both wings near the center, making an acute angle toward outer edge near the middle of fore wing. One to several eye spots, some pupiled with white, which show above as dark brown or black. The plate shows some of the variations of the species.

Distribution—The insect is found over a wide territory, from Hudson Bay and British Columbia to Colorado, the light colored variety *invalida* in Nevada and California. It has been taken in the state by Cooley in Gallatin county at 9,400 feet, and at Missoula; by Brandegee at Rimini near Helena and at Cascade on the Missouri river; Douglas collected it in the Tobacco Root range; Elrod has specimens from Missoula, from Mount Lo Lo, from Geyser Basin in the Yellowstone Park, and from the Swan range. The species is alpine. It has not been taken below 5,000 feet at Missoula, and above this is quite common. It has frequently been seen in the Swan range above 6,000 feet.

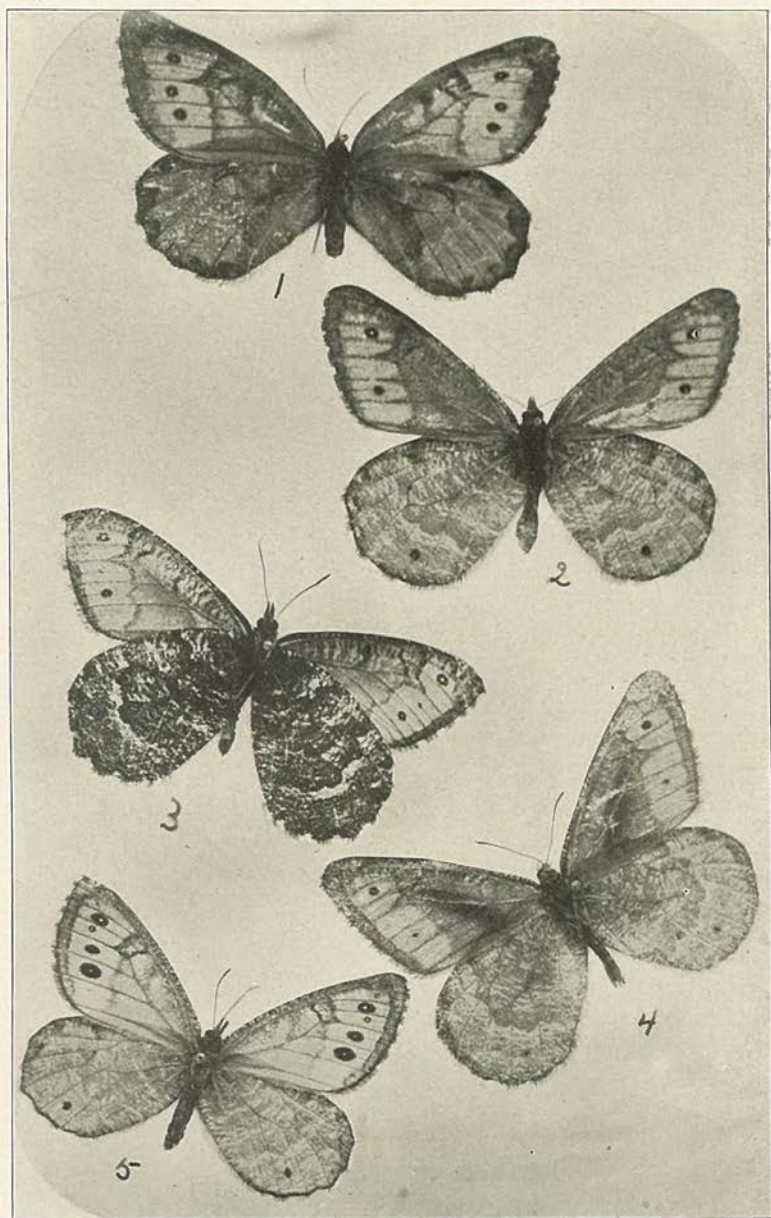


Fig. 92A. *Oeneas uhleri*, var. *varuna*; lower surface on left, upper surface on right; natural size.

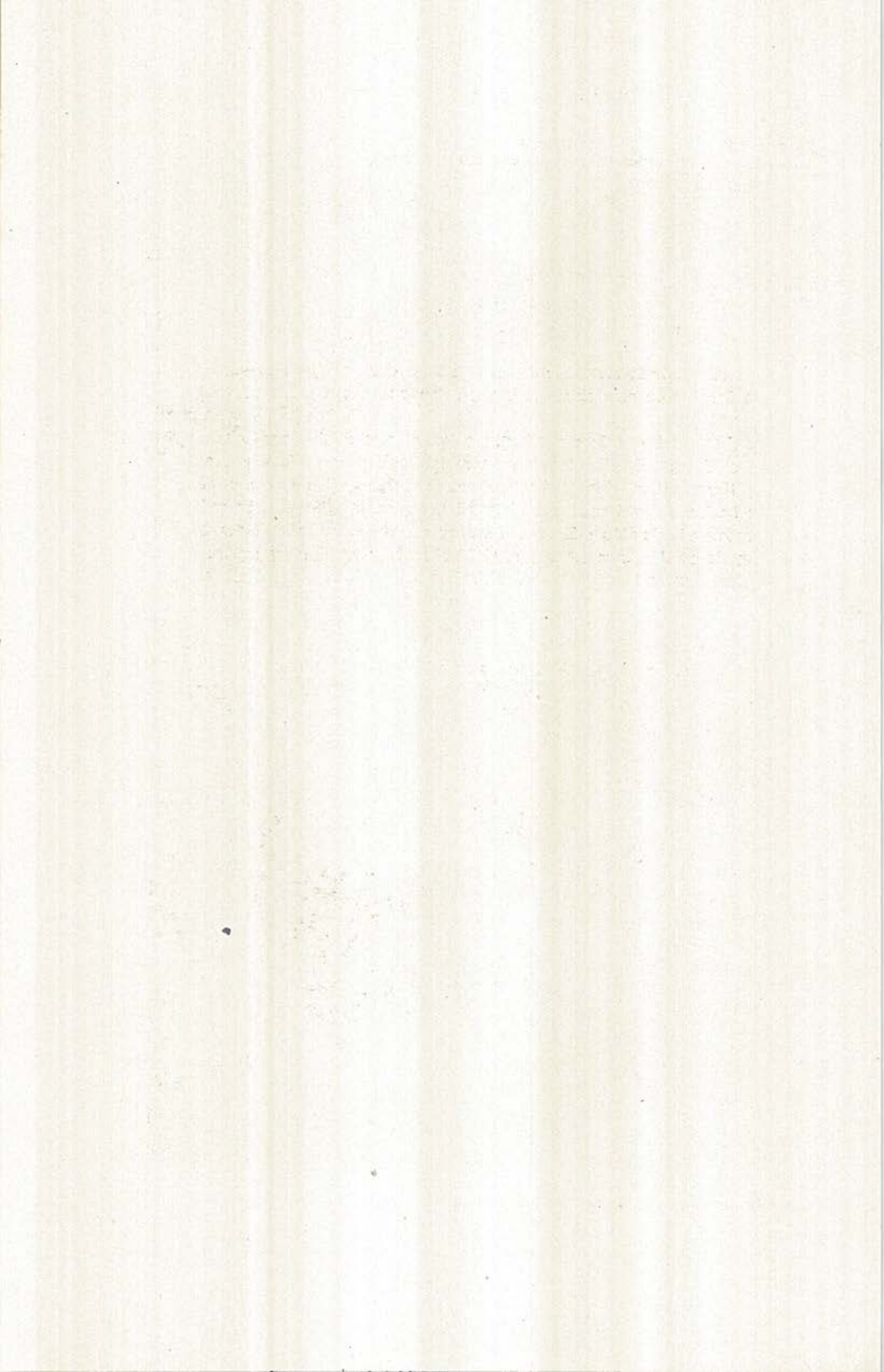
THE VARUNA ARCTIC. *Oeneas uhleri* Reakirt, var. *varuna*, Edwards.

Butterfly—Expanse, 1.50 to 1.75 inches, 38 to 45 mm. The butterfly is among the smallest of the *Oeneas* group. It is light tan colored above, with a narrow dark brown border on both wings. Edges with light fringe, broken by the brown. On the under surface the wings are mottled with brown, strongly marked with blackish blotches or shades. Usually several (two to five) eye spots, black, mostly pupiled with white, which show through as black.

Early Stages—Fully described by Edwards in Volume III of his great work "The Butterflies of North America." Eggs chalk-white, conical, truncated, ribbed. Mature larva .90 to .94 inches long, stout, thickest at the middle, a lateral band and several stripes of black, the intervening bands solid green. Under side, feet and legs, green, with a tint of brown. Chrysalis about .50 inch long, greenish yellow, wing cases



Oenias chryxus, showing various forms of wing coloration. Nc. 3 is lower surface.



with a shade of brown, head and abdomen with still more brown. Larval period, eleven to twenty days, pupal period about eleven days.

Distribution—It is found in the prairie lands of North Dakota, and the parts of Montana and Canada adjacent. It is not uncommon about Calgary. Wiley has collected many specimens around Miles City, and in 1894 sent eggs to Edwards to be hatched. Cooley has collected it at Bozeman. Taken by Coubeaux in Bear Paw Mountains.

Genus NEOMINOIS, Scudder.

RIDINGS SATYR, *Neominois ridingsii*, Edwards.

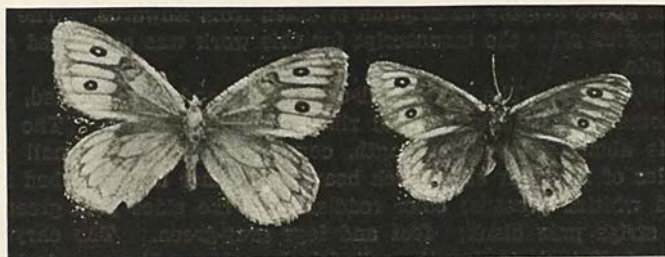


Fig. 92B. *Neominois ridingsii*, natural size.

Butterfly—Expanse, Male, 1.6 to 1.8 inches, Female, 1.8 to 2 inches.

Upper side dusky gray-brown, pale over the basal areas, beyond to margin dark; a common extra-discal series of buff spots, on primaries separated in the lower discoidal interspace; the four above this confluent, their outer extremities lanceolate, and being on the upper discoidal interspace a white pupiled black ocellus; the fifth spot is long, oval, narrower than the interspace—the upper median; the sixth is sub-oval, broad, and carries a second ocellus, usually equal to, but sometimes a little smaller than the other; the next two spots are sometimes completely confluent, and are about half the length of the sixth; on secondaries the spots form a continuous band of nearly even width, the upper three more or less incised on the basal side; the outer ends serrate, or partly lanceolate; a small black patch near the outer edge of the spot in lower median interspace; occasionally a minute pupiled ocellus is present on the lower sub-costal interspace of primaries, outside the line of the principal ocelli; fringes fuscous, yellowish at the tip of the nervules.

Under side paler; the cell of primaries and the basal and marginal areas of both wings covered with fine abbreviated dark streaks; the spots and ocelli of primaries repeated; the buff band of secondaries rarely clearly repeated, but the position of the outer edge of it is indicated by a black serrated line; the marginal inscriptions usually extend across this line well toward the mesial band; this band is closely as in the allied genus *Oeneas*, light within, dark near and along both edges; the elbow without rectangular on the lower discoidal interspace, with equal serrations from the angle to costa (though sometimes the lower two are much prolonged, acuminate); on the basal side a small angular sinus on the sub-costal nervure, and a large rectangular, or sometimes rounded, projection on the median.

Body dusky gray-brown; beneath light and concolored with the wings; femora light grey, the tibiae red-brown; palpi whitish, with many black frontal hairs; antennae fuscous above, cretaceous below; club red-brown beneath and at the tip.

The female is very much like the male; some individuals have a small ocellus on the upper median interspace.

A late form is a little larger, than the other, paler colored, especially beneath, where the inscriptions are faint and the space which on the upper side is occupied by the buff band is scarcely outlined; the mesial band but a shade darker than the basal area.

The above lengthy description is taken from Edwards. The species was reported after the manuscript for this work was completed and the cuts made.

Early Stages—The egg is sub-conic, base and top flattened, marked by nineteen and twenty vertical ribs; color chalk-white. The mature larva is about an inch in length, covered thickly with small pointed tubercles of irregular sizes, each bearing a rather long, clubbed and appressed whitish process; color reddish buff, the sides pale green; mid-dorsal stripe pale black; feet and legs gray-green. The chrysalis is about a half inch in length, cylindrical; color red-brown, darkest anteriorly, the divisions of the abdomen green; wing cases green, around the margin brown. Pupation takes place under the ground.

Distribution—It is reported from the Mountain states of the Pacific coast. In Montana it has been collected by Cooley at Bozeman and by Coubeaux at Big Sandy.

EXCHANGES.

One of the best ways of adding to a collection is by the method known as exchanging. A collector in one part of the country may find species which are rare, or altogether unknown, in another part of the country. By a system of exchanges with other collectors he is able to supply the gaps which may exist in his collection. No one, however, cares to effect exchanges with collectors who are careless or slovenly in the preparation of their specimens, or inaccurate in naming them. A collector who contemplates making an exchange should, as the first step, prepare double lists, in one of which he gives the names and the number of specimens of either sex of the butterflies which he is able to offer in exchange; in the other he sets forth the things which he desires to obtain. The first list is said to be a list of "offerta"; the second is a list of "desiderata." As an illustration of the manner in which such lists may be conveniently arranged, I give the following:

Offerta.

Papilio turnus—Male three; female four. Dimorphic var. *glaucus*, male six. *Colias alexandra*, male four; female six.

Desiderata.

Papilio nitra, female.

Papilio brevicauda, orange-spotted var.

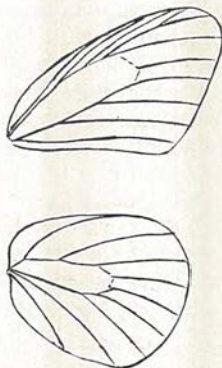
The collector who receives these lists of oferta and desiderata will be able to decide what his correspondent has which he desires, and what there may be in his own collection which the correspondent wishes that he can offer in exchange; and the process of exchange is thus immediately facilitated.

Persons who exchange insects with others should always be extremely careful as to the manner of packing the specimens. Too much care cannot be taken in preventing damage to specimens in transit.

Holland, in "The Butterfly Book."

Family LYCAENIDAE.

The Gossamar-winged Butterflies, the Blues and Coppers. Fig. 93.

Fig. 93. Venation of *Rusticus melissa*.

The family includes butterflies of small size and delicate structure. They are easily distinguished from the skippers. The body is slender, the wings delicate and often brightly colored, and the club of the antennae straight. The antennae are nearly always ringed with white, and a conspicuous rim of white scales encircles the eyes. The radius of the fore wings is three or four branched.

The blues can be distinguished from the metal-marks by the absence of the costal and humeral veins of the hind wings.

In the female the front legs are like the other legs, in the male they are shorter, without tarsal claws, and with the tarsi more or less aborted.

The caterpillars are slug-like. The body is short and broad, the legs and prolegs are short and small, allowing the body to be closely pressed to the object upon which the insect is moving—in fact some of the species glide rather than creep. Some of the species are remarkable for having honey-tubes which can be pushed out from the seventh and eighth abdominal segments, and through which honey-dew is excreted for the use of ants.

The chrysalids are short, broad, ovate, without angulations. They are attached by the caudal end, by a loop passing over the body near its middle.

There are three well marked groups, which have been distinguished as the hair-streaks, the coppers, and the blues.

Key to Species.

- | | |
|--|----|
| 1. Radius of the front wings four branched, wings blue or copper color | 7. |
| Radius of the fore wings only three branched, under side of wings with hair like streaks | 2. |
| 2. Hind wings with a long, slender, tail-like prolongation | 3. |
| Hind wings with only a short projection if any | 6. |

3. Upper surface of wings conspicuously marked with blue scales
Upper surface of wings with but few if any blue scales 4.
4. Lower surface of hind wings bright green marked with brown and white Mitoura P. 5.
Lower surface of hind wings not green
5. Lower surface of wings with a narrow white-edged bar at end of discal cell Thecla, P. 127
Without bar at end of discal cell Uranotus, P. 126
6. Under side of hind wings without a row of orange spots Incisalia, P. 130
Under side of hind wings with a row of orange spots Stryman, P. 131
Under side of hind wings pale fawn, with a row of red spots Erora, P. 131
Under side of hind wings green Callophrys, P. 130
7. Color above orange red with a coppery luster, or brown with a coppery tinge, in each case spotted with black 8.
Color above blue or bluish black 10.
8. Hind wings with a broad orange-red band on the outer margin extending from the anal angle nearly to the apex 9.
Hind wings with a sinuous submarginal orange line beginning at the anal angle and fading out near the middle of the outer margin Epidemia, P. 133
9. Fore wings fulvous, hind wings brown Heodes, P. 134
Both wings brown Gaeides, P. 133
Wings under side front wings orange hind wings gray Chalceria, P. 134
Wings under side front wings orange hind wings gray Chrysophanus
10. Hind wings with a slender tail like prolongation Everes, P. 139
Hind wings without tails 11.
11. Under side fore and hind wings similar 13.
12. Under side of secondaries pale gray with white spots Agriades, P. 136
Under side gray, with spots pupiled with black Cupido, P. 135
13. Hind wings with golden or orange spots Rusticus, P. 137
Hind wings without golden or orange spots 14.
14. Lower surface of wings slate brown Nomiades, P. 136
Lower surface of wings pale ash gray Cyaniris, P. 138

THE GRAY HAIR-STREAK or MELINUS BUTTERFLY, *Uranotes melinus*
Figs. 94, 1, and 2.

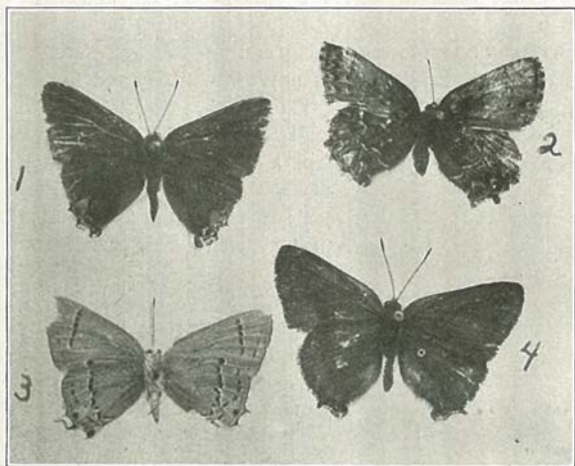


Fig. 94. *Uranotes melinus*; 1, upper; 2, lower side; 3, *Incisalia eryphon*; 4, *Thecla saepium*.

Butterfly—Expanse, 1.10 to 1.20 inches, 28 to 30 mm. This butterfly is easily recognized by its slaty upper surface, adorned by a large black spot, crowned with crimson, between the origin of the two tails of the secondaries. Along the outer margin is a series of more or less distinct pale blue spots. An orange spot at the anal angle: Two slender tails. Under side gray, two black lines crossing both wings, the inner on the hind wings forming a W. The other spots repeated on the under side.

Early Stages—The larvae are "green, downy caterpillars," feeding on the common hop vine.

Distribution—Found all over temperate North America, ranging southward into Mexico, at suitable elevations. It has not been found abundantly in the state. Three specimens have been taken at Missoula. It has been taken at the University of Montana Biological Station at Flathead lake, but is not plentiful. Wiley has one specimen from Miles City.



Fig. 95. *Lycaena* on the banks of Sinyaleamin Lake, Mission Mountains, Mountains.

Genus **THECLA**. Fig. 96.
Key to Species.

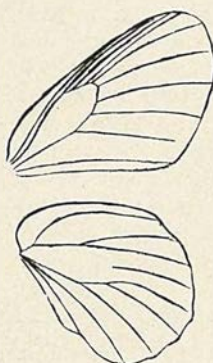


Fig. 96. Venation of *Thecla*.

Lower surface of wings with a narrow white-edged bar at the end of the discal cell acadica

Lower surface of wings crossed just outside of the middle by a row of small, dark, blue-edged spots, which form an almost continuous line calanus

The spots of the extra mesial row of the lower surface of the wings wide and discontinuous liparops

Lines of spots on the lower surface narrowly defined externally by white saepium

THE HEDGE-ROW HAIR-STREAK, *Thecla saepium* Boisduval, Fig. 94.

Butterfly—Expanse, 1.20 inches, 30 mm.

Upper side quite uniformly reddish brown, paler on the under side; a narrow submarginal and an irregular median transverse band,

narrowly defined externally by white; a well defined black spot at the anal angle of the secondaries.

Early Stages—Unknown.

Distribution—Found throughout the Pacific states, in Montana and Colorado. Holland thinks it identical with *chalcis*. Taken in the state at Missoula (4).

THE STREAKED HAIR-STREAK, or LIPOROPS BUTTERFLY.

Thecla liparops, Boisduval and LeConte.

Butterfly—Dark brown on upper side, grayish below. The lines on the underside are arranged in pairs, and very narrow. The spots at the anal angle are obscure and blackish. Expanse, 1.15 inches, 29 mm.

Early Stages—Almost entirely unknown.

Food—The caterpillar feeds on a variety of plants, oaks, willows, the wild plum and the Ericaceae.

Distribution—It ranges through the northern Atlantic States and Quebec to Colorado and Montana, but it is nowhere common. We have not taken it.

THE BANDED HAIR-STREAKED, *Thecla calanus*. Hubner.

Butterfly—Expanse, 1.2 inches, 30 mm.

The upper surface of the wings is dark brown or blackish brown. There is sometimes an orange spot at the anal angle. The under side is blackish slate brown, nearly as dark as the upper surface; there is a dark bar edged with bluish white at the end of the discal cell of both wings, and just outside of the middle a row of small, dark, blue-edged spots, which form an almost continuous line; and a submarginal series of crescents, edged within with white.

Early Stages—The caterpillar is 1.5 inches in length, slug-shaped, bright grass green or purple brown in color, marked with lighter and darker lines running lengthwise of the body. The food plants are oak, hickory and butternut.

Distribution—East of the Rocky Mountains.

THE ACADIAN HAIR-STREAK, *Thecla acadica*, Edwards. Plate I.

Butterfly—Expanse, 1.5 inches, 38 mm. The upper surface of the wings is of a uniform blackish slate brown; costal edge of fore wings, especially near the base, tawny. Anal angle of the hind wings with a submarginal, orange, lunate spot, which is indistinctly continued to the inner border of the wing. The under surface is pearl gray; on each wing at the end of the discal cell there is a dark bar edged with white; beyond this a bent row of roundish black spots encircled with white; and beyond this a submarginal row of black lunules edged within with white, and followed without by orange spots. The orange spots of the front wings are inconspicuous; but on the hind wings they increase in size toward the anal angle, except that one is largely covered by a blue patch.

Early Stages—Caterpillar; Length about one-half inch; slug-shaped; the brown head is very small; the body is almost oval in outline and grass green in color. Two yellowish stripes along the side include a row of oblique short stripes of the same color. The food plant is the willow.

Distribution—From New England west to Montana and Vancouver. South to Los Angeles. Taken in Nevada and Arizona. In Montana taken occasionally at Flathead lake. It is scarce.

Genus INCISALIA, the Elfins.

Butterfly—The hind wings have only a short projection, if any, at the anal angle. The under side of hind wings without a row of orange spots. Dark brownish butterflies, with the fringe of the hind wings a scalloped outline. No prominent tail like prolongations of the wings. In the outer third of the inner margin of the hind wings there is a deep rounded excision, producing a conspicuous lobe at the anal angle. Discal spot present in the fore wings of the males, usually inconspicuous. Under surface almost as dark as the upper, especially on the basal half, which is separated from the outer half by a wavy line.

Key to Species.

A large rusty brown space in the middle of each wing of the female, but near the anal angle of the male niphon

The inner of the two dark bands on the outer third of the wing not sharply angulated below the third median nervule eryphon

Outer half of the lower surface of the hind wings uniform rust red augustus

Outer half of lower surface of hind wings sprinkled with pale lilac irus

THE HOARY ELFIN, *Incisalia irus* Godart. Fig. 97.

Butterfly—Expanse, 1.10 inches, 23 mm. Grayish brown on the upper side; wings below are of the same color, paler on the outer margins, and darker toward the base; the outer half of the lower surface of the hind wings sprinkled, especially near the margin, with pale lilac scales, giving it a hoary bloom.

Early Stages—The caterpillar is said to feed on the plum.

Distribution—The species is rather rare, but has been found from the Atlantic to the Pacific in latitude of New England. In the state it has been taken on Mount Ascension, near Helena (one), by Brandegee; at Wincott (one), 6,000 feet (near Helena), by Brandegee; at Miles City (one) by Wiley.

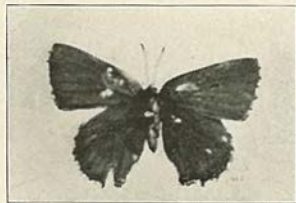


Fig. 97. *Incisalia irus*.

THE BANDED ELFIN, *Incisalia niphon* Huebner.

Butterfly—Expanse, 1.10 inches, 28 mm. Upper side dark blackish brown, a large rusty brown space in the middle of each wing of the female, but only near the anal angle of the male; a distinct white or whitish edging near the base of the under side of the hind wings, limit-