

although sometimes marred by being clouded; form usually spherical. The writer had not seen any collected within the Province. of the more delicate and highly prized tints.

The best Pearls hitherto found have been in the waters flowing westward into the Bay of Fundy, comparatively little search having been made, and but few found in the rivers emptying eastward, into the Atlantic.

In the United States Pearls of price are stated to have been taken from the *Alasmodonta margaretifera*; and the *Unio ochraceus*, *complanatus* and *radiatus*,—but as yet in Nova Scotia, only from the *Alasm. margaretifera*. Small and seed Pearls of no remunerative value are, however, plentiful in the *Mytilus edulis* on all the coasts.

The writer's observations went to indicate that the Pearl is an excretion from the first nacreous layer,—is a disease of age, but age does not necessarily produce pearl;—that it is of rapid growth, with vitality throughout its substance until maturity, which is when it has attained a spherical shape. It then separates from the neck or base which connected it with the shell, and is voided. If this be true—

“ Full many a gem of purest ray serene,  
The dark unfathomed caves of ocean bear.”

The attention of chemists was invited to the scales of the smelt, as a material for the manufacture of pearl paste, such as is now made from the scales of the bleak.

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ART. XII. LIST OF BUTTERFLIES OBSERVED IN THE NEIGHBOURHOOD OF HALIFAX, NOVA SCOTIA. BY THOMAS BELT.

[*Read May 2, 1864.*]

No catalogue of the Nova Scotian Butterflies having been published, I have been requested to draw up, a list of those observed by me in the vicinity of Halifax during the years 1862 and 1863. My observations were confined almost entirely to the neighbourhood of Halifax, were extended over only two seasons, and my time was

otherwise much engaged, so that the list can only be considered as a contribution towards a catalogue of the Nova Scotian species. There is no good accessible work on North American Butterflies, and I have thought it might be useful to append a few notes on the different species, and have given their times of appearance, their distribution, &c.

The day is now past when the study of any branch of Natural History might be considered trivial or unimportant, and an eminent naturalist has lately remarked, that “Butterflies offer great facilities for the study of the variation of species, from the ease with which suites of specimens may be obtained and preserved.” It may be added that both the advocates and the opponents of the Darwinian hypothesis may find arguments in support of their respective opinions; the one may shew as Mr. Bates has done, that two species occurring in the same locality and presenting apparently very distinct characteristics, are in other places connected by intermediate varieties—the other may point to the great persistency of form and colouring of species that range over both the old and the new worlds, and from the northern edge of the temperate zone to the tropics, with all the consequent variation of conditions as to food, climate, the enemies against whom they have to guard, and the rivals amongst whom they have to struggle for existence. These considerations invest the study with great interest, so that even the mere collector may by the specimens he brings together, assist in elucidating some of the most important problems in Natural History: for the laws that govern the variations of Butterflies must rule throughout the organic kingdom.

Here I may urge the great value of collections of the varieties of species, which may be more instructive than typical specimens. It is probable that many of the North American Butterflies instead of being representative species (as they have been called) of European insects, are in reality geographical varieties: thus the American *Colias philodice* is probably only a variety of the European *C. europome*, and the American *grapta*, *J—album* of the European *G. V—album*. It has often been considered that animals and plants presenting slight differences are more likely to be distinct when they inhabit far separated countries; whereas the

reverse seems to me more likely to be the case, that the different geographical conditions have caused the same species to vary.

In the names of the genera I have followed DOUBLEDAY, WESTWOOD and HEWITSON in their *Diurnal Lepidoptera*.

*Papilio turnus*, Linn. Abundant. The Butterfly appears about the first of June, having passed the winter in the pupa stage. After the middle of the month specimens are more or less faded and injured, and by the end of June they have deposited their eggs, and only a few stragglers are to be seen, presenting in their short lives a great contrast to species of the more robust genus *Vanessa*. The caterpillar changes to a chrysalis about the beginning of September, from which it does not issue until the following June, so that its active existence only extends over three months. It is probable that its congeners, *P. troilus* and *P. asterias*, will be found in the Province; but they do not occur near Halifax.—*Distribution*: Hudson's Bay, Canada, United States to East Florida.

*Pieris oleracea*, Harris. Common. The first brood appears at the end of May; the second in July.—*Distribution*: Canada, United States.

*Colias philodice*, Godt. Abundant. There are two if not three broods; the first appears in May; the second in July; and I have seen numbers on the wing in fine weather in November.—*Distribution*: Canada, United States.

*Danaïis archippus*, Fabr. *D. erippus*, Cramer. Rare near Halifax. In the autumn of 1863 a few specimens were taken on Citadel Hill, and in the neighbourhood of Ashbourne.—*Distribution*: Canada, United States, Bermudas.

*Argynnis cybele*, Godt. *A. aphrodite*, Fabr. Very abundant in July and August. Many writers consider the two forms distinct species; but they pass into each other by insensible gradations.—*Distribution*: Hudson's Bay, Canada, Northern States.

*Argynnis myrina*, Cramer. Common. There are two broods: the first in May and June; the second in August and September.—*Distribution*: Hudson's Bay, Canada, United States.

*Nelitæa ismeria*, Boisd. Scarce. Near Lake Loon and Lake Thomas, in July.—*Distribution*: Canada, Southern States.

*Melitæa tharos*, Cramer. Common in June, July and August.—*Distribution*: Hudson's Bay, Canada, Northern States.

*Grapta interrogationis*, Godt. Scarce. Horticultural Gardens, August, 1863.—*Distrib.*: Canada, Northern and Southern States.

*Grapta progne*, Cramer. Abundant. It issues from the chrysalis in July and August; hybernates during the winter, appears again in April, and faded specimens may be seen up to the end of June. It is distinguished from the next two species, by wanting the black mark in the centre of the upper surface of the hind wings; and on the under surface by its darker colour, and by the white mark being a simple right angle in shape, and not curved like the letter C.—*Distribution*: Hudson's Bay, Canada, United States.

*Grapta comma*, Harris. We have two very distinct forms in the neighbourhood of Halifax, which have been confounded under the above name. They occur in the same localities, and as I have examined a great number of specimens without detecting the slightest symptom of the one merging into the other, I must, pending further information, treat them as distinct. HARRIS in his description does not mention the points that distinguish the two forms, and I therefore append a description, taking HARRIS'S name for that which comes nearest his definition:

DESCRIPTION.—*G. Comma*, Harris. *Upper surface, fore wings*: orange tawny, spotted and barred with black, and bordered by a dark brown band. *Hind wings*, orange tawny, two black marks near the base, which in some specimens coalesce. A black mark in the centre of the wing, just below the median nerve. Border brown with a transverse row of obscure light tawny lunules. *Under surface, fore wings*: mottled with dark and light reddish brown; next the margin a connected row of grey lunules edged with black, within which is an interrupted line of black points. *Hind wings*: mottled with light and dark reddish brown; a grey lunule edged with black near the centre of the margin, and a line of nearly obsolete black points; the white mark in the centre is large, silvery, curved, and at each end thickened.

Rare near Halifax, though it appears to be common in the Northern States and in Canada. I have taken specimens near Waverley.

*Grapta C-argenteum*. I propose to revive KIRBY'S name for this species. HARRIS states that it is his *G. Comma*, but neither KIRBY'S figure nor description agrees with that species, and the authors of *Diurnal Lepidoptera* have with more reason placed the name as a synonym of *C. progne*; but I think it very probable that he intended the present species:

DESCRIPTION.—*G. C-argenteum*, Kirby? *Upper surface, fore wings*: tawny orange at the base, orange towards the apex, spotted, barred and

bordered with black. *Hind wings*: tawny orange, two black marks near the base and one in the centre of the wing; border broad, dark brown or black, and including a transverse row of orange lunules; border edged with grey in perfect specimens. *Under surface, fore wings*: mottled with black, brown and cinereous; a connected row of green lunules next the border, inside of which is a row of green spots. *Hind wings*: mottled with black, brown and cinereous; a row of conspicuous green lunules next the border, and then a row of green spots; white mark smaller than in the last species, but variable, generally thickened at the lower end and hooked at the upper. This species is easily distinguished from *G. progne*, by the conspicuous black mark in the centre of the upper surface of the hind wings; and from *G. comma* by the green markings on the lower surface; these are sometimes olive green, but always distinct. The mottlings are also different, and the wings more deeply angulated. In this last character and in the green markings of the under surface it comes very near *G. C-album* of Europe.

Much more abundant than the last. Near the Dartmouth Lakes and Lake Loon, in spring and autumn.

*Vanessa J-album*, Boisd. Rather scarce. I have noticed it near the Dartmouth Lakes and at Lawrencetown.—*Distribution*: Canada, United States.

*Vanessa milberti*, Godt. *V. furcillata*, Say. I have specimens from Windsor and from Truro, but have not noticed it near Halifax. It appears in July and August.—*Distribution*: Hudson's Bay, Canada, United States.

*Vanessa antiopa*, Linn. Common everywhere. Like most species of *Vanessa*, it is very long lived. It appears at the end of July, is plentiful all the autumn, hybernates during the winter, and appears again in spring, and faded specimens may be seen late in June. It is a very robust butterfly, and widely distributed, ranging over Europe and Northern Asia, and in America from Hudson's Bay to Mexico.

*Pyrameis atalanta*, Linn. Not common. It appears in August and hybernates during the winter. Horticultural Gardens, Lawrencetown, and Lake Loon.—*Distribution*: Europe, America from Hudson's Bay to Mexico, Bermudas, Hayti.

*Pyrameis cardui*, Linn. Common in August and September.—*Distribution*: Europe, Asia, Africa, Australia, America from Hudson's Bay to Venezuela.

*Pyrameis huntera*, Smith. Common on Citadel Hill and near Dartmouth, September and October.—*Distribution*: Canada, United States, Hayti.

*Limenitis arthemis*, Drury. Not uncommon, but scattered. It appears about the first of July and lasts until the second week in August.—*Distribution*: Hudson's Bay, Canada, United States.

*Limenitis disippas*, Godt. Rare near Halifax. I have seen it at Waverley and near Elmsdale. It appears in July and August.—*Distribution*: Canada, United States, Guiana.

*Debis portlandia*, Fabr. Rare. I have two specimens from near Elmsdale. It appears in August.—*Distribution*: Canada, Northern and Southern States.

*Erebia nephele*, Kirby. I have not seen this butterfly near Halifax. It is not uncommon near Windsor, in August.—*Distribution*: Canada, Northern States.

*Thecla niphon*, Hubner. Not uncommon in dry shrubby places in May.—*Distribution*: Canada, United States.

*Thecla augustinus*, Westwood. *T. augustus*, Kirby, (*non Fabricius*.) Common on dry shrubby banks; when pursued it falls amongst the herbage. It appears in May.—*Distribution*: Hudson's Bay, Canada.

I have another species of *Thecla* in my collection, which appears to be undescribed, but as I have not seen descriptions of the new Canadian species (*T. laeta* and *T. acadica*) I hesitate to describe it as new.

*Lycæna pseudargiolus*, Boisd. Abundant in May and June, and again in July and August.—*Distribution*: Canada, United States.

*Chrysophanus phleas*, Linn. *Polyommatus P.* Abundant. There are two broods,—the first in June, the second in August and September.—*Distribution*: Europe, Himalayas, Canada, United States.

*Chrysophanus crategi*, Boisd. *Melitæa tarquinius*, Fabr. I have taken specimens of this rare butterfly near Portobello, and the Rev. Mr. FRERE, of Bermuda, took one near Ashbourne.

*Nisoniades brizo*, Boisd. *Thanaos b.* Common. It appears in May, and again in the autumn.—*Distribution*: Canada, United States.

*Pamphila zabulon*, Boisd. Common in June and July.—*Distribution*: Canada, United States.

*Pamphila peckius*, Kirby. Common in June and July.—*Distribution*: Canada, United States.