

Bracteatus has been recorded as occurring on Vancouver Island (2), but during four years' collecting I have not as yet come across any specimens that could be referred to this species.

I wish to express my acknowledgments to Dr. H. M. Parshley who has assisted me by sending specimens of *Apateticus bracteatus* for comparison and a copy of Uhler's original description.

REFERENCES

- (1) Uhler, P. R., Trans. Maryland Ac. Sci., 1: pp. 383-394, 1897.
- (2) Van Duzee, E. P., Catalogue of Hemiptera of N. A., 1917.

THE GENUS ARGYNNIS IN BRITISH COLUMBIA

By E. H. Blackmore, F.E.S.

The genus *Argynnis*, or, as they are commonly called, Fritillaries or Silver-spots, belong to the family *Nymphalidae* or brush-footed butterflies, so called on account of the first pair of legs being aborted, and folded in front of them, thus being of no use for walking purposes.

This genus is one of the largest in this family; it is well represented in Europe, and is found in Asia, China and Japan. Several species are found in Australia, and two or three species in Africa, but it is in North America that it has found its greatest development. They are found on high mountains up to the timber limit, and at lower elevations down to sea-level, but they are, generally speaking, a mountain-loving group.

The species composing this genus are of moderate or large size, and are distinguished by their bright tawny or fulvous colour, with well defined black markings, which consist of wavy transverse lines and rounded or triangular markings on the outer borders.

A great many species so closely approximate each other that great difficulty is experienced in separating them satisfactorily; most of the eastern species have had their life histories carefully worked out, so that not much difficulty is now experienced in determining them, but it is our western forms that have caused the most trouble to students of this genus. Many different causes are responsible for this confusion; in some cases the limits of variation are not very well known; and in others, species intergrade with each other so that in a long series it is hard to tell where one species leaves off and another one begins. Mis-identifications and confusion of species by some of the older authors led to a great deal of trouble in this respect. In some cases descriptions have not been detailed enough to allow of a definite placing of species, and have been so vaguely worded that they will allow two or three different forms to fit it in a more or less satisfactory manner.

Fortunately, for present day systematists, Dr. Wm. Barnes some years ago—1913, to be exact—sent Dr. J. McDunnough to Europe for

the express purpose of studying the type specimens of No. Amer. Lepidoptera which were contained in British, French, Belgium and German Museums. After his return from Europe he visited the principal museums of the United States, where type collections were known to exist. The total result of these examinations of type specimens has been to elucidate many perplexing problems, and to put our knowledge of the species on a far better basis than has hitherto been possible. In the genus under discussion, there still remains in certain groups, much work to be done in careful breeding, and a comparison of the larval stages before a proper understanding of the species can be arrived at.

Egg. The eggs of this genus are beautiful objects under the microscope, being truncate conoidal, in shape something like a thimble, ornamented on the side by parallel raised ridges, between these ridges are a number of small cross ridges, giving it a reticulated appearance. According to W. G. Wright, in his "Butterflies of the West Coast," some species of this genus oviposit like a grasshopper, thrusting the ovipositor down amongst the dead leaves and rubbish under small bushes; others drop their eggs while flying over suitable places. The eggs hatch in about three weeks, the young larva devouring its shell; it then goes into lethargy without eating anything else and thus it hibernates, a tiny thing, not half so big as a pin's head, naked, without any covering, in the wet and frozen rubbish, till the leaves of its food plant shall grow in the early spring.

Larva. The larvae are cylindrical and covered with spines, the first segment always bearing a pair of spines somewhat longer than the others. So far as is known the North American species of this genus feed on the various species of wild violets, they are nocturnal feeders, lying concealed during the day.

Chrysalis. The chrysalids are rather large; angular; with more or less prominent projections and a bifid head.

As stated before, North America has shown the greatest development in this genus, no less than 63 described forms and species being recognized in the B. & McD. Check List.

In the 1904 B. C. Check List 14 species were listed, 9 of which were misidentifications, and in some cases the same species was listed under two or three different names. I am rather afraid that comparison with Holland's Butterfly Book was responsible for many of the errors in that list.

In the 1906 List we find but 10 species listed, of which only four were misidentifications, or species not occurring in the Province.

Up to the present I have 8 species and 7 geographical races listed from the Province, and out of these 15 forms I have 14 in my own collection, the remaining species being found in the far north of the Province.

1. **Argynnis leto** Behr. This is the largest and most beautiful species that we have in the Province. It is especially interesting from

the fact that there are no normal coloured females, instead of being fulvous they are of a blackish-brown colour, with the sub-terminal area of a pale straw yellow. The question whether there were ever any normal-coloured females in an interesting one. The localities I have it from are Princeton, Similkameen, Vernon, Armstrong, and Rossland.

2. **A. aphrodite** race **columbia** Hy. Edw. Until quite recently **columbia** has always been considered a distinct species, but upon an examination of the type by Dr. McDunnough it is now considered a small northern form of **aphrodite**. It resembles **atlantis** somewhat, and with which it has very often been associated, but they can always be separated in the males by the fact that in **atlantis** the veins on the primaries are enlarged or thickened by black scales. It was described from Lake La Hache and Quesnel in 1877, but it has a wide distribution throughout the northern part of Canada. I have specimens of this species from Chilcotin:

3. **A. atlantis** Edw. Although this butterfly occurs from the Hope Mountains to the Rockies, it is not listed in our B. C. Check Lists. It was probably listed under the name of **electa** Edw., which is, however, a larger and more heavily marked insect. I have it recorded from a number of localities, including Atlin, Mt. McLean, Armstrong, Osoyoos, and Rossland.

4. **A. electa** Edw. This is one of the commonest species of this genus in the Interior. I have it from a large number of localities between Princeton and the Rocky Mountains. There has been a considerable mix up in the types of **chitone**, **electa**, and **cornelia**, the latter of which is now sunk as a synonym of **electa**. Edwards had several forms before him when he described this species, but the type is now restricted to a male from No. Colo., taken by Mead in 1871.

In the Vernon district we have another species going under this name with the discal area of the underside of the secondaries suffused with chocolate brown. They could not be matched in the Barnes collection, and may be an undescribed form of either **electa** or **chitone**.

5. **A. bremneri** Edw. In our B. C. Check Lists the locality of this species is given as "generally distributed," but this is wrong, as I have no record of its being taken anywhere than on Vancouver Island and the Lower Fraser Valley. Possibly the undescribed form mentioned above has been confused with it, as they bear a general resemblance to each other.

6. **A. hydaspe** race **rhodope** Edw. This with the preceding species are the only two that occur on Vancouver Island, so that we are rather poorly off in this particular section of the Province. **Rhodope**, which previously held specific rank, is now regarded as the extremely heavily marked northern race of **hydaspe** which occurs in the Yosemite Valley, Cal. The race **purpurascens** of Siskiyou Co., Calif., being the connecting link between the two. **Rhodope** so far has only been found in British

Columbia, the type locality being given as the Fraser River. There is considerable variation in the amount of silver on the spots underneath, typically the marginal row of triangular spots are well silvered with the remainder of the spots straw yellow, but in many cases the amount of silver on this outside row are greatly reduced, while occasionally, on the other hand, nearly all the spots are silvered.

7. **A. hydaspe** race **sakuntula** Skin. This race was described in 1911 partly from material taken at Ainsworth and Kaslo. It is not quite so heavily marked on the upper side as **rhodope** but underneath the spots are entirely unsilvered, all being of a yellow colour. In addition to the above localities, I have the species from Rossland. It is evidently a high altitude species.

8. **A. nevadensis** Edw. This species, together with **meadii**, **edwardsi** and **snyderi** belong to a distinct group, which have the spots elongated and very heavily silvered and with a green suffusion on underside of secondaries. It is rather uncommon in B. C., as Vernon and Princeton are the only localities I have seen it from, although in some parts of Eastern California it is one of the commonest species of this genus.

9. **A. nevadensis** race **meadi** Edw. This form that we take in B. C. and through the Rocky Mountains to Calgary has never been satisfactorily placed. Some years ago the late Wolley Dod sent a series to Dr. Skinner who, in returning them, said: "They are certainly not **edwardsii** nor are they true **nevadensis**, nor are they exactly like the Colorado **meadi**, but they come nearest to **meadi**." This form occurs at Princeton, Similkameen, Armstrong and Vernon, and if some enterprising student in any of those districts would take upon himself the task of rearing this species from the egg, and make careful notes of all the larval stages, it would go far, I am sure, towards solving this problem. Personally, I think it is a distinct geographical race of **meadi**, which latter is typical in the mountains of Colorado.

10. **A. platina** Skin. This belongs to the **halcyone-coronis** group. The late Wolley Dod never quite satisfactorily separated this group, although he had quite a nice series for comparison; he also had specimens from Idaho (one of the type localities) and from Utah. The trouble is that some species that are found hundreds of miles from their nymotypical locality are subject to changes of colouration of the underside of secondaries, and also in the black markings of the upper-side, which may be markedly heavier or again may be somewhat reduced. These differences in colouration and maculation are probably due to a change of food plant and to climatic conditions.

So far this species has only been recorded from Osoyoos, but Wolley Dod took a pair at Brisco, B. C., about 35 miles below Windermere, which are probably referable to this species. I did not possess a speci-

men of this species until recently, when a specimen was sent to me by Dr. J. McDunnough through the kindness of Dr. G. Hewitt, the Dominion Entomologist.

11. **A. snyderi** Skin. I have a single specimen, as yet unexpanded, which has been identified by Dr. McDunnough as this species. It was taken by the late Capt. Harvey, at Vernon, in 1904. Dr. Fletcher, to whom it had been sent, returned it as "undescribed." It was described in 1897 from specimens taken in Utah. I have compared it with the description, with which it agrees. I have not seen any others, although I have examined a great deal of Vernon material in the last few years.

12. **A. mormonia** race **erinna** Edw. This is one of the small Argynnids and so far has only been found in the Kootenay country. It differs very little from the typical form **mormonia**, which occurs in California and Southern Oregon. **Erinna** was described from Spokane, Wash., and the name is retained to indicate the northern form. It resembles closely the following species, but it can be distinguished by its lighter colour and reduced black markings on the upper-side, and by the total lack of green suffusion on the secondaries on the under-side; in this case the disk being suffused with cinnamon brown.

13. **A. bischoffi** Edw. This species was described from Kodiak, Alaska, in 1870. Mr. E. M. Anderson took two specimens at Atlin in 1914, which are the only records for B. C. In the Report Canadian Arctic Expedition recently to hand, Gibson records the capture of a single specimen at Mayo Lake in the Yukon, by Mr. J. Keele in 1904.

14. **A. bischoffi** race **opis** Edw. This species was described from specimens taken at Bald Mt., Cariboo, and I have it from the Hope Mountains, Kaslo, Field, and the Taku River. It is the same insect that has been in our lists under the name of **eurynome** var. **clio** for many years. Dr. Dyar sunk **opis** as a synonym of **clio**, but this is not the case, as the green scaling at the base of the secondaries on the under-side show a greater affinity to **bischoffi** than to **eurynome**. This is the form that has the spots entirely unsilvered.

15. **A. bischoffi** race **washingtonia** B. & McD. This race was described in April, 1913, from specimens taken by Dr. McDunnough on Mt. Rainier, Wash. This is the southern representative of the Alaskan **bischoffi**. This is the same butterfly that has been in our lists for many years as **eurynome**, which, of course, with its race **clio** will now be dropped and **opis** and **washingtonia** will take their place. **Washingtonia** is considerably smaller than the average expanse of **eurynome** and the spots are well-silvered. It has practically the same range as the preceding and will no doubt we found on all of the higher peaks of the mountains of Southern British Columbia.