

those that take place in animals; for all the realms of Nature act and react on each other. The atmosphere and the earth (with its productions, animal and vegetable) are continually giving and taking; and as their actual relations to each other vary more widely at different points along the equatorial belt than elsewhere on the earth's surface, it is plain that what seems equilibrium is either oscillation or progress in some direction. If plants were the only organic existences, and there were no animals to aid in their reproduction, to feed upon them, to dispose of their dead carcasses, &c., the dominant forms would doubtless be quite different from what they are now. Darwin has shown by an admirable series of observations how necessary insect agency is to the fertilization of the flowers of many plants. Hence the organs of those insects and the parts of the flowers have been (and are being) continually modified, or moulded, the one on the other. I can conceive that if certain Orchids were henceforth entirely freed from the visits of insects, their flowers, notwithstanding the apparent permanence of inherited (though now useless) peculiarities, would immediately *tend* to revert to the symmetry which no doubt they possessed in the remote types. I have a good deal of evidence to show that in tropical countries many peculiarities of structure in the leaves and other parts of plants (prevailing through large suites of species and genera) have been brought about, and are still in part maintained, by the unremitting agency of insects, especially of Ants. These and many other matters require the fullest investigation before the precise relations of the changes, in animals and plants, that are taking place under our eyes can be properly understood and appreciated.

A Catalogue of Erycinidæ, a Family of Diurnal Lepidoptera.
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Soc. (Communicated by GEORGE BUSK, Esq., Sec. L.S.)

[Read June 20, 1867.]

THE Family Erycinidæ has increased so greatly, both in genera and species, since the last time its members were passed in review (by Westwood, in Doubleday and Hewitson's 'Genera of Diurnal Lepidoptera,' in 1851), that a new catalogue of its contents is much required. It is my intention, in the present memoir, to endeavour to supply this want, and to suggest a plan of classification of the genera—a work which has not hitherto been at-

tempted. The number of described species at the present time is not fewer than 630. In 1819, when Godart treated of the group, as one genus, in the 'Encyclopédie Méthodique,' only 134 species were described; and in 1851, Professor Westwood could muster only 247, exclusive of a few species insufficiently characterized by the older authors, and the knowledge of which at present appears to be lost.

The Erycinidæ are well distinguished from all other Butterflies, with the exception of the genus *Libythea*, forming a separate group allied to the Erycinidæ, by the anterior pair of legs in the males being aborted, without tarsal joints, or trace of claws and spines, the same legs in the females being of normal structure. The other characters which have been employed to distinguish the group are far from being so constant. The palpi are variable in length and shape; and the differences scarcely suffice to distinguish even subordinate groups of the family. The neururation of the wings, too, in some of the genera is very similar to that of the Lycænidæ, and in others differs from the Nymphalidæ only in the absence of an upper discocellular nervule to the fore wings; but this is not quite a definite character, as some species possess this nervule. The metamorphoses are also variable, some genera resembling the Nymphalidæ in the chrysalis being suspended by the tail*, and others the Lycænidæ in being recumbent and girt with silken threads. Too little is known of the caterpillars to enable us to say whether they offer any peculiarity. All the species, in the adult state, are of smaller size and weaker structure than the average of the Nymphalidæ, and are distinguished by the tenuity and fragility of the wing-membranes.

The geographical distribution of the Erycinidæ is interesting. All, except 34 species, are found in Tropical America. The whole of the Old-World species, 30 in number, belong to one subdivision, which is not, however, peculiar to the eastern hemisphere, the New World possessing a few genera coming within the same group. One species only is found in Europe, the well-known English butterfly, *Nemeobius Lucina*. The species of extratropical North America, four in number (one found in the

* In a former paper I had employed the character afforded by the position of the chrysalis to divide the Erycinidæ into two subfamilies, *Stalachtinæ* and *Erycininæ*; but I have since found amongst my papers a note of the transformations of *Emesis mandana*, an insect which I once bred from the caterpillar, and found that the chrysalis is suspended by the tail, as in *Stalachtis*. Such a fact as this entirely destroys the systematic value of metamorphosis in this family.

south-eastern States, and three on the western side of the Sierra Nevada) belong to Tropical American genera, of a subfamily which is peculiar to the New World. The family appears to be most numerous and flourishing in the equatorial zone, diminishing in the number of its representatives as we approach either tropic; and, with very few exceptions, the species are confined to the shades of the great forest which covers the lower levels of nearly the whole of this vast region. I collected, myself, 370 species on the banks of the Amazons, or three-fifths of the total number of known species. The family is remarkable for the wonderful diversity of form and colouring which it presents; and the habits of the species are almost equally varied. Some are of very slow, lazy flight, whilst others are excessively rapid in their movements. It may be stated, however, as a universal rule, that their flight is short, never exhibiting the sustained motion which is characteristic of the Nymphalidæ, Satyridæ, and other superior families of butterflies. A large number of genera have the habit of settling on the underside of leaves near the ground, extending their wings flat on the leaf. In many genera, on the contrary, the position of the wings in repose is vertical; and a few species settle on the upper surface of leaves with the wings half elevated. As these differences are constant in several large genera, it might be thought that they offered a clue to a natural classification of the family—an object of difficult attainment, if we employ structural characters only; but there are too many exceptions to the rule to render it of any use for this purpose. Thus the *Nymphidia* and *Lemoniades* belong to those genera which extend their wings in repose, but *Lemonias*, *Belise*, and *Molela* hold them partially elevated, and *L. zygia* and allies quite vertical; similar exceptions occur in *Charis*, *Mesosemia* and others. Very few species frequent flowers.

I made a great number of dissections of Erycinidæ from fresh specimens whilst in South America, and prepared drawings of their wing-neuration, palpi, and legs, with a view to discovering sure indications of the natural relationships of the species and genera. Previously the species had been grouped chiefly from similarity of shape, colour, pattern, and general aspect; but something more definite was wanted, as the style of coloration changes abruptly in allied species in some genera, and very often the sexes are of totally different colours and patterns. After many abortive trials I have found the wing-neuration, notwithstanding the frequent anomalous exceptions which it presents, to afford the best characters for primary divisions.

Taking the number of branches to the fore-wing subcostal nervure as the groundwork, it is found that all the Old-World genera have four, and the great majority of the New-World genera only three. The few New-World genera in which there are four, grouped with those of the Old World, form our first subfamily, which I believe to be a perfectly natural one—that is, to comprise forms having a closer blood-relationship to each other than to the members of the other subfamilies. The only exceptions to the number of subcostal branches in the group are presented by two or three small species of *Mesosemia**, in which the wing-neuration is very aberrant; these, however, offer no practical difficulty in the employment of the character.

This first subdivision disposed of, we come to a group of species of peculiar *facies*, in which the number of subcostal branches varies from two to four, and even varies according to sex. These are the Eurygoninæ, which there is no difficulty in distinguishing from the other groups, by the mode in which the lower radial (discoidal) nervure is connected with the subcostal, especially in the lower wings; it is so perfectly connected that it seems to be a continuation or a lower branch of the subcostal. A trace of this important peculiarity is seen in the first subfamily; but in the remaining groups the nervure in question is completely detached, or united at a right angle to the subcostal by an imperfect nervule. This character leads us to place the peculiar genus *Methonella* in the Eurygoninæ group, which forms our second subfamily.

In all the rest of the family the subcostal nervure possesses only three branches, if we may set aside one or two species as anomalous exceptions; and the lower radial is disconnected from the subcostal, as just now explained. This division, which I call the subfamily Erycininæ, comprehends the great majority of the New-World genera; and although it is further divisible, the groups thus formed are not of the same rank as the three already defined. To subdivide it, I have taken, in the first place, the colour of the antennæ, separating those genera in which these organs are destitute of rings or spots of paler hue, from the remainder, in which they are more or less distinctly ringed. These two subdivisions seem to be tolerably natural; for the first comprehends every species in which the fore-wing subcostal nervure emits its second branch after the end of the cell, and the second excludes every such species, with one evidently aberrant exception, viz. *Helicopsis Cupido*.

* *M. tenera* and *M. idotea*.

Descriptions of New Genera and Species.

DODONA EUGENES.

♂. Closely allied to *D. Egeon* (D. & H. Gen. D. L. pl. 69. f. 2); wings of the same shape, and the form of the tail of the hind wings the same. Above dark, blackish brown. *Fore wing* with a narrow line across the middle (touching neither the costa nor the hind margin), a curved streak near the hind angle, and about thirteen small spots pretty equally distributed over the apical half of the wing; all these marks are whitish except the transverse line and marks near the hind angle, which are slightly tinted with reddish tawny. *Hind wings* with the outer portion traversed by four indistinct brownish-tawny lines, converging from the costa towards the anal angle; at the apex are two black spots edged with light brown. On the broad, square lobe at the anal angle is a quadrate black spot, a slender tail arising from its outer edge.

Beneath, the wings are precisely similar to those of *D. Egeon*, being tawny brown, with stripes and spots of white, silky and shining on the hind wing and costa of fore wing.

Expanse 1" 9" ♂.

Nepaul and Bhotan. The species seems to have been confounded hitherto with *D. Egeon*; but the very different colour and small dimensions of the stripes and spots of the upper surface well distinguish it.

ALESIA LIPARA.

♂. Smaller than *A. Priolas*; fore wing much shorter, and outer border of hind wing not bowed outwards near the apex as in *A. Priolas*.

Above uniform dark purple; fore wing with scarcely any trace of the pale lines between the nervures towards the apex. Beneath pale brownish gray, much paler than in *A. Priolas*; nervures of the apical half of the fore wing, and lines between them, dark brown. Hind wing with seven small basal spots, and two narrow transverse lines, brown; a submarginal row of seven oblong black spots.

Expanse 1" 6" .

Hab. Forests of the river Tapajos, Amazons.

ALESIA THELYDRIAS.

♂. Much smaller than *A. Priolas*, and quite distinct in the colours of the male, which resemble those of the females of this genus. Shape of the wings similar, but outer border of hind wing not expanded.

Above brownish tawny. Fore wing with the nervures and lines between them (those terminating on the outer border much thickened towards their terminations), and three short belts across the basal half, dark brown. Hind wing with four transverse belts, the outer margin, and fringe dark brown; besides which the submarginal row of black oval

spots of the underside shine through conspicuously. *Beneath* light brownish grey. Base of fore wing free from dark spots, except two minute specks behind the median nervures; apical half of the wings crossed in the middle by a dusky belt, nervures and lines between them dark brown, as on the upperside. Hind wing with six or seven small black specks towards the base, beyond the middle are two brown transverse lines.

Expanse 1" 2" ♂.

Hab. Forests of the Cupari River, Tapajos, Amazons.

ALESA HEMIURGA.

♂. Smaller than *A. Priolas*. Dark brown, with a blackish-purple gloss.

Outer half of fore wing and outer border of hind wing paler. The pale streaks between the nervures of the fore wing are yellowish and are well-marked from the costa to the hind angle, but clearer in some specimens than in others. Hind wing with the marginal row of black spots visible on the upper surface and margined with yellowish.

Beneath paler than in *A. Priolas*, transverse streaks of hind wings much narrower. Cell of fore wings marked with two black spots.

♀. Smaller and lighter-coloured than *Priolas* ♀. Black markings the same, but of smaller dimensions.

Expanse ♂ 1" 3"—1" 4", ♀ 1" 2".

Hab. Ega, Upper Amazons.

ALESA TELEPHAË, Boisduval.

♀. Fore wing with the outer margin bowed outwards. Wings above lightish brown varied with paler spots; the markings (in the same position as the dark markings of the ♂) darker brown.

Hind wing with a row of submarginal triangular spots of a brilliant green hue edged with black, and each encircled by a yellow ring.

Beneath same as above, but paler.

This species was rare and found only at Ega, Upper Amazons.

MESOSEMIA SYLVINA.

♂. Closely allied to *M. Cippus* (Hewits. Exot. Butt. Mesos. f. 48, 49).

Wings very similar in shape and colours, the latter being brown, with darker brown streaks. The ocellus is moderately large, black, and with three glossy white specks—one large nearest the base, and two minute nearest the apex of the wing.

Differs, in the fore wing, in the two brown streaks nearest the ocellus converging towards the hind margin and in the submarginal streak being slender and strongly waved towards the apex; in the hind wing the central brown streak over the ocellus is absent, and the submarginal streak is slender, waved, and much thickened about the middle.

♀. Darker than the male, dark markings the same.

Hab. Pará and Obydos, Lower Amazons.