

TRANSACTIONS
OF THE
ENTOMOLOGICAL SOCIETY
OF
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I. *Notes on South American Butterflies.* By H. W. BATES, Esq., Cor. Memb. Ent. Soc., London.

[Read September 7th, 1857.]

THE following notes were communicated by Mr. Bates in a letter to Mr. Adam White, dated Ega, 20th May, 1857; and being the record of observations made on the insects in their native haunts, it is thought that they will not be devoid of interest to the Entomological Society:—

Papilio Caudius is the ♀ of *Papilio Torquatus*. It appears scarcely credible, but I once found a pair *in cop.* *Caudius* is found in the forest, *Torquatus* in the sunshine of open places, but in very damp weather both are found together at flowers on the borders of the woods.

Heliconidæ.—I reared *Heliconia erato* at Cametá; the larvæ are spinose, like the *Vanessa*, &c., and the chrysalis suspended by the tail. This family I look upon as mostly a modern creation, the species unfixed, very susceptible of change, in conjunction with the least modification of local circumstance; but these theo-

retical notions, I suppose, you do not care about. The neuration of the wings in many *Mechanites* and *Ithomiæ* differs in different individuals of the same species; therefore, Mr. Hewitson should not rely so much upon it.* I have found a good many *in cop.*, and the sexes have always had the closest resemblance in colour and markings. They are very gregarious in habits. A solitary species of *Mechanitis* or *Ithomia* in a locality is seldom, or rather never seen: there are always two or more nearly allied species flying together. This is a very strange fact. There are two species of large, brown, elongate-winged *Ithomiæ*, something like *Thyridia*; one species has one black bar across the wing, the other two. They are always found in company up the Tocantius, up the Tapajos, on the islands in the Amazon, and again at Ega. *Ithomia vestilla* is always accompanied by *I. Sao*.

H. Melpomone varies in a curious manner. Here, the other day, I took a pair in copulation, the female of which had red and black striped hind wings (like many species of the genus). What is very strange in this species is, that in ascending the river, it becomes more liable to vary. It first appears at Santarem, where, in a hundred specimens, you will only find the typical form, namely, a simple crimson belt on the fore wings. In Abydos, in a hundred specimens, perhaps twenty will have the crimson band broken in various ways. In Serpa nearly all the individuals are variations of the typical form.

I have no doubt they are hybrids (*i. e.* the varieties), and I can almost point out the species with which it hybridates. Strange to say, the hybrids occur in one district and not in another, and one style of hybrid only occurs in one district and not in the others, the species being equally abundant in all the districts.

Agrias.—I think the most magnificent group of *Nymphalidæ* in South America. They are very bold, strong, and rapid flyers; not at all like the *Catagrammæ* and *Callithece* in this respect, but like the *Paphiæ* and *Preponæ*. They fly for a short distance with inconceivable rapidity, and then settle on a leaf high up a tree, on a trunk of a tree where sugary sap is oozing, or at filth of some kind on the ground, with their wings erect, and are not very

* Mr. Hewitson is quite aware that the sexes of the same species of *Ithomia* sometimes differ in the position of the nervures of the posterior wing; he has, nevertheless, perfect faith in the different arrangement of the said nervures as a sure guide by which to discriminate closely allied species.—W. C. H.

easily scared away. The *Paphiæ* and *Preponæ* are exactly similar in manners. The larvæ, I have no doubt, are of the same form as that of *Apatura Iris*. I have bred a *Prepona*, the larva was naked, and the head of similar shape to *Apatura*. These genera and their allies form a very natural group in the *Nymphalidæ*.

Callithea Sapphira.—At the end of the dry season (end of December) this butterfly became very scarce on the wing, and the specimens were worn and faded. About the 12th of January its larvæ appeared in great numbers in the woods, feeding upon the leaves of young trees of various species. The larva is very beautifully banded with metallic violet colour and orange-red, and bristled with long, branching spines of the metallic colour, two of which, arising from the head, are three times the length of those arising from the body. At the beginning of February they generally changed into the pupa state, and about the middle of the month the perfect butterfly appeared, in beautiful dress and in great profusion, but only for a few days, for, with the continuation of the heavy rains in February and March, it disappeared again. I reared both the *C. Sapphira* and the *C. Leprieurii*. The larva of the latter is in the same way as that of the former spinose, but its colours are different, being banded with bluish black and greyish pallid green. The pupa is distinguished from that of *Sapphira* by having a few black spines.

The flight of *C. sapphira* is slow in comparison with all other *Nymphalidæ*. It settles frequently, and seeks the foliage of trees at a height of from ten to twenty feet from the ground. The female settles lower, but is very wary, and apt to escape into the thicket on being disturbed. The male is quicker in flight, and very rarely descends within reach of a moderate-sized net.

The *Catagrammæ* are more rapid and arrowy in flight than the *Callitheæ*. They repose on the trunks of trees, and are very much attracted by odours and filth on the ground, also by the sugary sap on the trunks of standing trees; they are much more wary than the *Agrias*, but still, in certain states of the weather, are not so difficult of approach as many other kinds of *Nymphalides*, as the *Epicaliæ* and *Cybdèles*, especially *C. Castalia*, which is the wariest butterfly I ever knew.

Cybdelis (?) *Pharsalia*, Hewits.—This is not a *Cybdelis*; it is a new generic form coming near *Callitheæ*. Its habits and mode of flight are very much like those of the *Callitheæ*. It frequents,

however, more frequently the moist margins of the water on sandy beaches (the *Callithea* do so sometimes), is very wary, and flies off in a sailing, circular manner to the borders of the forest, where it settles high up on the foliage. It is rare at Ega, and I did not see it on my excursion to Tunantins.

Cuerois chorinæus.—I have found one or two of this species at Ega, and one at Tunantins. One I took on the Cupari, up the Tapajos; so that it is widely distributed, but it is one of the rarest of butterflies. The figure in Cramer is bad, as the caudal lobe is represented as turned in a wrong direction. I suppose some one has by this time discovered the curious structure of the fore leg in ♂: it has the tibia and tarsus reduced to a rudimentary hook-shaped joint, like the *Mechanites* and *Ithomia*. The mode of flight of the species is exactly that of the larger brown *Satyri*, slow and heavy, near the ground, threading the shadiest thickets, and reposing on a leaf, wings erect, closed.

Mesosemiæ.—The *Mesosemiæ* form, with a few allied genera, a sub-family of *Erycinidæ*, nearly approaching the *Satyridæ*. Their neuration is after a distinct type.

The true *Mesosemiæ* are rather feeble in flight, but sustain themselves on the wing longer before settling than any other of the *Erycinidæ*: nearly all settle on the upper surface of leaves, with the wings held half erect. Two or three species, however, amongst them *M. Cræsus*, fly rather more rapidly, and settle underneath leaves with the wings horizontal, like the genus *Nymphidium*. All are found in the shades of the forest, never even by exception being seen in open grounds; some are only found in the gloomiest shades of the virgin forest; *Eunogyra Satyrus*, for instance, which flies very near the ground and settles under leaves only a few inches above it, the wings held horizontally.

Nymphidium, *Lemonias*, *Emesis*, *Symmachia*.—All these and many other forms are genera of the sub-family *Nymphydiinæ*, distinguished by their neuration, and found in thinned parts of the forest or on its borders; their flight very short and not rapid, settling always on the underside of leaves with the wings held horizontally. The species are not so local in their distribution as most other genera of *Erycinidæ*. We have several species common at all the stations I have visited, as may have been observed in the collections I have sent home to England.

The *Lemonias*, as figured on a plate by Mr. Hewitson, are a strange mixture:* there are a few species (*L. Pythia* is one) which, in style of colours, shape of hind wings, and mode of holding the wings in repose, are sufficiently distinct from the typical *Nymphidia* to be separated from them. They are found only in the virgin forest, fly low and by rapid jerks, and, settling on under-surfaces of leaves near the ground, hold their wings perpendicularly. The females differ much from the males.

Tharops, Doubl.—The metallic-coloured *Nymphidiæ*, I think, are a distinct group, and may be kept separate; their flight is extremely rapid, they are found only at the borders of the forest, and sometimes settle on flowers. Their wings are always held horizontally.

Anatole, Doubl., I also consider a distinct group, a genus of charming little creatures; they are found more in the centre of the forest, their flight rapid, wings horizontal in repose. *Lemonias Irene*, *L. Rhodope*, and two others, figured by Mr. Hewitson as *Lemoniæ*, I should consider *Anatoles*. *Irene* and another large species of similar colours I took at Ega, in the very centre of the forest, in a moist dell by the banks of a rivulet; they are very rare. Their flight and mode of repose is exactly that of *Anatole*. The female of *Irene* I have also found: it differs more from the male in colours than the female of white *Nymphidiæ* differ from their males.

Emesis.—The three or four species I have found are more rapid and jerky in their flight than the preceding, and are chiefly found at the borders of the forest and at flowers. Their mode of holding the wings in repose is the same as *Tharops*, &c. Although the neuration of the wings is identical with the preceding genera, their palpi distinguishes them quite sufficiently.

The *Symmachiæ* are very similar to the *Emesis* in their habits, as they are in structure. The two gilded green species found at Ega are very abundant at certain seasons; the females are found only at flowers on the borders of the forest, in company with the

* The mixture is from good authority. The genus is Mr. Westwood's, who could find no characters by which to separate the species composing the genera *Tharops* and *Anatole* from the other species of *Lemonias*. It would be a mistake to separate *Lemonias Irene* and *L. Pithia* of that plate from each other.—W. C. H.

Emesis (exceedingly rare, however), but the males accompany the *Cybdetes* to the moist margins of the river, where they settle and flit about the damp sand, sometimes by hundreds, forming a charming sight as you can well imagine.

Pupæ of Erycinidæ.—I have met with pupa of three genera only, viz. *Zeonia*, *Eurygona* and *Stalachthis*; the two former were secured to leaves by the tail, but laid horizontally on the leaf, with a fine silken thread passed over the body. The chrysalides of both have two faces; the under or ventral face is naked and flat, whilst the upper is convex and pubescent, most distinctly so in *Eurygona*. In *Stalachthis* it is secured by the tail only, but is inclined towards the leaf, and not suspended horizontally, as in the *Nymphalidæ*.

Lymnas.—I have taken six or seven species of this genus; they are all rare, and two of them are single specimens, which I have not yet sent to England. I exclude from the genus the specimens figured by Mr. Hewitson as *L. vitula*, on account of its different neuration. The true *Lymnas* (*L. electron* and allies) present two nervules emitted from the subcostal nervure before the end of the cell, in the fore-wings; whereas *L. vitula* has one nervule before and one after the end of the cell. In their mode of flight also the two forms differ. All the true *Lymnas* have a very rapid but short flight, settling, with wings extended, on the under surface of leaves of the lower trees on the borders of the pathways in the woods of second growth, while *L. vitula* flies slow and heavily, settling generally on the upper surface of the leaves. The only locality where I have found the *Lymnas* rather plentifully is the thinned dry woods of Santarem; in fact, in the same limited strip of wood where only in all the region *Callithea Sapphira* is found. In company with *L. electron* there were two or three very similar species, differing only in the colour of the spot on fore wings, and the red spots at base of wings. They were all flying together, and it struck me at the time that they were probably varieties, but as I never detected them promiscuously *in copula*, there is no alternative but to keep them separate at present. I have so often seen two or more closely allied species flying together, and yet keeping themselves perfectly distinct, that I find it safer to consider small differences as separate species, until positive proof offers of the contrary. I find when monographers at home are inclined to group apparent varieties together as one species on their own responsibility, they often make mis-

takes. The system of separating after all leads to less confusion ; for instance, some of our friends considered *Megacephala cruciata* and *M. bifasciata* as one species, but how beautifully distinct they are in reality, when we know the fact that *M. cruciata* is confined to the Lower Amazons, or as far as Barra inclusive, and *M. bifasciata* to the Upper Amazons, all the hundreds of individuals I have met with offering the same points of difference respectively ! *Lymnas vitula* is very common along the alleys in the forest at Ega in the showery seasons, June, July, November, January. The only other locality in which I have met with it is Areyros, on the Tapajos, but all the individuals found there are different in colour from the Ega ones.

The beautiful *Zeonia*, of which I sent you a fine series last July, I met with in a part of the forest near Ega, which I had traversed and examined before, many times, in all seasons. The first specimen I found was a straggler in a different part of the forest. On July 21st, after a month of unusually dry and hot weather, in ascending a slope in the forest by a broad pathway mounting from a moist hollow, choked up with monstrous arums and other marsh plants, I was delighted to see another of what had always been so exceedingly rare a group of butterflies ; it crossed the path in a series of rapid jerks, and settled on a leaf close before me. Before I had secured it, I saw another, and then shortly after a third. I mounted to the summit of the slope, followed a branch pathway which led along the brow of the ridge, without seeing any more, but returned again to examine well the exact spot where I had captured the three, for it very often happens that a species is confined to a few square yards of space in the vast forest, which to our perceptions offer no difference throughout its millions of acres to account for the preference. I entered the thicket from the pathway, and a few yards therein found a small sunny opening, where many of the *Zeonia* were flitting about from one leaf to another, meeting one another, gamboling and fighting ; their blue transparent tinge, brilliant crimson patch and long tails, all very visible in the momentary intervals between the jerks in their flight. I was very busy, you may imagine, at first in securing a supply of specimens ; I caught perhaps 150, two-thirds of which fell to pieces in the bottom of the net, so fragile is their texture. I then paused to look around the locality, and endeavour to find the larvæ and pupæ. I walked through the thicket in all directions, and found the space peopled by the species was not more than from twenty to thirty square

yards in extent, but within this space they were innumerable; up the trees, so far as the eye could reach, the leaves were peopled with them; it is possible the brood belonged to some one tree. The only two pupæ I could find, it is true, were on two distinct kinds of trees, but this is no proof that the larva may not have fed on one tree only. I was disappointed at not finding the larva, although I searched well during this and the three following days; on the second day the butterflies were still coming out; on the third they were much fewer, and nearly all worn; and on the fourth day I did not see a single perfect specimen, and not a dozen altogether.

During all the time I worked the neighbourhood of the city of Pará I found but one specimen of a *Zeonia*. This was in 1848; the next time I saw the genus was at Altar do Chao, where I took a few of a very small long-tailed species, at flowers. At Ega, a few miles up the Teffi, I took one of another very handsome species at flowers, very distinct from all the others.

Syrmatia.—This very week I have captured the first specimen I have seen of this genus. It is very small and delicate, the tails excessively long and twisted, but I secured it quite perfect; it had doubtless just escaped from the pupa case, and fell motionless to the bottom of my net. It is a form intermediate between *Zeonia* and *Isapis*, in fact, a little *Isapis*, with tails. Its flight is exactly that of the *Zeonia*, progressing by vertical jerks; it crossed the path from the thicket on one side to a low tree, then, before I could reach it, started off again to a palm frond, where it rested on the under surface, gently fanning its wings like the *Zeonia*.

Charis.—I place in this genus a few species (seven or eight) which agree in their rather elongate wings of dark brown or blackish colours, with more or less of a silvery border; some of them are extremely common at all places on the Amazons, and in all seasons, every day in the year; for when the weather is so cold and gloomy that no other butterfly will appear these are sure to be seen along the forest paths, flitting about the foliage, settling frequently and reposing a long time, generally on the upper surface of the leaves, with the wings half raised. One or two of the species, however, alight at once on the under surface of leaves. They are not averse to the sun's beams, for in any sunny opening, wherever in fact a ray of sunshine pierces the forest canopy and illumines the sombre shades beneath, two or more males of these merry little fellows are sure to be seen fighting furiously in the

beam of light. It is the species with the snowy white fringes which I have always seen thus occupied.

Panara Barsacus was very common at Altar do Chao on the Tapajos ; it occurs at Ega also, but much more rarely. Its flight is rapid and short, always near the ground, settling invariably on the under surface of leaves, with the wings horizontal. I see no difference whatever between the Ega and the Tapajos specimens of this species.

Calydnæ.—The metropolis of the *Calydnæ* is Altar do Chao, or, to speak more physical-geographically, the dry forests of the sandy region of the lower Tapajos ; ascending the Tapajos they disappear, but are again in great numbers as to individuals (but some of the species wanting) at Villa Nova, which is very similar in physical character to the Tapajos region. At Obydos I believe I did not meet with more than one species ; at Ega and Barra they are almost unknown ; at Ega, in fact, I have only met with one specimen of the species most generally distributed about the country (not figured in Hewitson's plate). Strange to say, several of the species occur at Tunantins, which fact I can only explain by considering that the soil is of the same light and sandy nature at this place as at Villa Nova, whilst at Ega and at Obydos it is clayey. They frequent a peculiar sweet smelling inconspicuous blossom on the borders of the forest ; these blossoms are found at Ega, as well as the other localities. I have about thirteen species ; they form a distinct and natural genus in the sub-family *Nymphidiinæ*,—identical, I think, in neuration with *Nymphidium*, *Anatola*, *Tharops*, *Theope*, *Lemonias*, *Emesis*, *Symmachia*, *Charis*, *Mesene*, *Beotis*, and many other genera. These sub-families only confuse. The palpi are different from those of *Nymphidium*. As to the legs, I do not think they will offer stable characters in the family *Erycinidæ*. The female of one species, *Calydna Calamisa*, has the fore legs of a very peculiar form, the terminal joint of the tarsi being very large and oval ; but I do not attach much importance to this, as similar strange aberrations of form in the fore legs are found without reference to other signs of affinity here and there in this family, as well as in the *Theclæ*. All the *Calydnæ* have a short but excessively rapid flight ; the eye cannot follow them in their movements ; they are found only in the very hottest and driest weather, when the herbage on the open campos is withered by the inevitable daily sun for many weeks into a yellow dust, and almost all other animal life is hushed into languid repose.

When many other tribes, and whole orders of insects (as *Coleoptera*), have long ceased to appear, after two or three months' absence of rain, these charming little butterflies are in their element, flitting about with restless activity. At Altar do Chao I have seen many scores in a walk along the parched dusty alleys of the forest, in the month of November. Some of them settle on the upper surface of the leaves, as *C. Calitas*, gently opening and closing their wings during the brief intervals of their repose, others alight at once on the under surface in the manner of the *Tharops*, &c.; whilst others, as *C. Charila* and *C. Caieta*, are more especially fond of the sweet smelling blossoms above mentioned. When on the Tapajos I used to see three or four at a time imbibing the sweets in company with the Tapajos *Zeonia*, several *Theclas*, and sometimes an *Odontocera Mesene*. I think this will prove a natural group of butterflies, allied to *Anatole* on one side, but distinguished from them by the shortness of the palpi, and to *Charis* on the other, from which they will have to be distinguished by their colours and facies. I do not know the species which are included in the several genera. In my collection here I have nineteen species which I consider *Mesene*; all are small butterflies of bright and trenchant colours; all are found in woods of second growth, reposing with wings horizontal on the under side of leaves, and all are identical in point of neuration with *Nymphidium*, &c. Some of the species are very common, and generally distributed throughout the Amazons, and are the first insects one meets with on entering the woods behind the villages. Their flight is nimble, like that of the *Nymphidiinæ* generally.

Theclidæ.—In the immediate vicinity of Pará, the *Theclidæ* are in astonishing variety, although the number of individuals of each species is very sparing. They people chiefly those parts of the forest of second growth which have once been plantations of fruit and coffee trees, and which are now overgrown by scattered bushes, young trees, or dense thickets of *Melastomæ*, *Tucumá* and *Marajá* palms, myrtles, mimosæ, &c.; but as they occur only in certain states of the weather, and are very local in their distribution, it requires long practice to collect them successfully. During the months of August and September, 1851, I paid very close attention to the *Theclidæ*, and succeeded in taking about eighty distinct species, after pairing fourteen or fifteen dissimilar sexes. All the species are remarkably alike in their habits, and do not differ in this respect from the European species. They fly by jerks, sometimes skipping backwards and forwards, and settle

frequently low on the leaves of bushes or Lycopodiæ. Sometimes I have seen them on the flowers of Melastomæ, which at rare intervals adorn these beautiful woods. The common *T. Marsyas* is frequently seen, but only in open grounds and road sides, where its soft and delicate blue is an ornament to the surrounding verdure. The large and rich species *T. Imperialis* and *T. Regalis*, on the contrary, are only found in the virgin forest, in some nooks along the pathways, where some opening in the umbrageous vault above admits the rays of the sun.



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