

III. *Notes on the Habits of Papilio Merope, with a description of its Larva and Pupa.* By J. P. MANSEL WEALE, B.A.

[Read 17th November, 1873.]

AT the request of Mr. Trimen I have for the last two years given my attention to the study of *Papilio Merope*, Cram., and I now propose to lay before the Society the result of my study of its life-history.

During my residence at the Koonap and Bedford, from 1864-69, I spent most of my time in collecting insects and plants. So conspicuous a butterfly as *Papilio Merope*, with which I had become acquainted at Grahamstown and Peddie, could hardly have escaped my observation, yet, during the whole of that time, the first four years of which were very dry, with prevalent north-westerly winds, I only twice noticed *Merope* ♂, viz., December and February, 1868-69.

When Mr. Trimen informed me of his opinion that *P. Cenea* was the female of *Merope*, I must own that I was very sceptical, notwithstanding my own observations of some curious cases of mimicry.

Following up the subject with a good deal of zeal, I began to learn the habits of *P. Cenea*, and to understand the meaning of the peculiar circular flight of *Merope*, as mentioned by Mr. Trimen in *Rhopalocera Africæ Australis*, vol. i. p. 12.

At the bottom of my garden, at "Brooklyn," near King William's Town, is a glen or kloof, filled with trees and shrubs, through which runs a small stream. A portion of this I have partially cleared and planted with flowers and garden shrubs. The spot is nicely sheltered, and receives the early rays of the morning sun. It is a favourite resort of butterflies.

If on a fine warm summer's morning I go down to this kloof, about 9 or 10 a.m., I am nearly certain to see one of the females, generally a *Cenea*. At this time of day she flies lazily about, much after the manner of a *Danaïs*, or flutters over the flowers like a true *Papilio*. Her mate is not generally so early on the wing, but shortly after-

wards he may be seen hurriedly darting over the bush, down on some flower, then up again and away. At this hour he seems to pay but little attention to his lady-love.

As the day grows warmer, the females, generally but not always, glide away into some shady spot, often settling for long periods, or occasionally gliding about in their cool and sequestered bowers. The males at this time chase each other in a rapid and violent manner, constantly passing and repassing the hidden nook, where their lady-love has coyly retired.

As the afternoon draws on the females leave their retiring spot and flutter slowly about, sometimes coming out into the open, but more apparently to show themselves than for the sake of food. On one occasion I saw four males busily courting a female, but unfortunately I disturbed them. I have several times seen individuals courting, but the conclusion has always been as follows, viz.:—

The female darts away into the thickest bush pursued by the male, and out of sight. Sometimes I have noticed that the females will, towards the close of the afternoon, try to attract the males by flying at them when settled.

On one occasion I noticed a male fly after a very large *Danaïs Echeria* which I had myself mistaken for a *Cenea*-form of the female, but after once approaching, though repeatedly passing the place where she had settled, he paid her no more attention. As I thought it strange I captured the supposed *Cenea*, and then found it was *D. Echeria*.

Lastly, I would notice that I have seen a *Tehitrea cristata* capture a *Merope* ♂, and chase a *P. Nireus*, and I have little doubt that this bird, as well as *Dicrurus musicus*, Vieil., is most destructive to bush-frequenting *Rhopalocera*.

The conclusion to my observations was the discovery of the ova, larvæ, and pupæ of this insect.

The larva feeds on the leaves of *Vepris lanceolata*, A. Juss., one of the Xanthoxylaceæ; and the filamentous tubercles in the early stages lead me to suspect that it may resemble the larva of *Danaïs Echeria*. The suspicion is certainly bold, but the pupa is such a perfect imitation of the leaflets of its food-plant, and so diverse is the livery of the perfect female, that I do not think it improbable, especially as the full-grown larva, which also feeds on the upper surface of the leaf, is very difficult to distinguish from the leaf.

From the first two pupæ raised by me, two males of the

ordinary type *Merope* issued; from the third, a very peculiarly marked female of the *Hippocoön* form, and from the fourth a *Cenea* with the forewing white-spotted, with a faint tinge of ochreous in one spot.

Danaüs Echeria here is of the white-spotted variety, the type-form being very rare, and the imitating female *Merope* is similarly coloured as a rule.

With respect to the coloration, I would notice that when settled both *Merope* and his various wives are very difficult to distinguish from withered foliage, although in the cabinet the peculiar tone is wanting. On the wing the imitation must be of great service to the female, for her flight is very heavy and slow, while the males dart up and down with great rapidity, and her habit of gliding in and out of bushes must expose her to the attack of birds.

In the drawing I have to note that the pupæ of *Merope* are figured with the head processes recurved. In the early stage of the pupa these processes are exceedingly flexible, and when in contact with any hard substance are often recurved, although normally tapering to a point.

I have also to note in reference to the pupæ of *P. Merope*, that although smaller than the folioles of *Vepris lanceolata*, yet that the general appearance is very similar. The leaflets like the pupæ are paler below than above, and the mid-rib is slightly ferruginous; the leaflets are likewise undulated, an appearance well personated by the pupæ. The upper surface is more glossy than the lower, the base cuneate and sessile, and the margins often slightly inflexed. The surface, too, is multipunctate and reticulate, all of which points are to some extent imitated by the chrysalis.

Description of Larva and Pupa of Papilio Merope, Cram.

Larva.—1st stage. Black, with white filamentous tubercles on 2nd segment and anal segment.

2nd stage. Two pairs of filamentous tubercles on same segments, the first and last pair longest, a white transverse lunular band connected with the head laterally across 6th and 7th segments. Laterally a broad white band above spiracles. Last two segments whitish.

From this growth to the last change but one, the filamentous tubercles grow longer, and the ground colour changes from greenish-brown to greenish, and the white markings grow less distinct.

Full-grown larva.—Bluish-green, like larva of *Philog-*

noma Varanes. Tubercles very short, those next head yellowish, on anal segment whitish, very much like a slug in shape. Y-like organ crimson lake at base, tapering to greenish-white. On 4th segment, two small black spots, bordered by a narrow white line; 6th and 7th segments festooned with delicate whitish zig-zag lines. A double row of bluish white dots along back. Lateral borders above spiracles white. Head and true legs green, false legs pale ochreous. $1\frac{1}{4}$ to $1\frac{3}{8}$ inch long.

Pupa.—Bright green, paler beneath, with pale yellow linear stripes and dots. Very arched in middle, tapering to extremities. Fork at head merely divided, the branches nearly parallel.

Ventral aspect.—From head to abdomen a pale yellow line, forming a keel-like ridge, three pairs of pale yellow dots, on base of wing covers two irregular yellowish spots, sometimes wanting; wing nervures, &c., palely indicated by yellow lines; two lateral ridges yellowish, marked with brownish as in *Papilio Nireus*, its edges somewhat recurved towards dorsal aspect. Two brownish spots sometimes on abdomen.

The second third, between the suspensory threads, very much extended laterally.

Dorsal aspect.—Thoracic projection smaller than in *P. Nireus*, and, like it, tipped with a brown dot; abdomen somewhat concave from anal extremity to thoracic prominence, a dark mark, like the mid-rib of a leaf, terminating at the anal pedicel with a double loop resembling the joint of the footstalk of a leaf. Two small triangular yellow marks on abdomen, sometimes wanting. Viewed from the side or below, the resemblance to a leaflet is very striking.

Change from larva to pupa.

The caterpillar generally fixes its anal legs below the axil of a leafstalk, and fastens itself below 6th segment with a double thread to the petiole; the whole body becomes flaccid and pale green, with an increase of white along the sides, the head curved upwards and inwards. In this state it invariably remains for about twenty-four hours. The body then contracts longitudinally, and the skin is gradually pushed backwards; when the skin of head is detached, the bifid tubercles of head, *which in this stage are widely separated*, are pointed upwards, and pushed against the suspensory threads; the antennæ, which are detached from the rest of the body, are likewise bent up-

wards, and the united efforts of the tubercles and antennæ push the loose skin between the suspensory threads. The body is then violently bent from side to side. The thread by which the anal extremity is attached is lengthened, so that it becomes almost detached, and the loose skin is then shaken off.

After a slight pause, the fork of head becomes straightened, and the tubercles parallel. The body is at intervals drawn up at the thorax; the head is drawn downwards, and the antennæ become attached to the body. The anal extremity is again attached. The keel and lateral ridges appear, and the bifid processes, which are now closely parallel, are bent downwards. The imago emerges in three weeks.

The following is a list of imagines raised by me from larvæ:—

30th March,	1.	<i>Merope</i> .	♂	
10th April,	2.	Do.	♂	
14th	3.	Do.	♀	{ A peculiar <i>Hippocoon</i> form.
15th	4.	Do.	♀	
20th	5.	Do.	♀	{ Kaffrarian <i>Cenea</i> form.
24th	6.	Do.	♂	
26th	7.	Do.	♀	{ <i>Trophonius</i> form.
1st May,	8.	Do.	♂	
2nd	9.	Do.	♀	{ Kaffrarian <i>Cenea</i> .
	10.	Do.	♂	
	11.	Do.	♂	{ Forewings with a black mark at extremity of discoidal cell, hindwings like <i>Papilio Meriones</i> .
7th	12.	Do.	♀	
	13.			{ Kaffrarian <i>Cenea</i> .
	14.			
	15.	Do.	♂	{ (R. Trimen).
	16.			
	17.			

It will thus be noticed that the males are as numerous, or only a little more so, than the females. This conclusion I had previously arrived at from observation. The rarity of females in collections I believe to be principally owing to their peculiar and retiring habits. In the Perie forest I have seen dozens of the male, but never a female, and I attribute this to the difficulty of penetrating the thick

bush. Nothing can be more remarkable than the difference of flight in the two sexes, and I have already elsewhere noticed that the female of *Nymphalis Xiphares*, which is much more easily captured than the male, appears to me to be assuming an *Echerioid* protection.

In my collection I have a remarkable series of the females with various intermediate examples, some of which are very curious, and I entertain a suspicion, perhaps unfounded, that the *Hippocoon* and *Trophonius* forms are here being slightly modified to an imitation of a very common and variable *Acræa*—viz. *Acræa Esebria*, Hewitson.

Explanation of Plate I.

Figs. 1—1. The Larva in different stages of growth, with leaflets of *Vepris lanceolata*. (1*. Ventral aspect).

Fig. 1a. The Larva immediately before assuming the pupal condition.

Figs. 2—2. The Pupa viewed dorsally.

Fig. 2a. The Pupa viewed thoracically and ventrally.

„ 2b. The Pupa viewed laterally.

„ 3. The ♂ Imago (example “No. 6” of those reared by Mr. Weale) at rest, to show the protective resemblance of the colouring of the under-surface to that of faded leaves.



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