

THE BUTTERFLIES OF KENYA AND UGANDA.

by

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The primary object of this, and subsequent Papers on the Butterflies of Kenya and Uganda, is to stimulate interest in this most absorbing branch of Entomology.

The study of Butterflies is not an idle pursuit; it does not consist merely in the capture and "setting" of specimens and the classification of them; it goes far beyond that, and has a practical application to several problems of economic value.

An insight into the mysteries of evolution is afforded by the study of this group of insects, to an extent almost unequalled by any other Order. The gradual and persistent effect of Natural Selection is wonderfully portrayed in the colour, patterns and shape of the butterfly's wings. Not only do we find evidence of this in the "imagines" or perfect butterfly, but also to a remarkable degree in the larvæ and the pupæ.

The subject of these wonderful phenomena is too vast to be treated in these notes at any length, but wherever possible attention will be drawn to specimens which exhibit in any way, the remarkable results of natural selection.

Apart from this aspect of "butterfly collecting" there is a vast field of almost untouched work awaiting the attention of the ardent, patient and observant student: we refer to the systematic working out of life histories of the several species and races, noting particularly, the various food-plants; the natural enemies of eggs, larvae, and pupae; the sex proportion in complete families; the influence of climatic conditions on seasonal forms, etc., etc.; the association of larvæ with other insects; and the seasonal or spasmodic migration of the adults.

Photographic records of stages in the life history of these insects are invaluable and should be secured whenever possible.

Enough has been said to indicate that the study of butterflies in this country is still in its infancy. Mere collecting has claimed many devotees, but the investigation into the bionomics and economy of the insects has received scant attention. It is in the hope of rousing interest in these subjects that these notes are written.

Perusal of these pages will soon reveal how really little one knows of these marvellous insects.

An elementary knowledge of the classification of butterflies is essential to ensure study on sound lines, and as an introduction to the systematic lists which follow, the appended classification will be found of great utility.

Wherever possible, line-drawings and half-tone blocks will be used to illustrate the letterpress.

The most important characters which will be used in the classification of the large number of species are (1) the development of the fore legs and (2) the venation of the wings. The text figure will give the nomenclature of the different parts of the wings and the different veins. (Page 25.)

The two veins which bound the cell from the base are known as the *Sub-costal* and the *Median*.

- A. Antennae close together at origin; tibiae with a pair of terminal spurs only.
- B. Tarsi of first pair of legs imperfect, and the whole limb much reduced in both sexes.

Family 1.—*NYPHALIDÆ*.

- c. Discoidal cell of hind-wings closed.
- d. Palpi very short, slender.

Sub-Family 1.—*Danainæ*.

- dd. Palpi of moderate length or long, not slender.
- e. Fore-wings short, broad; their nervures (veins) often swollen at the base.

Sub-Family 2.—*Satyrinæ*.

- ee. Fore-wing much elongated, narrow; their nervures never swollen at the base.

Sub-Family 3.—*Acræinæ*.

- cc. Discoidal cell of hind-wings open or incompletely closed.

Sub-Family 4.—*Nymphalinæ*.

- BB. Tarsi of first pair of legs imperfect in male, perfect in female.

Family II.—ECRYINIDÆ.

f. Palpi very long.

Sub-Family 1.—*Libythæinæ*.

ff. Palpi of moderate length or short.

Sub-Family 2.—*Nemeobinæ*.

BBB. Tarsi of first pair of legs small in male, wanting in one or both claws.

Family III.—LYCÆNIDÆ.

BBBB. Tarsi of first pair of legs perfect in both sexes.

Family IV.—PAPILIONIDÆ.

g. Tarsal claws bifid; inner margin of hind-wings prominently rounded.

Sub-Family 1.—*Pierinæ*.

gg. Tarsal claws simple; inner margin of hind-wings hollowed; tibiæ of first pair of legs with a small process on the inner edge.

Sub-Family 2.—*Papilionæ*.

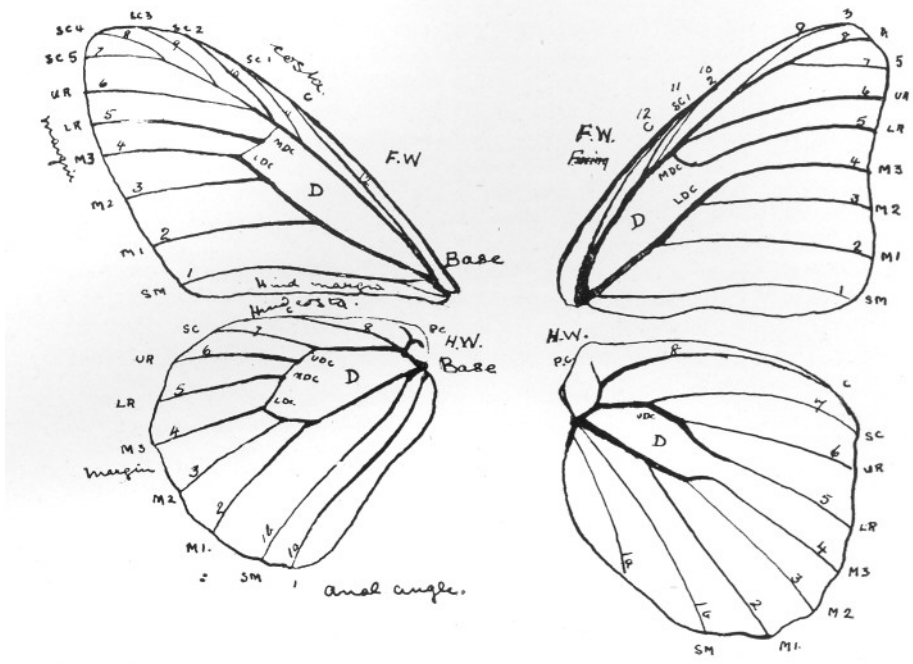
AA. Antennæ wide apart at origin; tibiæ of hind pair of legs with an additional pair of spurs rather beyond the middle.

Family V.—HESPERIDÆ.

Family I.—NYMPHALIDÆ.

Sub-Family 1.—*DANAINÆ*.

Vein 10 of the forewing arises from or behind the apex of the cell. The Discoidal vein of the cell of the forewing is so strongly curved that vein 5 arises much nearer to the base than to vein 10. 1. DANAICA. Ltr.



TEXT FIGURE 1.

FIG. 1.

FIG. 2.

Genus *Amauris*.

Genus *Hypolimnas*.

(adapted from *Eltringham*.)

c., Coastal nerve; sc., subcostal; sc. 1, 2, 3, 4, 5, branches of subcostal; ur., upper radial; lr., lower radial; m1, m2, m3, branches of median; sm., submedian; pc., precostal; mdc., middle discocellular; udc., upper discocellular; ldc., lower discocellular; D., discoidal cell; i., internal.

- AA. Vein 10 of the forewing arises before the apex of the cell.
 The Discoidal vein of the cell of the forewing is only feebly incurved so that vein 5 arises not or but little nearer to the base than to vein 10.
- a. Vein 7 of the hind wing arises much nearer to 6 than to 8.
 2. AMAURIS. Hbn.
- b. Vein 7 of the hind wing arises almost midway between veins 6 and 8.
 3. AMAURINA. Aurly.

Many authors divide the genus *Danaida* in different genera, but Aurivillius places them all in one genus and divides them into groups. The species are so few that there seems to be no object in separating the genera for the African forms.*

GROUP HABITS AND CHARACTERS.

The insects belonging to this group are conspicuously coloured; slow and flaunting in flight and much in evidence during their seasons. The majority of the *Amauris* group are black and white, with a varying amount of ochreous in the hind wing in some species. The *Danaida* are reddish ochre with a varying degree of black and white markings, or black with numerous white or pale blue-green spots, with a certain amount of brownish at the base of the fore and hindwings.

All are known to be distasteful to their natural enemies—birds, mammals, reptiles and even other insects. This fact has been ascertained by experiment and by careful field observations, and would account for their almost total disregard of danger from attack by enemies. Some of them secrete, when handled—a yellowish fluid from the thorax, which has a most disagreeable odour.

The strong influence exercised by the colours and patterns of members of this group, acting through natural selection, has made a deep impression on the colouration and patterns, not only of members of this, but to remarkable degree on susceptible species of widely separated groups. Reference to such mimicry will be made under each species as dealt with.

Many of the species are common and gregarious, not only at sunset when numbers gather together in some sheltered corner preparatory to settling for the night, but also during the heat of mid-day, and when feeding. It is a common sight to see large numbers of *Tirumala* or *Amauris* hovering round the creeper-clad trunk of some large sheltering tree, individuals vying with one another for the possession of some coveted twig or leaflet.

* Dr. van Someren prefers to recognise the genera *Tirumala* and *Melinda*.

Some individuals are highly aggressive and persistent in their attack and endeavour to dislodge the tenacious occupier of a favourite sleeping site. The usual mode of attack is for the aggressor to launch himself straight at the settled enemy, and then if repeated attempts fail to dislodge him, he settles alongside or even on top of the insect in possession, and by a rapid flapping of the wings, sometimes succeeds in displacing him. More often than not both insects lose a hold on the site and, by the time they have disentangled themselves, they find a third party in possession.

The number to be found over a particular feeding ground depends largely on the presence of some specially attractive food-plant. There are several flowering shrubs and plants frequented by these insects, such as the Wild Heliotrope, the flowers of a creeper, and those of the Cape Chestnut (*Calodendron capensis*) are especially attractive to *Melinda* and *Amauris*.

Members of the genus *Amauris* are attracted to damp mud, and it is a common sight to see dozens or even a couple of hundred feeding on some foul smelling patch of mud, or some evil odoured bait, such as is beloved by the beautiful male *Charaxes*.

Danaida chrysippus is found most frequently in open "park country" and open grass plains where the foodplants of the larvæ are most in evidence.

Tirumala is also found in such situations but frequents also the open glades and edges of forests. *Melinda* inhabits much the same country but should be considered as more partial to forests.

The species of *Amauris* are to all intents and purposes dwellers in the forest and sparsely forested areas, though one does come across certain species in the open.

A trait peculiar to the whole group is extraordinary longevity and resistance to conditions which would cause death to many more robust looking species. Individual specimens have been noted to live in a wild state for more than a month, while captive specimens, properly fed, have survived considerably longer.

On one occasion, a *Tirumala* which had been put in a cyanide bottle and subsequently papered, arrived three weeks after the date of capture. It was found alive and perfectly vigorous!

Pressure on the thorax which would kill most species appears to incommode these not at all, while fumes from an ordinary Cyanide bottle take a very long time to cause death.

"Shamming death" is practised by all members of this group. If a specimen is captured with one's fingers, it will suddenly cease struggling and remain motionless and if placed on the palm of the hand will lie quiet until all of a sudden it will take wing and make off. Similarly, when a specimen has been caught in a net and the

thorax compressed, it will lie as if dead at the bottom of the net until this has been opened, then out it goes!

Certain butterflies are provided with well marked scent "patches" or "pockets," and in the groups now under consideration these characters are developed to a marked degree.

In the *Danaida* group (including the *Tirumala* and the *Melinda*) these scent organs are developed in the male in the form of a pocket, or pouch, which is placed between veins 1 b. and 2, but nearer the latter, in the hind wing. In *Danalda chrysippus* the organ is a pouched pad which projects to an almost equal degree on the upper and under surface of the wing. In *Tirumala* and *Melinda* it is a pouch or pocket which projects on the under surface and is directed upwards, so as to overlie vein 2. The position of the pocket is indicated on the upper surface of the wing by the presence of a dull spot or mealy patch.—Vide Pl. I, fig. 1—5 and Pl. III., fig. 1—6.

In the *Amauris* group the male scent organ is a thickened dull mealy spot varying in shape in different species, situated near the anal angle and divided by vein I b. These spots are of great diagnostic value in determining the position of individuals of this group.—Vide Pls. II., V., X.

All the males of these groups possess a pair of retractile "pencils" or "brushes" which can be extruded from the anal end of the body.—Vide Pl. III., fig. 2. These organs are displayed during the act of courtship, (as described by Carpenter in Proc. Ent. Soc. 1914 p. cxi.) and are used for disseminating a scent calculated to excite the female. These brushes are charged with the secretion from the scent brands. The odour from these brushes is a pungent, disagreeable smell, somewhat like that from Bat droppings. The charging of these brushes has been observed by Lamborn (Proc. Ent. Soc. 1911, p. XLVI., 1912, p. XXXV., and one of us. In both instances the insect observed was *Amauris niavius*. Lamborn describes the act as follows:—"In January of this year I observed a male *A. niavius*, L., settle on the upper surface of a leaf with its wings expanded. The insect flexed its abdomen, making the dorsal surface convex, so that the extremity of the body was brought level with the brands, and the tufts were then thrust out. By alternately flexing and straightening out of the abdomen the tufts were passed to and fro over the surface of the bands as though some secretion was being conveyed from one to the other."

It is very important that such observations should be recorded, for little is known regarding these things.

GENUS I. *DANAIDA*, LTR.

D. CHRYSIPPUS. L. Pls. I & III., figs. 1—4.

General colour dull red-ochre, with white-spotted black margins. There are four well marked forms or varieties, with intergrades. The type form has the apical third of the forewing black, with an oblique row of six more-or-less closely connected, somewhat quadrate white spots along its inner edge. (Plate I., fig. I.). The apical half of this black tip is coloured brown on the undersurface of the wing. The anterior part of the forewing is usually of a darker shade of brown than the rest.

On the hindwing there are three black spots situated at the junctions of veins 4, 5 and 6, with the cell. There is in addition, in the male, a fourth black spot which indicates the position of the sex-pouch.

The second form *dorippus*, Klug, is very similar to the above but lacks entirely the black and white apical markings to the forewing.—Pl. I., fig. 2. Pl. III., fig. 2. Transitional varieties between this form and *chrysippus* are not very common. The usual variety being one in which the row of white spots are clearly indicated.

The third form, *alcippus*, Cr., resembles the type form in the markings of the forewing, but has the greater part of the hindwing white. The black marginal border is retained.—Pl. I., fig. 3, and Pl. III., fig 3.

A fourth form, *albinus*, Lanz., has the forewing as in *dorippus* and the hindwing more as in *alcippus*, though not so white, there being a distinct suffusion of yellow-brown scales between the central white patch and the black border.—Pl. I., fig. 4, and Pl. III., fig. 4.

The sexes are alike in all these forms, except that the male has an extra spot in the hindwing which corresponds to the position of the sex brand, or pocket.

Breeding experiments have shewn that all the above forms are one and the same species.

The species is generally abundant in the open country and woodlands, but is seldom seen in the forests. It flies very slowly and is sluggish in habits. As already mentioned, under group habits, etc., this danaine is known to be highly distasteful. In its various forms it serves as a model for a large number of mimetic species, the most notable being:—Mimics of *chrysippus*=female *Hypolimnas missipus*, *Acræa encendon*, *Mimacræa marshalli*, *Euhpædra eleus* and *ruspina*, *Papilio dardanus* female form *trophonius*, etc. Mimics of form *dorippus* *Hypolimnas*, female form *inaria*, *Acræa encendon* f. *daira*, *Acræa johnstoni* f. *fulvescens*, *Mimacræa marshalli* *dohertyi*, *Popilio dardanus* female form *dorippoides*, etc.

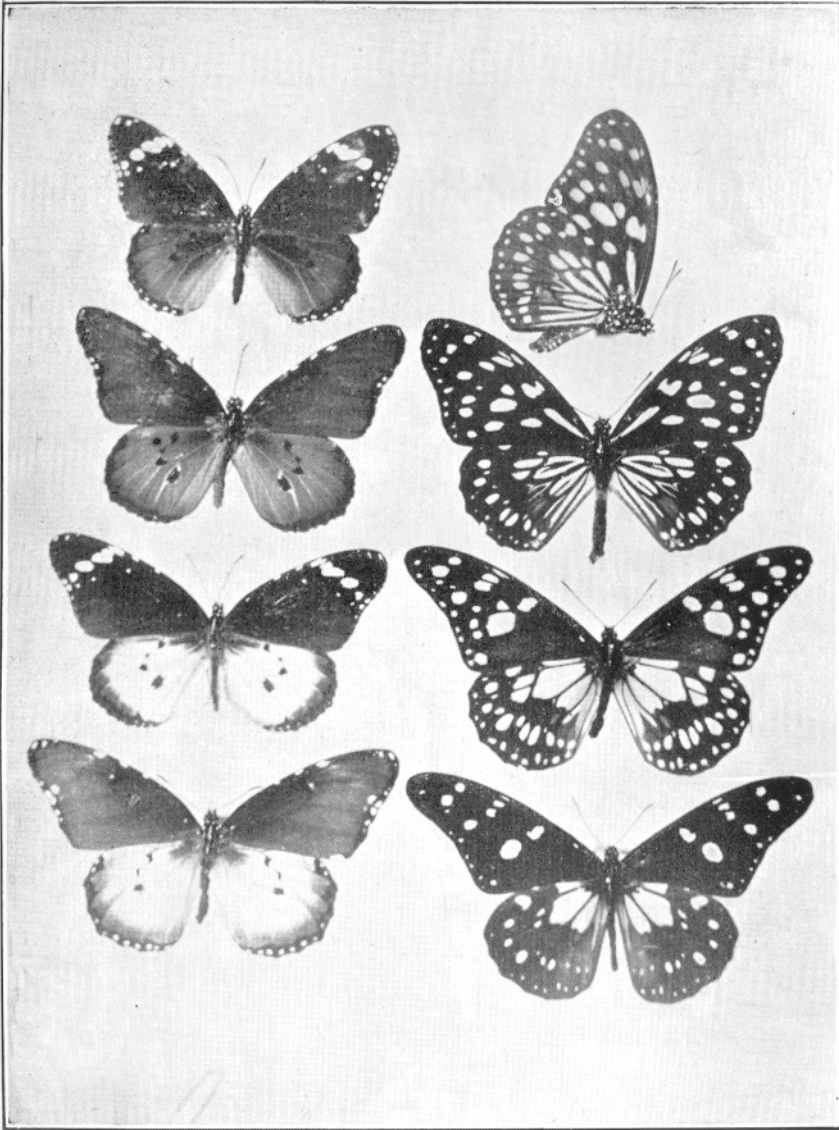


Fig. 1. *Danaida chrysippus*, L., Jinja.
(Female)

Fig. 2. *Danaida chrysippus*, form
dorippus, Klug. Nairobi. (Male)

Fig. 3. *Danaida chrysippus*, form
alcippus, Cr. Jinja. (Male)

Fig. 4. *Danaida chrysippus*, form
albinus, Lanz. Nairobi. (Female)

Fig. 5. *Tirumala limniace petiverana*,
Dbl. Hew. undersurface shewing
"pocket" on hind wing. (Male)

Fig. 6. " " " "
Kamoisi. (Male)

Fig. 7. *Melinda formosa formosa*.
Godm. Nairobi. (Male)

Fig. 8. *Melinda mercedonia*, Karsch,
Jinja. (Male)

DISTRIBUTION :—

The type forms occur at the coast along with the other varieties in lesser degree, *dorippus* far outnumbering all other forms. The prevalent form in Nairobi is the *dorippus* variety—but others occur also. In Kavirondo and Uganda all forms are present, but the *alcippus* and *albinus* varieties are common in this district.

Danaida chrysippus breeds on several kinds of plants, notably, various species of *Asclepias* and *Gomphocarpus fruticosus* and a creeper (un-named).

EARLY STAGES :

The eggs are laid singly on the upper or undersurface of the leaves; occasionally a single leaf will have four or five eggs scattered here and there. Occasionally the eggs are deposited on vegetation nearby the food plant. In shape the egg is oval, rather pointed at its upper end and slightly flattened at its base. It is longitudinally ribbed and ornamented with ridges between the ribs.—Pl. VI., fig. 1. Larvæ have emerged from eggs, kept under observation, on the third day. They are 3 mm. in length, and of a greyish-brown colour, semi-transparent, with faint indications of cross bars. Growth is very rapid and at the second instar the colour is almost that of the mature larva though the ornamentation is not so pronounced. The adult larva (length 40—50 m.m.) is bluish-grey on the back, finely barred transversely with black; each segment, except the first, dorsally ornamented with two contiguous oval orange or yellow spots. The undersurface of the body is purply-black and separated from the bluish-grey of the upper parts by a somewhat diffuse body or spiracular line. The legs are blackish with a bluish-grey transverse line. The head, which is greyish, has a frontal horse-shoe-shaped line of black. The dorsal surfaces of the 2nd, 5th and 11th segments bear a pair of long black flexible filaments arising from the extremities of the yellow spots. The bases of these filaments are reddish. The anterior pair are the longest.—Pl. VIII., figs. 1—3. Pl. IX. a.

The colour of the larva changes just before pupation; the dorsal yellow marks become less pronounced, while the yellow body-line becomes more distinct and the insect becomes more translucent purplish.

The larva suspends itself by its posterior end and pupates within forty-eight hours. The pupa (Pl. VIII., fig. 4, Pl. IX. a.) is a beautiful object; translucent pale pink or pale green, slightly more opaque in the region of the wing cases, and ornamented dorsally with golden spots at the line of angulation of the abdominal segments.

Faint yellowish dots denote the position of the abdominal spiracles. The pupal period lasts from ten days to three weeks, varying in individual cases.

The larvæ are highly subject to being parasitised by several species of flies. The relative scarcity of the food plant, coupled with the high percentage of mortality due to parasites probably accounts for the control in numbers which undoubtedly exists.

DANAIDA (TIRUMALA) LIMINIACE PETIVERANA, Dbl. &

Hew.—Pl. I., figs. 5 and 6.

This species has a blackish ground colour, and light blue-green markings; the forewing has a longitudinal streak at the base of the cell, but the hindwing, deeply cleft basal marks. The cell of the forewing has a transverse spot beyond the middle. Both wings have discal spots and small submarginal spots. The ground colour of the undersurface is lighter, more greyish than the upper, and distinctly brownish over the basal two-thirds of the forewing and at the base of hindwing. The type form is Oriental. The sexes are alike in colour and differ only in size, the females averaging larger.

The flight is slow and weak. When feeding at flowers, the insects keep their wings stationary, and when moving from one bloom to another, they glide rather than fly. It is found in forest and woodland and is the model for the mimetic Swallowtail, *Papilio leonidas*. In Kenya it is also the possible model of *Euxanthe wakefieldi* and in Uganda of *Euxanthe ansellica*.

DISTRIBUTION :

The species is common throughout Kenya and Uganda, but is more plentiful in the warmer areas. It is very abundant at the Coast and was seen in large numbers at Marsabit.

EARLY STAGES :

The eggs, which are pale creamy white are laid on the undersurface of the leaves of a creeper (un-named). They are long oval, with longitudinal ribs and transverse ridges.

The larva from the second instar is whitish with narrow brownish transverse lines, each segment with a broad white band at its anterior edge. The legs are blackish, each with a couple of large white spots at their bases. The head is black, ornamented with a white trident. There are two pairs of fleshy filaments, placed on the 3rd and 11th segments, dorsally, as in *D. chrysippus*.—Pl. VIII., fig. 8—9.

The pupa is a pale semi-translucent green, similar in shape to that of other *danaina* chrysalises, but rather more angled dorsally. It is decorated along the line of the abdominal angle with golden spots and ornamented with spots of the same colour on the dorso-thoracic ridge, the wing cases and the head case.—Pl. VIII., fig. 10. When the butterfly has emerged, the pupal case is clear and transparent like glass.

DANAIDA (MELINDA) FORMOSA, Gd.—Pl. I., fig. 7 and Pl. III., 5.

In general scheme of pattern, this species resembles somewhat, the preceding. It differs, however, in having a large, pale, bluish-cream basal area in the hind wing, traversed by dark veins; and in having the basal part of the forewing, to almost the middle, and the costa of the hind wing, bright orange-brown. The spotting on the fore and hind wing is larger. The dark markings on the undersurface are more brownish than blackish. The forewings are rather long and tapering in the male, less so in the female. The sexes are coloured alike except that in most females the brown patch on the forewing is paler. Some females however have the whole of the pale patch in the hindwing broadly outlined with orange-brown. In some examples the pale spot in the forewing cell is entirely wanting.

The habit of *M. formosa* are typically *danaine*; the flight is a slow sailing and gliding movement, though when the insect is disturbed, it has a remarkable turn of speed. It is a conspicuous object when flying, or when settled on some flowering plant. When actually feeding at a flower it hangs down with motionless wings (this is distinct from the method of feeding of *Papilio rex rex*, its wonderful mimic, which generally flaps its wings at such times). We have occasionally taken males at damp mud, but they do not appear to be particularly partial to such.

DISTRIBUTION :-

The species has a somewhat restricted distribution, extending from the Taita country northward to North Kavirondo where it meets with and slightly overlaps the next species, *M. mercedonia*. It is common throughout its range.

EARLY STAGES :

Melinda formosa has been found laying on two species of fine-leaved creeper (as yet unidentified) both of which are fairly common in the forests round Nairobi. The eggs are laid singly, preferably on the young tender straggling shoots. They are creamy white with a glazed surface, decorated with longitudinal ribs arising

from a common point, at the apex of a long oval. There are numerous transverse ridges between the ribs.

When the larvæ are first hatched they are creamy or dirty whitish but develop into striking creatures at the second and third moult. An adult larva is a delicate pale bluish on the dorsum, with a lateral line of crimson, followed by a bluish spiracular line. Each spiracle is surrounded by a yellowish area. The undersurface of the body is greenish, separated from the spiracular line by a narrow bordering of crimson. The legs are blackish, ornamented on the outer surface with crimson. The dorsum of the caterpillar is ornamented with four pairs of very long fleshy filaments, situated on the 2nd, 3rd, 5th and 11th segments. These are crimson. There is a certain degree of variation in the colour of the larvæ in the last instar; thus certain individuals are less bluish than normal, but are, however, distinctly barred transversely with brownish. These lack entirely the first lateral body-line and instead have an extension of the yellow surrounding the spiracles in the form of a wide lateral stripe. The fleshy spines are pinkish. The underside of the body is brownish yellow and the suctorial legs are ornamented with white marks.—Pl. VIII., fig. 5 and 6 and Pl. IX. (b.). The head is black with central and lateral white lines.

The pupa, which is suspended by a well-formed black cremaster, is pale translucent green ornamented dorsally with a row of golden spots at the abdominal angle, and decorated on the dorsum and lateral surfaces of the thorax with golden spots of varying shape and size. When the butterfly is nearly ready to emerge, the pupa darkens generally, but the first colour to show up is the orange-brown of the base of the forewing. When the insect has emerged the pupal case looks like clear glass.

DANAIDA (MELINDA) MERCEDONIA. Karsch.—Pl. I., fig. 8.

Pl. III., fig. 6.

In this species the spotting of the fore and hind wings is greatly reduced, and resembles, so far as the forewing, that seen in the *Amauris* group. The base of the forewing and the whole of the hindwing, except for the spots, is a rich chestnut-brown, deepening in the latter, at the margins, to blackish-brown, and in the former to rich black-brown for the terminal two-thirds. The pale spots in the forewing have a bluish tinge while those in the hindwing are creamy with a greenish tinge. The submarginal spots of both wings are greatly reduced. The sex spot in the male is very conspicuous. The forewings in both male and female are narrow and abruptly graduated, though not so much in the latter sex.

The males predominate undoubtedly, but on the other hand, the females are more retiring and keep to the thicker forest and are easily overlooked. Males are frequently seen feeding on damp mud.

DISTRIBUTION :

This species is found throughout Uganda and inland east to Elgon and Nandi.

EARLY STAGES :

Melinda mercedonia appears to resemble *M. formosa* in habits of flight and feeding, and in regard to the egg and larva; this last, however is unknown to us in the mature stage. The pupa is similar in shape to that of *M. formosa*, but is less ornamented. The line of abdominal spiracles is conspicuous.

This species is the model of the mimetic Swallowtail *Papilio rex mimeticus*. It is highly distasteful and is almost immune to attack from insectivorous birds, etc.

GENUS *AMAURIS*. HBN.

This genus is peculiar to the Ethiopian region but extends to Madagascar, and the neighbouring islands. It is represented within the countries dealt with in this paper by sixteen species and races.

(For general notes on the group see introductory remarks on page 23.)

AMAURIS NIAVIUS NIAVIUS. L.

AMAURIS NIAVIUS DOMINICANUS, Trimen.

(Pl. II., figs. 1 and 2. Pl. III., figs. 8 and 9).

This is a large conspicuous black and white species which extends from the coast to western Uganda. There are two well-marked geographical races.

The type form is a beautiful intense black in the forewings and sooty brown-black in the hindwings. The forewings have large white spots towards the base on the lower edge, continuous in outline with larger white spots in the hind wing. The hindwing spot extends from the base to the apex of the cell. In addition to the spot on the forewing, there is a wide white subapical band; an oblique white line in the cell; two subcostal spots; and five submarginal spots in internervular spaces 1, 2, 3, 6 and 7. The hindwing has no submarginal spots.

The race *A. n. dominicanus* differs from the type form in the much larger white patch of the hindwing and the wider subapical bar in the forewing. On the undersurface of both races, the dark areas are brownish black in the forewing, while in the hindwing the whole surface is white-scaled except at the extreme base and the outer margin. The internervular rays are blackish and stand out against the whitish ground. The sex mark in the male is a dull oval spot on vein Ib.

DISTRIBUTION:

This type form is found throughout Uganda east to Mt. Elgon. The race *dominicanus* extends from the Coast to Mt. Kenia and Marsabit and on to Elgon—in which area it interbreeds with the typical form producing intermediates.

EARLY STAGES:

The early stages of this insect are unknown to us.

This species has impressed its colouration on many highly susceptible butterflies including *Papilo dardanus*, female form

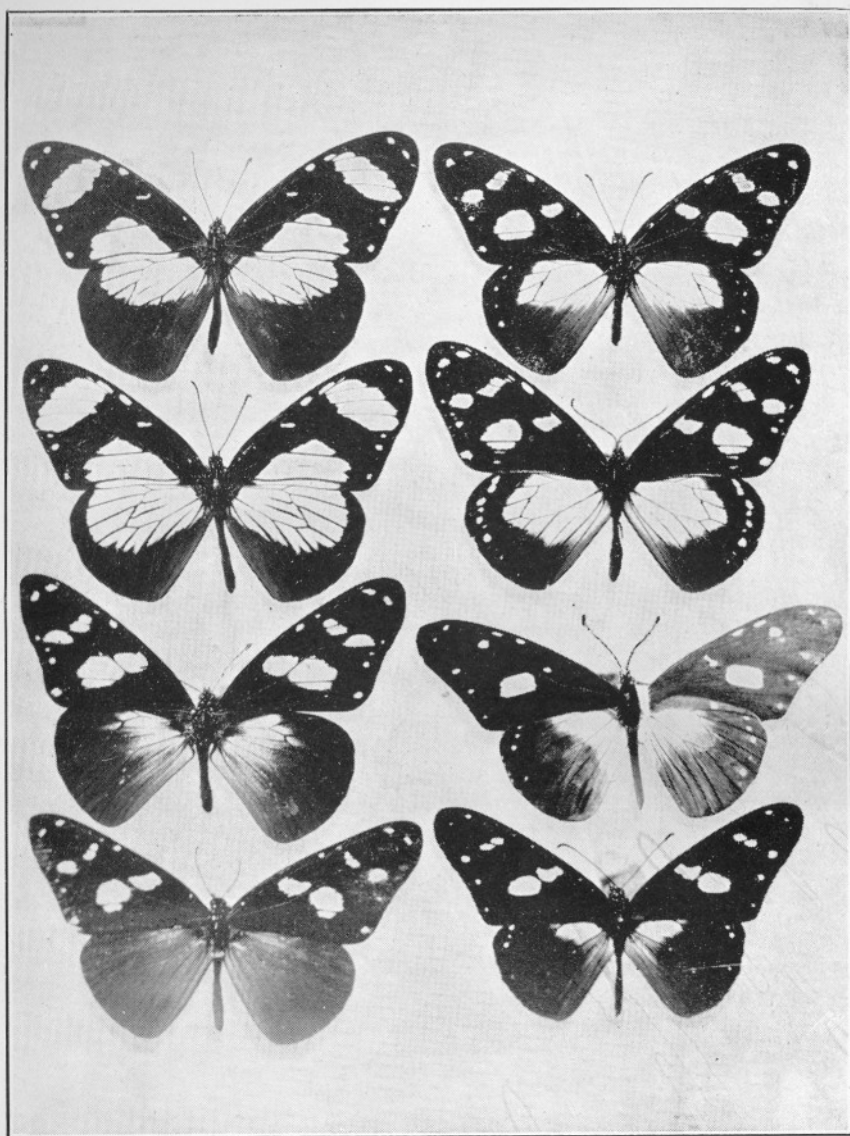


Fig. 1. *Amauris niavius niavius*, L.
Mawokota. (Male)

Fig. 2. *Amauris niavius dominicanus*,
Trimen. Mombasa. (Male)

Fig. 3. *Amauris damocles damocles*,
Beauv. Mawokota. (Male)

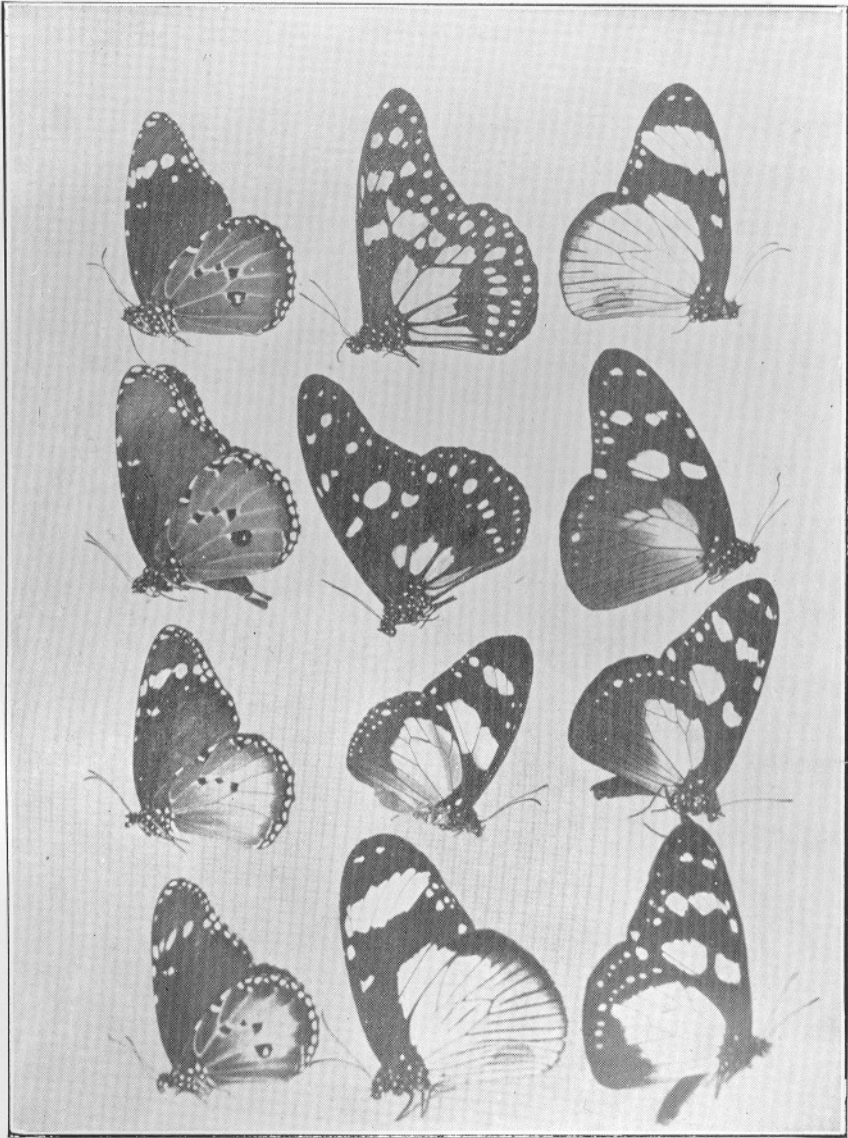
Fig. 4. *Amauris damocles* ab. Toro.
(Male)

Fig. 5. *Amauris damocles* f. *psyttalea*,
Plötz. Jinja. (Male)

Fig. 6. *Amauris damocles damocles*,
Slgr. Kaimosi. (Male)

Fig. 7. *Amauris dira*, Neave. Teriki.
(Male)

Fig. 8. *Amauris hecate*, Btlr. Mulange.
(Male)



Under surfaces of Danaines, shewing "pockets" and Sex Brands.

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| Fig. 1. <i>Danaida chrysippus</i> , L. Mulange. | Fig. 5. <i>Melinda formosa</i> , Godm., Kaimosi. | Fig. 9. <i>Amauris niavius dominicanus</i> , Trimen, Mombasa. |
| Fig. 2. <i>Danaida chrysippus</i> f. <i>dorippus</i> , Klug. Nairobi. shewing "Brushes" extruded. | Fig. 6. <i>Melinda mercedonia</i> , Karsch. Jinja. | Fig. 10. <i>Amauris damocles</i> , Beauv. Jinja |
| Fig. 3. <i>Danaida chrysippus</i> f. <i>alcippus</i> , Cr. Jinja. | Fig. 7. <i>Amauris ochlea</i> Bdv., Samburu. | Fig. 11. <i>Amauris damocles psyttalea</i> , Plötz. Mulange. |
| Fig. 4. <i>Danaida chrysippus</i> f. <i>albinus</i> , Lanz. Jinja. | Fig. 8. <i>Amauris niavius niavius</i> , L. Jinja. | Fig. 12. <i>Amauris damocles damocles</i> , Stor. Kaimosi. |

nippocoon, *Hypolimnas dubius f. wahlbergi*, *H. anhedon*, *Hypolimnas usambara*, etc. (For further information see Jrl. Nat. Hist. Soc., Vol. No. 2, p.p. 81—92).

AMAURIS OCHLEA, Boisdu.—Pl. V., fig. 1., Pl. III., fig. 7.

A small black and white species, with black, white-spotted fringes. The forewing has a large, oblique, irregular patch extending from the subcostal nervure to the submedian or vein i. near the base of the wing. At the extremity of the cell, but above the subcostal nervure, there is a small spot and a still smaller one beyond. An oblique subapical bar of three confluent spots crosses the end of the wing. There are four submarginal spots.

The hindwing has a very large white patch covering nearly the whole of the wing, while in cellules 4, 6 and 7 are small submarginal white dots.

The male sex brand is a long ovoid patch at the anal angle of the hindwing, divided by vein Ib.

DISTRIBUTION :

This species is very common at the coast but extends to Kibwezi, and along the Tana River, and has been taken in the Southern Masai Reserve. It is not very common in Taita.

EARLY STAGES :

The egg is a creamy white long oval, pointed at the upper end and ornamented throughout its length with longitudinal ribs, between which are numerous transverse ridges. The eggs are laid on *Tylophora anomala* and *Cynchum chirindense* and on a creeper as yet unidentified.

This species is the model for *Hypolimnus deceptor*, *Pseudacraea l. expansa*, and possibly the female of *Euxanthe wakefieldi* and *E. tiberius*.

AMAURIS DAMOCLES DAMOCLES, Beauv.—Pl. II., fig. 3 and Pl. III., fig. 10.

AMAURIS DAMOCLES F. PSYTTALEA, Plotz.—Pl. II., fig. 5 and Pl. III., fig. 11.

AMAURIS DAMOCLES F. DAMOCLIDES, Stgr.—Pl. II., fig. 6 and Pl. III., fig. 12.

AMAURIS DAMOCLES, ab.—Pl. II., fig. 4.

A. damocles in its various forms is a large black and white species extending from the Kilimanjaro area to Uganda, but not extending into Kenya except along the Tanganyika border and in the Elgon Nandi region. In the type form, the basal white patch of the hindwing does not extend much beyond the middle of the cell and never reaches the apex. The large spot in the forewing cell is continuous with that in cellule 2, this latter extending into 1.

The discal spot in cellule 3 is larger than those in 4 and 5. There are a few submarginal spots on the forewing but none on the hindwing. The sex spot is a small oval divided by Ib.

The sexes are alike, though many specimens from the Sesse Isles have a decidedly ochreous tint to the hindwing patch; thus approaching *A. grogani* in colour.

Fig. 4 of Plate 2 is a very dark variety which is very like *Amauris tartarea*, Mab. There is a reduction in size of the spots and an almost entire absence of whitish scales at the base of the hind wing. Both forms occur in Uganda to Elgon and Kaimosi.

The form *psyttalea*, Plotz., differs from the type form in a reduction of the spot in the forewing cell, but an increase in size of the hindwing patch to the apex of the cell: the margins being well defined. A further difference is the presence of submarginal spots on the hindwing.—Fig. 5, Plate 2.

The form *damocoides*, Stgr., is the extreme form exhibiting an increase in size and number of the submarginal spots on both fore and hindwings and an enlargement of the hindwing patch to well beyond the apex of the cell.—Fig. 6, Pl. 2.

The sex patch in all the forms is a dark dull area at the anal angle of the hind wing on vein Ib.

The undersurfaces of the wings are browner than the uppers but otherwise similar except in the race *damocles* which has a row of distinct submarginal pale spots on the undersurface of the hindwing, which are not visible on the upperside.

DISTRIBUTION :

The range of *Amauris damocles* would be Kilimanjaro to Victoria Nyanza and Western Kenya and throughout Uganda.

EARLY STAGES :

The egg of this species is a pointed oval with wide ridges and narrow grooves. The ridges being indistinctly barred transversely. The mature larva and the pupa are unknown to us.

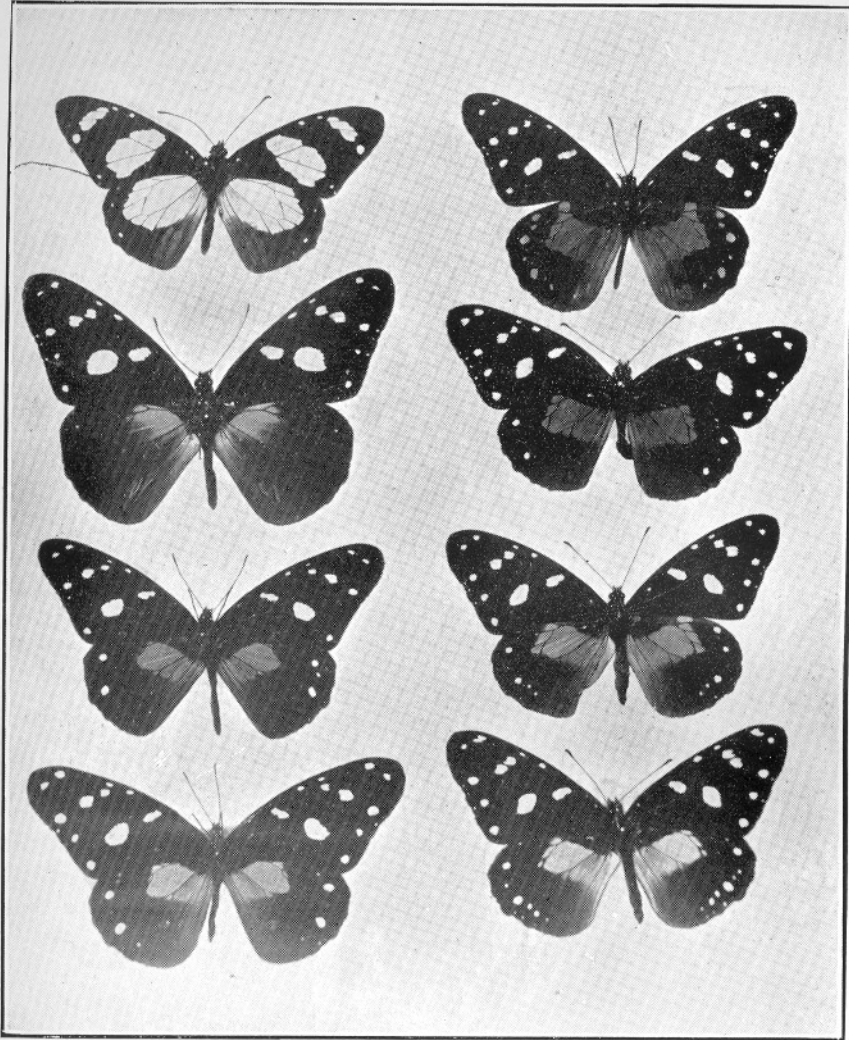


Fig. 1. *Amauris oehlea*, Bdv.
Mombasa.

Fig. 2. *Amauris grogani*, E. Sharpe.
Jinja.

Fig. 3. *Amauris oscarus*, Thureau.
Jinja. (Male)

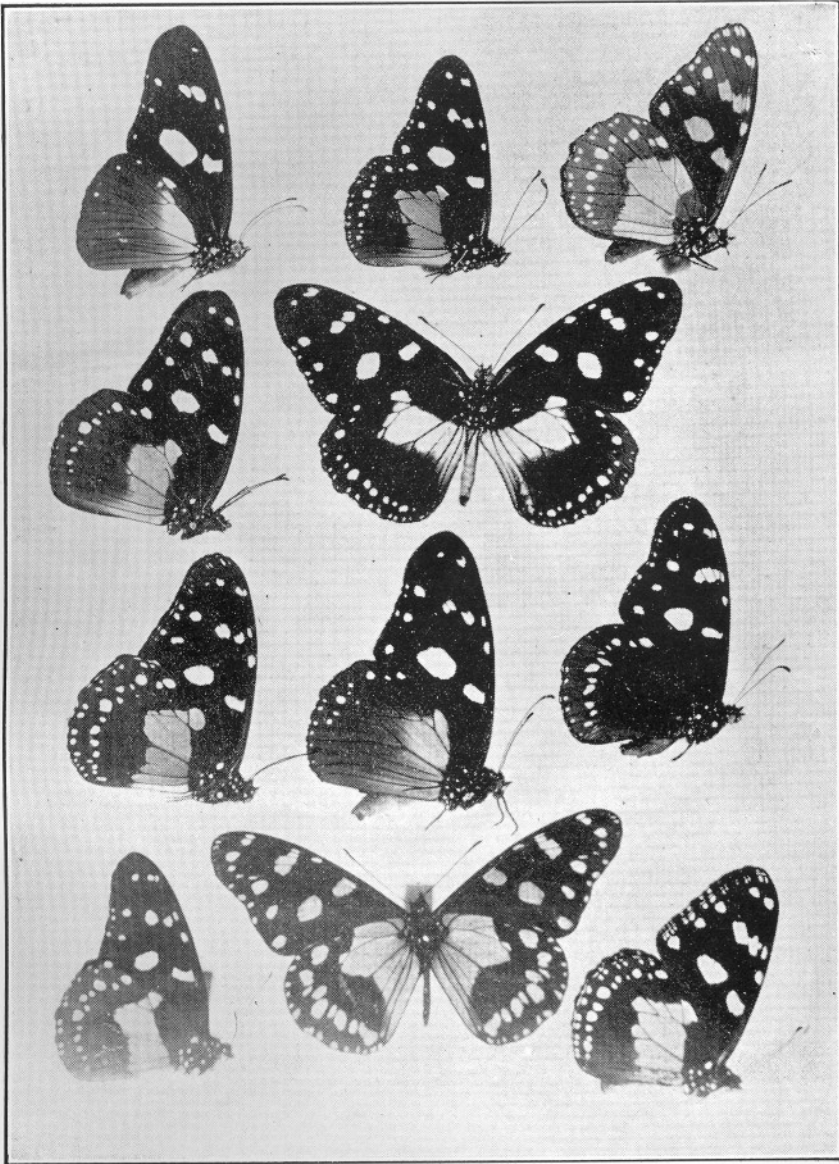
Fig. 4. *Amauris oscarus*, Thureau,
Mawokota. (Female)

Fig. 5. *Amauris echeria jacksoni*, E.
Sharpe. Terika.

Fig. 6. *Amauris albimaculata*, Btlr.
Nairobi. (Male)

Fig. 7. *Amauris albimaculata*, Btlr.
Nairobi. (Female)

Fig. 8. *Amauris albimaculata hanningtoni*, Btlr. Taita.



- | | | |
|--|--|---|
| Fig. 1. <i>Amauris hecate</i> ,
Btlr. Jinja. | Fig. 5. <i>Amauris albimaculata albimaculata</i> ,
Btlr. Jinja. | Fig. 9. <i>Amauris lobengula septentrionis</i> ,
Poulton. Marsabit |
| Fig. 2. <i>Amauris oscarus</i> ,
Thurau. Jinja. | Fig. 6. <i>Amauris albimaculata hanningtoni</i> ,
Btlr. Taita. | Fig. 10. <i>Amauris ansorgei</i> ,
E. Sharpe.
Lumbwa. |
| Fig. 3. <i>Amauris echeria jacksoni</i> . E.
Sharpe. Jinja. | Fig. 7. <i>Amauris grogani</i> ,
E. Sharpe. Jinja. | Fig. 11. <i>Amauris albimaculata hanningtoni</i> ,
Btlr. Kibwezi. |
| Fig. 4. <i>Amauris echeria</i> . | Fig. 8. <i>Amauris ellioti</i> .
Btlr. Kigezi. | |

Under surfaces *Amauris*.

AMAURIS DIRA, Neave.—Pl. II., fig. 7. (Upper and under surfaces).

This species is apparently rare, or has been overlooked by collectors. It is at present known only from the type and one other specimen. As there are no specimens before us, the original description is given. General colour glossy black with white spots. Forewing: In discoidal cell placed a little beyond the middle and nearer the posterior border, a very small spot. Below cell, between the first and second median nervules, both of which bound it, is a large rectangular spot. This is by far the largest and most striking spot in the wing. At the extremity of the cell and above it is a small spot. Just beyond this and beneath the costa, is another spot, rather long and narrow. This spot is the first of a row of four spots which cross obliquely the apical portion of wing to distal margin. Of this row, the second is the largest, and the third, which is somewhat indefinite and may be evanescent, is close to it. The fourth is close to the distal margin and lies just under the third radial nervule. Near the apex are two small white spots, of which the one nearest the costa is the larger. There are also near the distal margin two more spots placed beneath the second and the first median nervules respectively. There are two or three minute evanescent spots close to the distal margin about its middle. Fringe black, with small white internervular patches throughout the middle of the distal margin. Hindwing paler in colour than forewing. Crossing the cell near but not quite up to its base is a whitish patch; beginning at the anterior border of the cell, it extends across its posterior border to the inner angle of the wing. In breadth it extends rather beyond half the length of the cell. Just below costa, beyond extremity of the cell, is a spot, and there are three more small spots at the beginning of and following the course of the distal margin. There is also a fourth sometimes indefinite spot near the distal margin just beneath the third radial nervule. Fringe as in upper wing. The underside is very much as upperside, except that apex of forewing is paler and all spots are more pronounced. The spot in the forewing cell has a projection extending towards the costa. In the hindwing traces of more spots appear.—Fig. 7, Pl. II. (this figure is taken from *Novit. Zool.* Vol. XI., 1904, Pl. 1).

DISTRIBUTION:

Teriki, Kaimosi, N. Kavirondo.

EARLY STAGES:

Nothing is known of the early stages of this insect.

The sex patch is well marked, consisting of two long streaks on either side of vein Ib. at the anal angle.

AMAURIS HECATE, Butl., Pl. II., fig. 8. Pl. IV., fig. 1.

This species is extremely like the foregoing but may at once be distinguished by the presence of a large white spot in the forewing cell, touching or not far removed from that in cellule 2. The costal spots of the forewing are reduced in size. There is an additional spot in cellule 4.

The basal patch in the hindwing is small and does not extend beyond the middle of the cell.

This is a very dark species with narrow forewings and only slightly curved margins to the hindwings. The wing-fringes are white-spotted. The undersurface is browner than above.

The sex brands are very large elongate spots on vein 1b., reaching almost to the hind margin. The sexes are alike.

DISTRIBUTION:

Amauris hecate has a restricted range extending from the Kaimosi district, west to Toro in Uganda, and is found in forests.

EARLY STAGES:

The early stages are unknown.

AMAURIS GROGANI, E. Sharpe. Pl. V., fig. 2. Pl. IV., fig. 7.

This species resembles somewhat *A. hecate* and *A. dira* in so far as the spotting of the forewing and would appear to be a link between the *A. damocles* group and the *echeria* or *albimaculata* section.

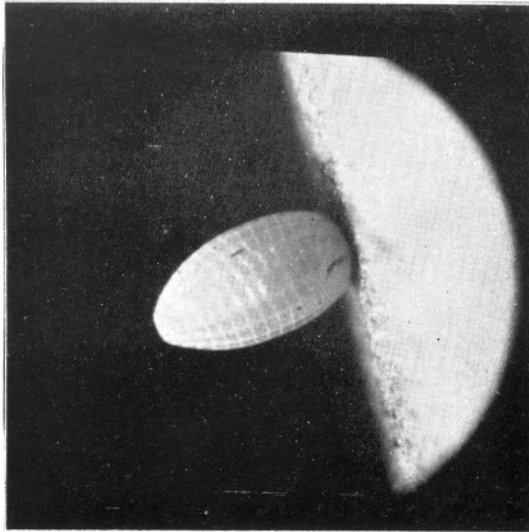
The single spot in the cell of the forewing is large and rounded while that in cellule 2 is also round, but larger. There are two costal streaks and sub-marginal spots as in *A. dira* and in addition, a few marginal spots. In the hindwing there is a basal ochreous patch which extends to about the middle of the cell. The hind margin of this patch is markedly diffuse or dyslegnic (in contradistinction to the clear-cut patch in most others of this group).

The submarginal spots in the hindwing are variable, but that in cellule 6 is constant (though varying in size); the others usually present are in cellule 4 and 7. On the undersurface of the wings, which is brownish black, the marginal and submarginal spots are more numerous, and very distinct.

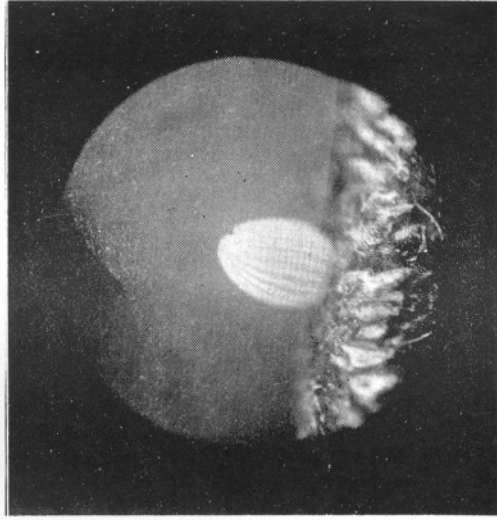
The sex brand is very distinct and having a somewhat glazed surface stands out well from the dull brown of the ground colour.

The relationship of this insect is at present obscure. Talbot redescribed it as a race of *A. egialea* under the name *similis*, but we understand that Dr. Jordan thinks it may be a race of *A. inferna*, Butl.

PL. VI.

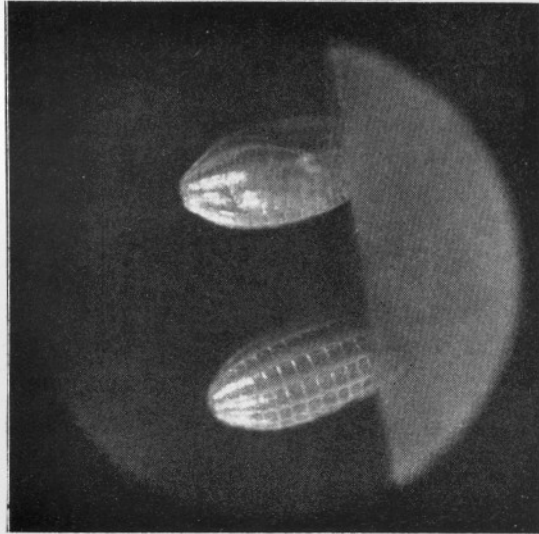


Egg of *Amauris oscarus*.
X 20.

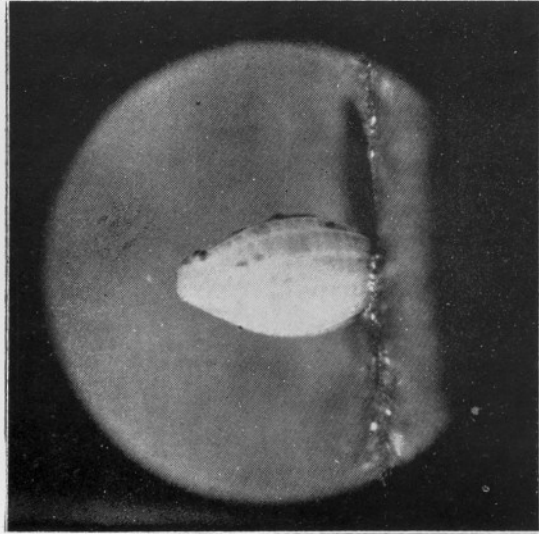


Egg of *Danaida chrysippus*.
X 20.

PL. VII.



Egg of *Amauris damocles*.
X 20.



Egg of *Amauris albimaculata*.
X 20.

DISTRIBUTION :

The distribution is from Teriki in North Kavirondo to west Uganda and Lake Kivu. It is a forest species.

EARLY STAGES :

Nothing is known of its early stages.

AMAURIS OSCARUS, Thureau. Pl. V., fig. 3 and 4. Pl. IV., fig. 2.

This species has a strong superficial resemblance to *A. echeria* and *A. albimaculata*. The essential features are as follows:—The hindwing patch is narrow, the whole being limited on its lower edge by a line drawn from the origin of vein 5 to the starting point of 2; on its outer margin from vein 5 to just beyond the origin of 7, and thence extended up to 8. The hindwing above has only three submarginal spots, and the submarginal spot in cellule 8 in the forewing is wanting.

The forewing spotting is reminiscent of that in *A. dira* but is at once differentiated by the presence of the discal spot in cellule 4.

In female specimens there is an extra submarginal spot in cellule 2. The hindwing patch is also slightly larger and paler. The hind margin of the patch in both sexes is somewhat dyslegnic.

A. oscarus has the undersurface of the abdomen dark, and not whitish as in *A. albimaculata*, and thus resembles *A. echeria* in this respect. The base of the hindwing is dark sooty brown.

The sex brand is a small dark dull oval spot.

DISTRIBUTION :

The distribution would appear to be Uganda, from Toro east to Mt. Elgon and Teriki.

Aurivillius in Seitz places *oscarus* as a race of *echeria*, but this cannot be correct as the race *A. e. jacksoni* is present in Uganda.

EARLY STAGES :

We have no information on the eggs or larvæ of this species.

This species is one of the group models for *Papilio ugandae*. *P. homyeri*, *P. jacksoni*, *P. echerioides*, *P. dardanus f. f. cenca*, etc.

AMAURIS ECHERIA JACKSONI, E. Sharpe.—Pl. V., fig. 5.

Pl. IV., fig. 3 and 4.

This race differs from the type form in having the forewing spots pure white, not ochreous. The hindwing spots and patch markedly ochreous, the latter sharply defined. The spot in the forewing cell is an oblique bar; that in cellule 2 (discal) somewhat quadrate or

ovoid; those in 4 and 5 rounded. There are three round submarginal spots in cellules 1, 2 and 3.

The hindwing submarginal spots are numerous; there being two spots in each cellule from 2 to 5; the upper ones in 4, 6 and 7 being the largest. The base of the hindwing below is decidedly rufescent-brown. The sex brand is a fairly large dull oval. The white mark on the palp is round.

The underside of the abdomen is dark, not light as in *A. albimaculata*.

DISTRIBUTION :

The distribution is from the Sokoke Forest and Taita hills north to Nandi and Uganda and eastward to Mt. Kenya. It is distinctly uncommon at Taita and very scarce in the highland area of Kenya.

EARLY STAGES :

The eggs of this species are long oval, slightly more pointed at the upper end, and ornamented with longitudinal ribs and transverse ridges. The food plant is *Tylophora anomala*, and an unnamed creeper.

The mature larva is black with longitudinal narrow blue and orange stripes. There are five pairs of fleshy short black subdorsal filaments placed on the 2nd, 3rd, 5th 11th and 12th segments respectively. The pupa is greenish, semitranslucent, markedly convex in the region of the mid-abdominal segments and of the thorax and slightly so over the wingcases; the dorsothoracic junction is very concave; the wing cases and thorax are ornamented with golden spots.—Pl. VIII., fig. 11, 12, 13.

AMAURIS ALBIMACULATA ALBIMACULATA, Butlr.—Pl. V., fig. 6, 7, Pl. IV., fig. 5.

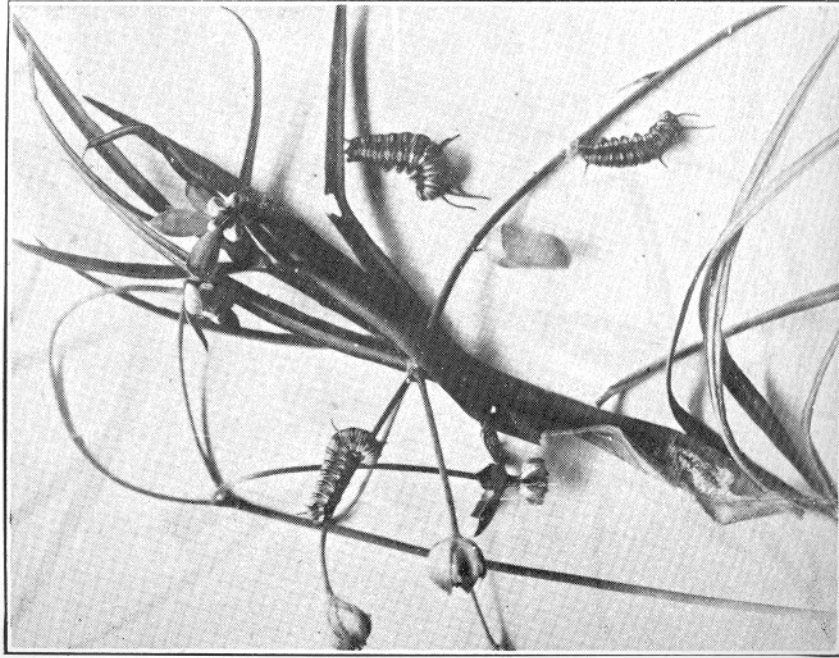
This species is very like the preceding; the spots in the forewing are similarly placed, but are on the whole slightly larger.

The main points of difference are: the white mark on the palp is a long streak; the sex brand is a very large oval, reaching almost to the margin of the anal angle; the underside of the abdomen is whitish contrasting with the dark upperside; the spots on the hindwing are white. The hindwing patch is ochreous.

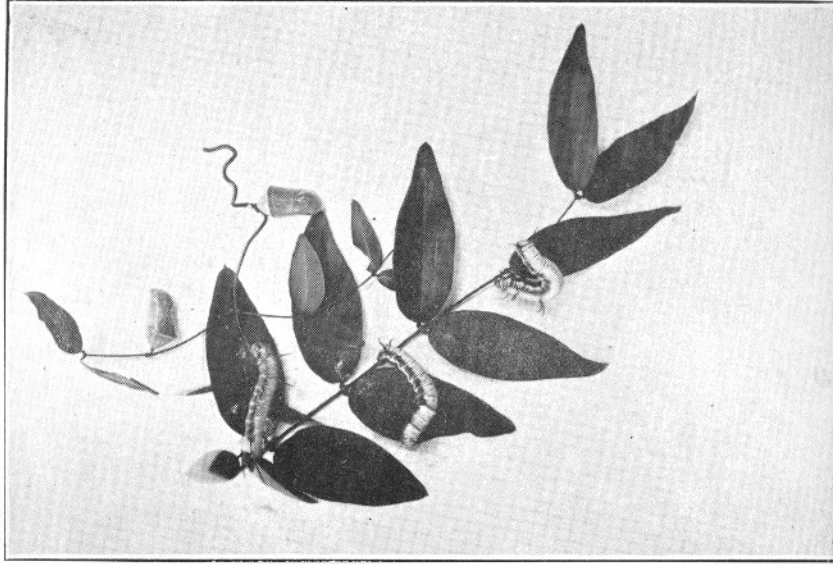
* Specimens from this locality are near the race *jacksoni* but are not typical.

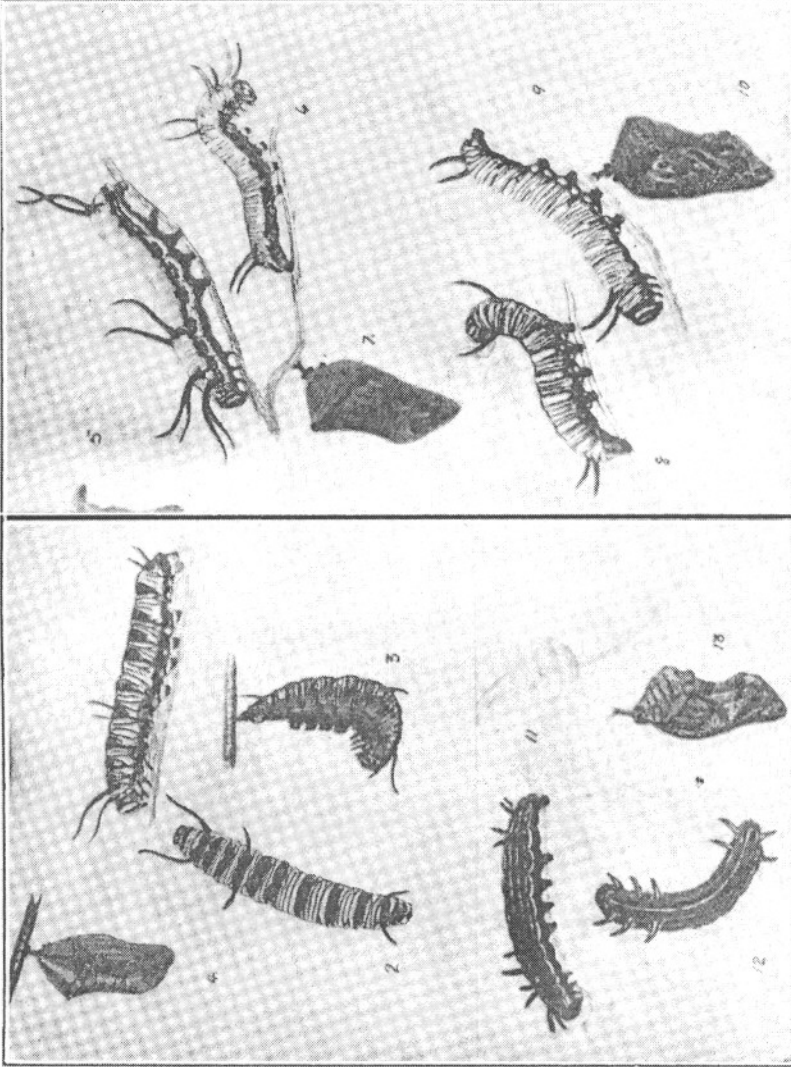
PL. IX.

A.



B.





1—4. Larve and pupa of *Danaida chrysippus*.
5—7. Larvae and pupa *Melinis formosa*.
8—10. Larvae and pupa of *Tirumala petiverana*.
11—13. Larvae and pupa of *Amantia echeria jacksoni*.

AMAURIS ALBIMACULATA HANNINGTONI, Butlr.—Pl. V.,
fig. 8. Pl. IV., figs. 6 and 11.

This insect has been described as a race of *albimaculata*, the main features being the very pale creamy hindwing patch and the often numerous spots in the hindwing.

This is the predominant form in the Kilimanjaro Taita area, extending north to Lake Victoria. The majority of the Nairobi specimens, however, are considerably darker; while those of the Mau to Nandi and Uganda are even darker, influenced presumably by the dark species, *A. ansorgei*. Certain examples from Nairobi are equally dark. Examples from Uganda are markedly paler than specimens from Kaimosi and Nandi, but they also differ as markedly from Kilimanjaro examples being less whitish.

DISTRIBUTION :

This species in its various forms extends from the coast, where it is rare, through Kenya to Elgon and Western Uganda.

EARLY STAGES :

The egg of both forms is a long oval, slightly more pointed at the upper end, decidedly ribbed longitudinally, these ribs projecting slightly at the upper disc, and transversely ornamented with close ridges.—Pl. VII., fig. 2. The mature larva is blackish with two orange stripes extending the length of the body. A narrow white central stripe divides the dorsal black line, while a similar line runs along the sides of the body just below the level of the spiracles. The feet are black. The two orange stripes of the body are connected at the middle of each segment by a narrow orange line.

The insect is ornamented with five pairs of short, fleshy filaments middle of each segment by a narrow orange line.

figs. 14 and 15.

The shape of the pupa is like that of the preceding species but is more ornamented. The dorsal aspect of each abdominal segment is golden, outlined with greenish. The thorax has a large golden spot on each side, on a waxy green ground. The wingcases are translucent green with two large basal golden patches and four longitudinal lines and one transverse patch over the rest of the wing shields. Just before the insect emerges the green of the pupa is replaced by jet black from which ground-colour the golden spots and lines show up distinctly.

AMAURIS LOBENGULA SEPTENTRIONIS, Poulton.—Pl. X.,
figs. 1 and 2. Pl. IV., fig. 9.

This insect is remarkable in being a race of a species which until recently was not known to extend beyond southern Taganyika Territory and Nyasaland. This form differs from other named races in having all the spots dark ochreous in colour. The subapical series of spots in the forewing forms a nearly continuous bar with the submarginal spot instead of being separated from it by a wide interval.

The general ground colour is a brownish black in both fore and hind wings, and the pale hindwing patch is very wide.

The sexes are very alike, the female being perhaps a trifle paler in ground colour and having more marginal spots but otherwise very like the male.

DISTRIBUTION :

So far the only district from which we have taken this insect is the isolated forests of Marsabit.

A. l. septentrionis is the model for a remarkable form of female of *Papilio dardanus*, named *ochracea* by Prof. Poulton, in which all the pale markings are ochreous as in the *Amauris*.

Nothing is known of the early stages of this insect.

EARLY STAGES :

AMAURIS (AMAURINA) ANSORGEI, E. Sharpe.—Pl. X., fig. 8,
Pl. IV., fig. 10.

This very distinct species can readily be recognised by its curious colouration. The spots in the forewing being pure white on a very black ground, while those of the hindwing, including the basal patch, are deep chestnut brown. Further, the three subapical spots are closely placed so as to form a bar. The submarginal spots in the hindwing are so dark as to hardly shew up against the dark ground colour.

This curious species with its very dark hindwing appears to have influenced the colour of other *amauris* in the area of its distribution. (Vide Poulton Proc. Ent. Soc. 1924, p. xxix.-xxx.)

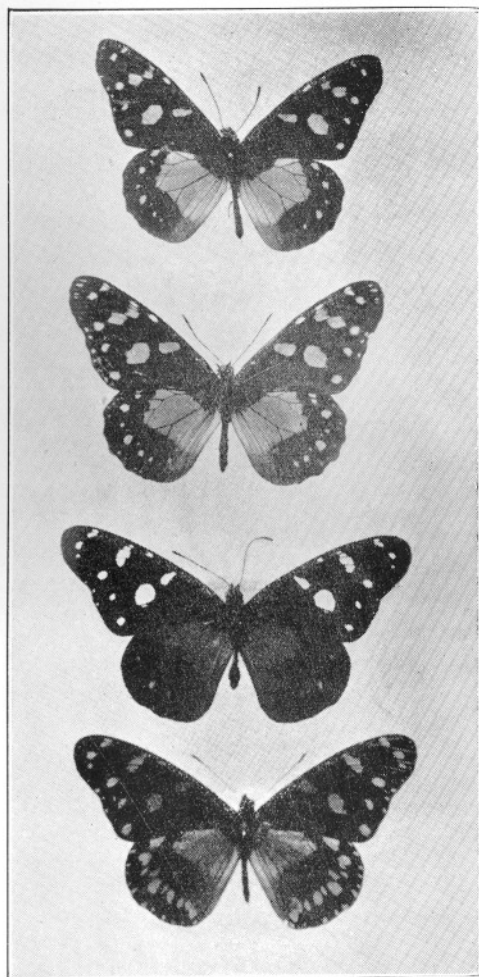


Fig. 1. *Amauris lobengula septentrionis*,
Poulton. Marsabit. (Male)

Fig. 2. *Amauris lobengula septentrionis*,
Poulton. Marsabit. (Female)

Fig. 3. *Amauris ansorgei*, E. Sharpe.
Lumbwa. (Male)

Fig. 4. *Amauris ellioti*, Btlr. Kigezi.
(Male)

DISTRIBUTION :

The species is common west of the Mau and has apparently influenced the colour of *A. echeria* and *A. albimaculata* in this district.

A single specimen was captured in Nairobi; this is not quite typical, as the hindwing patch and submarginal spots are decidedly paler than normal.

EARLY STAGES :

We have no records regarding the egg or larvæ of this species.

AMAURIS (AMAURINA) ELLIOTI, *Butl.*—Pl. X., fig. 4, Pl. IV., fig. 8.

General colour deep brownish black with all spots a rich ochreus. The hindwing patch extends to the base of the wing, but does not reach the apex of the cell.

The forewing has a transverse spot in the cell which is separate from the large spot in cellule 2; and there is a subapical bar of four spots in cellules 4—6 and 9. The submarginal spots are well developed in both wings, especially so in the hind. The marginal spots are also large in the hindwing.

DISTRIBUTION :

The species occurs in the western Province of Uganda from Kigezi to Ruwenzori.

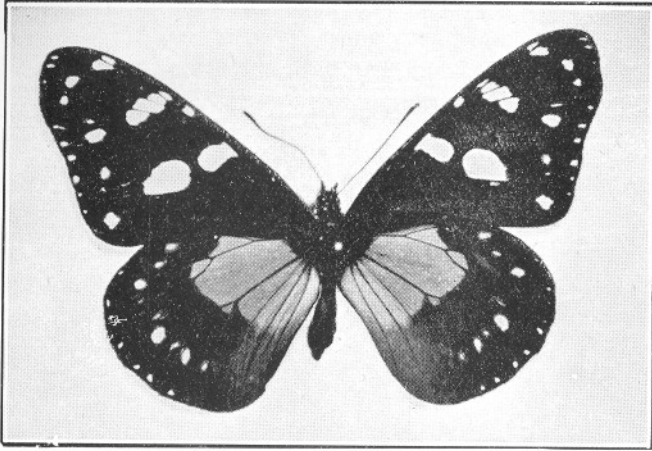
EARLY STAGES.

The early stages are unknown to us.

It would be of the greatest interest to ascertain whether this decidedly marked species has influenced the colours of others of this group or of the *Papilios* in the district..



A.



B.

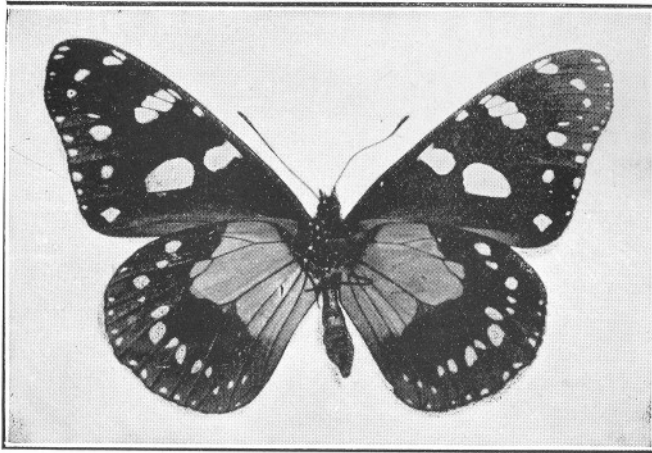


Photo: V. G. L. VAN SOMEREN.

A. Upper surface.

B. Under surface.

Amauris ansorgei altumi,
van Someren.

MAY, 1926.

AMAURIS ANSORGEI ALPUMI. Sbsp. Nov.

This geographical form differs from the typical race in having the light patch of the hind-wing much paler in colour (as in *A. echeria jacksoni*), and having the submarginal spots more numerous and almost white. On the lower surface of the hind-wing there is a marked black line which crosses the ochreous patch at the bases of the cell and area 8.

Types Male and Female, Uplands. March, 1926. Dr. van Someren collection in Hope Dept. Oxford Museum. Cotypes in my collection.

This interesting form has long been suspected as a possibly distinct race on the evidence of a male captured in Nairobi by Canon Rogers, and now in my collection. Material (106 examples) recently obtained from the Katamyio River, Uplands, establishes the fact that all examples of *A. ansorgei* from that area are of the pale form and constitute a distinct geographical race.

In addition to the imagos taken, eggs and larvæ are preserved in my collection and establish validity of this form.

EARLY STAGES:

The egg is of the usual *Amauris* type, *i.e.*, a long barrel-shape—finely ribbed and ornamented with cross ridges. They are deposited either on the upper or lower surfaces of a fleshy-leaved creeper (similar to the food of *A. echeria jacksoni*) in groups of forty or more.

The young larvæ are gregarious and feed together, eating the fleshy surface of the leaf, and leaving the skeleton more or less intact. In the first stage they are pale ochreous without longitudinal lines and little indication of the soft body spines which appear at the second moult. In this stage the number of spines on each side is four—but at the third moult a fifth spine develops at the anal end.

These spines are present on the dorso-lateral aspect of segments 2, 3, 5, 10 and 11. The longitudinal body lines become broken into a series of spots and in addition a blue line develops centro-dorsally.

The pupa is at first pale pink but when hardened becomes a beautiful gold with an extremely high glaze.

The dorsal aspect of the abdominal segments is prominent—as is also the thoracic area, leaving in between a deep depression.

Each abdominal segment is ornamented with black dots, two dorsally, one laterally, and one ventrally.

The imago emerges in 14—16 days.

* *Instructions to Binder*.—This page should be bound in after page 43, Journal No. 21, March, 1925.