

THE EARLY STAGES OF INDIAN LEPIDOPTERA.

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SUPPLEMENTARY INTRODUCTION.

These descriptions were originally prepared for the *Entomologist's Record*, but lack of space entailed considerable delays in publication, and it was eventually decided that the series could be handled more advantageously in India. The following had, however, already appeared:—

Introduction—1933, xlv, p. 136.

Byasa aristolochiae F., *aristolochiae*—1933, xlv, p. 137.

Chilasa clytia L., *clytia*—1933, xlv, p. 137.

Huphina nerissa F., *evagete* Cr.—1933, xlv, p. 138.

Catopsilia crocale Cr.—1933, xlv, p. 148.

Terias hecabe L., *hecabe*—1933, xlv, p. 148.

Pareronia valeria Cr., *hippia* F.—1933, xlv, p. 149.

Danais chrysippus L.—1933, xlv, p. 149.

Euploea core Cr., *core*—1935, xlvii, p. 18.

Elymnias hypermnestra L., *undularis* Drury—1935, xlvii, p. 18.

Euthalia garuda Moore, *suddhodana* Fruhs.—1935, xlvii, p. 49.

Rathinda amor F.—1935, xlvii, p. 49.

Suastus gremius F., *gremius*—1936, xlviii, p. 19.

Udaspes folus Cr.—1936, xlviii, p. 19.

Dasychira mendosa Hbn.—1936, xlviii, p. 58.

Orgyia postica Wlk.—1936, xlviii, p. 59.

Porthesia (Euproctis) scintillans Wlk.—1936, xlviii, p. 99.

Rhyncholaba acteus Cr.—1937, xlix, p. 80.

Natada suffusa Moore—1937, xlix, p. 81.

Polytela gloriosae F.—1937, xlix, p. 124.

Ophiura coronata F.—1937, xlix, p. 125.

Buzura suppressaria Guen.—1938, l, p. 76.

Agathia laetata F.—1938, l, p. 77.

Sylepta derogata F.—1938, l, p. 77.

and I am much obliged to the Editors of the *Entomologist's Record* for permission to republish them here.

In some of these I have added further references and also names of food-plants; such additions are enclosed in brackets.

Since writing the original introduction, a considerable advance in our knowledge of the early stages has been made by the publication of Vol. v in the *Fauna of British India*, Moths—Sphingidae by Bell and Scott; this contains descriptions and, in many cases coloured figures or photographs, of all the then known Indian Sphingid larvae.

Calcutta, 4-vii-38.

INTRODUCTION.

The more easily obtained books on Indian Lepidoptera are, I have found, of very little help in the identification of the early stages; a large number of the few descriptions appearing in Sir George Hampson's *Moths in the Fauna of British India* and in the Indo-Australian section of Seitz's *Macrolepidoptera of the World* are vague, incomplete and even inaccurate, whilst Evans, in his *Identification of Indian Butterflies*, ignores the early stages altogether.

I have, therefore, made a point of recording brief descriptions of the various larvae that have passed through my hands in the hope that they may prove of use to other entomologists working in India.

When numbering the somites I have in all cases ignored the head, the 1st somite is, therefore, the one immediately behind the head, i.e. the first thoracic somite. Further, in spite of the fact that most of the descriptions are noted as being made from single larvae, they have all been checked with other examples so that there is no danger of an aberration masquerading as the usual form. There is, however, always the possibility of some of these descriptions applying to local forms only.

In cases where the description given in the four volumes of *Moths* by Sir George Hampson in the *Fauna of British India* or in the English Edition of the Indo-Australian section of Seitz's *Macrolepidoptera of the World* is particularly incomplete or misleading, I have added it to mine with the reference 'Hampson' or 'Seitz' as the case may be.

London, 7-vii-33.

RHOPALOCERA.

PAPILIONIDÆ.

Byasa aristolochiae F., *aristolochiae*.

Moore, *Lep. Ind.*, v, 178, pl. 442, figs. 1, 1a-1c. 1901-03.

(Moore, *Lep. Ceyl.*, i, 151, pl. 57, figs. 2a, 2b. 1880-81.)

Head and legs black. Body velvety black, the 6th somite with a white transverse band. The skin between the somites dark purplish crimson. 1st to 3rd somites each with eight coral red fleshy tubercles, the dorsal four on the 1st somite being very much smaller than the others. 4th to 10th somites each bearing six of these tubercles, those on the 6th being white, except the lowest one which is red. 11th and 12th somites with four tubercles. Osmeterium yellow.

Pupa fawn, very like a curled dead leaf. Thorax keeled with five white lines anteriorly and two posteriorly diverging from the keel. Wing cases darker brown and developing into a lobe anteriorly. The first three abdominal somites each with a white lateral U-shaped line. 4th to 7th abdominal somites each bearing a pair of conspicuous rounded lobes. Suspended by a girdle and tail pad of dark brown silk.

Food-plant—*Aristolochia* sp.

Described from a full fed larva found in Calcutta 8-x-31, pupated 12-x-31 and a female emerged 26-x-31.

Seitz does not mention the number of the tubercles nor the intersegmental colour of the larva and omits the colour of the pupa.

Chilasa clytia L., *clytia*.

(Moore, *Lep. Ceyl.*, i, 153, pl. 57, fig. 1b. 1880-81.)

(Moore, *Lep. Ceyl.*, i, 154, pl. 56, fig. 2b. 1880-81.)

(Moore, *Lep. Ind.*, vi, 84, pl. 502, figs. 1, 1a-1b. 1903.)

Moore, *Lep. Ind.*, vi, 89, pl. 506, figs. 1, 1a-1d. 1903.

Head and legs black. Ground colour black. A wide cream dorsal stripe from the 1st to the 9th somite, a cream lateral stripe from the 1st somite joining the dorsal stripe on the 7th and forming a trident, and a cream lateral stripe extending backwards from the 10th somite. A subdorsal series of fleshy black tubercles with a rose pink spot at the base of each. A double lateral series of rose pink spots, the upper complete and the lower with spots on the 3rd, 4th, 5th, 7th, 8th and 9th somites only. The osmeterium blue.

Pupa like a broken piece of stick, mottled with various shades of brown. Cylindrical, the last four abdominal somites hollowed out below. Thorax not keeled but projecting forward over the head which is truncate. Supported by a girdle and tail pad of dark brown silk.

There is no difference between the type and v. *dissimilis* in the early stages.

(Food-plant—*Alseodaphne semicarpifolia* Nees (Laurineae).)

Described from a full fed larva found in Calcutta 20-iv-31, pupated 23-iv-31 and a female emerged 4-v-31.

Seitz does not mention the cream-coloured markings and states that the 'fork on the neck' (osmeterium?) is pale-coloured.

(In my original description I omitted to mention that the first three tubercles of the subdorsal series are double, the additional ones being slightly smaller.)

Zetides agamemnon L., *agamemnon*.

Moore, *Cat. Lep. Mus. E.I.C.*, i, 114, pl. 3, figs. 9, 9a. 1857.

Moore, *Lep. Ceyl.*, i, 145, pl. 63, fig. 2a. 1880-81.

Davidson and Aitken, *Journ. Bom. Nat. Hist. Soc.*, v, 363. 1890.

Moore, *Lep. Ind.*, vi, 7, pl. 470, figs. 1, 1a-1c. 1903.

Jordan Seitz, *Indo-Austr. Rhop.*, 101.

Head green. Body green with darker indistinct oblique stripes. Spiracles black. Shape thickened from head to 3rd somite then tapering. The 1st and 2nd somites each with a small black subdorsal spine, the 3rd with a similar but slightly larger spine with an orange ring round the base. Anal plate with a pair of spines. Osmeterium pale green and, when once protruded, not withdrawn for some time. It is directed forward in a horizontal plane rather than above the head as in most Papilionid larvae. When at rest the larva bears a strong resemblance to a large green Pentatomid bug and this is increased when it is alarmed as the protruded osmeterium then mimics the bug's antennae.

Pupa pale green. Thorax with a white dorsal line, which divides on the first abdominal somite and joins again at the base of the cremaster. Thorax produced in front into a blunt horn tipped with brown and this colour continues as a margin along the outer edge of the wing cases. Head obtuse.

Moore, in *Lep. Ceyl.*, gives *Magnoliaceae* and *Anonaceae* as food-plants.

Described from a full fed larva found at Peshoke (2,500 ft. Darjeeling District) 30-xii-36, pupated 4-i-37 and a male emerged 2-ii-37.

Bingham, quoting Davidson and Aitken, describes the larva as having four pairs of spines. This is a little misleading as the spines on the anal somite are green and quite different to the black spines on the thoracic somites.

PIERIDÆ.

Huphina nerissa F., *evagete* Cr.

Moore, *Lep. Ceyl.*, i, 136, pl. 53, fig. 1b. 1880-81.

Bell, *Journ. Bomb. Nat. Hist. Soc.*, x, 574. 1897.

Typical Pierid larva of a dark velvety green. Very like *Pieris rapae*.

Pupa very like that of *Pieris rapae* in shape. Two colour forms, one green with head, thoracic keel and a triangular patch on each side of the metathorax pale brown. The other with the ground colour darker and similar markings in paler brown.

Food-plant—*Capparis* sp.

Described from a full fed larva found in Calcutta 22-xi-30, pupated 24-xi-30 and a male emerged 5-xii-30.

Catopsilia crocale Cr.

Moore, *Lep. Ceyl.* i, 122, pl. 48, fig. 1b. 1880-81.

Bell, *Journ. Bomb. Nat. Hist. Soc.*, x, 570. 1897.

(De Nicéville and Kuhn, *J.A.S.B.*, p. 271, pl. 1, figs. 5a, 5b. 1898.)

Typical Pierid larva. Head green with minute black dots. Skin of the body very rough, green with minute black dots. A white spiracular line above which is a black dotted one and below an olive green stripe. Ventral surface whitish green.

Pupa boat-shaped with the thorax slightly keeled and the head produced to a point. Two colour forms. The one apple green with a yellow line on the thoracic keel and another lateral one running from the head along the dorsal edge of the wing case to the tail. The other form grey green, a dark brown dorsal line and a pale lateral line. The wing cases and the sides of the abdomen suffused with dark brown striae. Suspended by a girdle and tail pad.

Food-plant—*Cassia* sp.

Described from two full fed larvae found in Calcutta 7-ix-31, pupated 9-ix-31 and two females emerged 14-ix-31.

Seitz describes the pupa as having black tubercles.

Terias hecabe L., *hecabe*.

Moore, *Lep. Ceyl.*, i, 118, pl. 45, fig. 1c. 1880-81.

Bell, *Journ. Bomb. Nat. Hist. Soc.*, x, 570, pl. 6, figs. 5, 5a. 1897.

Typical Pierid larva, green with a white spiracular line. The skin rough.

Pupa with thorax slightly keeled. Very variable in colour. Some grass green with a dark dorsal line and a black spot at the base of the wing cases, others have in addition a square black subdorsal spot on the 2nd abdominal somite and others again have the wing cases more or less suffused with black and black lateral suffusion.

Food-plant—*Cassia* spp.

Described from a batch of nine full fed larvae found in Calcutta 17-x-31, pupated 19-x-31 and five males and four females emerged 24-x-31.

Seitz states that the larva has a large black head, this was not the case with my specimens.

Terias blanda Bsd., *silhetana* Wall.

Bell, *Journ. Bom. Nat. Hist. Soc.*, x, 571, pl. 6, figs. 6, 6a. 1897.

Fruhstorfer Seitz, *Indo-Austr. Rhop.*, ix, 169.

Head large and black. Body yellow green, the anterior portion usually rather darker owing to the contents of the crop. A barely distinguishable pale lateral stripe. The appearance is very different to that of *T. hecabe*, whose larva is of a far bluer green with a distinct white lateral line and a green head. Gregarious.

Pupa with the thorax compressed and the wing cases forming a deep keel. Ground colour yellowish, almost obscured by black suffusion, and a black dorsal line. Suspended by the tail and a longish girdle. A point of interest is that while all my *T. hecabe* larvae have suspended themselves for pupation from the lid of their tin, the great majority of the *blanda* larvae pupated on the stems of their food-plant.

Food-plant—*Cassia* spp.

Described from a batch of full fed larvae found at Peshoke (2,500 ft. Darjeeling District) 1-i-37, one of which pupated 13-i-37 and a female emerged 26-i-37.

Pareronia valeria Cr., *hippia* F.

Bell, *Journ. Bomb. Nat. Hist. Soc.*, x, 573. 1897.

Typical Pierid larva, bright green with a pale dorsal line. Legs pinkish. A lateral fawn coloured blotch of granular appearance on the 4th and 11th somites. A series of oblique dark lateral lines from the 5th to the 10th somite. Anal plate projecting and slightly forked.

Pupa compressed laterally. Wing cases very large. The head produced into a beak forming an almost unbroken curve with the dorsum. Colour whitish green with a dark dorsal and a pale lateral line. 2nd abdominal somite with a pair of small black dots. Wing cases with a red central and a series of white submarginal spots.

Food-plant—*Capparis* sp.

Described from a full fed larva found in Calcutta 10-i-31, pupated 12-i-31 and a female emerged 22-i-31.

Seitz describes the larva as being green but mentions no markings. He compares the shape of the dorsal distal margin of the pupa to that of an enormous sun helmet.

DANAIDÆ.

Danais limniace Cr., *mutina* Fruh.

Moore, *Lep. Ceyl.*, i, 4. 1880-81.

Moore, *Lep. Ind.*, i, 30, pl. 6, fig. 1. 1890-92.

Head very pale green with two black rings. Ground colour very pale green, each somite with four transverse black lines, the second being considerably broader than the others and dividing into two laterally. A yellow sublateral band edged above with black. A pair of long fleshy filaments on the 2nd and a pair of short on the 12th somite, coloured pale green with black tips and with a black line along the anterior and posterior edges. Legs and prolegs pale green ringed with black. Ventral surface with indistinct transverse black lines.

Pupa green with the following brilliant golden markings. A beaded dorsal band along the posterior edge of the 4th abdominal somite. A dorsal and a lateral spot on the 3rd and a dorsal spot on the 2nd abdominal somite. A subdorsal and a lateral spot on the metathorax and a dorsal and lateral spot on the mesothorax. A double spot on the eye. A spot at the base of the wing case, a subbasal spot and a post median series of two to four spots placed in a curve. A spot on the edge of the wing case in continuation of the dorsal band. A very short line at each end of the transverse dorsal stripe, the cremaster and a U-shaped mark on the ventrum black. Suspended by the cremaster under a leaf.

Bingham gives *Asclepias* and *Calotropis* as food-plants.

Described from a full fed larva and pupa found in Calcutta 25-viii-35, from which a male emerged 26-viii-35.

Danais chrysippus L.

(Moore, *Lep. Ceyl.*, i, 7, pl. 3, fig. 1b. 1880-81.)

Moore, *Lep. Ind.*, i, 36, pl. 8, fig. 1. 1890-92.

(Bingham, *Fauna Brit. Ind.*, Butterflies, i, 11. 1905.)

Head grey with two black rings. Ground colour grey, 1st to 11th somites each with a black transverse central stripe and a black line on each side. The 2nd to 11th somites each with a pair of subdorsal elongate yellow spots. 12th somite with a transverse yellow stripe edged with black. 2nd, 5th and 11th somites with a pair of subdorsal black filaments, those on the 2nd longest and pointing forward, the base of the pair on the 5th somite reddish. A yellow lateral stripe. Legs black. Claspers black banded with grey. Anal plate black. Ventral surface blackish with a few grey dots.

Two pupal forms, the one blue green, the other pinkish buff. Both with a golden spot on the eye, one in the middle of the wing

case, one at its origin and two near the lateral edge of the meta-thorax. The abdomen with a dentate ridge on the 4th somite, black anteriorly and gold posteriorly. Cremaster black. Suspended by the tail from any suitable support. The green form is usually found among leaves, the buff form in other situations.

Food-plant—'Ak' (*Calotropis procera* R. Br.).

Described from a full fed larva found in Calcutta 27-x-31, pupated 29-x-31 and a male emerged 6-xi-31.

Seitz mentions a wax yellow pupal form but I have never seen it.

Euploea core Cr., *core*.

(Moore, *Lep. Ind.*, i, 81, pl. 23, figs. 1, 1a. 1890-92.)

Head shining black edged with white, a white mark above the jaws and a white line running from the side of the mandibles to the median suture forming a triangle. Body chocolate brown ringed with white, a brick red line edged below with white along the spiracles, which are black. Paired black subdorsal fleshy filaments on the 2nd, 3rd, 5th and 11th somites, those on the 2nd being longest. A transverse black line on the 2nd and 3rd somites joining the bases of the filaments. Ventral surface dark brown. Anal plate black. There is another form of the larva in which the chocolate and white markings are replaced by a dark and light shade of purplish grey.

Pupa brilliantly gilded with fawn coloured markings. Cremaster and last abdominal somite black. Suspended from the underside of a leaf and somewhat resembling a drop of water shining in the sun. The fawn markings are more pronounced in those pupae that develop in shady places.

Food-plant—Oleander and Peepul (*Ficus religiosa* Linn.), vide *Entomologist*, lxvi, p. 118.

Described from a full fed larva found in Calcutta 30-ix-30, pupated 5-x-30 and a male emerged 12-x-30.

Seitz mentions an emerald green form of pupa with a brilliant metallic gloss on the head, but I have never come across it.

SATYRIDÆ.

Elymnias hypermnestra L., *undularis* Drury.

(Bingham, *Fauna Brit. Ind.*, Butterflies, i, 171. 1905.)

Head square, pinkish brown outlined with yellow, and divided above into a pair of horns. Skin rough and pubescent. Body bright apple green with a fine double yellow dorsal line, a subdorsal yellow line bearing a red spot on the 8th, 9th and 10th somites and a blue dot on the 8th and 9th. A thin yellow line running along just above the spiracles with another below it. The last somite produced into a pair of processes about $\frac{1}{4}$ inch long, yellow at the base and shading into reddish at the apex. In some examples the red dorsal spots are obsolete.

Pupa apple green. The head divided into two short horns marked at the base with pink. The upper edge of the wing cases marked with pink and with a pink spot in the cell. Thorax keeled,

the keel yellow outlined in pink, with two subdorsal pink spots. The abdomen with a subdorsal line broken up into yellow and pink spots. Trace of a similar lateral line. The last abdominal somites strongly curved so that the pupa, instead of hanging, lies parallel to the leaf to which it is attached. Fixed to the underside of a leaf of the food-plant by the cremaster.

Food-plant—Palms of various species.

Described from a full fed larva found in Calcutta 14-x-30, pupated 18-x-30 and a female emerged 26-x-30.

Seitz does not mention the long anal processes.

NYMPHALIDÆ.

Euthalia garuda Moore, *suddhodana* Fruhs.

(Moore, *Cat. Lep. Mus. E.I.C.*, i, 186, pl. 6, figs. 2, 2a. 1857.)

(Moore, *Lep. Ind.*, iii, 115, pl. 234, figs. 1, 1a-1d. 1896-99.)

Head green, body green with a pale dorsal stripe and a pale mauve transverse line on each somite. A series of eleven feathery scoli, about $\frac{3}{4}$ ths of an inch long, arising subdorsally, the first pair pointing forwards, the 2nd to 10th pairs sideways and the 11th pair backwards.

Pupa green. The head lobed with a brown spot on each projection. A lateral and a dorsal brown spot on the thorax, a gilt and brown line between the 3rd and 4th abdominal somites dorsally. Shape, ventral surface flattish; thorax and first three abdominal somites flat with a median keel and rising to a point, the posterior somites with a slight median keel.

Food-plant—Mango (*Mangifera indica* Linn.).

Described from a full fed larva found in Calcutta 16-i-32, pupated 19-i-32 and a female emerged ?-ii-32.

Seitz describes a form of the larva in which the transverse lines are yellow.

Aglais cashmirensis Koll., *aesis* Fruhs.

Head black with rufous bristly pubescence. Ground colour black sprinkled with yellow specks, which are thickest on each side of the dorsal line. 1st somite spineless, 2nd and 3rd each with four (subdorsal and lateral) and 4th to 11th somite each with seven (sublateral, lateral, subdorsal and dorsal) branched spines. 12th and 13th somites with the subdorsal spines only. Legs black. Prolegs tinged with green. When young lives gregariously in a web.

Pupa with head bilobed, thorax rising to a point and with six short subdorsal paired spines along the abdomen. Colour pinkish stone colour, some being darker and greyer. Slight gilding on the posterior portion of the thorax and on the first pair of abdominal spines. In some specimens the gilding extends over the whole body.

All stages are very like the European *A. urticae* L.

Food-plant—Nettle.

Described from one of a batch of full fed larvae found in Darjeeling 10-v-35, pupated 12-v-35 and a male emerged 28-v-35.

LYCAENIDÆ.

Cosmolyce (Lampides) boeticus L.

Bingham, *Fauna Brit. Ind.*, Butterflies, ii, 432. 1907.

Head retractile, brown. About half an inch long of typical Lycaenid woodlouse shape. Varies in colour from pale to dark green, some specimens being suffused with purplish. A dark dorsal and a pale lateral line. Each somite with a dark subdorsal oblique line directed backwards. The divisions between the somites shallow. The gland and tubercles not very noticeable.

Pupa bone colour, the head and thorax slightly darker and shaded with black. A dark dorsal line. Each abdominal somite with four subdorsal black spots, a pair on each side of the dorsal line. Anal end rounded. Supported by a girdle of silk in a spun together leaf.

Food-plant—Lupins and Peas, preferring the flowers and seeds. De Nicéville records it feeding on the flowers and pods of *Crotalaria striata* DC. and there are probably few leguminous plants on whose flowers and seeds it would not feed.

Has the common Lycaenid habit of devouring its pupating fellow larvae. Imagines emerge about 9 a.m.

Described from a number of full fed larvae found in Calcutta 1-ii-35, one of which pupated 8-ii-35 and a female emerged 17-ii-35.

Bingham, quoting De Nicéville, describes the larva as being pale, dull green without markings except for the dark dorsal line. He also describes the pupa as being pale yellowish green.

Pratapa deva Moore, *lila* Moore.

Seitz Seitz, *Indo-Austr. Rhop.*, ix, 971.

Pupa darker or paler olive brown. The following chalky white marks, a short streak on each side of the head, a trident-shaped mark on the metathorax with the handle pointing forwards, the whole of the abdomen with the exception of the dorsum of the 1st somite and a lateral stripe. Resembles a bird dropping. Suspended by the tail without any girdle.

Described from a number of pupae found on the trunk of an orange tree at Peshoke (2,500 ft. Darjeeling District) 30-xii-36, from one of which a male emerged 13-i-37.

A pupating larva found at the same time was pale pinkish ivory in colour with the thoracic somites humped. It is said to feed on *Loranthus*.

Rathinda amor F.

Head retractile. Ground colour bright green, olive green or dull purple. The green forms with a brown transverse band on the 4th and a brown dorsal patch on the 6th to 8th somites, the purple forms with the same markings a little darker than the ground colour. A white lateral line from the 5th to 10th somite. The 2nd and 3rd somites with a pair of subdorsal horn-like projections, the pair on the third somite being the longer. A single dorsal projection on the 4th somite. The 5th somite bearing a long dorsal and a long lateral projection. The 6th to 9th somites each bearing

a dorsal projection, that on the 6th very short, the 7th and 8th slightly longer and that on the 9th long. The 10th somite with a short dorsal projection and a long lateral one.

Pupa shaped like that of a Syrphid, green with a brown dorsal patch.

Food-plant—A cultivated garden shrub with bright scarlet flowers (*Ixora* sp.). The larvae prefer the flowers and the young berries to the leaves.

Described from full fed larvae found in Calcutta 10-vii-32, pupated 12-vii-32 and males and females emerged 20-vii-32.

Seitz described the larva as being 'Green with purplish red cones of different lengths'.

GRYPOCERA.

Suastus gremius F. *gremius*.

Kershaw, *Butt. Hong Kong*, 125, pl. 14.

De Nice., *Ind. Mus. Notes*, i, 9.

Head brown with pale central and lateral stripes. Body glaucous green with a dark dorsal line. Spiracles black. Anal plate large and broad, the body flattened posteriorly.

Food-plant—Palms of various species on which the larva lives in a turned over leaf.

Pupa very moth-like, enclosed in a cell made from a spun together leaf and covered with a waxy powder. Yellow green with the last somite and cremaster reddish brown. Thorax darker green with a lateral reddish spot anteriorly.

Described from a full fed larva found in Calcutta 11-xii-31, pupated 16-xii-31 and a male emerged 10-i-32.

Udaspes folus Cr.

Kershaw, *Butt. Hong Kong*, 136-37, pl. 14.

Larva slug-like. Head dull black, heart-shaped and small for the size of the larva. Thoracic somites very slender giving the appearance of a neck. Colour bluish green due to the contents of the intestines and the blood, the skin itself being unpigmented. Anal plate very broad and flat. A white mealy blotch ventrally between each pair of claspers.

The larva lives in a turned over leaf on various sorts of Monocotyledons.

Pupa very pale green, torpedo-shaped with the head produced to a long snout. Attached by a girdle and the cremaster in a waxy cell. During the pigmentation of the developing imago, the eyes become red but later darken to black.

Described from a full fed larva found in Calcutta 17-x-30, pupated 20-x-30 and a male emerged 11-ii-31.

HETEROCERA.

ZYGAEINIDÆ.

Trypanophora semihyalina Koll.

Moore, *Lep. Mus. E.I.C.*, ii, pl. xiv, fig. 6.

Hamps., *Fauna Brit. Ind.*, Moths, i, 249. 1892.

Jordan Seitz, *Indo-Austr. Bombyces*, x, 14.

Head brown and retractile. Ground colour dark brown, a lateral yellow patch extending back from the 9th somite. A series of small subdorsal tubercles, those on the 2nd somite red and double, on the 3rd black and double, on the 4th to 9th black and single and on the 10th yellow. A sublateral series of tubercles, those on the 2nd and 3rd somites red and double, on the 4th to 6th red and single, on the 7th and 8th black and on the 9th to 11th yellow. Spiracles black. Ventral surface and claspers orange red.

Pupa yellow with the thorax a little darker. Enclosed in a thin cocoon of papery white silk.

Food-plant—*Lagerstroemia indica* Linn. and *L. Flos-reginae* Retz.

Described from a full fed larva found in Calcutta 26-x-31, pupated 29-x-31 and a female emerged 12-xi-31.

ARCTIIDÆ.

Roeselia fola Swinh.

Head yellowish. The body thickly clothed with dark hair. A remarkable feature is that the head capsules are not got rid of at each ecdysis but adhere one to the other, a full grown larva often carrying a chain of five or six. Before fully mature the larva is covered with pale pink fluff, this is shed during the last instar revealing the dark hair.

Pupa reddish brown, rather long. Enclosed in a cocoon spun along a twig and composed of silk, hair and woody fragments.

Food-plant—*Quisqualis indica* Linn.

Described from a full fed larva found in Calcutta 23-x-31, pupated 27-x-31 and a female emerged 3-xi-31.

Aganais ficus F.

Hamps., *Fauna Brit. Ind.*, Moths, i, 504. 1892.

Seitz Seitz, *Indo-Austr. Bombyces*, x, 225.

Penultimate instar. Head and legs brownish black. 1st somite orange with a black median patch. The rest of the body with a black median line, a white dorsal stripe, a black subdorsal stripe with transverse white lines and an orange lateral stripe. A pair of dorsal black spots on each somite. The 9th somite entirely black. Ventral surface orange red.

Final instar. Head and legs brownish black. Ground colour blackish, the ventral surface and claspers orange red. A lateral yellow patch on the 5th and 9th somites. 1st to 3rd somites each with eight red papillae bearing white hairs. 4th to 11th somites each with ten similar papillae. Some specimens have fine white transverse lines on the dorsum and a broken pale yellow spiracular line.

Pupa reddish brown, very noctuid in shape and enclosed in an earthen cocoon on the surface of the ground.

Food-plant—Peepul (*Ficus religiosa* Linn.).

Described from a batch of larvae found in Calcutta 6-v-32, pupated 13-v-32 and males and females emerged 24-v-32.

Asota caricae Bsd. (*alciphron* Cr.).

Moore, *Lep. Ceyl.*, ii, 52, pl. 102, fig. 1b. 1882-83.

Hamps., *Fauna Brit. Ind.*, Moths, i, 502. 1892.

Seitz Seitz, *Indo-Austr. Bombyces*, x, 227.

Head black marked behind with red. 1st somite with a red transverse band and a black median patch. A black median line, a white subdorsal stripe with a black dot on each somite, a black lateral stripe and an interrupted white spiracular line. Last somite reddish. Ventral surface dark brown. Claspers pinkish. Clad with sparse white hairs. The larvae are gregarious and very active falling to the ground at the slightest touch.

Pupa reddish brown, very noctuid in appearance. Enclosed in an earthen cocoon on the surface of the ground.

Food-plant—*Ficus hispida* Linn.

Described from a full fed larva found in Calcutta 16-i-32, pupated 19-i-32 and a male emerged 5-ii-32.

Hampson describes the larva as being 'black above, brown below; two dorsal white bands, a subdorsal black speck on each somite; a series of lateral black specks; sparse black hairs; the head red'.

Spilarctia obliqua Wlk.

Roths. Seitz, *Indo-Austr. Bombyces*, x, 243 (ab. *dahlbergiae* Moore).

Ova spherical, pale green. Laid in large batches.

Young larva with the head black. Ground colour yellowish, the first three and last three somites marked with black. A subdorsal blackish stripe. Hair pale on the pale somites and mixed with black on the black ones. Legs and claspers black. After the 3rd moult there is a series of indistinct pale oblique lateral stripes and the posterior portion of the pale somites is dark grey.

Full grown larva with the head black. Ground colour dark grey, the 1st to 3rd and 11th to 13th somites black with the inter-segmental areas whitish. 4th to 10th somites with anterior half rufous orange. A pale dorsal stripe. A sublateral series of pale oblique stripes. The hair pale except on the 1st to 3rd and 11th to 13th somites, where it is mixed with black. Legs and claspers black.

Pupa of the usual Arctiid shape and dark red in colour, in a cocoon of brownish silk mixed with larval hair.

Food-plant—Sunflower, *Antirrhinum* and probably many other low plants.

Described from a number of larvae bred from ova in Calcutta, one of which pupated 26-iii-38 and a male emerged 2-iv-38.

Seitz describes the larva of ab. *dahlbergiae*, Moore as 'black, very long haired'. My larvae gave both ab. *dahlbergiae* and typical imagines and there was no apparent difference in the larvae.

Utetheisa pulchella L.

Hamps., *Fauna Brit. Ind.*, Moths, ii, 55. 1894.

Ova pale yellow, spherical with the base flattened slightly. Laid in lines with a space between each ovum. Hatch on the fourth day.

Larva—Head rufous. Body blackish with a white dorsal stripe interrupted in the middle of each somite by a transverse black edged reddish bar. A pale lateral stripe and a white sublateral line, each with a series of black centred orange tubercles giving rise to a white hair. Each somite with two black tubercles on each side of the dorsal stripe, the anterior pair being rather closer together, these each give rise to a black hair except those on the 1st to 3rd and 10th to 12th somites, which have a white and somewhat longer hair. Ventral surface greenish with a blackish lateral stripe. Legs and prolegs marked with blackish. The ground colour fades to a greyish tint prior to each moult and the markings are then more noticeable.

Pupa in a thin cocoon of white silk. Chestnut brown, the thorax blackish except for a central stripe, a blackish transverse stripe on each of the abdominal somites. Wing cases striped with black along the veins. Leg and antenna sheaths black striped. In some pupae the black markings on the thorax and wing cases are less pronounced.

Food-plant—Dahlia, but this may not be a natural one. South in *Moths of the British Isles* gives *Myosotis* and records that the larva is said not to feed in the absence of sunshine. Mine did not do this.

Described from a full fed larva from a number bred from ova in Calcutta, pupated 30-iii-38 and a female emerged 5-iv-38.

Hampson gives the following rather incomplete description:— 'Larva dark grey, with a dorsal white band and subdorsal series of red spots; head yellow.'

Argina argus Koll.

Moore, *Lep. Ceyl.*, ii, 69, pl. 105, figs. 1b, 1c. 1882-83.

Hamps., *Fauna Brit. Ind. Moths*, ii, 51. 1894.

Seitz, *Pal. Bombyces*, ii, 74.

Head reddish brown, black at the sides. Body blackish with a broad white dorsal stripe. An interrupted red sublateral line from the 4th to the 10th somite. A few hairs.

Pupa in a slight web. Yellowish brown with the following black markings. On the abdomen a large dorsal and subdorsal spot on each somite and a double median and broad lateral stripe ventrally. On the thorax a U-shaped mark. On the wing cases a costal stripe, a broad median streak dividing at the outer margin into four and a broad stripe along the inner margin. Leg sheaths streaked with black.

Food-plant—A leguminous plant with large yellow flowers. The larva bores into the pods, which are pubescent, thick and about an inch and a half long, eating the unripe seeds and leaving a conspicuous hole.

Described from a number of larvae found at Peshoke (2,500 ft. Darjeeling District) 26-xii-36, one of which pupated 10-i-37 and a male emerged 29-i-37.

Hampson's description is 'Larva purple black, with a few dorsal hairs; head and a lateral line from 4th to 10th somites reddish; a dorsal series of transverse white streaks.'

LYMANTRIIDÆ.

Dasychira mendosa Hbn.

Moore, *Lep. Ceyl.*, ii, 96, pl. 115, fig. 4b. 1882-83.

(Hamps., *Fauna Brit. Ind.*, Moths, i, 452. 1892.)

(Strand Seitz, *Indo-Austr. Bombyces*, x, 292.)

Head, legs and claspers crimson. 1st somite white with four longitudinal crimson stripes and bearing subdorsal pencils of dark grey hair pointing forward. 4th to 7th somites with short dorsal tufts of greyish white hair, the skin between these somites velvety black. A lateral tuft of white hair on the 4th and another of plumose black and white hair on the 5th somite. A dorsal pencil of dark grey hair pointing backward on the 11th somite. Ground colour grey, a lateral series of crimson spots on a white line. 4th to 11th somites with a subdorsal series, the 8th to 10th bearing in addition a dorsal pair, of red spots. An interrupted white median line bearing a red spot on the 8th and 9th somites.

Pupa dark brown dorsally, the first three abdominal somites with patches of golden brown pubescence. Wing cases and ventral surface greenish. Enclosed in a cocoon of white silk mixed with larval hairs.

Food-plant—*Lagerstroemia indica* Linn. (Crape Myrtle).

Described from a full fed larva found in Calcutta 9-xii-31, pupated 15-xii-31 and a female emerged 23-xii-31.

Hampson describes another form of the larva with the ground colour blackish and the dorsal tufts bright yellow. All my specimens, however, have been of the grey form with greyish white tufts.

Varmina indica Wlk.

Hamps., *Fauna Brit. Ind.*, Moths, i, 435. 1892.

Head and legs brown. Ground colour rufous with a paler dorsal line and a black subdorsal and lateral stripe. The skin on the dorsum between the 1st, 2nd and 3rd somites also black. 1st somite with a dorsal fringe of pale hair projecting forward over the head and a pencil of long grey hair arising subdorsally. 2nd to 10th somites each with a subdorsal tuft of pale yellowish hair and a slighter lateral tuft springing from a reddish tubercle. Each tuft with one or two hairs very much longer than the others. 11th somite with a dorsal pencil of dark grey hair, 12th somite with a few scattered long grey hairs. Spiracles white ringed with black. A black stripe running from each spiracle to the anterior edge of the somite, where it joins the lateral stripe. Ventrums with an interrupted black stripe.

Another larva was completely black with white spiracles.

Pupa dark reddish brown in a cocoon of thin yellowish silk mixed with larval hairs.

Food-plant—A shrub rather like the English Dogwood.

Described from a full fed larva found in Darjeeling 15-v-35, pupated 21-v-35 and a female emerged 7-vi-35.

Hampson describes the larva as 'black, speckled with white and with dorsal and lateral tufts of hair arising from fulvous

tubercles; the thoracic and anal somites with reddish tufts, the medial with grey, 4th and 11th somites with long dorsal black tufts.'

Orgyia postica Wlk.

Moore, *Lep. Ceyl.*, ii, 78, pl. 109, fig. 1b. 1882-83.

(Hamps., *Fauna Brit. Ind.*, Moths, i, 436. 1892.)

(Strand Seitz, *Indo-Austr. Bombyces*, x, 301.)

Head reddish brown. 1st somite with subdorsal pencils of long dark plumose hair projecting forward. Short dorsal tufts of yellow hair from the 4th to 7th somite. Lateral tufts of white hair on the 4th and 5th somites. A dorsal pencil of long brown hair on the 11th somite directed backwards. Ground colour blackish with a pale subdorsal line. A series of small lateral pinkish spots tufted with hair.

Pupa whitish, the thorax and first four abdominal somites dark brown. Enclosed in a cocoon of whitish silk mixed with larval hair.

Food-plant—*Lagerstroemia indica* Linn. (Crape Myrtle).

Described from a full fed larva found in Calcutta 15-i-32, pupated 18-i-32 and a male emerged 24-i-32.

Hampson describes the larva as 'yellowish, sparsely clothed with brown hair; one dorsal and two lateral brown bands; paired tufts of long brown hair on the 1st and 11th somites projecting forward and backward; lateral tufts of grey hair from 4th and 5th somites; dorsal tufts of yellow hair on 4th to 7th somites; the head red,' and this description is copied almost word for word by Seitz.

Perina nuda F.

Moore, *Lep. Ceyl.*, ii, 94, pl. 114, fig. 1b. 1882-83.

Hamps., *Fauna Brit. Ind.*, Moths, i, 486. 1892.

Head grey and pubescent. Ground colour pinkish grey. 1st somite with a red lateral tubercle tufted with grey hair and a dorsal pair of black or red spots. 2nd and 3rd somites with an olive green lateral band, bearing two pink spots on each somite. 4th and 5th somites each with a dorsal hump covered with short hair. A broad olive green dorsal band from the 4th somite backward. 4th to 11th somites each with a subdorsal blue spot ringed with black and bearing a few black bristles. A white dorsal papilla on the 9th and a red on the 10th somite. A series of lateral tubercles tufted with grey hair. Legs, prolegs and ventral surface whitish.

Pupa under a very slight web spun over the fold of a leaf. Head, wing cases and ventral surface whitish. Thorax yellow green with a chestnut coloured transverse band anteriorly, a dorsal chestnut stripe and a lateral series of five black spots. Abdominal somites bright green, all but the 3rd and 4th with a chestnut dorsal patch, which is edged laterally on the posterior somites with black. Tufted with golden yellow hair.

Food-plant—*Ficus* of various species. Moore gives *Acanthads*, but this seems unlikely.

Described from a full fed larva found in Calcutta 25-viii-35 pupated 27-viii-35 and a female emerged 31-viii-35.

Porthesia (Euproctis) scintillans Wlk.

(Moore, *Lep. Ceyl.*, ii, 86, 87, pl. 111, figs. 1b, 3a. 1882-83.)

(Btlr., *Ill. Het.*, vii, 123, pl. 138, fig. 10. 1889.)

(Hamps., *Ill. Het.*, ix, 77, pl. 175, fig. 12. 1893.)

Hamps., *Fauna Brit. Ind.*, Moths, i, 483. 1892.

Strand Seitz, *Indo-Austr. Bombyces*, x, 333.

Head yellow brown. Ground colour blackish. A pair of red tubercles tufted with hair on the 1st somite. A pale dorsal stripe from the 1st to the 3rd somite, the portion on the 3rd being yellow with a red central line. A black dorsal swelling on the 4th and another on the 5th somite, that on the 4th edged anteriorly and laterally and that on the 5th posteriorly with yellow. A yellow dorsal stripe from the 6th to the 10th somite with a red central line. A black dorsal swelling on the 11th somite. 4th to 10th somites with raised black lateral patches dotted with white.

Pupa. Yellowish brown, thorax and wing cases greenish. Abdominal somites with a subdorsal and lateral dark line. Enclosed in a thin cocoon of brown silk mixed with larval hairs.

Food-plant—*Lagerstroemia indica* Linn. (Crape Myrtle).

Described from a full fed larva found in Calcutta 18-x-31, pupated 22-x-31 and a male emerged 31-x-31.

Hampson describes three other forms of larva, but omits this, the only form I have seen. Seitz's description is as follows:— 'Head and legs brown, head with two hair tufts on red tubercles. Dorsum white with a red streak, the third joint with a red tubercle, 4th and 5th joints with black hair tufts, penultimate joint with a black torus, last joint brown. On the sides greyish brown and red longitudinal stripes.' He does not give the food-plant.

LASIOCAMPIDÆ.

Metanastria hyrtaca Cr.

Moore, *Lep. Ceyl.*, ii, 148, pl. 141, fig. 1b. 1882-83.

Forsayeth, *Trans. Ent. Soc.*, pl. xv, figs. 3, 3a, b. 1884.

Hamps., *Fauna Brit. Ind.*, Moths, i, 410. 1892.

Head purplish grey brown, minutely speckled with darker. A dark brown median stripe divided into two above the mouthparts. Body purplish grey brown streaked and speckled with darker. 1st and 2nd somites with a dark brown dorsal stripe, narrow anteriorly and broadening posteriorly. 3rd to 11th somites each with a dorsal hexagonal dark brown blotch, the whole forming a chain, the blotch on the 8th somite rather paler in colour. A short lateral oblique dark streak on each somite. Except the 1st, each somite with four blue warts with dark hairs. The 2nd somite with a dorsal tuft, the anterior portion of short buff spatulate hairs, the posterior portion with longer black simple hairs, the skin between black. 3rd somite with a transverse fold, the skin of which is deep scarlet but which only shews when the larva is alarmed. Each somite with a lateral tubercle with a fan-shaped tuft of pale hair, immediately

above which is a smaller tuft of buff coloured spatulate hair. Ventral surface black with yellow streaks and specks, which are more pronounced laterally. Prolegs marked with orange. True legs blackish ringed with paler. Some larvae are without the dark dorsal blotches, which are replaced by a zig-zag subdorsal line.

Pupa in a cocoon of brown silk mixed with larval hairs and spun in a leaf. Colour purplish brown. Thorax thickly covered with short pale hair, parted centrally and directed sideways. The abdominal somites ringed with dark rufous hair. Head, wing, leg and antenna cases smooth.

Food-plant—*Mimusops Elengi* Linn. (Sapotaceae). The larvae feed at night and rest gregariously on the trunk during the daytime.

Described from a full fed larva found in Calcutta 20-iv-38, pupated 1-v-38 and a male emerged 15-v-38.

There seems to have been some confusion over the situation of the scarlet transverse fold. Hampson places it on the 2nd somite and Moore between the 4th and 5th.

BOMBYCIDÆ.

Ocinara varians Wlk.

Moore, *Lep. Ceyl.*, ii, 136, pl. 133, fig. 1b. 1882-83.

Hamps., *Fauna Brit. Ind.*, Moths, i, 35. 1892.

Ova flattened discs. Yellow with a slightly varnished appearance. Laid in rows of eight to twelve. They become dark leaden grey the day before hatching. Hatch on the fourth day.

Young larva with the head greyish. Body with 2nd somite somewhat swollen. Dorsum whitish grey, a darker grey lateral stripe with a tooth projecting onto the dorsum on the 5th and 8th somites. A short fleshy grey horn on the 11th somite.

Full grown larva. Head brownish with a darker inverted V. Dorsum brownish, a dark greyish lateral stripe marked with orange brown on the 5th to 10th somites. Horn brown tipped with white, fleshy, not chitinised as in the Sphingidae. The larva is very variable, the dorsum may be any shade of yellow brown, grey brown or red brown, sometimes mottled and speckled with blackish, and the lateral stripe may be greyish or the same colour as the dorsum. Ventral surface greenish grey. Legs pale brown.

Pupa yellowish white, very slightly chitinised. In a boat-shaped cocoon of pale yellow silk, very closely woven and hard. Usually spun in a slight depression in a leaf.

Food-plant—Peepul (*Ficus religiosa* Linn.).

Described from a number of larvae bred from ova in Calcutta, one of which pupated 23-vi-38 and a male emerged 27-vi-38.

Both Moore and Hampson describe the horn as being on the anal somite.

SPHINGIDÆ.

Deilephila nerii L.

Moore, *Lep. Ceyl.*, ii, 14, pl. 82, fig. 1a. 1882-83.

Hamps., *Fauna Brit. Ind.*, Moths, i, 94. 1892.

Bell and Scott, *Fauna Brit. Ind.*, Moths, v, 268, pl. 3, figs. 10, 11. 1937.

Ovum—Usual Sphingid type but rather small for the size of the insect. Deposited night 23-vii-36. Hatched morning 30-vii-36.

1st instar—Head round, pale green. Body yellowish green. Horn black. Moulded 1-viii-36.

2nd instar—Head round, pale green. Body pale green, at first without markings but later two blue ringed white spots appear on the subdorsal part of the 3rd somite and a bluish lateral line dotted with white along the abdomen. Horn black, the base yellow. Moulded 3-viii-36.

3rd instar—Very similar to the previous one. The bluish lateral stripe edged above with yellow. A transverse line of white dots along the anterior edge of the 5th, 6th and 7th somites with the beginnings of a second line at the sides. 8th somite with similar spotting but the line broken on the dorsum. Moulded 5-viii-36.

4th instar—Similar to the preceding. The legs pink. The spots on the 3rd somite joined together into a kidney-shaped blotch only visible when the thoracic somites are extended. Spiracles black. Horn with the basal half stout and yellow green, the apical half very thin and hyaline, the two parts divided by a black ring. Moulded 7-viii-36.

Final instar—Similar to the preceding. Legs purplish. The spot on the 3rd somite with a dark indigo ring shading into the white centre. The lateral stripe almost obsolete on the 4th somite and the white lateral dots not present on the anterior part of the 4th, the posterior part of the 9th nor on the 10th somite. Horn yellow, very short and thick and curved downwards. Before pupation the ground colour changes; the head, the dorsal portion of the 1st somite and the area from the base of the horn to the 4th somite above the lateral line turning brown, this colour extending as a wedge along the dorsum of the 3rd somite. The rest of the body pinkish orange. Ceased feeding 10-viii-36. Pupated 12-viii-36.

Pupa—In a loose cocoon among litter on the surface of the soil. Pinkish tinged with orange, the abdominal somites sprinkled with black specks. Spiracles broadly ringed with black. A black median line on the thorax and ventrally from the head to the end of the wing cases. A male emerged 23-viii-36.

Food-plant—Oleander (*Nerium odorum* Soland).

Described from one of a number of larvae bred from ova in Calcutta.

Hampson describes the larva as 'Green, with a bluish lateral band from 4th somite to horn, with white oval spots on it, and others above and below it; 3rd somite with a blue ocellus; horn yellow.'

(To be continued).



Sevastopulo, D G. 1938. "The Early Stages of Indian Lepidoptera." *The journal of the Bombay Natural History Society* 40, 391–408.

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