

FURTHER NOTES ON THE EARLY STAGES OF HETEROCERA
BRED IN THE NAKURU DISTRICT.

SERIES IV.

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It will be seen that among the species dealt with in these notes are included a number whose larvae feed on grasses. From a series of failures and successes with such species, I have come to the conclusion that two conditions are necessary if they are to be reared successfully from the egg. First, they must be supplied—in their first instar at least, and often in their second—with the dead, withered trash that lies on the ground among the grass-roots. Up to the present, the only exception to this rule that I know is to be found in those moths (e.g., *Spodoptera mauritia*: see Vol. XVI of this *Journal*, p. 214) whose ova are laid on trees or bushes, whence the newly-hatched larvae descend at once to the grass. These larvae will make their first meal of the growing grass, and are not interested in the withered stuff. The second condition is that the food supplied must be damp, or even wet—a condition which is, of course, often fatal to young larvae feeding, in captivity, on other pabula.

SYNTOMIDAE.

Syntomis chrysozona Hmps. n.

FOODPLANT.

Grasses: but will eat *Silene macrostolon*.

OVA.

Pearly, pinkish: laid in deep piles under grassheads, or sometimes on the stem, lower down.

LARVA.

The young larvae lie hid among the dead leaves, grass-trash, etc., on the ground. They feed on this trash, eating it to shreds, and will not touch the green grass. They are very shy: but can sometimes be seen feeding in the late afternoon. When older, they can be found at night high up on the grass stems; but they drop instantly at the approach of a lamp. They live, when not feeding, among the stems close to the ground, and are very difficult to extract, as they burrow right down very quickly. When they have been detected, the best way to obtain them is to dig up the plant of grass, and invert it over a sheet of paper: when the larvae will drop out—often 10 or 15 from a single plant. When young, the larva is black, with a rubbery-looking skin covered with very short dark fur. When full-fed, it is over 1 inch long, tapered to both ends, with dark grey skin, lighter below lateral area and on ventral surface. Narrow raised transverse bands—wide apart when the larva moves—are clothed in rosettes of short, feathery, grey hairs: and there is a double line of "clumps" of shorter, woolly, black fur on dorsum. Head small, red, hairy. Legs brown; claspers pale transparent grey.

PUPA.

Is in a very flimsy silk-and-earth cell, deep down among the grass-stems, almost under ground-level. It is slender, red-brown except on

dorsum, where it is black. Very short fine down on dorsal and lateral areas; and on the ventral side of the last few segments. Spiracles black. A bunch of small hooklets on terminal segment. Duration of pupal stage about thirty-five days.

Thyretes negus Wallengr.

FOODPLANT.
Grasses.

OVA.

Laid on a grass leaf, in a patch containing a couple of hundred. They are spherical, very small, covered with a greyish bloom which very easily washes off, leaving the ova pearly white. They hatch in about five or six days.

LARVA.

Very much like that of the preceding species: but the fur is brown rather than grey, and the head is black, not red.

PUPA.

In a very flimsy cocoon among dead grass. It is very dark brown, with rings of more or less oval yellow ring-spots on abdominal segments, and a line of very small raised dark excrescences on each side of the dorsum. The whole pupa, except wingcases, etc., is covered with short golden-brown down. A large bunch of very short hooks on terminal segment. Duration of pupal stage about a fortnight.

Metarctia rufescens Wlk.

FOODPLANT.

The natural food of this larva is presumably, as with many other *Syntomids*, the trash that lies among the roots of grass. It will feed up successfully on this. But it is very often found in cupboards, posho-stores, and such places: and I find that it will always leave the grass-trash provided, for bran or maize-meal; while I have reared several imagines from half-grown larvae that were supplied with nothing but the mixture of torn and shredded sacks, scraps of bran, etc., from the floor of a rat-infested posho-store.

LARVA.

The larva grows to the length of $1\frac{1}{4}$ inches, and, the thoracic segments being very extensile, can stretch itself out to a good deal longer when walking. Skin grey-brown, covered with a sparse growth of very long, silky, brown hairs, lighter at tips. Head black, large, very shiny.

PUPA.

In a very loose flimsy grey cocoon, at ground-level between two or three grass-stems, or half under a clod of earth; among loose bran on the floor; in the fold of a sack; or spun in the corner of the walls of a store. It is black, stout, very brightly polished. Terminal segment a blunt dome, with a bunch of separate hooks at the end.

ARCTIIDAE.

Estigmene multivittata Roths.

FOODPLANT,
Grasses.

OVA.

The small, spherical, smooth, cream-coloured ova are laid in small patches on the leaves of grass.

LARVA.

When young, the larvae feed on the grass-trash on the ground. Later, they eat the grass itself. When full-fed, the larva is about $1\frac{1}{4}$ inches long, dense black, with transverse rings of many tubercles which emit rosettes of long fur. On the dorsal area this fur is black: on lateral and sub-lateral areas it is bright tawny. The tubercles are grey: but the colour of the fur springing from them makes the dorsal ones appear bluish-white, the lower ones yellowish. Short tawny forward-pointing fur makes a collar round the head, which is large, black, shiny. Spiracles white, legs brown, claspers pale brown. The larva stands with the head held down and to one side. It falls very readily.

PUPA.

Is in a thin silken cocoon on or near the ground surface. Dark brown, thickset. Terminal segment very flat; having in the centre a small group of short stalks, each ending in a sort of rosette of minute diverging points. Duration of pupal stage very variable—from two to eleven months.

Estigmene tenuistrigata Hmpsn.

FOODPLANT,
Grasses.

LARVA.

When young, feeds exclusively on the grass-trash on the ground. In early life it is slender, much indented between segments, scantily furred. Very dark grey-brown, with rings of prominent, closely-set tubercles. The pairs of tubercles astride of dorsal line are smaller than the rest. These tubercles emit grey hairs, not very long. There is a paler dorsal thread-line, and a small dark plate on segment 2. Head black. Legs dark brown. Claspers lighter brown. When full-fed, the larva is $1\frac{1}{2}$ inches long, or more. There are whitish dorsal and latero-dorsal lines. Spiracles white. Fur scanty; grey mixed with a good deal of tawny. The larva has a tremendous turn of speed.

PUPA.

Is in a small cocoon of grey silk, spun among the trash on the ground. It is short, stout, dark red: girth at centre greater than that of thoracics. Terminal segment much flattened. At its centre are two short, round processes, covered with minute bristles; and around them stand a few separate stalks, with small flat heads. Duration of pupal stage very variable—from one to eight months.

Sommeria (Digama) aganais Fldr.

FOODPLANT.

Carissa edulis.

LARVA.

Ground-colour when young, grey: when full-fed, dark purplish brown. A conspicuous greenish-white lateral stripe, or wrinkle, expands into broad patches on segments 5, 6, 7 and on the last two segments. On 6 and 7 there is a narrow pinkish dorsal area astride of a black central thread-line. Segment 5 is much swollen dorsally. Each segment has four orange-red dorsal warts, or tubercles, arranged in two pairs: the front pair nearer the dorsal line than the hind pair. On segment 5 these tubercles are larger, especially the two nearer the centre. On the thoracic segments the tubercles rise from an orange-red swelling on each side of the dorsal line. All the warts, and others in the lateral area, emit single bristles. The body tapers considerably from segment 5 to head, and from segment 6 to anal end. Ventral area green. Head small, black. Legs pale yellowish, claspers reddish. The larva sits on upper side of a leaf, with head and thoracics bent sharply to one side.

PUPA.

Is in a very thin web in a partly rolled leaf. It is brown, with a bunch of fairly long hooks on the dorsal edge of the terminal segment. Duration of pupal stage about six weeks.

LASIOCAMPIDAE.

Bombycopsis conspersa Auriv.

FOODPLANT.

Hypoestes verticillaria.

OVA.

Nearly spherical, dirty white, with either a pale greenish or a faint reddish tinge: splashed and spotted with greenish (or reddish) markings. A nearly black micropylar spot. Laid in clumps of from ten to twenty on stems of foodplant. Much subject to parasitisation by a small fly.

LARVA.

When about half-fed the larva is about $1\frac{1}{2}$ inches long. Dorsal area black with a pale crossbar behind the centre of each segment. This area is separated from the dark grey lateral area by a narrow stripe consisting of an ochreous line with reddish patches in it, a black space, and below this a pale grey wavy line. A row of short white tufts point upwards from this stripe: and a thin white fringe, springing from it, lies close to the body between the tufts. Below the stripe each segment has a small ochreous tubercle with black centre. These are more pronounced on the thoracics. Lateral area dark grey with much tawny fur, so arranged that the black skin shows through in diagonal stripes. Very hairy leg-lappets, and hairy sub-lateral tubercles on segments 5, 6, 11 and 12. The bases of the claspers also emit tufts of long greyish hairs mixed with tawny. On segment 3 and 4 transverse dorsal folds show dark orange-red slips when the larva is extended. Claspers ochreous, with a black streak before and behind. Ventral surface black with two yellow stripes, and yellow crossbars

between segments. Seen from above, the effect of the pale transverse bars and white latero-dorsal tufts is to make an apparent dorsal pattern of broad-arrows. Head velvety black, with a fringe of whitish hair pointing forward over it from segment 2. The above description holds good for the full-fed larva, except that the lateral stripe is a wide ochreous line with two thin wavy yellow lines below it, and that the slips on thorax are darker: almost crimson. The length of the full-grown larva is up to 2½ inches.

PUPA.

In a curled leaf, or between two leaves. Dark brown, wing-cases black. Yellow at segment-joints. Except the wing-cases, the whole pupa is covered with a fairly dense crop of short yellow-tawny hairs. Terminal segment short, with two patches of the tawny hair, and a large semi-circular patch of many short brown hooks on the dorsal side. Duration of pupal stage variable—from fourteen days.

Taragama sodalium Auriv.

FOODPLANT,

Acacia abyssinica.

LARVA.

When full-fed, is 3 inches long. Stout, rather flattened below. Ground colour buff, with complicated dorsal pattern of reddish-brown marks, almost shield-shaped, having a grey outer edge. At the widest part of each shield is a pair of small grey latero-dorsal tubercles, and a smaller pair behind them on each segment. On segment 12, two grey hairy dorsal tubercles rise from a common base, and on 13, are two smaller separate ones. The two dorsal slits on the thoracic segments have blue-black extensile cushions, the second one having behind it a prominent central tuft of blond hair. The leg-lappets carry hair of a more reddish colour. The lateral area has a pattern of black and red-brown lines, very difficult to describe. At the forward and hinder ends it approximates to a XX formation. All segments have sub-lateral tufts of blond hair. Ventral surface reddish-buff, with a black central line of irregular width. Head dark grey, woolly, with black markings.

PUPA.

Is in a long spindle-shaped cocoon of harsh greyish silk, on twig or trunk. Duration of pupal stage is about twenty days.

Gonometa postica Wlkr.

FOODPLANT.

Black Wattle and *Acacia* sp. var.

OVA.

Smooth, spherical, dead white except for a grey micropylar spot.

LARVA.

When full-fed, this heavily-furred larva may reach a length of 5 inches. It is stout and rather flattened; and the fur, which except round the head and on segment 2, points downwards and backwards, has a "combed" appearance, with a wide parting running along the dorsum. In this parting

is a narrow black, grey-edged stripe. Six broad-arrows, their points forward, form part of transverse black bands; but these are almost hidden in the fur, which is a mixture of grey, brown, and silvery-white; the brown hairs having sometimes a slightly pinkish tinge. The general effect is dark grey. On each side of the dorsal line stand diverging tufts of coarse blue-black hair; those on the thoracic segments being larger than the others. The dorsal fur on thoracics is tawny, mixed with blue-black. The head is very hairy, with tufts of long chalky-looking plumes projecting round it from segment 2. Similar but smaller sub-lateral tufts occur on all segments. Legs and claspers are hidden in thick grey tufts. Spiracles ochreous, in black patches, with a whiteish tuft behind each. Legs red, claspers black. Round the anal claspers are bunches of short white plumes.

PUPA.

Is in a tough oval cocoon on stem or trunk. The cocoon is brownish or greyish, dusted thickly with white, and with a few irregularly placed black tufts. It is covered with short black and brown urticating hairs. A very small cocoon for so colossal a larva. The pupa is black, horny. Terminal segment ends in a short dome, its end covered with short, reddish spiky bristles. Duration of pupal stage is three or four months.

Olyra sublineata Wlkr.

FOODPLANT.

Various grasses. In the first two instars, the larvae feed only on the grass-trash on the ground, and will not touch the green grass.

OVA.

Roughly spherical: bright red-brown. Laid in small batches on the stalks. Hatch after about ten days.

LARVA.

The young larva is black, tapering slightly from front to back. A double, wavy, "old-gold" dorsal line encloses white spottings. Nine orange lateral spots, the central five larger, are joined by a faint wavy yellow line. Lateral area dark grey, with a black patch surrounding each of the orange spots. Grey lateral fur. Thin dark pencils on segment 2.

When full-fed, it is over 2 inches long, stout, tapered front to back, not very furry except in lateral and sub-lateral areas. Black: with a dorsal stripe consisting of a double wavy old-gold line enclosing two uneven, very pale, narrow yellow lines. This stripe runs the whole length of body, ending in a point between anal claspers. Dorsal fur scanty, yellowish. The interrupted old-gold latero-dorsal line has nine small but conspicuous white spots: seven above it, and the front two (on segments 3 and 4) below it. Below this line, the black colour merges into a pinkish-grey lateral stripe, beneath which are the white spiracles, with a wavy irregular gold line below them. This area is clothed in fine but dense down-pointing grey fur. Head blue-black, hairy, with a thin hair-pencil pointing slightly forward on each side of it from segment 2. Mouth parts yellow. Legs bright red. Claspers black with a pale streak. Ventral area dark grey, with a chain of white central dashes.

PUPA.

Is in a long oval cocoon among grass heads. Duration of pupal stage is from two to four months.

Pseudolyra divisa Auriv.

FOODPLANT.

Grasses: many species.

LARVA.

When full-fed, is $2\frac{1}{2}$ inches long, tapering considerably from head to anal end. Ground-colour greenish yellow, much speckled with black. Short pale bristles all over the body, particularly round head. Four conspicuous white longitudinal stripes, latero-dorsal and lateral. The latter are much wrinkled. Below the latero-dorsal stripes the black irroration is denser, and just above the lateral ones are vestiges of short black diagonals, the first three being more conspicuous. Below the lateral wrinkle is a good deal of whitish fur, pointing downwards. When the larva moves, a sort of double vertical fold, brownish, appears on each segment above the lateral wrinkle. Ventral surface greenish, much wrinkled. Black spots on either side of the second and third pairs of legs, and a black transverse line on the front part of segment 2. Three whitish transverse marks before, behind, and in the middle of the ventral claspers.

The larva sits head-downwards in the grass, and becomes very active after rain, when it dashes about drinking up an astonishing quantity of raindrops on the grass.

PUPA.

Subterranean. Duration of pupal stage is two months.

LYMANTRIIDAE.

Laelia entricha Collenette.

FOODPLANT.

Grasses.

OVA.

Laid in single rows, from $\frac{1}{4}$ to $1\frac{1}{2}$ inches long: or sometimes three or four rows are laid one on top of another, each row shorter than the one below it. The ova are joined together, and are rectangular, but have the upper corners rounded off. Colour, pale, dull straw. Hatch about the fifth day.

LARVA.

The young larvae eat the grass-trash on the ground. Later they feed on the grass itself. The half-fed larva is black, thinly covered with pale tawny fur. Conspicuous bluish-white lateral patches, the central ones having a yellow stain in their hinder half. Segment 5 has a thin reddish dorsal tuft. Sub-lateral stripe grey, with a pinkish edge. Spiracles white, in a black line with short yellowish inclined lines along its upper edge. Head black, with many yellow metallic spots. Ventral surface black: legs red-brown: claspers red.

In the final instar, it is over 1 inch long. It has now four wide, compact dorsal brush-tufts of a dark tawny colour. Just below the spiracles is a reddish line. Thick grey fur all over body, rising from fairly large oval tubercles, which, on the thoracics and segment 12, form transverse rings. On segments 10 and 11 are central studs, translucent white, like crystals.

PUPA.

Is in a large, almost transparent oval cocoon on a grass stem. The pupa is dark brown: eye- and antenna-sheaths very prominent: small tufts of greyish hair on head, and sparse fur on abdomen. On the dorsal side of the terminal segment is a long, tapered, wrinkled shank, ending in a bunch of very many very short hooklets. Duration of pupal stage is from eight days to three weeks.

Laelia xyleutes Hmps.

FOODPLANT,

Various grasses: seem to prefer "Watergrass," (*Cyperus* sp.).

OVA,

Spherical, grey. Scattered loose: but each one coated with anal fur.

LARVA.

During the first two instars, the larvae lie hid in the grass-trash on ground-surface, and eat it to shreds. They will not touch the green grass. They are uniform greyish-ochreous, and very difficult to see on their food. The full-fed larva is $1\frac{1}{2}$ inches long. Segments 5 and 6 are of greater girth than the rest. The four dorsal brush-tufts are brown-topped, white-sided. In front of them the dorsal area has complicated markings of black and gold, with a black thread-line in the centre. Behind the brush-tufts the centre of dorsum is orange-golden; there being an amphora-shaped patch of this colour on each segment except the last two, with a transverse linear golden mark in front of each segment-division. Inconspicuous dorsal studs on 10 and 11, the same gold colour as the patch from which they rise. On the last two segments the orange colour is divided by a central black thread-line. Lateral area dark grey, with a lateral stripe consisting of two interrupted lines: the upper being a series of slightly oblique orange dashes, and the lower of scarlet ones. Below this—and the ventral area—grey. Rings of grey tubercles emit long but scanty hairs, grey mixed with black. Thin black pencils on segment 2. Legs red, claspers pinkish, head black.

PUPA.

Dark brown, showing yellow at segment-divisions. All segments are slightly hairy: the head, and dorsal area of thoracics particularly so. Terminal segment ends in a long thin tapered shank, with a bunch of very small hooklets at its extremity. Duration of pupal stage about fifteen days.

Dasychira georgiana Fawc.

FOODPLANT,

Acacia.

LARVA.

When full-fed is $1\frac{1}{2}$ inches long, hairy. Dorsal area rusty red, with four converging tufts of yellowish-white hairs having a few smoky grey hairs in front of and behind them. The first tuft has more of these than the other tufts. Thoracic segments covered with rather long, thin yellowish-white hair. Head bright red. A conspicuous white lateral stripe of irregular width has a wide black area below it. Rings of large yellowish

tubercles emit yellow-white hairs. A thin upright smoky-grey tuft on segment 11. Yellow latero-dorsal lines on all segments behind the fourth dorsal tuft. On segment 10, the four dorsal tubercles combine to form a rectangular greenish-yellow patch. Across this, two diagonal lines of the rusty-red ground colour, meeting at its hinder edge, form a sort of broad-arrow. Just inside the point of this arrow-head is a central greenish-yellow stud. The dorsal tubercles on segment 12 are black. A yellow triangular plate on 13.

PUPA.

In a very flimsy and transparent web, chiefly composed of the yellowish larval hairs, among leaves. It is green at first; later yellow, with the sheaths of legs and antennae vivid black. The wing-venation near the hind margins is also delicately outlined in black. Whole pupa covered with fairly long, blond hair, thick on dorsal side, thinner on ventral. On ventral side of terminal segment is a dark brown excrescence, somewhat globular in shape; and on the dorsal side a long, wrinkled, tapering shank, with a bunch of short hooks at its end. Duration of pupal stage is from ten to fifteen days.

Euproctis torrida Dist.

FOODPLANTS.

Very many: including Castor-oil (*Ricinus communis*), Lantana, sp. var., Acacia sp. var., Peppertree (*Schinus molle*), Sodom-apple (*Solanum incanum*), etc. Imagines from larvae fed on *Ricinus* and Lantana are invariably larger than those from other foods.

OVA.

Are laid in a long patch, covered with grey anal fur, on twigs or leaves. In the case of acacia, they are almost always at the extreme tip of a branch.

LARVA.

When young, is smoky grey, with a double black tuft on segments 5 and 6, and very conspicuous orange studs on 10 and 11. When full-fed, it is 1½ inches long, stout, black and white. The dorsal area is, for the most part, covered with greyish-white fur, which forms a backward-pointing fringe across each segment. Behind (and therefore under) these fringes the skin appears black, naked. The fur, however, on segment 2, and round the head, is dark brown, and points forward; and that on the last two segments is the same colour. Segments 5 and 6 carry a square black patch, with four upright black tufts; and there is another tuft on segment 12. On 10 and 11 are two orange dorsal studs, in black patches. Lateral hair darker grey than dorsal. Red marks in lateral area of all segments. Head black with yellow mouth-parts. Legs and claspers red-brown; claspers yellow-tipped. Ventral surface black, with many yellow markings.

PUPA.

In a rather flimsy cocoon on stem of foodplant. It is darkish-brown, with rather sparse tawny fur. Terminal segment has a long tapering shank, with a bunch of short red hooklets; and there are others on long thread-like stalks springing from round the base of the shank. Duration of pupal stage varies: from five weeks. The hairs of both larva and cocoon are highly urticating.

Stilpnaroma venosa Hering.

FOODPLANT.

Acacia (various species).

LARVA.

One and a half inches long, hairy, fairly stout. Dark brown, with a pinkish dorsal area, and black latero-dorsal lines. On each of these lines, on the segment in front of the first ventral claspers, stands a small black tuft: and there are two very small blue-black tufts on segment 12. Very inconspicuous dorsal studs, yellowish, on 10 and 11. Double rings of oval blue-black tubercles on each segment emit short bristly hairs, mostly grey. These tubercles, on the last segment, are very large and conspicuous. Fur is longer in the lateral area, and round head and anal claspers. Head dark red, with black patches. Ventral surface crimson: legs crimson: claspers crimson with a dark streak.

PUPA.

In a slight web among leaves. It is yellow, polished, with black segment-divisions, black venation, and rings of conspicuous black spots on all segments. Slight downy fur, thicker on dorsal surface, rises from these spots. Cremaster is a long stout shank on the dorsal side of the terminal segment. This shank is fluted and wrinkled, and terminates in a large bunch of small hooklets. Duration of pupal stage is about three weeks.

NOCTUIDAE.

Achaea finita Guen.

FOODPLANTS.

Castor-oil (*Ricinus communis*), and many other plants.

LARVA.

When full-fed, is 2½ inches long, but can extend itself to nearly 3 inches. Ground-colour, yellowish drab, with a slight greenish tinge. Thickly powdered with minute brown markings. Rather stout, tapering in front. Divisions between segments somewhat wrinkled, yellow. Head small, yellow; clypeus brown. Antennae prominent. Two small yellow dorsal tubercles on segment 11, which is slightly humped. A red lateral line becomes indistinct and disappears on the hinder segments. Ventral area greenish, with a black patch between legs, and conspicuous black circles between ventral claspers, and one in front of anal claspers. Legs brown. Ventral claspers three pairs complete, one pair rudimentary. The larva feeds by night.

PUPA.

In a rolled leaf, inside which is a close silk cell. It is purplish brown, covered with a grey bloom. Terminal segment fluted, and with a small bunch of hooks at the tip. Duration of pupal stage about six weeks.

Heliothis armigera.

FOODPLANTS.

Almost any low-growing plant. It is frequently found in the buds of *Antirrhinum*.

LARVA.

One and one-third inches, stout, smooth. Ground-colour may be greenish yellow, or reddish ochreous, with dorsal and lateral stripes consisting of very many fine dark lines. A slight anal hump. Strongly indented between segments. Spiracles black-ringed, the ochreous stripe in which they are situated having whitish top and bottom edges. Area below this is pale ochreous or greenish, mottled with brown. Ventral surface paler. Small but prominent dark warts, emitting short pale bristles, form an irregular transverse ring on each segment. The dorsal pair, in front of the anal hump, are conspicuous, black. Head ground-colour, with a faint white Δ : clypeus black.

PUPA.

Underground, in a very flimsy cell. Red-brown, shiny, rather slender. Cremaster of two long parallel spikes.

Anomis flava Fabric.

FOODPLANTS.

Abutilon indicum, and cultivated Hollyhock.

LARVA.

One and one-eighth to one and one-quarter inches. Slender, bright green, rather transparent. Smooth, except for a few bristles. The dorsal vessel shows darker green, with a central line of faint white dots. Latero-dorsal lines of white dots and short linear marks. Immediately below this dotted line is a dull, cloudy, whitish line; and on its lower edge a line of white dots. A similar, but fainter dotted sublateral line. Transverse rings, two per segment, of small black warts, white-ringed, emit single short pale bristles. Head very pale green, with a few bristles. Legs and claspers pale, transparent: ventral claspers three pairs, but first pair very small. Ventral surface pale green without markings. The larva lies straight out, or with the forepart half-looped, on underside of leaf. Wriggles furiously, and falls without a thread when disturbed.

PUPA.

Is spun in a tightly curled leaf. It is brown, slender, smooth. The terminal segment is fluted and wrinkled, prolonged on the dorsal side into a narrow ridge which carries four stout spikes—the central pair longer than the others. From the same ridge spring a few slender hooks. Duration of pupal stage from fifteen days. May be much prolonged.

Odontestra albivitta.

FOODPLANTS.

Very many, mostly low growing: but I have found it on *Clematis grata* and *Gymna scandens*.

LARVA.

When full-fed, is $1\frac{1}{4}$ inches long, stout, smooth. Dorsal and latero-dorsal area dark greenish brown, mottled with indefinite blackish markings of almost hieroglyphic form. Lateral area almost black, with a stripe of yellowish green. Below this stripe, light green. Ventral area also light green. Head large, transparent yellow: legs and claspers green.

PUPA.

Is in a strong subterranean cell. Duration of pupal stage may be six months or more.

GEOMETRIDAE.

Rhodesia alboviridata Saalm.

FOODPLANT.

Carissa edulis.

LARVA.

When young, is very slender: claret-colour, with green sub-lateral and ventral area. When full-fed is $1\frac{2}{3}$ inches long, fairly slender, slightly tapered from back to front. Colour pale apple-green, with a pinkish flush. The whole body is finely powdered with minute white raised spots. Head deeply bifid, the tips of the sharply pointed lobes claret-colour. A pair of small spikes, similarly coloured, on segment 2. An indistinct reddish-brown dorsal line, powdered with white, has six conspicuous dark purplish-red marks, one at the rear end of each of the six central segments. A pale claret triangle, prolonged almost to a spike, over anal claspers: ventral claspers claret, with a blackish streak. Spiracles black, in a very faint whitish line. The larva is very sluggish: when seriously disturbed it falls without a thread, and stays bend into a slight curve on the ground for a long time.

PUPA.

Is spun in a very few threads between two leaves, or in one curled leaf. Pale greenish brown; abdomen paler, spotted with sparse, small, roughly circular brown spots: those on dorsal side are arranged in pairs astride the narrow brown dorsal line, and emit single dark bristles. Spiracles dark brown. Tip of antenna- and leg-sheath just detached from main case. Terminal segment prolonged on dorsal edge, very narrow in lateral aspect; broad—almost spatulate—in dorsal and ventral aspects; wrinkled longitudinally, with eight separate dark hooks at its extremity. Duration of pupal stage about twenty-one days.

Tephрина deerraria Wlkr.

FOODPLANTS.

Acacia and Black Wattle.

OVA.

Very small, spherical, bluish grey: laid in a sort of fringe at the points of leaflets.

LARVA.

Is exceedingly variable. The following is an attempt to describe it. Length when full-fed is $1\frac{1}{4}$ inches. Ground colour almost any shade of green, brown, or grey: sometimes brick-red: sometimes almost white. All these colours may be found in individuals of a single batch. There are usually six white lateral "splashes," with short black lines below them. These lines are more noticeable when larva is "looped." The dorsal area contains, on the central segments, three, four, or sometimes five square dark marks, occasionally white-edged: and between each two of these a pair of roughly oval marks outlined in black. Conspicuous white and black "eyebrow" marks on head. In a heavily-marked specimen the body has many dark longitudinal lines: but these are often entirely absent. A pair of very tiny reddish tubercles over anal claspers. Ventral area has a white central line for the first few segments: sometimes for its whole

length. The most constant feature is the black lateral lines: but the square dorsal marks are usually discernible. In those specimens whose ground-colour is white, the lateral dashes are the only markings, and the larva has a very curious pallid appearance.

PUPA.

Is brown, with green wing-sheaths, and is in a flimsy cell just under ground surface. Duration of pupal stage about twenty days.

Hemerophila obtusata Warr.

FOODPLANTS.

Peppertree, (*Schinus molle*) and *Tinnea aethiopica*.

OVA.

Bright, rather bluish green, in small groups on the underside of a leaf. In shape like a maize-cob, and covered with regular rows of slight excrescences like the seeds of the cob. On the third day they turn claret-colour, and about two days before hatching they turn silvery grey. Hatch about the twenty-fifth day.

LARVA.

When full-fed, is $1\frac{1}{4}$ to $1\frac{3}{8}$ inches long. Ground-colour variable—different shades of ochreous: perhaps the most common is clay-colour. Fairly smooth: a few short, dark, scattered bristles. Head square: a dark brown patch on the crown of each lobe. A complicated smoky-brown dorsal pattern, including a double interrupted dark stripe, darker on segments 5 and 6, and on 10 and 11. On 7, 8 and 9 a lateral patch of the same colour, with three ochreous swellings around the spiracles. A dark patch between ventral and anal claspers. Ventral surface ground-colour, thickly spotted in black and ochreous: white between claspers. Legs rather long: the base of the third pair much swollen.

PUPA.

Is in a thin cocoon of silk and earth just below ground surface. It is brown, polished, anal end almost black. The terminal segment has a long conical shank on dorsal side, ending in two stout hooks. A few shorter and more slender hooks originate further up the shank. Duration of pupal stage is about one month.

Xenimpia erosa Warr.

FOODPLANT.

Castor-oil (*Ricinus communis*).

LARVA.

When full-fed, is $1\frac{1}{3}$ inches long. Stout, but tapers considerably to front. A complicated mixture of browns. Head very small: very dark brown with an ochreous spot on each lobe. Two extensile latero-dorsal tubercles, Indian-club shape, on segment 6. In front of them a small very dark dorsal patch: in front of that a bright ochreous dorsal mark, triangular in shape, darker edged, with two small warts on its hinder edge. The segment behind that with the "clubs" has two smaller dark tubercles, and latero-ventral swellings: and the next segment a still smaller pair of tubercles. There are various other swellings (particularly in the neighbourhood of the claspers) and various small warts scattered about the body.

Behind the dorsal tubercles the body is lighter in colour, greyish laterally, with dark grey latero-dorsal lines of irregular width. A greyish-ochreous lateral stain extends down the front of the ventral pair of claspers. Legs black: the third pair springing from a swollen, fleshy base.

PUPA.

Is in a small cocoon of thick silk, spun up in a leaf. Duration of pupal stage is about five weeks.

Note.—This larva, particularly in its early stages, can be very easily mistaken for that of *Coenina aurivena*.

Lithina subcurvaria Mabilie.

FOODPLANT.

Acacia (*A. abyssinica* and *xanthophloea*).

LARVA.

About 1 inch long, much indented between segments, which appearance is accentuated by the markings. Ground-colour apple-green, with a yellowish tinge in dorsal area. Latero-dorsal lines conspicuous white, as if enamelled: interrupted. Above these lines is a yellowish stain on all segments: and, on all but the thoracics, a central double dark dash. Yellowish-white diagonal markings with a red or brown linear spot above, and another below each at its hinder end. The latter spot is yellow behind. The upper spots enclose the spiracles. A red-brown stain on the front side of the ventral claspers. A few colourless bristles scattered over the body. Head green, with red-brown cheeks. Ventral surface ground-colour, with a yellow central line and three brown cross-marks.

PUPA.

Subterranean. Brown, rather slender for its length. Viewed from the anal end, the terminal segment shows a number of regularly spaced radial ribs, or flutings. On the dorsal side is a long, slender cone, ending in a very long narrow shank with two short diverging prongs at the end. There is a slight groove down the centre of this shank, as if it consisted of two long spikes close together: but I have never seen them separate.

Scopula (Emmiltis) bigeminata form *fumosaria* Swh.

FOODPLANTS.

Lantana and *Silene macrostolon*.

LARVA.

Length when full-fed, $1\frac{1}{3}$ inches. Ground colour light drab, with darker dorsal and latero-dorsal lines; the latter interrupted. Three conspicuous dark brown lateral spots on the central segments. Sub-lateral area dark grey: ventral, ground-colour with darker spots, and very narrow wavy pale grey lines. A few short pale bristles scattered over the body. Larva is rather slender for its length, and tapers from back to front. It stands extended straight out from claspers, without a thread.

PUPA.

Is subterranean. Duration of pupal stage is one month.

Neocleora tulbaghata Feld.

FOODPLANTS,

Carissa edulis, *Clerodendron myricoides*.

LARVA.

When full-fed, is $1\frac{1}{3}$ inches long. Fairly stout, reddish drab, with wavy lines and other markings of darker colour. There are twin latero-dorsal tubercles on segment 6, darker than the ground-colour. Faint rectangular dorsal patches, redder than the ground-colour, on most segments. The lateral wrinkle is of the same colour as these patches. A dark semi-circular patch on head. Ventral area with a pale central line. Skin smooth: but with a few short, dark, scattered bristles.

PUPA.

Spun in a slight web between leaves. Duration of pupal stage is about three weeks.

Lophorrhacia rubricorpus Prout.

FOODPLANT.

Maerua hochnellii (Kik. *muthigeo*).

LARVA.

One and three-eighths inches long, fairly stout, very slightly tapered from back to front. Smooth: dark sage green: paler below lateral wrinkle, which is yellow with very slight, interrupted, red lower edge, especially on first two and last two segments. On the final segment it forms the edge of a long, narrow triangular anal plate. Very indistinct, wavy, double latero-dorsal lines; dark red-brown. Head paler green than ground-colour, bifid to one-quarter of its length: lobes pointed, tipped with red.

PUPA.

Between two leaves drawn together with a few threads. No cocoon. Drab, very finely spotted with black. Last three abdominal segments very dark brown. Dorsal area covered with very fine short stubble. There is a transverse ring of small black spots on each segment, and dark cloudy marks on the lateral part of abdominal segments. Wing-cases darker than ground-colour: the veins closely spotted with dark brown. Terminal segment drawn out into a very long central shank, flattened in lateral aspect, with a small bunch of hooks at its extremity, and a single hook on each edge of the shank, about one-third up from the tip. Duration of pupal stage is one month.

Chlorerythra rubriplaga Warr.

FOODPLANT,

Acacia xanthophloea.

OVA.

In shape a long cylinder, with one end domed, and the other hollowed out. Pale green, slightly iridescent, finely reticulated. Laid on the edges of leaves. Hatch in about nine days.

LARVA.

Slender; rather snake-like, with large, square head. Length when full-fed is $1\frac{1}{8}$ inches. Bright velvety green above: paler below. A series of white diagonal lines form Vs, with their points forwards on the ventral surface. At the lateral line, every second one of these lines changes direc-

tion, and continues diagonally forward to the centre of the dorsum. The alternate lines stop at the lateral line. From here to the dorsal area the colour of the diagonals is yellow, and there is a pink spot at each end. In the lateral area they have a black lower edge, and in the dorsal area a black upper one. A faint interrupted yellow lateral line, and a still fainter double dorsal one. On the thoracic segments a pink diagonal from the lateral line is continued as a yellow ridge across the front of segment 2, forming a sort of collar. A pink line edges the triangular anal plate. A few short scattered bristles. The peculiar shape of the markings gives the larva the appearance, from above, of being very deeply indented between segments.

PUPA.

Is slung in a very flimsy web between leaves. It is very slender: wing-cases green, dorsum brown-ochreous, with a white central line on thorax. Conspicuous white lateral ridge. Ventral surface greenish-brown. Head prolonged into a bifid "beak," with four hooklets. Terminal segment has a broad flattened shank on the dorsal side, with two stout hooklets and a few smaller ones. Duration of pupal stage is about sixteen days.

Thalassodes digressa Prout.

FOODPLANT.

Castor-oil (*Ricinus communis*).

LARVA.

When full-fed is from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long. Apple green, with faint red transverse lines at segment-divisions. These lines thicken into red maculae on the dorsal line, which is faintly marked in red, more distinctly at the ends. Head deeply bifid, the tips of lobes reddish. Legs red. A reddish anal triangular plate. Claspers green. Skin smooth. Larva tapers slightly from head to anus.

PUPA.

In a curled leaf. It is bright green, paler towards end of abdomen. Terminal segment has a long and very sharply pointed cone on the dorsal side, very much wrinkled, with many fine hooklets arranged on both of its sides. from point to base of the cone. Duration of pupal stage is about sixteen days.

Comibaena leucospilata Prout.

FOODPLANT.

Acacia sp. var., and *Lantana* sp.

LARVA.

When full-fed is about 1 inch long. It is difficult to describe, for it is thickly dressed in scraps of leaves, bark, etc., and only its head is visible. This is yellow, with two pale lines on the epicrania. Its position of rest is that of "looping," so that all the bits of leaves project in all directions.

PUPA.

Is spun up in a few threads among leaves. The larval system of decorations still form an effective disguise, for the larval skin is not completely thrown off. Duration of pupal stage is one month.

The following are supplementary notes on some species previously dealt with in this *Journal*:—

Coenina aurivena. 13, 127.

OVA.

Butter-yellow, roughly cylindrical, but slightly domed at ends. Length = $\times 2$ cross-diameter. Covered with small depressions in irregular longitudinal rows. On leaves.

Metarctia flavicincta. 13, 169.

OVA.

In shape a wide, short cone, with rounded apex. Very pale green, with finely granulated surface. Scattered loose in grass.

Tathorrhyncus homogyna. 13, 176.

OVA.

Almost spherical, but with a deep micropylar hollow. Pinkish-brown: many raised "meridian" ribs, some simple, some branched. Surface between ribs finely reticulated. On leaves and twigs.

Psalis pennatula. 16, 200.

OVA.

Short barrel-shape, with deep micropylar hollow at top. Shiny yellowish-brown. Finely granulated surface. Laid around grass-stem in patches about $\frac{3}{4}$ inch long.

Omphalucha extorris. 16, 216.

OVA.

Viewed from above, present an ellipse, whose length = $1\frac{1}{2}$ times its width. (= $2\frac{1}{2}$ times height, as seen from the side.) Purplish-red. In centre of upper surface is a slight depression, with reticulated surface. The rest of the ovum is thickly covered with white raised dots arranged some singly, some in pairs. Laid in small batches on twigs.

LARVA.

The young larva is black, with four half-rings of white spots on the central segments.