PSYCHE.

ON THE LARVAL FORMS OF SEVERAL EXOTIC CERATOCAMPID MOTHS.

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The larvae here described are of moths heretofore referred to the family Saturniidae. They are however members of quite another group, a great family or superfamily of which the Ceratocampidae of the older authors (Citheroniidae) Agliinae and perhaps four or five other groups are components. For example, Nudaurelia, of which there are about twenty species, and which were confounded with Antheraea, until separated by Rothschild, is, though an African genus, both in its imaginal and larval characters allied to our American Ceratocampids. This is also the case with *Gynanisa isis*, and *Urota sinope*. I might also add that after a prolonged study of the venation and other characters, besides what little we know of the larval histories, I have come to the conclusion that many other genera heretofore referred to the Saturniidae, will have to be removed from that family, and placed in this group. Apparently none of these genera are spinners but, like Citheronia, Eacles, Anisota, Sphingicampa, etc., enter the earth to finish their transformations, and spin no cocoon.

The group as we are now disposed to limit it is divided into about six subfamilies, and comprises about thirty five genera, including the five genera (*Sysphinx*, *Sphingicampa*, *Anisota*, *Eacles* and *Citheronia*) usually referred to the Ceratocampidae. The Eurasian genus *Aglia* is a type of the subfamily *Agliinae*, and does not belong with the Saturniidae, though universally referred to that family, but falls into the group under consideration. The following genera with the six provisional groups referred to, by their imaginal characters, *i. e.* the venation, antennae, etc., as well as what we know of their transformations, should be taken out of the Saturniidae and associated with the Ceratocampidae (Citheroniidae) : —

Besides (1) the Citheroniidae, there is

2. A group represented by Micrattacus, Lugia, Bolocera, and Sagana.

3. A group (Agliinae) represented by Arsenura, Rhescyntis, Aglia, Cercophana, Cirina, and Usta, with a side genus Polythysana.

4. A group comprising Dysdaemonia and Copiopteryx, and perhaps Titaea and Loxolomia.

5. A group represented by Eudaemonia, Urota, Eudelia; and finally (6) a group containing the following genera, Bunaea, Imbrasia, Gynanisa, Salassa, Nudaurelia, Antherina, Melanocera, and Cinabra, with two undescribed genera, one represented by *Bunaea phaedusa* and another by *Nudaurelia belina*.

It will be a matter of interest to consider the geographical distribution of this great group, now comprising some thirty-six (probably forty) genera.

All but two genera (Aglia and Salassa) the former Eurasian, the latter Asiatic, are either Neogaeic (Central and South American) or Ethiopian (Equatorial and South African). Of these thirty-four (perhaps 36–38) genera, seventeen are African, and about the same number (15–16, perhaps 18) are South American. This fact in the distribution of the group is of interest in connection with the relations between the South American and African flora and fauna, of which so much has recently been written, confirming the view that perhaps at the close of the cretaceous period and through the early tertiary there may have been a land connection between the two continents.

There are about thirty genera of Saturniidae; of these we know the larval forms of seventeen genera. But of the larger group in question we know the larval stages of but thirteen genera and that very imperfectly. Besides the larva of a single species of Nudaurelia, of Gynanisa and of Urota, we know only that of *Thyella zambesia* roughly figured by Maassen and Weymer, of *Bunaea alcynoe* briefly described by Aurivillius, that of the Eurasian Aglia and the South American forms Cercophana, Rhescyntis, Arsenura, and the Ceratocampid genera Syssphinx, Sphingicampa, Anisota, Eacles and Citheronia, or thirteen genera.

In this great family whose larvae are so sphinx-like in general shape, in the form of the anal legs, head, and other features, besides the pupa and subterranean habits the name Sphingicampidae may be suggested. The name Ceratocampidae might be used in an extended sense but by the present rules its use is unfortunately forbidden.

Nudaurelia dione (Fabr.).

Larva. — Head as in *Gynanisa isis*, large, smooth, but dull black, shining but a little, and seen to be finely granulated under a lens, the granulations grouped in lines. Head a little more than one-half as thick as the body, which is cylindrical, not quite so thick as in Gynanisa. The body is uniformly dull velvety black, except the groups of yellow warts. Prothoracic shield black, roughly corrugated transversely, with no spines, but a simple pale dorsal hair on each side.

Second thoracic segment with four large chestnut-brown spines, the two middle ones nearly twice as long as the outer ones, and bearing one or two minute short tines or tubercles each of which gives rise to a white hair. The spines of the 3d thoracic segment are of the same size and reddish testaceous color as those of the abdominal segments; they are very sharp, strong and constitute a most formidable armature. Those of the infraspiracular row are darker. Each dorsal spine gives rise to from 3 to 5 slender fine pale hairs. The spines are curved backwards, those of the dorsal rows are directed a little inward.

The single median spine in the 8th segment is wide, deeply cleft, or forked, with the base enlarged. On each abdominal segment between the dorsal and supraspiracular row of spines is a group of from 3 to 6 irregular, flattened ruffle-like or fungoid bright yellow warts, the number on the 8th abdominal segment being reduced to two round crateriform ones, like a tart or fungus.

Spiracles conspicuous, bright testaceous or luteous. Suranal plate large rounded triangular, the surface irregularly roughly corrugated but unarmed. Thoracic and abdominal, including the anal, legs dull black, anal legs rather large sphingiform, black, the surface rough. Under side of the body black, with no warts or other markings.

Length 78 mm.; thickness of the body 12 mm.; width of head 7 mm.

A remarkably spiny larva, with a most formidable armature of very sharp slightly recurved long spines, while the head and body are dull black. The groups of yellow warts would render it a very conspicuous object. It would be interesting to know whether it feeds exposed on trees.

This is another example of the occurrence of very dark or black caterpillars in the tropics, a circumstance as yet to be explained.

Described from a blown example from "Natal" received and labelled as above from Messrs. Staudinger and Bang-Haas.

This variable species is distributed throughout equatorial and southern Africa. According to Sonthonnax * the larva transforms in the earth, without spinning a silken cocoon, at a depth of two or three inches; the "transformation" or resting period lasting six months.

* Essai de classification des Lépidoptères producteurs de soie. (3e fascicule) Lyon, 1901.

GYNANISA ISIS Westwood.

Larva. — Body cylindrical, thick, a large thick spiny caterpillar. Head about one-half as thick as the body; surface unarmed, with short minute wrinkles or corrugations; pale olive green; a short black line on each side of the clypeus, the anterior division of which bears a low conical tubercle situated each side of a median smooth ridge.

Prothoracic shield distinct, of the usual lunate shape, unarmed, the surface nearly smooth, only slightly corrugated, and the front edge shining jet black; on the side of the segment directly in front of the spiracle is a low thick tubercle, and lower down a few simple flattened pale warts.

Second and third thoracic segments each with two dorsal tubercles, not erect but flattened and adhering to the skin on the basal two-thirds; they are pointed inward towards each other, with the ends erect, but rounded, not ending in a spine; those of the third are a little larger than those on the second segment. A supraspiracular and an infraspiracular smaller minute tubercle, a continuation of the three rows of similar tubercles on the sides of the abdominal segments. These two segments are crossed by three irregular rows of irregular flattened pale tubercles.

On abdominal segments 1 to 7 are six rows of large tubercles (three on each side of the body) inclined inwards and backwards towards the median line of the body, and larger than those on the thoracic segments, each ending in a stout sharp point. The two dorsal spines of each segment are tipped with black, the small lateral ones not thus tipped. These spines are all smooth and bear no setae. In the neighborhood of and behind each spiracle is an irregular group of 5 to 6 elongated oval crateriform warts, and two

between the dorsal spines on the first three abdominal segments.

On the 8th abdominal segment is a single median stout short spine, not so long as those in front, but deeply cleft or forked at the end, each fork acute and diverging from its mate. Around the base of the spine are about sixteen pale flattened circular smooth warts.

Suranal plate subtriangular, apex much rounded, with about a dozen solid thick black tubercles, each giving rise to a short minute seta; they are mostly collected around the end of the plate. A lateral reddish line. Thoracic legs stout, pale, black at the sutures between the joints. Abdominal legs reddish below, dark on the planta. Under side of the body speckled with fine oval setiferous pale warts. Anal legs large, their sides triangular in shape, bright yellow, the lower edge or plantar region shining jet-black. Spiracles pale sienna brown.

Length 77 mm.; thickness 15 mm.

Described from a blown specimen from Natal, received from Staudinger and Bang-Haas.

Urota sinope Westwood.

Larva. — Described from a blown example from Natal received from Messrs. Staudinger & Bang-Haas. Head large round smooth, surface dull brown-black, not polished, unarmed. Body cylindrical, neither humped or conspicuously tuberculated. A prothoracic plate on each side bearing a pair of pale setae which are short, slender, arising from an inconspicuous flattened tubercle (not easily detected in a blown example) situated as are all the thoracic and abdominal ones on the hinder edge of the segment. On abdominal segments 1 to 7 are two widely separated rows of minute flattened tubercles giving rise to a pair of slender flattened setae which are pale at the base and darker toward the tip; there is also a lateral row (there are in all as in the family in general 3 rows of tubercles on each side of the body). The setae are in groups of from 2 to 5, each seta arising from a separate minute secondary tubercle; the setae are about $\frac{1}{6}$ as long as the body is thick. On the 8th abdominal segment there is no median tubercle, but 2 groups of 4 rather long setae each arising from minute separate bases; they are white, slender, curved; each group situated not far from the median line. On the side of the body below and behind the spiracle, though close to it, is a group of 3–4 setae. On the 9th segment are 3 sets of similar setae arranged as on the 8th segment; those on the sides below the spiracles are longer than those above. Spiracles black. Thoracic and abdominal legs blackish. Anal legs of moderate size. Suranal plate with three groups of rather long setae on each side; the plate rounded, surface convex and a little corrugated. Base of abdominal legs (1–4) reddish. The skin rough, finely granulated. Thoracic segments 2–3 and abdominal ones with a transverse band of coarse pale yellowish flattened granulations, smooth, the band on the side widening and surrounding the spiracles. Length 55 mm., thickness 9 mm.

SOME INSECTS OF THE HUDSONIAN ZONE IN NEW MEXICO. — VI.

HYMENOPTERA APOIDEA. II.

BY T. D. A. COCKERELL.

The following, taken on the top of the Las Vegas Range at the end of June, 1901, are additional to the previous list. (*Psyche*, Feb. 1901, p. 163.)

Bombus appositus, Cresson. 1 ♀.

Anthophora cardui, Ckll. 1 ♂. I was surprised to find this at such an altitude.