XVII. *Further notice concerning the fig-insects of Ceylon.*

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[Read July 4th, 1883.]

Plate XVI.

A renewed examination of some of the numerous species of fig-insects, received from Mr. Stainforth Green and Dr. Thwaites, has brought to light some curious and unexpected circumstances relative to the sexes of several of these little creatures which it is necessary for me to bring before the notice of our Society, especially as it enables me to correct an error into which I have inadvertently fallen from too great confidence in the analogy which might be thought to exist between several of these creatures, by which we might predict as to the relative sexes and their consequent specific sexual identification, and at the same time to do justice to a careful observer who I had been led to suppose had erred in the sexual identification of a species from the Levant.

Sycoscaptella ? 4-setosa, Westwood.

In my last paper (Trans. Ent. Soc. Lond., 1883, p. 43) I described, under the name of *Sycoscaptella ? 4-setosa*, a male insect which my two Ceylonese correspondents had forwarded to me as infesting the seeds of *Ficus asperrima*, and which appeared to me to be identical with the male insect described and figured by Dr. P. Mayer as the male of *Ichneumon ficarius*, the female of which, according to Dr. Mayer (represented in his pl. xxv., fig. 5), is furnished with an elongated exserted ovipositor arising near the extremity of a slender tubular joint as long as the remainder of the basal portion of the abdomen ; such being also the structure of the female insect which I figured (Trans. Ent. Soc. Lond., 1883, Pl. VI., fig. 37) as the female of *Idarnella transiens*, of which the winged male is represented by me in fig. 36.

By accident the deflexed stigmal branch of the fore wings of the female was omitted in fig. 37, although represented in the adjoining fig. 40.

My identification of the sexes, and indeed my knowledge of the species, was derived from Sir S. S. Saunders, who kindly presented me with the specimens represented in my figures, and, on carefully re-examining them, I adhere to the opinion I then expressed that they represent the legitimate partners of a species infesting *Ficus indica*.

At the same time Dr. Mayer's statement as to the sexes of his *Ichneumon ficarius* is completely confirmed by the contents of a bottle received from the late Dr. Thwaites, with the following note :—

"Bottle No. 1 contains the sexes of two species found parasitic in the ripe fruit of *Ficus asperrima*, namely, (A). The large wingless males belong to the winged females of bright metallic colour and with long ovipositors, these latter organs being thickened at the joints. (B). The smaller (wingless) males may therefore be referred to the other winged females, black, with shorter ovipositors.

"The males of A are very active, and, after cutting open the fig at exactly the right time, may be observed scrambling about among the florets surrounding the inner wall of the central cavity, looking out for the females as they escape from their little prisons, laying hold of them with their jaws and strong legs, and not allowing them to escape till after *coitûs*, which occupies but a few seconds of time ; the females then at once fly away, and settle on the leaves of some neighbouring shrub or tree. These proceedings I have witnessed several times in this species; the males remain mostly within the central cavity of the fig, and are found dead after a very few hours. I have not seen the sexes of B *in coitû*."

This very precise statement leaves no doubt that the males of A are the legitimate partners of the bright-coloured females, and it fortunately happens that Bottle No. 1 contained a great number of specimens of each sex of each of the two species, B being a species of *Blastophaga*, with a male of the true Blastophagous form, whilst of A the numbers of each sex were nearly equal, the males being the *Sycoscaptella ? 4-setosa* or the *Ichneumon ficarius* (male) of Dr. Mayer, and the females

being, as appears to me, identical with Dr. Mayer's *Ichneumon ficarius* (female), and which, with its details, is represented in the figures accompanying this notice (Plate XVI., figs. 1—1*f*). This female measures 2½ mm in length, the ovipositor, with its basal tubular sheath, being about 4 mm. long. It is of a rich shining orange colour, with the club of the antennæ dark brown. The mandibles are terminated by two teeth, the inner one rather oblong, the other (apical) one acute and trigonate. The palpi are distinct, the maxillary 4-jointed, the labial 2-jointed. This is an important character, since the male, as shown in Plate X., fig. 78, of this volume, is also palpigerous, thus proving that in this species at least both sexes have the lower parts of the mouth (maxillæ and labium) furnished with palpi. The thorax is compact and oval, the legs moderately long, of the normal form, the thighs not thickened, the tarsi distinctly 5-jointed. The abdomen has the basal portion oval, with two dark spots on the upper side beyond the middle; the penultimate joint is formed into a long slender cylinder, equal in length to the basal portion of the abdomen, furnished on each side with strong setæ; this is followed by another segment channelled beneath, as is the preceding joint. The ovipositor itself is extremely slender and curved, and arises within the base of a deflexed scale on the middle of the under side of the abdomen. The central portion of the ovipositor is defended by two demi-sheaths, which are marked throughout their whole length by small dark spots, from each of which a strong bristle is produced; these demi-sheaths are thickened at their tips, and their upper edge seems thickened by a slender back-piece. The joints of the antennæ beyond the annuli are marked with longitudinal impressed lines, which in some species of *Chalcididæ* seem to be represented by rows of setæ.

If this Ceylonese insect should prove to be absolutely identical with that described by Dr. Mayer, it will be proper to retain for it the specific name of *ficarius*, but, in default of the means of establishing this identity for want of specimens of the insect described by Dr. Mayer, I prefer to retain the specific name I bestowed on the male, *4-setosa*. The question of the generic name of this insect is also beset with difficulty. If we are correct in regarding the two insects, figured in my Plate VI., figs. 36, 37, as legitimate partners, with the generic name

of *Idarnella*, it will be clear that the insect now in question cannot be associated with them, although the structure of the female abdomen might be supposed to warrant such a step. On the other hand, there appear to be sufficient characters in the male *S. 4-setosa* to separate it from the type of *Sycoscaptella* (see Trans. Ent. Soc. Lond., 1883, p. 36, as compared with the description of the male *4-setosa* on p. 43), so that it may be necessary to establish another generic name for its reception. This step, however, I prefer to defer until I have made a more precise examination of some of the other long-tailed female fig-insects received from Ceylon.

Apocrypta, *Coquerel.*

In the memoir published by Dr. Coquerel in the 'Revue et Magasin de Zoologie' for August, 1855, on the species of hymenopterous insects infesting the *Ficus terragena* of the 'Ile Bourbon,' we find the following notice of this tree and the habits of its parasites, which merits republication in our 'Transactions,' which have already contained so many recent memoirs on fig-insects:—

"Le *Ficus terragena* est un arbre qui a souvent plus de dix mètres de haut; ses fruits (*sycones*) sont fixés à de longs rameaux toujours dépourvus de feuilles, naissant des grosses branches et du tronc lui-même; ils sont très-acides, et ne sont employés à aucun usage. J'avais remarqué plusieurs fois que de petits Chalcidites volaient à l'entour, et, voulant savoir aux dépens de quel insecte vivaient ces parasites, j'emportai plusieurs figues. En les ouvrant, j'y trouvai, non seulement un grand nombre de Chalcides, mais une infinité de petits insectes d'une forme très-singulière. Au milieu de la matière visqueuse qui réunit les drupes, et dans l'intérieur des drupes elles-mêmes, ils vivaient pêle-mêle, avec les Chalcidites, qui, selon toute apparence s'étaient développés à leurs dépens. Ces insectes sont très-lents dans leurs mouvements; au moindre contact, ils se roulent sur eux-mêmes et demeurent immobiles. Leur taille égale a peine deux à trois millimètres; ils sont dépourvus d'yeux et d'ocelles; ils sont armés de puissantes mandibules. Mais malgré l'emploi de très-forts grossissements, je n'ai jamais pu découvrir chez eux ni palpes, ni mâchoires, ni trace d'aile ou d'élytre."

The insects described and figured by Dr. Coquerel are four in number, three wingless and one winged individuals. The winged *Chalcis explorator*, Coquerel, now proves to be a female *Sycophaga*: the *Sycocrypta cæca*, Coq., is the male of a species of *Blastophaga*: the *Apocrypta paradoxa*, Coq., is the male of a *Sycophaga*, of which the female is unquestionably the winged *Chalcis explorator* of Coquerel, agreeing with the female insect figured by me in our 'Transactions' (1882, Plate II., fig. 2).

The remaining wingless insect figured by Dr. Coquerel under the name of *Apocrypta perplexa* (*op. cit.*, p. 369, Pl. X., fig. 2) is smaller than *A. paradoxa*, "L. 4 à 4½ mil.," being 3 to 3½ mm. long, and differs from the latter insect (*cf.* Trans. Ent. Soc. Lond., 1882, Pl. II., fig. 1) in several important respects. It is comparatively much narrower, more cylindrical, with short mandibles acute at the tip but destitute of teeth on the inner margin; the antennæ composed of three joints, of which the basal joint is not dilated into a large oval plate; the clypeus forms an acute point between the insertion of the antennæ. "La lèvre inférieure présente une languette plus allongée que dans l'*A. paradoxa*." The abdomen is not quite so long as the thoracic segments, as wide as the posterior part of the thorax at its base, and gradually dilated till it becomes twice as broad as the head, "Ici les deux grandes trachées latérales ne viennent pas aboutir à des lames membraneuses (as in *A. paradoxa* or *Sycophaga*, male); elles se rendent à d'énormes stigmates qui sont situés sur la face dorsale de l'avant-dernier anneau. Ces stigmates sont munis, à leur partie supérieure d'un bourrelet saillant. L'extrémité de l'abdomen est muni d'une tarière semblable à celle de l'espèce précédente," and which "je suppose être la tarière qui sert à l'insecte à introduire les œufs dans les drupes dont est garni l'intérieur des fruits."

Among the numerous species of fig-insects forwarded to me by Mr. Stainforth Green and Dr. Thwaites from Ceylon, I found, as parasites upon *Ficus glomerata*, specimens of what appear to me to be identical with the three wingless insects figured and described by Dr. Coquerel. And it is to the *Apocrypta perplexa* that I now desire to call the attention of our Society; and which, with its various details, I have represented in Plate XVI., figs. 2—2*g*. On comparing these with the details of the male *Sycophaga*, given in Trans. Ent. Soc.

Lond., 1882, Plates II. and III., the structure of the front of the head, both on the upper and lower surface (Plate XVI., figs. 2 *a*, 2 *b*), as well as of the basal portion of the head (figs. 2 *c*, 2 *d*), the mandibles destitute of teeth, the antennæ destitute of the dilated basal joint, the possession of two small black spots near the base of the mandibles in the place of eyes, the ovate form of the abdomen destitute of the elongated lateral cerci, which seem replaced by the two horny plates described by Coquerel (of which I have not been able to define the structure), but which appear to me to be unprovided with the two singularly large lateral tracheæ of the male *Sycophaga* (of which I could observe no trace, although represented in Dr. Coquerel's figure),—are all sufficient to warrant the separation of *Apocrypta perplexa* from *A. paradoxa*, and, as the latter is now proved to be a *Sycophaga*, the retention of the name *Apocrypta* for *A. perplexa* will not perhaps be objected to. It was only after numerous dissections that I was able clearly to trace the two retinacula of the male, proving the exserted terminal appendage to be the male organ, and not, as supposed by Dr. Coquerel, the ovipositor of a female insect.

In the absence of specimens of *A. perplexa* from *Ficus terragena* for comparison with the Ceylonese ones from *F. glomerata*, it is not possible to determine the minute differences (if any) between Dr. Coquerel's and my insects. Mine vary in size from 1 to 2 mm. in length, and have the abdomen of a different form from Dr. Coquerel's figure. I have further to remark that the external envelope of the thoracic and abdominal segments is so extremely thin and transparent, that I cannot determine the absolute form of the posterior portion of each segment, which overlaps the base of the following segment to a considerable extent.

Explanation of Plate XVI.

Fig. 1. *Sycoscaptella ? quadri-setosa*, Westw., female.
1 *a*. Mandible of ditto.
1 *b*. Maxillary and labial palpi of ditto.
1 *c*. Labium and its palpi of ditto.
1 *d*. Antenna of ditto.
1 *e*. Ovipositor of ditto (basal portion).
1 *f*. Extremity of one of the sheaths of ditto.
2. *Apocrypta perplexa*, Coq., male.
2 *a*. Front of head of ditto, from above.
2 *b*. ,, ,, from below.
2 *c*. Basal portion of head, from above.
2 *d*. ,, ,, from below.
2 *e*. Extremity of abdomen of ditto.
2 *f*. Retinacula of ditto.
2 *g*. Teeth of retinaculum of ditto.