

VII. *Notes on the Thysanura*.—Part III. By SIR JOHN LUBBOCK, *Bart., F.R.S., V.P. Linn. Soc., Pres. Ent. Soc., V.P. Ethn. Soc., &c.*

(Plates XXI. & XXII.)

Read June 6th, 1867.

THE following Memoir contains descriptions of seventeen species of *Thysanura*, belonging to the *Smynthuridæ*, *Poduridæ*, and *Lipuridæ*. Five are new; the others have been already observed on the Continent. With those described in my previous Memoirs, and the sixteen in that of Templeton, this will make a total of about fifty species, one-fourth of which have been as yet observed in this country only. I have also met with several forms which will probably prove to be distinct species, but about which I am not as yet prepared to offer a decided opinion. There can, however, be very little doubt that many more species remain to be discovered in this country. Even the Continent has been anything but thoroughly examined; and yet, including the *Lepismidæ* and the curious genera *Campodea* and *Nicoletia*, 117 species are said to occur in Europe, of which eighty-three have been found in France.

SMYNTHURUS VIRIDIS. (Pl. XXI. figs. 1-3.)

Podura viridis, Geoffroy, *Ins. d. Env. de Paris*, ii. p. 607.

— —, Schrank, *En. Ins. Austr.* p. 495.

— —, Fabricius, *Entom. Syst.* ii. p. 65.

— —, Linn. *Syst. Nat.* i. p. 2907.

Smynthurus viridis, Nicolet, *Rech. pour servir à l'histoire des Podurelles*, p. 82, *Mém. Soc. Helv.* vi.

— —, Bourlet, *Sur les Podurelles*, p. 56, *Mém. Soc. R. de Douai*.

— —, Lucas, *Hist. Nat. Crust. Arachn. et Myriapod.* p. 567.

Green; eyes on a black patch; terminal segments of antennæ reddish; abdomen with a reentering angle; hairs scattered.

Length $\frac{1}{12}$ of an inch. Very common among grass, in May, June, July, August, and September. It is sometimes attacked by a small red mite.

Geoffroy's description of this insect is still quite sufficient: "*P. viridis, oculis nigris, capite flavescente, antennis in medio fractis.*"

The antennæ have the basal segments pale green, the terminal one reddish. The segments increase in length from the base to the apex. The basal one is $\cdot 004$ of an inch in length, and $\cdot 003$ in breadth; the second is $\cdot 008$ in length, the third $\cdot 013$, and the fourth $\cdot 027$. The segments do not taper, though each is a little narrower than the preceding. The terminal segment has about twenty whorls of hairs. The mandibles are of the usual form; one of them, however, is somewhat characteristic, from having the penultimate tooth unusually projecting. The maxillæ resemble those of *S. Buskii* (Linn. *Trans.* vol. xxiii. pl. 45. fig. 6). The feet resemble those of *P. cursor*; there are no

tenent hairs. Pl. XXI. fig. 2 represents one of the posterior feet. The spring is simple in form (Pl. XXI. fig. 3). It has no tenent hairs; and the terminal lamellæ are without teeth; the hairs are simple, and shaped like a lady's riding-whip, but rather rough.

SMYNTHURUS LUTEUS, n. sp. (Pl. XXI. figs. 4-7.) Yellow; eyes on a black patch; apical portion of antennæ violet.

The females, which are decidedly larger than the males, are about $\frac{1}{33}$ of an inch in length. Very common, among grass, from May to July.

In colour and in habits this species closely resembles the *S. lupulinæ*, of Bourlet; the eyes, however, are situated on a black patch. My *S. aureus* agrees with *S. luteus* in the possession of the black patch, but differs in the form of the caudal lamellæ, of the feet, and of the antennæ.

The four segments of the antennæ (Pl. XXI. fig. 5) increase in length from the base to the apex, each being nearly twice as long as the preceding: the proportions are 8, 15, 24, 45. The terminal portion consists of about twelve segments more or less closely soldered together and each bearing a whorl of hairs; the four central segments are more distinctly marked than those on either side of them. At the extremity of the organ are some rod-like hairs.

Though the males are smaller than the females, their antennæ are not only relatively, but absolutely longer. In form, however, there is no material difference between the sexes.

The *mandibles* are strong, but the terminal teeth, excepting the last of all, project very slightly. The teeth are four and five in number; those of the male and female are alike.

The *claws* (Pl. XXI. fig. 6) are simple; the inner one is small; there are two tenent hairs on the upperside; and the inner claw, which is elongated, appears to terminate in a small globular expansion, which has probably the same function. The feet are alike in both sexes.

Caudal appendage (Pl. XXI. fig. 7). The basal segment tapers slightly; it bears scattered setæ, but no tenent hairs. The terminal lamellæ are elliptical, without setæ or teeth. At the end of the abdomen are two setæ much stronger than the rest. The caudal appendage of the male resembles that of the female.

Some specimens have on each side two longitudinal bands of rather darker yellow. These, I believe, only form a variety. These specimens have three dark spots in a on each side in the paler portion; each of these bears a hair.

It is very amusing to see these little creatures coquetting together. The male, which is much smaller than the female, runs round her, and they butt one another, standing face to face, and moving backwards and forwards like two playful lambs. Then the female pretends to run away and the male runs after her, with a queer appearance of anger, gets in front and stands facing her again; then she turns coyly round, but he, quicker and more active, scuttles round too, and seems to whip her with his antennæ; then for a bit they stand face to face, play with their antennæ, and seem to be all in all to one another.

SMYNTHURUS BOURLETII, Gervais. (Pl. XXI. figs. 8-10.)

Suites à Buffon, Ins. Aptères, iii. p. 403.

Dark purple and yellow. The purple forms two broad, irregular bands with broken edges running along the side of the body; there are two yellow patches on the head between the black eye-patches, separated by a central band of dark purple, and uniting behind. The spring, legs, and underside of body are yellow, the two terminal segments of the antennæ with a brownish tinge.

I found this pretty little species among long grass at High Elms, in June and July. The antennæ resemble those of *Smynthurus luteus*, but the terminal segment (Pl. XXI. fig. 9) is less distinctly ringed.

The mandibles offer no special peculiarity; they have respectively four and five teeth; the one with four has only the terminal one large, the other three are very small. In the mandible with five teeth they are all well marked, increasing in size from the base to the extremity. The feet have the two claws more equal in size; the tenent hairs are slightly marked.

The spring has only a few scattered hairs (Pl. XXI. fig. 10), none of which are tenent. The terminal segment is knife-shaped, somewhat pointed at the extremity, and very finely serrated on the inner margin.

There is no other species with which this can be confounded.

SMYNTHURUS NIGER, n. sp. (Pl. XXI. figs. 11, 12.) Bluish black; feet, terminal segment of spring, and a spot at the front inner corner of each eye-patch pale. Hairs short, white, more or less in longitudinal rows.

Length $\frac{1}{23}$ of an inch. Under boards in my kitchen-garden. Not common, solitary, August to December.

This ugly little species does not resemble any one yet described. It differs from *S. ater* of De Geer in the form of the spring &c., and from *S. fuliginosus* of Nicolet in the absence of white patches on the body, and in having the head and antennæ black.

The terminal portion of the antenna is not distinctly ringed, the position of the subsegments being, however, indicated by the whorls of hairs. The upper lip is naked and rounded; one mandible has five teeth, while in the other they are rudimentary. The feet have several tenent hairs. The large claw is simple, the smaller one is narrower in the anterior legs than in the posterior ones. The terminal lamellæ of the saltatory appendage (Pl. XXI. fig. 12) are narrow and pointed. Both appear to have on the same side a row of fine teeth; in fact there are two rows on the under surface, which, being almost always thrown either to one side or the other, give the appearance of asymmetry.

SMYNTHURUS PALLIPES, Bourlet. (Pl. XXI. figs. 13-15.)

Smynthurus pallipes, Bourlet, Sur les Podurelles, p. 59.

— —, Gervais, Suites à Buffon, Aptères, p. 404.

— —, Nicolet, Ann. Soc. Ent. France, 2^e sér. v. p. 359.

Purple; antennæ, legs, and hairs pale yellow; eyes on a black patch; spring white.

Abdomen with a reentering angle and scattered pale hairs.

High Elms, among grass. Common, May to July.

Length $\frac{1}{28}$ of an inch.

One mandible has five well-marked teeth; the other can hardly be said to have any at all.

The feet much resemble those of *S. luteus*; there are two tenent hairs above, and one on the underside. The larger claw is simple, the lesser one very small.

The saltatory appendage (Pl. XXI. fig. 15) also much resembles that of *S. luteus*.

ORCHESSELLA CINCTA, L.

Podura cincta, Linn. Syst. Nat. ii. p. 1014.

— *vaga*, Linn. ibid. p. 1013.

— —, Fab. Ent. Syst. ii. p. 66.

— *cincta*, Fab. ibid. p. 67.

Orchesella filicornis, Templeton, Tr. Ent. Soc. i. p. 93.

— *cincta*, Templeton, ibid. p. 93.

Heterotoma vaga, Bourlet, Sur les Podurelles, Mém. Soc. R. d. Lille, 1839, p. 398.

— *cincta*, Bourlet, Sur les Podurelles, ibid. p. 399.

Ætheoscerus pulchricornis, Bourlet, Sur les Podurelles, Mém. Soc. R. d. Douai, p. 22.

— *cinctus*, Bourlet, ibid. p. 23.

Orchesella fastuosa, Nicolet, Sur les Podurelles, Mém. Soc. Helv. vi. p. 78.

— —, Gervais, Aptères, iii. p. 414.

— *filicornis*, Gervais, ibid. p. 415.

— *cincta*, Gervais, ibid. p. 421.

This common and pretty species varies very much in colour, and has been described by different authors under a variety of names. In addition to the synonyms given above, I have little doubt that some of the other supposed species of *Orchesella* will eventually prove to be only the young of this.

The third abdominal segment and the third segment of the antennæ are black; the apical half of the second segment of the antennæ, the posterior half of the second abdominal segment, two patches on the mesothorax, and two spots on the posterior margin of the fourth abdominal segment are white; the two terminal segments of the antennæ are brown; the rest of the body is mottled, and in different specimens may be found of every hue between light reddish brown and deep black.

Of course, in the black specimens the dark band on the third abdominal segment ceases to be conspicuous, and the pale one on the second abdominal segment comes out by contrast; such specimens constitute the *Podura vaga* of Linnæus and subsequent authors. On the other hand, in pale specimens the dark band on the third abdominal segment is the salient feature; and these specimens form Linnæus's *P. cincta*. This name seems to me the best of all those which have been given to the species, because in all cases the transverse abdominal band is the distinctive characteristic of the species.

DEGEERIA LANUGINOSA, Nicolet. (Pl. XXII. figs. 16–18.)

Degeeria lanuginosa, Nicolet, Podurelles, p. 74.

— —, Gervais, Aptères, p. 425.

Fusiform; entirely grey, with a tinge of green; antennæ, legs, and saltatory appendage somewhat paler than the rest of the body, which is very hairy. The upper surface is thickly covered with clubbed hairs. Eyes black. Sixth segment of the body as long as the three or four preceding taken together.

Length $\frac{1}{20}$ of an inch.

Under pieces of wood in winter; not common.

The second and third segments of the antennæ are about equal in length, and somewhat shorter than the apical. The feet have a single tenent hair.

DEGEERIA NICOLETHI, n. sp. (Pl. XXII. fig. 19.) Yellow; eyes on a black patch; terminal portion of antennæ tinted with violet; a reddish-brown band between the eyes; two brown patches on the posterior end of the fourth abdominal segment, and a band of the same colour on the posterior margin of the seventh.

Length about $\frac{1}{15}$ of an inch.

Common on bark and among grass in spring and summer.

The antennæ are about three-fifths of the length of the body. The basal segment is rather shorter, and the apical rather longer, than the two middle ones, which are of about the same length. Besides the short hairs pointing forwards, the three basal segments have a few rather longer ones, which stand out at right angles to the segment itself.

The brown band on the head between the eyes also projects a little behind them.

The mandibles have respectively three and five rather blunt teeth.

The body is somewhat thickly clothed with hairs, which are of three sorts:—first, the ordinary short hairs, which are spread pretty evenly over the whole surface, as well as over the appendages; secondly, longer clubbed hairs, as in Pl. XXII. fig. 17; these generally stand at right angles to the skin, and are characteristic of *Degeeria* and *Orchesella*; they occur only on the body; thirdly, long, serrated hairs, most of which lie along the body, but some of those at the posterior extremity, as well as a few scattered ones on the legs, stand out at right angles. Lastly, there are on the fourth abdominal segment a few still longer, serrated hairs which have a curious bend in the middle, as in Pl. XXII. fig. 18; this bend is not accidental, as might at first be supposed, but is always present.

The feet have two claws and one tenent hair; they are all six alike, and resemble those of *D. nigromaculata* or *Lepidocyrtus argentatus* (see Linn. Trans. xxiii. pl. 59. fig. 17).

ISOTOMA TRIFASCIATA, Bourlet. (Pl. XXII. figs. 20, 21.)

Isotoma trifasciata, Bourlet, Mém. sur les Podurelles.

— *bifasciata*, Bourlet, ibid.

— —, Nicolet, Ann. Soc. Ent. de France, 2^e sér. v. p. 374.

Greenish yellow, mottled with purplish-brown patches, which form three more or less wide and continuous bands down the back. Underside of body, antennæ, legs, and caudal appendage pale. Eyes on a black patch. Basal segment of the antennæ rather shorter than the other three, which are subequal.

In damp situations, under fallen branches of trees, and among decaying leaves, throughout the year; common.

Length $\frac{1}{10}$ of an inch.

Many specimens are pale, irregularly mottled with purplish-brown patches. In dark specimens, however, the purplish-brown colour usually occupies the greater part of the back, and the yellowish-green portion is thus reduced to two more or less irregular bands, which, however, increase in size towards the posterior extremity of the body. These specimens appear to me to form the type of Bourlet's *I. bifasciata*. He describes the antennæ, however, as "annelés de brun à leur sommet." On the other hand, in pale specimens the dark areas are reduced, and, as the underside is pale, the dark portion thus comes to form three bands, one in the centre of the back, and one on each side. These specimens, I think, constitute Bourlet's *I. trifasciata*, which is characterized by having three dark longitudinal bands on a greenish ground. I prefer this latter name as being the most characteristic.

This species is rather broader in proportion to its length than most of the others. The head is shaped like a capital D, and, like the whole body, is clothed with short hairs, many of which, on the head and thorax, are slightly longer than those of the abdomen. On the other hand, the posterior abdominal segments possess a few long setæ, which point backwards.

The caudal appendage extends forwards beyond the base of the so-called gastric tube. It is sometimes quite pale, sometimes yellowish, almost approaching to orange in colour.

The antennæ are four-jointed, and clothed with short hairs. The basal segment measures about $\frac{1}{100}$ of an inch in length; the second and third segments are equal, and measure $\frac{1.5}{800}$ each, while the terminal segment is somewhat longer, and reaches $\frac{1.8}{800}$ in length.

The mandibles have respectively four and five teeth, and offer no special peculiarities.

The legs are of moderate length, the posterior ones being, as usual, the longest, owing almost entirely to the elongation of the femur and tibia. The whole leg is clothed with the usual small hairs, mixed with a few larger ones; there are no tenent hairs.

The feet (Pl. XXII. fig. 21) of all the three pairs of legs are alike. The large claw is simple and stout; the second appendage is of irregular shape; on the side which is turned towards the large claw it projects considerably, and bears a small tooth. The end is produced into a very fine thread-like point.

LEPIDOCYRTUS ÆNEUS, Nicolet.

Cyphodeirus æneus, Nicolet, Podurelles, p. 66.

Brazen metallic; first and third segments of antennæ short. Eyes black. Antennæ yellow at base, the rest brown. Hairs few; the usual thick bunch on first body-segment. Thorax gibbous, but not projecting. Head set on almost straight. Body broadest in front, not ovate.

I found one specimen in December.

This species is compressed laterally, which, together with its colour and its power of

jumping, give it very much the appearance of a flea. I have referred it to Nicolet's *C. æneus*, though with some doubt, as the antennæ do not altogether agree with his description.

LEPIDOCYRTUS GIBBULUS, Nicolet. (Pl. XXII. fig. 22.)

Cyphodeirus gibbulus, Nicolet, Podurelles, p. 64.

Nicolet's description of this species is as follows:—

“Semblable au précédent (*L. capucinus*) pour la couleur, mais plus court et proportionnellement plus large. Premier article des antennes jaune, les suivants d'un gris foncé, légèrement violacé. Premier segment du corps, très-convexe, peu prolongé en avant et cilié au bord antérieur. Deuxième segment, un peu plus long que le suivant. Bord inférieur du sixième segment rougeâtre. Filets de la queue courts et blancs. Pièce basilaire de la couleur du corps. Yeux noirs. Corps luisant, très-peu velu. Même reflet métallique que le précédent.”

Length $\frac{1}{2\frac{1}{5}}$ of an inch. Among moss and in gardens. Rather rare, solitary.

High Elms. I found a few specimens in winter, under logs of wood.

LEPIDOCYRTUS ALBINOS, Nicolet.

Lepidocyrtus albinos, Nicolet, Podurelles, p. 67.

— —, Gervais, Aptères, iii. p. 412.

Oblong, white; the first and third segments of the antennæ short and conical; body very brilliant and without many hairs.

Length $\frac{1}{2\frac{1}{5}}$ of an inch.

Under decaying boughs and in similar places.

PODURA AQUATICA, De Geer.

Podura aquatica, De Geer, vii. p. 14.

— —, Linnaeus, Sys. Nat. 1814.

— —, Fabricius, Ent. Sys. ii. p. 67.

— *atra aquatica*, Geoffroy, Ins. Env. Paris, ii. p. 610.

— — —, Boisd. et Lacord. Faun. Ent. Env. Paris, i. p. 114.

— — —, Lucas, Hist. Nat. Anim. Art. p. 565.

Hypogastrura aquatica, Bourlet, Podurelles, p. 35.

Podura aquatica, Nicolet, Podurelles, p. 55.

— —, Nicolet, Ann. Soc. Ent. France, 2° sér. v. p. 375.

I found a few specimens of this species on a pond at Chiselhurst, in Kent, during the summer of 1863.

ACHORUTES ARMATUS, Nicolet. (Pl. XXII. fig. 23.)

Podura armata, Nicolet, Podurelles, p. 57.

Hypogastrura fuscoviridis?, Bourlet, Podurelles, p. 37.

Achorutes armatus, Gervais, Aptères, iii. p. 437.

Nicolet's description of this species is as follows:—

“D'un gris verdâtre sur la tête et le dos; dessous du corps, antennes et pattes gris pâle. Une tache triangulaire d'un brun sombre entre les yeux, et quelques autres taches de même couleur sur le reste de la tête. Yeux noirs. Deux lignes longitudinales et parallèles de taches à peu près triangulaires et également brunes, sur le dos. Poils gris. Appendice saltatoire très-court. Deux crochets recourbés en dessus à l'extrémité de l'abdomen, au-dessus de l'anús.

“Longueur 1 millim. et demi.

“Sur les eaux stagnantes; peu commune.”

I have several times found specimens on a hotbed in autumn which agreed pretty well with Nicolet's description and figure; the spots, however, were scarcely apparent.

The caudal appendage of my specimens is figured in Pl. XXII. fig. 23.

ACHORUTES PURPURESCENS, n. sp. (Pl. XXII. figs. 24–26.) Brownish purple, underside of body rather paler. Eyes not on a black patch. Body covered with short, scattered, white hairs; two clawed hooks at the posterior extremity of the body.

Length $\frac{1}{12}$ of an inch.

On a hotbed and under branches of trees, throughout the year.

I was at first disposed to refer this species to the *A. armatus* of Nicolet. It differs, however, in the colour of the body, and in the absence of brown spots on the back. Moreover, if I have been right in identifying the preceding species with the *A. armatus* (*Podura armata*) of Nicolet, it differs from the present in having larger abdominal hooks, and in the form of the caudal appendage, as may at once be seen by comparing Pl. XXII. fig. 23, which represents the caudal appendage of *A. armata*, with fig. 26 of the same plate, in which I have figured the corresponding organ of *A. purpurescens*. Again, in the present species the eye is not on a black patch.

The antennæ are short, and composed of four segments; the articulations are somewhat oblique; and the two terminal segments form a sort of club. The mandibles have respectively four and five teeth. The skin of the body, as well as of the appendages, is granular, and covered with short, scattered, smooth, white hairs.

The anterior feet (Pl. XXII. fig. 25) have two long tenent hairs, which, however, are but little swollen at the extremity. The large claw bears a single tooth on the underside; the small claw is of somewhat peculiar form, and terminates in a filament. The second and third pair of feet differ from the first principally in having three tenent hairs, which, moreover, seemed to me to be more enlarged at the tip than those of the anterior feet.

The caudal appendage is simple and two-jointed, as in Pl. XXII. fig. 26.

ACHORUTES MURORUM, Bourlet.

Achorutes murorum, Bourlet, Podurelles, p. 35.

I have occasionally found, during winter, a small very dark species of *Achorutes*, which I have referred with a good deal of doubt to the *A. murorum* of Bourlet. It is of a bluish black, and, as usual, is paler below. The eyes are on a black patch. It has very minute abdominal hooks, and the feet have a single tenent hair. The skin is granulated.

ACHORUTES RUFESCENS, Linnæus.

Podura rufescens, Linnæus, Sys. Nat. Gmelin's ed. p. 2910.

Achorutes rufescens, Nicolet, Podurelles, p. 57.

Brick-red; eyes on a black patch; abdominal hooks very minute.

Common in winter among dead leaves.

LIPURA FIMETARIA, L. (Pl. XXII. figs. 27, 28.)

Podura fimetaria, Linnæus, i. p. 2909.

— —, Schrank, En. Ins. Aus. p. 497.

— —, Fabricius, Ent. Syst. p. 67.

— —, Lucas, Hist. Nat. Crust. Arachn. et Myriapod. p. 565.

Lipura fimetaria, Burmeister, Handb. der Ent. xi. p. 447.

Anurophorus fimetarius, Nicolet, Mem. Soc. Helv. 1839.

Adicranus —, Bourlet, Mém. Soc. Roy. Douai, 1842.

— *volvator*, Gervais, Suites à Buffon, Aptères, iii. p. 442.

— *fimetarius*, Nicolet, Ann. Soc. Ent. France, 2^e sér. v. p. 385.

White; skin granular; prothorax short, but not covered by mesothorax; posterior extremity of abdomen without hooks.

Length $\frac{1}{10}$ of an inch.

In damp places, under boards, flowerpots, &c. Common, sociable.

The antennæ are shorter than the head; they are four-jointed and somewhat clubbed.

The articulations between the second and third, and third and fourth segments are oblique.

The organ is covered with short, stiff hairs, which are most numerous on the apical segment.

The mandibles have four teeth each; in one of them the penultimate tooth projects beyond the others.

The body is thinly clothed with short scattered hairs. The legs are short. The large claw is big and simple; the smaller one resembles a seta, but is thickened at the base. There are no tenent hairs.

This species has frequently been confounded with *L. ambulans*, which, indeed, it very much resembles. They may, however, be at once distinguished by the posterior end of the abdomen, which in *L. ambulans* is armed with two small upright hooks; these are entirely absent in the present species. According to Nicolet, there is also a considerable difference in the eyes. In *L. ambulans* these are fourteen in number on each side, arranged in two parallel lines running obliquely across the head immediately behind the antennæ. *L. fimetaria*, on the contrary, has only eight eyes on each side, which form an oblong group. They are, however, in both species very difficult to make out.

As Nicolet has himself pointed out, his *Anurophorus fimetarius* (Podurelles, p. 53) is really the *P. ambulans* of Linnæus.

From *L. corticina* and *L. laricis*, which are probably identical, *L. fimetaria* is at once distinguished by the colour.

One of my specimens laid some eggs on the 8th September; they were fifteen in number, spherical, white, and $\frac{1}{180}$ of an inch in diameter.



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