

X. *Descriptions of Fifty-two New Species of Phasmidæ from the Collection of*
Mr. W. WILSON SAUNDERS, with Remarks on the Family.
By HENRY WALTER BATES, Esq.

(Plates XLIV. & XLV.)

Read June 15th, 1865.

DURING the six years which have elapsed since the appearance of the excellent Monograph of the Phasmidæ by Professor Westwood, published under the title of a 'Catalogue' by the authorities of the British Museum, the cabinets of London have been enriched by the acquisition of a large number of new species in this group. This has been more particularly the case with regard to the extensive collection of Mr. W. Wilson Saunders; and the present memoir owes its existence to the desire of that gentleman to make them known to science in a connected form, so that the descriptions may serve as a supplement to the Monograph. In so difficult a family as the Phasmidæ every fresh acquisition serves to throw light on the limits of species and genera and their classification—questions still in a very debateable condition, owing to the insufficiency of material. The new species have been received chiefly from the islands of the Eastern archipelago, through the researches of Mr. Wallace, who had not yet finished his labours when the Monograph of Professor Westwood appeared—from Cambodia, collected by the late M. Mouhot—from South-eastern Africa by M. Guenzius, Mr. Gerard, and others—from Ceylon, by M. Nietner—and from the Amazons, brought home by myself. The Phasmidæ are generally insects of great rarity and circumscribed in the range of their species, so that many, doubtless, still remain to be discovered in tropical countries. The progress of our knowledge of the group has been rapid. Thus in 1839, when Serville published his work on orthopterous insects, with the command of the principal collections of France, the total number of species he could find to describe was only 58; four years previously, Mr. G. R. Gray enumerated 108 species as all that had been described; Burmeister in 1839 (in the 2nd volume of his 'Handbuch'), making use of the Berlin collections, described 61; soon afterwards De Haan, in his work on the Entomology of the Dutch possessions, added 40 new species; Westwood, in his Monograph (1859), increased the number of described species to 471; since then 17 have been published by various authors*, which, added to the 52 described in this memoir, make a total of 540 Phasmidæ now known to science.

- | | | | |
|---|---|---|---------|
| * 1. Bacillus (Baculus) Humberti, <i>Saussure</i> , Ann. Soc. Ent. Fr. 1861, p. 469 | . | . | Ceylon. |
| 2. Bacillus (Baculus) ramosus, <i>Sauss.</i> l. c. p. 127 | . | . | Brazil. |
| 3. Bacteria emortualis, <i>Sauss.</i> Rev. et Mag. Zool. 1859, p. 61 | . | . | Bahia. |
| 4. Bacteria longimana, <i>Sauss.</i> l. c. | . | . | Bahia. |
| 5. Bacteria spinigera, <i>Sauss.</i> l. c. | . | . | Brazil. |

variously modified in external structure in the direction of disguises to guard the species against extermination by their enemies. It is thus that from the *Phasma* type have been produced the narrow, green or yellow, apterous *Bacilli*, with their habit of stretching out rigidly their elongated limbs when clinging to a plant, so as to assume the appearance of a slender stem—the flattened and rugged-lobed, mossy-looking *Prisopi* and *Creoxyli*, which, when the wings are folded, cannot be distinguished from a piece of lichen-covered bark—the flattened *Phyllium*, which, as every one knows, cannot be distinguished from a leaf of the tree on which it crawls—and so forth, the adaptation of general form carrying with it modifications of limbs and appendages. The difficulty which we find in defining generic groups in the family is explicable on the ground that, where there is much of this adaptive modification, all the corporeal parts concerned must have become to a high degree variable. Natural selection having, from the first, favoured the species which offered variations in these parts, the tendency to variability has become perpetuated by inheritance. There can be no other explanation of the persistence of certain structures throughout a range of species—the persistence which enables naturalists to define generic and other groups—than that, in the long process of multiplication of forms in Nature, these parts have not been involved in the process of adaptation. It is a strong proof of this persistence having prevailed in Nature, that all naturalists of the old school have held so firm a faith in the original creation of genera as well as of species. To state it in simple language, they believed that when a species was created it was endowed with certain features in common with other allied species: a newly-originated form was thus thought to receive its generic as well as its specific stamp. A group like the *Phasmidæ*, therefore, ought, instead of perplexing us, to be regarded with high interest, as showing that the existence of generic characters is not a universal rule, and as affording a probable explanation why it is not.

In the following descriptions I have followed the classification of Professor Westwood, who adopted its main features from Lichtenstein, Gray, Burmeister, and their successor, De Haan, the author of one of the best treatises on the family, comprised in his work on the Entomology of the Dutch possessions. The groundwork of this classification is the gradation in development of the wings from genus to genus. Thus it begins with those genera which are wingless in both sexes, these forming one *Division*, and passes through those in which the males are winged and the females wingless, or in which the wings are rudimentary, to the genera which have well-formed wings in both sexes—the whole of the latter forming the second *Division*. The wingless series commences with those forms which have much-abbreviated antennæ and very attenuated bodies, and progresses to those having long setiform antennæ, or bodies of much more compact structure. The winged series progresses gradually from those genera in which the upper and lower wings are either rudimentary or developed in one sex only, to those in which they exist in both sexes (but the upper wings of extreme shortness), ending at length with genera in which both upper and lower wings have become elongated in an approach to due proportion. This classification has lately been severely criticised by Dr. Gerstaecker, the author of the Entomological portion of the Berlin annual Report on the progress of Zoology.

He points out that in certain cases where the unwinged female alone was known, the author of the Monograph himself confessed he could not decide whether the species belonged to the winged division (*i. e.* winged in the male) or to the apterous division; and in one instance at least, *Lonchodes feruloides*, he had placed a species in the apterous division, which, now that the winged male was known, proved to be a *Phibalosoma* of the winged division. This implied that winged and wingless species (in the male) might be included under one and the same genus; and the critic argued, from the analogy of other families of Orthoptera where genera occurred containing both forms (e. g. *Saga*, *Gryllacris*, &c.), that the alary structure was an erroneous principle to adopt in the classification of these insects. To the instance brought forward by Gerstaecker I can add several others. For instance, *Acanthoderus bufo* (Westw.), an apterous species, has, except in wings, all the essential characters, and especially the elongated anal pseudosegment in the female, of the genus *Heteropteryx*, which is winged in both sexes. In another case, the genus *Dimorphodes*, whose males are winged, a new species has been taken by Mr. Wallace in the islands of Batchian and Ternate, very closely allied in the female to Westwood's typical species of the genus, but apterous in the male sex. Other less decisive cases might be mentioned.

A careful examination of the extensive series of Phasmidæ in the Saundersian collection has convinced me that the objections thus producible against a classification founded on the absence or presence of wings, could be brought forward with equal justice if other organs were taken as the groundwork. The only other classification of the family which has been proposed is the one first sketched out by Latreille and developed by Serville, and which takes various other features as guides, especially the armature of the legs. This leads to equally artificial results, such as separating widely *Bacteria* and *Bacillus*, *Phibalosoma* and *Bacteria*, and so forth. The wording of the objections to the alary system by the Berlin Professor, as in all such cases, implies that there exist in the nature of the thing the materials for a neatly definable classification of the group, which the Monographer had failed to discover. But I believe such materials do not in this case exist. In other words, I believe that in the Phasmidæ, as in some other groups, Nature, in adapting her species to their conditions of life, has, in the process of variation and adaptation, involved all those parts of structure which usually yield, by their partial constancy, characters for the definition of generic groups. The type of structure of the family is, moreover, as I have before said, homogeneous to an unusual degree, considering the very wide range of dissimilarity that it embraces. This explains why apterous species are so closely allied by affinity to winged species, and why, when other parts of structure are taken for characters, species are widely sundered which in reality are closely related. The family is an isolated one in its order, so much so that it is impossible to say what genus in it is more nearly related to a neighbouring family than any other genus; and as its type was evidently simple at its origin, and not compounded of two or more allied types which, throughout their subsequent modification, have not receded too far to be included in one family, all the existing species are very closely related to each other. It has even been shown by writers on the group that the principal great modifications of structure which do exist, namely those involving the thoracic segments, are due to the development or

non-development of the wings. This is also a proof of the homogeneity of the type; for we have seen how the possession of wings is little better than a specific character.

For these reasons I have not thought it necessary, in describing the following large number of new species, to make any considerable alteration in the classification adopted by Professor Westwood. The species possessing wings in both sexes seem to be generally more nearly allied to each other than any of them are to apterous species. Some of his genera might be improved by withdrawing a portion of their contents, and placing them in other genera; and it will perhaps be necessary, eventually, to establish several new ones; but, upon the whole, his work seems to place the forms in tolerably natural order. The genera with lengthened upper wings (tegmina) are properly placed near together, and the elongated apterous ones, with equal propriety, brought into proximity. But I think it would be very desirable to abolish the two divisions, and bring several of the apterous genera into nearer connexion with the winged ones. For instance, *Lonchodes* and *Bacteria* with *Phibalosoma*; *Acanthoderus* and *Eurycantha* with *Heteropteryx*, and so forth. The genus *Anophelepis* (containing species with very rudimentary wings) would perhaps be better abolished, and its contents distributed amongst other genera—for instance, *An. xiphias* and *An. despecta* to *Bacteria*, and *An. vittata* to *Ceroys*, the characters of these genera being altered to suit the change.

Habits.—There is very little to say about the habits of the Phasmidæ. They are wholly vegetable feeders, and are seen in the tropical forests, where they are most numerous, clinging closely to stems or crawling slowly over the foliage of bushes and trees. Belonging to the Orthopterous order, they, of course, do not undergo a metamorphosis in the proper sense of the word, having a similar form when they emerge from the egg to that which they present in the adult state, and continuing active at all stages of their existence. So similar is the full-grown larva and the so-called pupa to the adult, that the old authors sometimes described these adolescent forms as adult insects, and all authors describe new species from examples in the earlier stages, as it is generally not difficult to recognize the adult by a description of a pupa. They undergo several changes of integument; and in the stage preceding the adult the wings first appear as inarticulated foliaceous lobes on the thoracic segments. Like the rest of the Orthoptera, which is an order situated low in the scale of development of the insect type, there is very little or no consolidation of the segmentary structure of the body. The Phasmidæ have the full number of freely-articulating segments characteristic of the abstract insect type—a feature retained only in the larval condition by most of the higher orders of insects with perfect metamorphosis. These segments being elongated, the movements of the insects are necessarily sluggish; and the slowness of movement is increased in many species by the bulk and weight of the entrails, the Phasmidæ being voracious feeders, and the elasticity of the connecting membranes of the abdominal segments admitting of increased bulk to the body. Wings to such creatures are not of much use as organs of distant and rapid locomotion. We know that wings in some other allied families of Orthoptera are supplemented by saltatorial hind legs, as in grasshoppers, crickets, &c.; but the Phasmidæ have not this advantage, and the wings seem to serve little better than as parachutes, or to float their possessors from one tree to another. In the economy of the species, this limited

power of locomotion must be of some use; but the numbers of apterous forms in close alliance with the winged ones show that some Phasmidæ can maintain their own in the battle of life as well without as with organs of flight. They are, however, insects of rare occurrence, and in my own experience in the Amazons region I found only one that was distributed over a wide extent of country. Some of them, as I have recorded under the head of *Phasma putidum*, have the power of emitting a fetid liquid when alarmed; many others are armed with sharp spines on their legs or body; numerous species, as I have before stated, have a perfect disguise in their resemblance to a stem of grass, a dead branch, a mossy chip of bark, a leaf. All these properties, it is needless to remark, are the varied means by which these apparently helpless creatures succeed in maintaining their place by the side of the nimbler and more compactly organized families of insects. Some species of *Phasma* and *Necroscia* (winged in both sexes) have no disguise, but, on the contrary, brilliant and varied colours: what means of protection they enjoy is unknown, but the fact shows the justice of the view that these are typical Phasmidæ; they have not been perverted by the agencies of special adaptation into a resemblance to a stem of grass or a leaf.

The method of copulation I have described below in the remarks on *Phasma putidum*. The females, according to Lansdown Guilding, drop their eggs first into the concave seventh ventral segment, which, together with the two remaining segments, is curiously changed from the normal form, apparently for this purpose, the eggs remaining there until their shells are dry and hardened, when they are deposited at random.

BACILLUS GRAMINEUS, n. sp. *B. elongatus*, tenuis, pallide viridis; capite elongato, inermi, haud convexo, lateribus subparallelis; mesothorace leviter granulato; abdomine stylis analibus valde curvatis pubescentibus; pedibus elongatis, tenuibus, inermibus; antennis 15-articulatis, brevibus, subuliformibus, articulis duobus basalibus depressis (*mas*).—Long. corp. 2" 3"; cap. $1\frac{3}{4}$ "; anten. $2\frac{1}{4}$ "; prothor. 1"; mesothor. $4\frac{1}{2}$ "; metathor. $5\frac{1}{2}$ "; abdom. 1" $2\frac{1}{4}$ ". (Plate XLIV. f. 4.)

Resembling *B. Stellenboschus*, Westw. (Cat. Phasm. plate ii. fig. 4), in colour and size, but differing from that species in the slenderness of the thighs, which are filiform and unarmed. It has some affinity also with *B. natalis*, Westw. (Cat. Phasm. plate xxiii. fig. 7); but the legs, although long and slender, do not reach the excessive tenuity which they exhibit in that species, and the middle legs are strikingly smaller, compared with the other legs, than in *B. natalis*.

Head elongate, scarcely narrowed behind, pale green; eyes scarcely prominent. Antennæ short, the two basal joints depressed (not so broad as the third), the rest thick, and the whole tapering to the apex. Thorax light green, paler and yellowish in the middle of the dorsal surface, mesothorax a little shorter than the metathorax, and slightly granulated over the surface. Abdomen light green, not dilated at the apex, apical dorsal segment obtuse; anal styles pubescent and strongly curved inwards; genital segments short, not passing the end of the eighth dorsal segment, moderately convex. Legs elongated, all equally slender and unarmed, the middle pair somewhat shorter than the others.

Hab. One example, from Natal. (The artist has represented the middle legs too long in the figure.)

BACILLUS ASPERICOLLIS, n. sp. *Fœmina*. Cylindricus, tenuis, pallide luteus; capite elongato, haud convexo, lateribus parallelis; antennis subuliformibus; mesonoto dorso lævi, lateribus fortiter granulatis, metathorace sublævi; abdomine apicem versus attenuato, stylis analibus rectis compressis, operculo brevi; pedibus modice elongatis, inermibus.—Long. corp. 2" 10''; cap. 1 $\frac{3}{4}$ ''; anten. 2 $\frac{1}{4}$ ''; prothor. 1 $\frac{1}{4}$ ''; mesothor. 5 $\frac{1}{2}$ ''; metathor. 7''; abdom. 1" 5 $\frac{3}{4}$ ''; styl. anal. $\frac{3}{4}$ ''.

Head elongate, thick, scarce perceptibly narrowed behind, eyes not at all prominent; pallid, dingy-ochreous, with a dusky line on each side behind the eyes. Antennæ with the basal and second joints depressed (not so wide as the others), the rest thick and gradually tapering to the apex. Mesothorax smooth, with the exception of the edge of the mesonotum on each side, which has a row of rather sharp, raised granules; these continue also along the edges of the metanotum, but are there much less prominent, and remain of the same colour as the thorax, namely dingy pallid ochreous. Abdomen smooth, very tapering at the tip, which is furnished with two moderate-sized, compressed and straight anal styles. The genital operculum is very short, similar to that of *Bacillus Peristhenes* (Westw. Cat. plate viii. fig. 2), and scarcely passing beyond the commencement of the eighth ventral segment. A short anal segment or plate is visible at the apex of the terminal (ninth) dorsal segment of the abdomen. Legs moderately short (like *B. Rossii*), and quite unarmed.

Hab. This insect, which is possibly the female of *B. gramineus*, is also from Natal.

BACILLUS GUENZII, n. sp. *B. filiformis*, lævis, inermis, luteo-viridis, meso- metanotoque lateribus nigro lineatis; capite oblongo, supra plano; antennis 16-articulatis, mesothorace longioribus; abdomine ante apicem paulo dilatato, segmento dorsali terminali apice emarginato, segmentis genitalibus fortiter tumidis; stylis analibus brevibus, rectis; pedibus modice elongatis, inermibus (*mas*).—Long. corp. 2" 3''; anten. 8''; mesothor. 6''; metathor. 4 $\frac{1}{2}$ ''; abdom. 1" 3''. (Plate XLIV. f. 14 a.)

Bacillus Guenzii belongs to the same group as *B. gracilipes*, *Stellenboschus*, and *natalis* (Westw.). It appears to be most nearly allied to *B. Stellenboschus*, but differs at once from this species by the shortness and linear form of the anal styles.

Head oblong, very slightly narrowed behind, sides behind each eye with a longitudinal furrow, surface-plane dingy-yellow, dusky on the crown, and with a dusky line on each side; eyes very prominent; antennæ 16-jointed, rather more slender than in the allied species, basal joint flattened and tumid beneath at the apex. Pronotum uneven. Meso- and metanota with a black streak on each side, dorsal surface (in dried example) red. Abdomen filiform, with the three terminal segments of nearly equal length; antepenultimate dilated towards the apex, dilated sides (together with those of the penultimate) deflexed; apical segment scarcely convex, angles rounded off, tip emarginated in the middle; genital segments much inflated, but not reaching beyond the tip of the penultimate dorsal segment. Anal styles short, straight, scarcely visible beyond the tip of the abdomen. Legs moderately elongated, intermediate pair short (fore leg 2" 1''; intermediate 1" 4''; posterior 1" 9'').

Hab. Natal: from the collections of M. Guenzius.

BACILLUS PATELLIFER. *Fœmina.* Cylindricus, robustus, granulatus, viridis; antennis brevibus, filiformibus, articulo basali magno, ovato, complanato; capite postice attenuato, inermi; femoribus anticis serratis, reliquis inermibus; segmento sexto ventrali margine postico producto acuto; operculo usque ad apicem dorsalem protenso, angusto, vix convexo, obtuso.—Long. 4'' 3'''; anten. 6'''; mesothor. 10½'''; metathor. 8½'''; abdom. 2'' + 6'' = 2'' 6'''; ped. intermed. 1'' 11'''; ped. post. 2'' 9''.

Allied to *Bacillus cuniculus* and *B. Hyphæreon* (Westw. Cat. plate vi. figs. 1 & 2), but quite distinct from either.

Body moderately thick, cylindrical, and covered throughout, closely and regularly, with small acute granulations, yet the integument is slightly shining: the colour light green. Head stout, moderately narrowed in a straight line behind the eyes, which are slightly prominent. Basal joint of antennæ large, ovate, and flattened from base to apex, second joint also dilated, the rest filiform. Apical dorsal segment quadrate; sixth ventral segment with the hind margin produced and acute in the middle; operculum reaching the tip of the abdomen, obtuse, narrow, and scarcely convex; anal styles short, filiform, pointed. Legs moderately stout, ridges of middle and hind femora with a few minute spines, upper and lower ridges of anterior pair strongly serrated. Tarsi simple.

Hab. Darjeeling (*Mr. Russell*): Coll. W. W. Saunders, Esq.

BACILLUS SCYTALE, n. sp. *B. cylindricus*, elongatus, lævis, luteus; capite oblongo, postice attenuato, inermi, linea transversa inter oculos elevata; oculis prominentibus; antennis articulo basali magno dilatato; abdomine segmento dorsali terminali apice medio inciso, angulis apicalibus distinctis; pedibus validis, modice elongatis, femoribus anticis supra serratis, intermediis posticisque apice infra unidentatis, tibiis quatuor posticis apices versus serratis (*fœm.*).—Long. corp. 6''; mesothor. 16''; metathor. 12''; abdom. 3'' 1'''. (Plate XLIV. f. 9.)

Agrees in size, form, and armature of the legs with *B. cuniculus* (Westw.), but differs in wanting the cephalic horns which distinguish that species.

Head oblong, narrowed behind, unarmed, but with an obtuse, thick transverse ridge between the eyes; basal joint of antennæ dilated and flattened (broken beyond the fourteenth joint). Thorax cylindrical and smooth. Abdomen smooth; seventh dorsal segment two-thirds the length of the sixth; eighth little more than half the length of the seventh, and considerably shorter than the terminal segment; the latter with the apical edge notched in the middle and with the lateral angles distinct; operculum (♀) reaching the extremity of the abdomen, inflated and keeled towards the tip; anal styles short, straight, concealed. Legs moderately elongated, intermediate pair short; anterior femora serrated along their upper edge; middle and hind femora with a tooth-like spine beneath near the tip; four posterior tibiæ with the raised lines towards the apex finely serrated; basal joint of the tarsi about the same length as the three following joints taken together.

Hab. Ceylon: Coll. Nietner. This species, with several others having a similar form of antennæ (large, flattened basal joint), will range under the genus *Ramulus* of M. de Saussure; it is closely allied to *Bacillus* (*Ramulus*) *Humberti* of this author (*Annales d. l. Soc. Entom. de France*, 1861, p. 472).

The genus *Linocerus* of G. R. Gray (Synopsis Phasm. p. 20) appears to be the same as *Ramulus*, and the name will take precedence if the genus is adopted.

BACTERIA CYRTOCNEMIS, n. sp. *B. cylindrica*, viridis, calamum viridem simulans; capite valde convexo, vertice spinis duabus armato; thorace inermi; abdominis segmento dorsali ultimo apice emarginato; operculo vaginali angustato, depresso, abdominis apicem haud superante; stylis analibus brevibus, rectis; pedibus valde angulatis, modice elongatis, femoribus intermediis curvatis prope basin spinis foliaceis binis utrinque armatis (*fem.*).—Long. corp. 5"; anten. 3"; mesothor. 1" 3"; metathor. 10½"; abdom. 2" 6". (Pl. XLIV. f. 10.)

Head with the crown much raised, the front part of the elevation having two strong and short, acute spines directed obliquely forwards. Thorax unarmed. Abdomen cylindrical to the apex; the apical segment equal in length to the preceding, its apical edge triangularly emarginate; the vaginal operculum narrow, not at all convex, pointed at the tip, and not passing the apex of the abdomen; anal styles short, straight, obtusely pointed. Legs moderately stout, scored between the raised lines, which are strongly elevated and compressed; the fore and hind legs are elongated and simple; the middle femora are strongly curved, and have, at one-fourth their length from the base, on each side, a flattened expansion divided into two tooth-like points. The basal joint of all the tarsi is much elongated. The colour of the entire insect is pale green, and in life it bears the closest resemblance to a stalk of grass, or rather the midrib of a palm-leaflet.

Hab. One example, taken at Ega on the Upper Amazons.

BACTERIA LATICAUDA, n. sp. *B. cylindrica*, tenuis, glabra, olivaceo-viridis, capite prothorace pedibusque rufescentibus; capite inermi; abdominis segmentis tribus apicalibus dilatatis, segmento ultimo apice late emarginato; stylis analibus brevibus, rectis, filiformibus; pedibus elongatis, femoribus quatuor posticis apice subtus bispinosus et denticulatis (*mas*).—Long. corp. fere 5"; anten. 4" 3"; mesothor. 1" 3"; metathor. 10½"; abdom. 2" 5". (Pl. XLIV. f. 11 a.)

Head oval, scarcely convex, unarmed, reddish. Antennæ very long, dusky. Meso- and metathorax dark green, very smooth, and slightly shining, scarcely enlarged at the insertion of the legs. Abdomen dark-green, light-brown towards the apex; the three apical segments of nearly equal length (the apical one the shortest), each being about half the length of the sixth segment; the seventh is strongly dilated from base to apex; the eighth is of greater width, its sides being only moderately deflexed and its angles rounded; the ninth or terminal segment is less broad, and of nearly square shape, but convex above, its front edge broadly excised, its margins smooth, not thickened, and its angles prominent but obtuse; the anal styles do not project beyond the sides of this segment, but are pendent, short, and nearly straight; the terminal ventral segments are very gibbous. The legs are long, slender, and of a reddish hue; they are unarmed, with the exception of the apical part of the four posterior femora, which, beneath, are furnished with a row of denticulations, two of which are larger than the rest, and spiniform; the basal joint of the tarsi is quite simple, being neither compressed nor crested.

Hab. One example, taken at Ega on the Upper Amazons.

BACTERIA AMAZONICA, n. sp. *B. cylindrica*, tenuis, omnino inermis, fusco-lutea; capite ovali, subconvexo, rufescente, supra fusco trivittato; thorace lævi; abdominis segmentis tribus apicalibus brevibus, haud dilatatis; segmento ultimo minore, supra bifoveolato, lateribus bisinuatis, margine apicali incrassato, leviter emarginato; segmentis apicalibus ventralibus fortiter gibbosis, gibbo medio carinato, apice obtuso. Pedibus simplicibus, tarsis omnibus elongatis, articulo basali simplici (*mas*).—Long. corp. 4" 2''; anten. 4''; mesothor. 1" 1''; metathor. 10''; abdom. 2''.

The distinguishing characters of this species are the narrowness of the seventh and eighth dorsal abdominal segments, whose lateral margins are continuous with those of the preceding, and the shape of the apical segment. In general form the species does not differ much from *B. muricata*, *B. serricauda*, and numerous other allied species.

Head with the sides rounded, and the crown convex; pale, with three broad dusky stripes. Thorax smooth, dingy-brown. Abdomen with the seventh and eighth dorsal segments much shorter than the sixth, but not broader; or if they appear broader, this is owing to their being flattened out by the bulk of the sexual organs beneath them. The terminal segment is about half the length of the penultimate, and very much narrower; its sides are bisinuate or waved, and its narrow apical part has thickened margins and on its upper surface two elongated depressions, the apical edge itself being excised in the middle and having its angles very obtuse. The anal styles are short, straight, and abruptly thickened at the end, and they are pendent beneath the apical segment. The legs are slender and unarmed; the tarsi, especially the posterior, are much lengthened, and the basal joint is long and simple.

Hab. Two examples, taken at Ega, Upper Amazons. One of them is rather smaller than the other, and has the intermediate legs shorter in proportion. The two specimens, however, agree precisely in the apical segments of the abdomen and their appendages—a fact which shows that these offer more reliable specific characters than the legs.

BACTERIA COMIS, n. sp. *Mas. B. filiformis*, gracillima, omnino inermis, luteo-viridis, antennis pedibusque pubescentibus; capite oblongo, supra plano, postice paulo attenuato, oculis convexis; abdominis segmento penultimo dorsali haud dilatato, lateribus deflexis; segmento ultimo (longitudine præcedenti æquali) postice subattenuato, angulis rotundatis, apice leviter emarginato; stylis analibus brevibus, simplicibus; pedibus parum elongatis.—Long. corp. 3" 5''; anten. 2" 5''; capit. 1 $\frac{3}{4}$ ''; prothor. 1 $\frac{1}{3}$ ''; mesoth. 10''; metath. 7 $\frac{1}{2}$ ''; abdom. 1" 8 $\frac{1}{2}$ '' (Pl. XLIV. f. 12 b.)

Bacteria comis differs from most of the other South American species in the shape of the head, which, in the male, is oblong instead of suborbicular; in this respect it resembles *B. molita*, but it is well distinguished from this by its much larger size, and by the apical dorsal segment being narrow and attenuated instead of inflated on the sides.

Head oblong, slightly narrowed behind, above plane, unarmed; eyes large and prominent. Antennæ pubescent. Body slender, cylindrical, smooth and shining, quite free from spines or tubercles, yellowish green, in life doubtless of a grassy-green hue. Thorax

not dilated at the insertion of the legs. Abdomen rather slenderer than the thorax; three terminal dorsal segments of nearly equal length; penultimate scarcely dilated towards the tip, sides deflexed; apical segment attenuated posteriorly, apical edge faintly notched in the middle, angles rounded; anal styles short and filiform. Legs less elongated than usual in *Bacteria* (fore leg 2'' 3'', hind leg 2'' 6''), pubescent, unarmed; tarsi with the basal joint elongated, simple.

Hab. One example, received from Bogotá.

BACTERIA SERRICAUDA, n. sp. *Mas.* *B. tenuissima*, omnino inermis, olivacea, antennis abdomine pedibusque pilis brevibus erectis dense vestitis; capite convexo, suborbiculari; abdominis segmento penultimo dorsali parum dilatato, lateribus rectis deflexis; segmento ultimo basi constricto, marginibus multidenticulatis, apice leviter emarginato; stylis analibus sensim clavatis, subrectis, apice subtruncatis; pedibus gracillimis, tarsorum articulo primo compresso latiusculo haud cristato.—Long. corp. 4'' 6''; anten. 3'' (?); mesoth. 1'' 1''; metath. 9½''; abdom. 2'' 3½''. (Pl. XLIV. f. 13a.)

This species is closely allied to *B. Emesa*, Westw. (Cat. Phasm. plate v. fig. 3), having the same slender form, and nearly the same proportions of the different parts of the body; it differs, however, in the shape of the apical dorsal segment and the anal styles.

Head convex above, much wider than the prothorax, unarmed. Antennæ pubescent (apex wanting). Body unarmed, of an olivaceous hue. Thorax smooth, naked, scarcely dilated at the insertion of the legs. Abdomen clothed with short hairs similar to those on the antennæ and legs; the three apical dorsal segments nearly equal in length, scarcely dilated, the seventh slightly so at the apex, the eighth more so, but the sides deflexed and the angles rounded; the apical segment excised on each side at the base for the passage of the anal styles (which are rather long, pendent, gradually clavate to the apex, and obtusely truncated), the rest of its margin distinctly and evenly serrated, and its apex slightly emarginated. Legs elongated and simple; basal joint of all the tarsi strongly compressed along its whole length, not crested.

Hab. One example, Ega, Upper Amazons.

BACTERIA CULMUS, n. sp. *Mas.* *B. cylindrica*, tenuissima, viridis; pedibus omnibus inermibus, valde elongatis, longitudine fere æqualibus; capite suborbiculari, vertice bicorni; abdominis segmento dorsali ultimo præcedente longiore.—Long. corp. 5''; anten. 4''; mesothor. 1'' 3''; metathor. 11''; abdom. 2'' 6''.

Male. Extremely slender, filiform, and wholly of a grassy-green hue. Head nearly globular, the vertex with two moderately long, acute and stout spines, which are nearly erect, being curved only in a slight degree forwards. Thorax wholly smooth and simple, the proportion of the mesothorax to the metathorax being the same as in the other South American species of this group—namely, about as 4:3. The abdomen has the seventh and eighth segments about half the length of the sixth; but the ninth, or apical segment, is somewhat longer than the two preceding, and, like them, is of the same width as the rest of the abdomen, except at the tip, where it is somewhat widened, the terminal angles being very much rounded, and the middle of the margin

being sinuated. The anal styles are small, and wholly concealed under the apical segments. The apical ventral segments are elongated, and only moderately convex beneath, the tip reaching to the base of the terminal dorsal segment. The legs are all greatly elongated and simple, the intermediate pair being very little shorter than the front and hind pair. The basal joint of the tarsi is excessively elongated, being about double the length of the remaining joints taken together.

Hab. One example, from Brazil.

BACTERIA SAKAI, n. sp. *B. cylindrica*, fusco-grisea, capite pedibusque inermibus, corpore albo minute granulato, thoracis lateribus sparse denticulatis, mesonoto spinis majoribus acutis armatis (*fæm.*)—Long. corp. 6'' 4'''–7''; anten. 3'' 3'''; mesothor. 1'' 9'''; metath. 1'' 1'''; abdom. 3'' 6'''. (Pl. XLIV. f. 1.)

Head oval, scarcely convex, unarmed; mesonotum furnished with short scattered spines, a few of those on the middle portion being larger than the rest and stouter, but sharply pointed; mesonotum unarmed above, having only a few short denticulations on the sides. Abdomen cylindrical to the apex, the fourth dorsal segment having in the middle of its apical margin a small tubercle; the apical segment is rather longer than the preceding, and is sinuated on its front margin, with the lateral angles very obtuse. Anal styles inconspicuous. Sixth ventral segment narrowed and bifid at the tip. Vaginal operculum surpassing (by a length of about two lines) the tip of the abdomen, scarcely convex, obtuse at its apex; sides of the penultimate ventral segment visible, the hind angles being greatly elongated and deflexed. Legs moderately stout, basal joint of the tarsi scarcely longer than the three following united, compressed and crested. The whole body is covered with very small whitish granulations, most conspicuous on the underside of the thorax; its colour is dingy-greenish or brownish-grey.

Hab. Two examples, taken at Ega, Upper Amazons. The male of this species would be closely allied to *B. muricata* (Burm.). I have given to the insect the name which it bears amongst the Indians, namely *Sakai*, a twig or stem.

LONCHODES DOREYANUS, n. sp. *Mas.* Gracilis, cylindricus, viridis; capite bispinoso; antennis longis, setaceis; prothorace antice bi-, postice unispinoso; mesothorace postice trispinoso, medio spinoso vel inermi variabili; metathorace 4- vel 6- vel 8-spinoso; abdominis segmentis 4 anticis maris unispinosis, feminae 3-spinosis; femoribus apice infra bidenticulatis; abdominis segmento terminali dorsali inciso, ventrali modice inflato.—Long. corp. 1'' 3'''; mesothor. 5 $\frac{3}{4}$ '''; metath. 3'''.

Fæmina. Robustior, corporis latitudine inæquali; femoribus fusco maculatis, quatuor posticis supra dentatis, omnibus apice infra denticulatis; abdomine thorace latiore, pone medium paulo constricto, segmento dorsali septimo postice elevato-tuberculato, ultimo rostriformi horizontali; operculo elongato, attenuato.—Long. corp. 2'' 8'''; mesothor. 7'''; metath. 3 $\frac{1}{2}$ '''; segmenti termin. dors. 2 $\frac{1}{2}$ '''; operc. 4 $\frac{1}{2}$ '''.

This species resembles much *L. Wallacei* (*Acanthoderus id.*, Westw.), differing chiefly in the presence of two spines on the head, and in the short and horizontal form of the terminal segment of the abdomen in the female. The females of the two species, how-

ever, differ greatly in size and in the armature of abdomen and thorax. The number of the thoracic spines varies considerably, but the cephalic spines are constant in all the four examples which I have examined. I place this and the allied species in the genus *Lonchodes* on account of the general form, antennæ, and cleft apical segment of the males agreeing well with the rest of the numerous species forming the genus. The shape of the apical segment of the abdomen in the females seems to point to a connexion between *Lonchodes* and *Heteropteryx*.

Hab. Dorey, New Guinea (*Wallace*).

There are four examples in Mr. Saunders's collection, two of which are ticketed as having been taken *in copulâ*. The male in this pair has the middle part of the mesothorax quite smooth and unarmed, whilst the same portion of the segment in its partner has two transverse rows of spines, four in each row. A second specimen of the male agrees in all respects with the one just mentioned, except in the number of the thoracic spines—the middle part of the mesothorax having two pairs, placed in the same position as those of the female.

LONCHODES HISPA, n. sp. *Mas.* Gracilis, cylindricus, viridis; capite bispinoso; antennis longis, setaceis; prothorace antice bi-, postice unispinoso; mesothorace medio 4- vel 6-, postice 5-spinoso; metathorace 6-, 8- vel 10-spinoso; abdominis segmentis quatuor primis trispinosis, quinto unispinoso; femoribus apice infra denticulatis. Variat femoribus apice nigris.—Long. corp. 2" 1''; mesothor. 7''; metath. 3½''.

Lonchodes Hispa has a close resemblance to *L. Doreyanus*, differing chiefly in the four basal segments of the abdomen having each three spines instead of one. Unfortunately the female sex is at present unknown, so that it is difficult to decide whether it is a mere variety of *L. Doreyanus* or a distinct form.

The spines are longer than in the males of either *L. Doreyanus* or *L. Wallacei*; the anterior division of the metathorax has near the hind margin three spines, and the posterior division also normally three; but in one example the lateral ones are small, and in a third obsolete; the sides of the metathorax have each either one or two spines; so that the total number on this segment of the body varies from six to ten. The coxæ have all a distinct, acute spine. The apical dorsal segment of the abdomen is of the same shape as in the two allied species; the central line of the three terminal dorsal segments is strongly elevated.

Hab. There are three examples in Mr. Saunders's collection—namely, one from the island of Salwatty, and two from New Guinea.

LONCHODES FLAVICORNIS, n. sp. *Mas.* Gracilis, cylindricus, corpore tenuissime transverse ruguloso, leviter granulato, subnitido, castaneo-olivaceo; capite oblongo, inter oculos acute bispinoso; antennis setaceis, dimidio basali nigro, apicali pallide flavo; thorace inermi; abdomine cylindrico, segmentis 7° et 8° sexto vix minoribus, 9° elongato attenuato profunde fisso; pedibus gracilibus, inermibus, tarsis simplicibus.—Long. corp. 2" 4''; anten. 2''; mesothor. 7½''; metath. 5''; abdom. segm. prim. 10'' + 3'' terminal. 3½'' = 1" 4½''.

Closely allied to *L. Praon* and *L. pseudoporus* (Westw.), but differing greatly in the shape and proportions of the terminal segments of the abdomen. A large number of specimens arrived in the same collection from Ceylon, with a number of females of *L. cyllabacus* (Westw.), unaccompanied by examples that could be taken without doubt as the opposite sexes of the two species; so that it is possible, notwithstanding the total want of resemblance in the armature of the legs, that *L. flavicornis* may be the male of *L. cyllabacus*.

The body is slender, cylindrical, and shining; it is finely sculptured throughout, however, with transverse striæ visible with a lens of small magnifying power; and the thorax is sparingly granulated. The antennæ in all the examples before me (four) have the apical halves of a pale yellow colour. The seventh segment of the abdomen is very little shorter or broader than the sixth; the eighth is of nearly the same dimensions as the seventh; the ninth or terminal segment is almost as long as the two preceding taken together, and is narrowed behind, with the apex cleft to less than half the length of the segment; the two lobes formed by the fissure, however, are not straight, but curved, forceps-like, and finely denticulated on their inner side. The legs are unarmed and slender.

Hab. Ceylon (*Nietner*). There are four examples, precisely agreeing, in Mr. Saunders's collection.

LONCHODES GRALLATOR, n. sp. *Mas.* Elongatus, gracilis, lævis, nitidus, omnino inermis, viridis; pedibus elongatis, gracilibus, flavis, geniculis tibiæque apicibus nigris; capite oblongo, haud convexo, postice paulo attenuato; antennis modice curtis, filiformibus; abdominis segmento terminali duobus præcedentibus conjunctis longiore, recto, postice attenuato, usque ad basin (spatio brevi excepto) fisso.—Long. corp. 3'' 4'''; anten. 1'' 2'''; mesothor. 10'''; metath. $7\frac{1}{2}$ '''; abdom. art. ultim. $2\frac{1}{4}$ '''; ped. ant. 3'' 9''', intermed. 2'' 5'', post. 3''.

Allied to *L. Stilpnus* (Westw.) and *L. nematodes* (De Haan), with which species *L. grallator* agrees in the short, filiform antennæ. It differs, however, from *L. Stilpnus* in the unarmed condition of its legs, and from *L. nematodes* in the oblong form of its head.

The body and limbs are entirely smooth and unarmed. The antennæ are quite thread-shaped, or of equal and moderate thickness throughout. The seventh and eighth abdominal segments are a little wider than the rest of the abdomen, and are no longer, taken together, than the sixth. The terminal segment is much elongated and attenuated behind; it is cleft nearly to the base; the two lobes are quite straight, and have each a series of denticulations on their inner side; but their basal parts are deflexed, and meet on the underside, protecting the slender anal styles, which are far from reaching the apex of the abdomen. The apical ventral segment is conically inflated. The legs are very slender, and wholly unarmed. In the dead specimen they are of a yellow colour, with the knees and tips of the tibiæ black. The tarsi are greatly elongated and filiform.

Hab. Ceylon (*Nietner*), one example. Coll. W. W. Saunders, Esq.

LONCHODES AUSCULTATOR, n. sp. *Mas.* Elongatissimus, gracilis, parce verrucosus, virescens; capite subquadrato, postice paulo attenuato, supra processis duobus auri-

formibus magnis armato; oculis magnis; antennis elongatis, filiformibus; abdominis segmento terminali reliquis latiore, medio emarginato, lateribus paulo divergentibus; pedibus modice elongatis, elevato-lineatis, femoribus intermediis supra tibiisque infra spina brevi foliacea armatis.—Long. corp. 3'' 11'''; anten. 2'' 9'''; mesothor. 11'''; metath. 9 $\frac{1}{4}$ '''; ped. antic. 3'' 1''', intermed. 2'', post. 2'' 10'''.

The insect is almost as slender in body as the *L. nematodes* (De Haan); but the legs are very much shorter, thicker, and more ridged than in that or any of the allied species; the shape of the terminal segment of the abdomen also distinguishes it from these and other members of the genus. The ear-shaped cephalic processes resemble those of *Lonchodes Taprobanæ*, to which our species also approximates in the form of the legs; it differs, however, from the male of *L. Taprobanæ*, as figured by Professor Westwood, in the shape of the apical abdominal segment.

The colour is probably green in life, varied on the legs and antennæ with spots of a darker hue. The antennæ are very long, but filiform rather than setaceous in shape. The body has a number of small round warts scattered over its surface. The abdomen is as narrow as the thorax from the base to the end of the sixth segment; the seventh widens from base to apex, and is only half the length of the sixth; the eighth is somewhat shorter; but the ninth is longer than either of them, and, instead of tapering to the end as in the allied species, becomes broader; it is broadly notched in the middle, and the two sides are somewhat divergent, with their apices broad and sinuated. The anal styles are short and concealed; the terminal ventral segment reaches the tip of the eighth dorsal, and is much smaller. The raised lines of the legs, near the middle of the intermediate femora above and the tibiæ of the same legs beneath, are expanded into very short compressed spines; with this exception the legs are unarmed; the basal joints of the tarsi are only moderately elongated, and in the anterior feet are compressed.

Hab. Ceylon (*Nietner*). One example, in the collection of W. W. Saunders, Esq.

LONCHODES FURCATUS, n. sp. *Mas et fœm.* Cylindricus, granulatus, obscure fuscus; capite oblongo, inter oculos bispinoso; antennis longis, setaceis, articulo basali complanato; abdominis segmento terminali furcato.

Mas. Minor gracilis; thorace parce granulato; abdomine longitudinaliter elevato-lineato, segmento apicali ventrali tumido; pedibus modice elongatis, subcompressis, valde elevato-lineatis.—Long. corp. 1'' 11'''; anten. 1'' 2'''; mesothor. 6'''; metath. 4 $\frac{1}{2}$ '''; ped. antic. 1'' 2 $\frac{1}{2}$ ''', intermed. 11''', post. 1'' 1 $\frac{1}{2}$ '''. (Pl. XLIV. f. 6.)

Fœm. Major, robustior; thorace dense acute tuberculato; abdomine aspere granulato; capitis spinis longis, validis, acutis; femoribus intermediis supra prope basin lobo magno foliaceo rotundato.—Long. corp. 3'' 5'''; anten. 2'' 4'''; mesothor. 9 $\frac{1}{4}$ '''; metath. 6 $\frac{1}{4}$ '''; ped. ant. 2'' 8''', ped. intermed. 1'' 11''', ped. post. 2'' 3 $\frac{1}{2}$ '''. (Pl. XLIV. f. 5.)

This species is readily distinguished by the forked shape of the terminal abdominal segment in both sexes. This structure seems to result from the fissure of the apex of the segment being very wide, and the sides diverging slightly, each forming a lobe of equal breadth from base to apex, with the sides strongly deflexed. The anal styles are short, and visible only underneath the entire base of the forked apical segment. The operculum

of the female is of the ordinary, convex, keeled shape, and reaches to the base of the fork. The thorax of the female is thickly covered with sharp tubercles both above and beneath. The cephalic spines are much smaller in the male than in the female. The legs are unarmed in the male, and also in the female with the exception of a large foliaceous lobe on the upper side of the intermediate femora near the base. The tarsi are simple, but compressed.

Hab. Ceylon (*Nietner*). Two examples in the collection of W. W. Saunders, Esq.

LONGHODES DENTICAUDA, n. sp. *Mas.* Gracilis, cylindricus, obscure viridi-fuscus, granulatus; capite oblongo, inter oculos bispinoso; antennis setaceis, pallidis, nigro annulatis; abdomine apicem versus longitudinaliter sulcato, segmento terminali apice medio inciso, lateribus utrinque apice excavato, angulo inferiore producto intus valde dentato; pedibus modice elongatis, gracilibus, inermibus.—Long. corp. 2"; anten. 1" 4"; mesothor. 6"; metath. $4\frac{1}{4}$ ".

The peculiar form of the terminal abdominal segment amply distinguishes this species from its congeners. The abdomen towards its apex is longitudinally furrowed and wrinkled; the seventh and eighth segments are not much shorter or apparently broader than the sixth; the terminal segment is a little longer than either of the two preceding, it is not attenuated behind, and is cleft as usual in the middle, but each lobe at its vertical apex is emarginated, and the lower edge is much produced and armed on its inner side with a row of conspicuous teeth. The slightly convex and rugose apical ventral segment reaches barely to the apex of the eighth dorsal.

Hab. Ceylon (*Nietner*). One example in the collection of W. W. Saunders, Esq.

LONGHODES PERSONATUS, n. sp. *Fœmina.* Elongatus, cylindricus, granulatus, opacus, cinereo-ochraceus, corpore fusco lineato, pedibus nebulosis; capite subquadrato, leviter convexo, aspere granulato, inter oculos spinis brevissimis duabus; antennis elongatis, setaceis; abdomine ruguloso; operculo convexo, declivitate postica valde dentata; pedibus brevibus, femoribus omnibus apice infra dentatis, tibiis anticis dilatatis, femoribus intermediis supra spinis foliaceis magnis, tarsorum anticorum articulo basali elevato-compresso.—Long. corp. 5" 2"; anten. 2"; mesothor. 1" 2"; metath. 10"; ped. ant. 2" 3", intermed. 1" 7", post. 2". (Pl. XLIV. f. 7.)

This fine species so nearly resembles Stoll's figure of *Phasma femoratum* (*Prisomera femorata*, Westw.), an Amboyna insect, which appears not to have been met with since the time of the early Dutch naturalists, that I have some hesitation in giving it a new name. It differs in the form and number of the foliated spines of the upper surface of the middle femora; but the amount of difference in this respect would be scarcely sufficient to warrant the step I have taken, if the figure and description of Stoll did not leave us in the dark as to several other important features which, if absent from his specimen, as we might conclude from their not being mentioned, would show that we have to deal with a totally distinct species. These features are the granulated surface of the body and the curious dentated posterior slope of the operculum. Even should Stoll's species possess these characters, it would perhaps still be necessary, on account of the different armature of the middle femora, to distinguish ours as a local form—it

being an inhabitant of the island of Bourou, while *Phasma femoratum*, as before mentioned, is a native of Amboyna.

The body is cylindrical and granulated throughout, with numerous longitudinal wrinkles on the surface of the abdomen. It is of a dingy-ochreous hue, with irregular dusky stripes, and is quite without lustre. The head is subquadrate and slightly convex, and there are two short, widely-separated spines between the eyes. The seventh abdominal segment is shorter than the sixth, but much longer than either of the two following, which are about equal in length, the apical segment has its terminal margin trisinate, with the angles prominent. The operculum is a little longer than the dorsal tip of the abdomen, and has a very distinct keel, the posterior half of which is cleft, leaving a number of tooth-like projections; the sides of the posterior slope are also dentated. The legs are short and stout; all the femora have numerous teeth near the apex on the under surface; the anterior pair have also a row of short, compressed, and rounded expansions of membrane along their upper surface, and the middle femora have each, along the apical half, five or six larger, compressed, and obtuse spines. The anterior tibiæ are equally and broadly dilated throughout, the middle tibiæ are a little widened at the base and apex; the hind tibiæ have a broad and short foliated tooth near the base on the inner side. The tarsi are short, the basal joints being scarcely so long as the second and third taken together, and in the anterior feet are elevated and compressed.

Hab. Island of Bourou, Malay archipelago (*Wallace*). Coll. W. W. Saunders, Esq.

LONCHODES PHALANGODES. *Mas. L. tenuissimus*, inermis, pedibus elongatissimis, rectis, linearibus; abdominis segmento dorsali apicali usque ad basin fissio. Long. corp. 4" 2"; mesothor. 11"; metath. 10"; ped. anticis 5" 2"; ped. intermed. 3" 6"; ped. poster. 4".

Closely allied to *L. nematodes* of De Haan; but the body is rather stouter, and the apical dorsal segment differs in shape.

Head oval (mutilated, and antennæ wanting). Fore legs excessively elongated, being an inch longer than the body, and quite linear, the base of the femora not being curved as it generally is in this family; fore tarsi nearly $\frac{3}{4}$ of an inch in length. Thorax entirely smooth. Abdomen smooth; seventh and eighth segments taken together about equal in length to the sixth, and not much longer than the ninth, which is cleft to the base, the cleft not suddenly gaping towards the apex, the tips of each lobe being denticulated, and the anal styles short and incurved. The seventh and eighth segments are dilated, but the dilated margins are deflexed, the eighth at the tip nearly, and the base of the ninth quite, meeting beneath, the apical ventral segments being much abbreviated, and not reaching the tip of the eighth dorsal segment. Legs all quite simple and linear.

Hab. One example, from Batchian (*Wallace*).

LONCHODES DISPAR, n. sp. *L. cylindricus*, elongatus, tenuis, granulatus, luteus, olivaceo, varius; capite breviter bispinoso; pedibus anticis elongatis, tenuibus, intermediis brevibus, posticis paullo elongatis, femoribus omnibus apicem versus infra den-

ticulatis; abdominis segmento ultimo dorsali valde elongato et postice attenuato (*mas*).—Long. corp. 3" 7''' ; mesothor. 1" ; metath. 9''' ; abdom. 1" 8'''.

This species is nearly allied to *L. uniformis* (Westw. Cab. Or. Ent. plate 39. fig. 3); but it is much more slender, and the apical dorsal segment is much longer, and cleft in a somewhat different manner. It resembles still more closely *L. Trollius* (Westw. Cat. Phasm. plate xxiii. fig. 1); but *L. Trollius* has the apical segment cleft to its base, whilst the fissure extends in *L. dispar* only a short way from the apex.

Body slender, cylindrical, densely and finely granulated throughout; the colour is green, in some parts luteous, with the tips of the thighs red. Head elongate, being much prolonged behind the eyes, flattened above, and with prominent hind angles, the forehead, between the eyes, having two short but acute spines directed forwards. Antennæ two-thirds the length of the body. Thorax unarmed, mesothorax enlarged at the insertion of the legs, metathorax not so; the latter is strongly bowed. Abdomen with the seventh and eighth dorsal segments dilated; taken together they exceed the sixth in length; the terminal segment is nearly equal in length to the two preceding, and is gradually narrowed behind to a point, the apex being cleft, and the two lobes slightly incurved and toothed on their inner margins; anal styles short and inconspicuous. Fore legs slender, 2" 3''' in length; middle legs shortened and thickened, especially the thighs, 1" 4''' long; hind legs of the same thickness as the front pair, but 3''' shorter. The tarsi are all short, with the upper apical angles of the joints much produced, the basal joint in the middle and hind tarsi being no longer than the two preceding taken together, in the fore tarsi much longer. All the thighs have a small cluster of denticulations beneath near their apex, those of the middle thighs being larger than the rest.

Hab, One example, taken by Mr. Wallace at Sarawak, Borneo.

LONCHODES FORCIPATUS, n. sp. *L. cylindricus*, modice elongatus, robustus, confertim granulatus, luteo-olivaceus, pedibus viridibus, femoribus apice luteis; abdominis apice clavato, segmento ultimo fisso, ramulis instar forcipis incurvatis (*mas*).—Long. corp. 2" 6''' ; mesotho. 7½''' ; metatho. 6½''' ; abdom. 1" 1''' ; anten. 1" 6'''.

Resembles *L. geniculatus* of Gray (Westw. Cab. Or. Ent. plate 39, fig. 4), but differs from that species in being much stouter, with (in proportion) shorter antennæ, and in the apical dorsal segment being cleft nearly to the base, with the two lobes thus formed narrowed each to a claw-like point, and curved.

Head quadrate, slightly narrowed behind eyes, and flattish beneath, unarmed, closely covered like the rest of the body, above and beneath, with minute and smooth, rounded tubercles. Thorax longer than the abdomen, greatly enlarged at the insertion of the legs, the metathorax, in addition, being gibbous above at that point; the metathorax is also wider than the mesothorax. Abdomen cylindrical like the thorax, but narrower, the three terminal segments forming a club, the seventh and eighth being greatly dilated, and the ninth, which is much the longest of the three, deflexed, cleft in the middle, with the two lobes curved and sharply pointed, with a series of sharp teeth on the inner side of each. The anal styles are short, straight, and obtusely pointed; the apical ventral segments are gibbous beneath. The legs are rather short and stout

the femora somewhat thickened and each armed, near the apex, beneath with a cluster of small and sharp teeth; the basal joint of the tarsi is scarcely longer than the three following taken together. The colour of the body is fulvous-brown, with an olive tinge; the legs (even in dried specimens) are of a fine green hue, with the knees orange-yellow.

Hab. Of this handsome, well-proportioned species there are two examples, one from Menado, and one from Tondano, in the North of Celebes, taken by Mr. Wallace.

LONCHODES ASPERATUS, n. sp. Robustus, sordide olivaceo-luteus, opacus, corpore toto rugulis longitudinalibus, granulis et tuberculis acutis asperato; capite quadrato, postice haud attenuato, inter oculos breviter bispinoso, antennis articulo basali lato complanato; pedibus validis, femoribus apice anticis uni-, intermediis et posticis quadrispinosis; tarsis simplicibus.

Mas. Cylindricus, tuberculis parvis minus acutis; corpore supra coxas dilatato; abdomine segmentis 7° et 8° paulo abbreviatis et dilatatis, 9° attenuato profunde fisso, fissura intus denticulata; segmentis genitalibus nodulosis, medio carinatis, apice subacuto; stylis analibus brevibus, complanatis, obtusis.—Long. corp. 2" 2"; anten. 1" 6" (circa); mesothor. 6"; metath. 4"; ped. post. 10½".

Fcem. Major, latior, subcylindricus, tuberculis majoribus subspinosis; abdomine segmentis dorsalibus 6°–8° apice dentatis, ultimo apice dilatato, medio valde emarginato; segmento ventrali sexto apice producto, lobato; operculo medio tumido, usque ad apicem segmenti ultimi dorsalis extenso.—Long. corp. 2" 9"—3" 3"; anten. 2".

The male of this species resembles *L. Myrina*, Westw. (Cat. Phasm. t. xxiv. fig. 7), agreeing with that species in the form, and pretty nearly in the proportions of the apical segments of the abdomen, both ventral and dorsal, and in the spines at the apex of the femora; but it is shorter, much more robust, and differs entirely in having coarse wrinkled integuments studded with small tubercles and granulations. The head is short and thick, and not narrowed behind; and is armed in both sexes, between the eyes, with two short spines. The basal joint of the antennæ is broad and flattened, like that of many species of *Bacillus* and *Acanthoderus*. The proportion of mesothorax to metathorax is as three to two in both sexes, and the granulations and wrinkles of the body are moderate in the male, but strongly pronounced in the female, the former amounting in some examples to short and acute spines. The legs are stout and somewhat short, the hind pair, when stretched out, surpassing by but little the length of the abdomen, and the middle pair are in due proportion. The apical dorsal segment of the abdomen in the female is dilated at each apical angle, and deeply emarginated in the middle, the emargination being occupied by a supplementary tenth segment. A distinguishing character of the species, as far as this sex is concerned, is the remarkable compressed lobe into which the apical part of the sixth ventral segment is produced.

Hab. Darjeeling; from Mr. Russell's Collection. One male and two females in Mr. Saunders's Collection.

LONCHODES RUSSELLII. *Mas.* Cylindricus, elongatissimus, obscuro-viridis, glaber, subnitidus; capite oblongo-quadrato, postice leniter attenuato; antennis articulo basali

haud dilatato; abdomine segmentis 7° et 8° paulo abbreviatis, segmento ultimo tertia parte apicali fissa, segmento terminali ventrali paulo convexo, lævi, segmentum 8^m dorsale vix superante; pedibus modice elongatis, femoribus intermediis et posticis apice quinque-denticulatis, denticulis linea unica ordinatis; tarsis filiformibus.—Long. corp. $4'' 3'''$; mesothor. $10\frac{3}{4}'''$; metath. $9\frac{1}{2}'''$; ped. post. $3''$; abdom. $1'' 10''' + 6''' = 2'' 4'''$.

Differs from *L. nematodes*, De Haan (Westw. Cat. Phasm. t. v. fig. 7), which it resembles in the extent of fissure of the terminal abdominal segment, in the elongato-quadrangular shape of the head, in the body and limbs being very much less attenuated: the general colour is dark-green or olive-brown, and the body is smooth throughout and shining. The antennæ are broken in the specimen described; the basal joint is of ordinary thickness. The legs are unarmed, except a single row of small denticulations underneath the middle and posterior femora towards the apex. The seventh and eighth dorsal segments are not notably abbreviated; taken together they are considerably longer than the sixth; the apical segment is a little shorter than the sixth, tapering, and the fissure extends scarcely to one third the length; the sides of the basal part coalesce beneath; the anal styles are short and pendent beneath the middle of the segment. The apical ventral segment is smooth, slightly convex, and reaches the apex of the eighth dorsal segment; the seventh and eighth ventral segments are simple.

Hab. Darjeeling: one example, male, from Mr. Russell's Collection (Coll. of W. W. Saunders, Esq.).

PHIBALOSOMA EXTENSUM, n. sp. *Ph. magnum*, cylindricum, attenuatum, corpore lævi; capite cornibus duobus rotundato-foliaceis armato; operculo vaginali longissime canaliculato, apice sinuato-truncato, longe ultra apicem in linea recta extenso; pedibus mediocribus, foliaceo-spinosis (*fœm.*).—Long. corp. (operc. inclus.) $7'' 7'''$; mesothor. $1'' 6'''$; metath. $1'' 3'''$; abdom. $3'' 8'''$; operculi $8'''$.

Body moderately slender, cylindrical, dingy-brown sprinkled with white. Head slightly convex, vertex, between the eyes, armed with two oval leaf-like horns. Antennæ long, setaceous (apex wanting). Thorax and abdomen unarmed. Abdomen with the three apical joints, taken together, rather shorter than the sixth; a small pointed segment appearing at the tip of the ninth. Anal styles rather short. Vaginal operculum scoop-shaped, keeled beneath, sinuato-truncate at the apex, surpassing the dorsal apex of the abdomen by a length of 8 lines, and unaccompanied by filaments. Fore legs not much longer than the second pair; fore femora beneath with three tooth-like expansions—namely, one before the middle, the second beyond the middle, the third at the apex; fore tibiæ with three rounded expansions beneath, in nearly the same relative positions as those of the femora. Middle femora with four large tooth-like expansions near the base—namely, two above, approximated, and two wide apart beneath; middle tibiæ with a pair of similar expansions on the upper surface near the base, and a single one in the same line beyond the middle. Hind femora with numerous tooth-like spines placed wide apart from base to apex; hind tibiæ with two or three similar processes on the upper surface. Tarsi moderately elongated, basal joint simple, as long as the remaining four taken together.

This fine species resembles greatly *Phibalosoma phyllocephalum* (Westw. Cat. Phasm. plate xxxiii. fig. 1), differing in its unarmed body and in the shape of the vaginal operculum. There is one example only, without locality.

PHIBALOSOMA MAXIMUM, n. sp. *Ph.* longissimum, cylindricum, corpore lævi, abdominis segmento ventrali sexto apice longe bidentato, segmento dorsali apicali valde sinuato; pedibus spinosis (*fœm.*).—Long. corp. 10''; mesothor. 2'' 3'''; metath. 1'' 7'''; abdom. 5'' 6''.

Closely allied to *Phibalosoma acanthopus*, Burm., but differing in the sinuation of the tip of the apical dorsal segment, and the existence of two tooth-shaped processes at the apex of the sixth ventral segment instead of a simple spine.

Head oblong, smooth, crown oblique, the occiput projecting behind in a conical but obtuse elevation. Antennæ slender and elongated. Thorax and abdomen cylindrical, smooth; the apex of the sixth ventral segment armed with two rather long tooth-shaped corneous processes, placed close together; the terminal dorsal segment deeply and widely notched. The seventh dorsal segment is a little shorter than the sixth, and more than twice the length of the eighth and ninth taken together. The vaginal operculum is boat-shaped and keeled, with its tip rounded, and reaching the apex of the last dorsal segment, the membrane between the operculum and the apical dorsal segment has two corneous appendages, one of them greatly elongated, narrow, and curved, the other short and broad. The anal styles are short, straight, and pointed. The fore legs are moderately long (7'' 2'''), the femora being serrated along their upper and lower edges, and the tibiæ faintly denticulated; the middle femora are strongly denticulated, with a large foliaceous spine on their upper edge towards the base, the middle and posterior tibiæ (also denticulated) have a similar flattened spine in the middle of their upper edges, whilst the hind femora are simply denticulated. The basal joint of all the tarsi is greatly elongated, with the upper edge raised, compressed, and foliaceous at the tip.

Hab. Taken in Sumatra by Mr. Wallace. It is probable that this may be the female of *Ph. serratipes*, Gray.

PHIBALOSOMA CALAMETUM. *Fœm.* Cylindricum, glabrum; capite fusco, lateribus albo late vittatis, subquadrato, postice subsinuato-attenuato, inter oculos spinis duabus brevibus approximatis, occipite bituberculato; oculis valde prominentibus; thorace abdomineque inermibus; operculo elongatissimo, lineari, supra concavo, apice truncato; stylis brevibus, acutis; pedibus validis, femoribus et tibiis acanthophyllis, tarsis anticis articulis tribus apice extrorsum lobatis.—Long. corp. 7'' 3''' + operculo 1'' = 8'' 3'''; anten. 4''; mesothor. 1'' 7'''; metath. 1'' 3'''; ped. antic. 4'' 4'''; ped. post. 4'' 2''.

Distinct in the shape of the head from the allied species, this member being cuboidal in shape, narrowed behind the eyes, and slightly widened again at the posterior angles, which are obtuse; the eyes are very prominent, and there are two acute tubercles lying between the eyes and nearer together than frontal spines generally are in this family; there are, besides, two rounded tubercles above the slope of the occiput; the sides have

each a broad, distinct, whitish vitta. The antennæ are elongate and setaceous, the base being thick, but not flattened and dilated. The thorax and abdomen are free from tubercles, the three apical dorsal segments of the latter, taken together, are equal in length to the sixth, and the extreme apex is somewhat narrowed and sinuated in the middle. The operculum is transformed into a scoop-shaped ovipositor projecting an inch beyond the dorsal tip of the abdomen, and is 1 inch and 7 lines in length altogether; the anal styles are very short, and taper to a point. The legs are short and strongly ridged, some of the ridges of the femora and tibiæ having on each joint one or two foliaceous spines; the tip of the anterior tibiæ and the tips of three basal joints of the tarsi are each produced externally into a rounded lobe.

Hab. Caffraria, taken by M. Gerrard (Coll. W. W. Saunders, Esq.). In the example described, the legs on the left side of the body are, as is often the case in Phasmidæ, reproduced limbs, and consequently much shorter and more feebly armed than those of the right side.

ACANTHODERUS MOUHOTII, n. sp. *Fœm.* Elongatus, subdepressus, obscurus, griseofuscus; capite oblongo, occipite linea elevata sex-dentata, vertice et fronte acute tuberculato; antennis brevibus, filiformibus, articulo primo lato extus tuberculato, angulo exteriore apicali spinoso; prothorace tuberculato-rugoso; mesothorace verrucoso, linea mediana elevata, lateribus sulcatis; metathorace lineis curvatis dorsalibus; abdomine supra inæquali, lateribus parallelis, linea duplici dorsali, segmentis tertio quartoque medio bituberculatis, penultimo postice valde elevato, terminali apice lato verrucoso; sterno tuberculato, metasterno paulo dilatato marginibus articulatis; pedibus brevibus, validis, sulcatis, femoribus posticis supra spinis foliaceis tribus.—Long. corp. $1\frac{1}{2}''$; anten. $4\frac{1}{4}''$; mesothor. $3\frac{1}{2}'''$; metath. $2\frac{3}{4}'''$; lat. corp. $1\frac{3}{4}'''$.

Closely allied to *Acanthoderus Oileus*, Westw., an inhabitant of the island of Java, differing chiefly in the shape of the terminal dorsal segment of the abdomen and the armature of the hind thighs. The single example is a female pupa, as is the case with the only known specimen of *A. Oileus*; but the great similarity between the pupæ and adult insects in this genus renders the description of the one state applicable to the other.

Elongate, of nearly equal breadth throughout; dingy brown. Head oblong; occiput with a curved, slightly raised line bearing six or eight short spines or pointed tubercles; vertex and forehead rugose and armed with two lines of similar spines converging towards the occiput; eyes moderately prominent. Antennæ short, filiform; basal joint oblong, flattened, sides tuberculate, lateral anterior angle produced into a spine. Thorax rugose; pronotum warty; mesonotum with a raised dorsal line, a row of tubercles on each side, and two ridges with corresponding grooves running near to each lateral margin, hind edge in the middle with two obtuse tubercles; metanotum with two curved raised dorsal lines on each of its divisions. Abdomen a little narrower than the thorax, surface rough, the lateral portion of each segment with two oblique raised lines, the spaces between which are punctured, middle of each segment with two curved raised lines which, in the third and fourth, terminate in obtuse tubercles; penultimate seg-

ment elevated behind, apical segment broad at the tip, its surface separated from the sides by raised lines, sloping and tuberculated. Meso- and metasternum tuberculated, the sides near the coxæ dilated and obtusely denticulated. Legs short, stout, sulcated; hind femora above with three foliaceous spines.

Hab. One example, collected by the late M. Mouhot at Chantaboun, Camboja, is in Mr. W. W. Saunders's Collection.

ACANTHODERUS GRAVIDUS, n. sp. *A. minus* elongatus, crassiculus, rugosus, abdominis dimidio basali dilatato, tumido; cinereo-fusco unicolor; capite fronte breviter sex-spinoso, occipite valde elevato et tuberculato; antennis brevibus, articulo basali margine exteriori bispinoso; thorace tuberculato; abdomine ultra partem elevatam valde depresso, deinde apicem versus paullo elevato, tuberculato, lateribus tuberculato-carinatis, segmentis 4^o–8^m medio carinato-dentatis (*fœm.*).—Long. corp. 1" 11½''; anten. 8''; cap. 1½''; prothor. 2''; mesoth. 5''; metath. 3''; abdom. 1".

Closely allied to *Pachymorpha coronata*, De Haan (*Acanthoderus id.*, Westw.), but differs in being almost uniformly tuberculated and destitute of the many prominent spines on the various parts of the body which *P. coronata* presents.

Body somewhat thick and broad, uniform light ashy-brown. Head not broader than the prothorax; forehead (above the antennæ) with six small but acute tubercles arranged in two rows converging upwards; behind these the occiput rises obliquely into an irregular conical mass studded with obtuse tubercles. The antennæ are short (as in the group to which *P. coronata* belongs), being little more than a third the length of the body and somewhat stout; the basal joint is of thick, irregular shape, but flattened above, and having two short teeth on its outer edge. Thorax nearly cylindrical, 10 lines in length and 3 in diameter, tuberculated throughout, the tubercles being more obtuse on the breast, two or more in the middle of the front and hind margins of the mesothorax and on the hind margin of the metathorax being larger than the rest; the keeled sides of the breast above the sockets of the legs have a row of small and rather more pointed tubercles. Abdomen with keeled lateral margins, the basal half dilated and elevated, the fifth and sixth segments much depressed, the rest rising again slightly to the apex; the lateral edges are obtusely denticulated, the surface is tuberculated, the fourth segment is strongly elevated in the middle, the elevation forming a double ridge gaping behind; the fifth to seventh segments have each a prominent tubercle in the middle; in the eighth this tubercle is expanded into a very prominent ridge; the apical angles of the segments are produced each into a tooth, the apical segment being strongly produced in the middle and faintly notched at the tip. Anal styles short, inconspicuous. Vaginal operculum convex, keeled, with its apical margin flattened out. Legs short, stout, femora of the middle and hind legs tuberculated above and beneath; tarsal joints very short; claw-joint about as long as all the rest taken together.

Hab. Island of Gilolo, Moluccas (*Wallace*).

ACANTHODERUS SPINIVENTRIS, n. sp. Elongatus, subdepressus, cinereo-fuscus; capite oblongo, postice oblique elevato et spinoso, declivitate frontali usque ad basin anten-

narum lateribus spinosis; antennis brevibus, robustis, filiformibus, articulo basali extus trispinoso; pronoto quadrato, angulis spinosis, dorso acute tuberculato; mesonoto depresso, postice paulo ampliato, lateribus acute tuberculatis, dorso verrucoso, linea dorsali antice et postice bispinoso; metanoto mesonoto angustiore, quadrato, angulis posticis spinosis; metasterno lateribus dilatatis, denticulatis, medio spina magna; abdomine maris cylindrico, fœminæ pone medium constricto et depresso, supra verrucoso, segmentis 7 anterioribus supra bispinulosis, lateribus denticulatis et spina magna recta acuta armatis, 2 terminalibus angulatis, penultimo supra valide carinato, segmento quinto fœminæ nigro bimaculato; femoribus omnibus breviter spinosis.—*Mas* corpore angustiore; long. corp. $1'' 8'''$; capit. $2'''$; prothor. $1\frac{3}{4}'''$; mesoth. $4\frac{1}{2}'''$; metath. $3''$. *Fœm.* Corpore latiore; long. corp. $2''$; anten. $9'''$, 21-articulatis; cap. $3'''$; prothor. $1\frac{3}{4}'''$; mesoth. $5'''$; metath. $3\frac{1}{2}'''$. (Pl. XLIV. f. 2 a, 2 b.)

Closely allied to *Acanthoderus coronatus* (De Haan), differing chiefly in the greater length and more pointed form of the lateral spines of the abdomen, which stand out at right angles to the body. Other minor points of difference are the much darker colour of *A. spiniventris* and the more enlarged form of the basal half of the abdomen in the female, followed by a greater constriction of the fifth and sixth segments.

Body of a dark ashy-brown colour; antennæ tawny at the tip. Head obliquely raised behind, the raised part armed with 5–7 acute tubercles or spines, and the frontal slope to the base of the antennæ armed on each side with similar spines, the middle of the forehead being tuberculated. Thorax flattened above, the outline widening from the front towards the middle of the mesonotum; surface warty, angles and dorsal line spiny; metasternum dilated on the sides and armed with a long straight acute spine. Abdomen of the male cylindrical, of the female dilated in its basal half, then greatly constricted, becoming dilated again towards the apex; surface in both sexes rough and warty, with a pair of sharp spines near the hind margin of each segment except the two terminal ones, the sides of the same denticulated and armed each with a long and very acute spine standing out at right angles to the body; eighth and ninth dorsal segments dilated and angulated, eighth with a high ridge in the middle, ninth narrowed towards the tip, tip notched. Legs stout, thighs armed with a few short spines.

Male. Body narrower than in the female; abdomen cylindrical, spotless; ninth ventral segment greatly enlarged and convex, tuberculated on the surface, and dilated on the sides.

Female. Body broad; fifth abdominal segment with two black spots in the middle of the base; operculum convex, keeled, tuberculated, reaching nearly the tip of the last dorsal segment.

A pupa of the female sex in Mr. Saunders's collection differs from the adult stage (besides the undeveloped state of the genital segment of the abdomen) only in the smaller size of the tubercles and spines, and in the absence of enlargement of the first four segments of the abdomen.

Hab. Islands of Timor and Bourou (Coll. W. W. Saunders, Esq.). Many examples were sent home by Mr. Wallace, and all agree in the essential features which distinguish the species from *A. coronatus*.

HETEROPTERYX WESTWOODII, n. sp. *Fœm.* Elongata, robusta, postice valde attenuata scabra et spinosa, cinereo-fusca; capite subquadrato, acute tuberculato, vertice mox pone oculos utrinque spinis duabus majoribus; pronoto valde inæquali, spinoso; mesonoto inæquali, scabroso et spinoso, lateribus valde spinosis; metathoracis lateribus spinosis; pectore plano, inermi; abdominis segmentis dorsalibus quatuor basalibus lateraliter acute tuberculatis, reliquis scabrosis, processu apicali elongato quam operculum brevior, apice subtruncato; operculo valde elongato, attenuato et curvato; pedibus validis, femoribus crassiusculis spinosis, tibiis apice paulo incrassatis; tegminibus quam alæ brevioribus, oblongis, prope basin supra valde elevatis et tuberculatis, ochraceis, fusco maculatis; alarum parte membranacea fusca, area costali ochracea fusco maculata.—Long. corp. 2" 9"; anten. 1" 6"; prothor. 3"; mesoth. 3½"; metath. 5"; abdom. 1" 4" + process. apicali 3" = 1" 7"; opercul. 7½"; expans. tegmin. 1" 10", alar. 2" 3".

This very distinct species of *Heteropteryx* differs from all others at present known by the length of the wings, which surpasses considerably that of the tegmina.

The general form of the insect is very similar to that of *H. Grayii* (Westw.) and *H. Mülleri* (De Haan); its colour is a dingy ochreous-brown, but the tegmina and costal area of the wings are rather prettily variegated with brown and ashy-ochreous. The head is rough and tuberculated, and has a number of short spines, besides two longer ones on each side of the crown a little behind the eyes. The mesothorax is not much longer (although very much broader) than the prothorax, and the upper surface of both is very uneven, minutely tuberculated and spined; there are two spines near the disk of each, besides others near the angles, and the sides of the mesothorax, as well as those of the metathorax, have each a number of various-sized spines; the breast is plane and smooth. The tegmina are elongate-oblong, with their apices broadly rounded; the middle of their surface, near the base of each, is conically elevated, and the elevation is surmounted by a number of acute tubercles; they are ashy-ochreous in colour, with numerous brown spots, besides an irregular oblique brown belt from the base to the middle of the hind margin; the apex also has a large brown spot, bordered on its inner side with black. The costal area of the wings is coriaceous only towards the tip, where the organs project beyond the tegmina in repose, and the opaque part is coloured like the tegmina, being ochreous, and having the tip brown with a short blackish belt a little before the tip; the membranous portion of the wings is smoky-brown. The abdomen is broad from the base to the end of the third segment; it then tapers gradually to the tip; the surface of the four basal dorsal segments is smooth, and their sides tuberculated; but the remaining segments are tuberculated throughout. The apical process is long, of uniform breadth, broad and entire at the tip, and shorter than the operculum, both together being strongly curved downwards. The legs are stout, the tibiæ unarmed, and the femora multidentate.

Hab. Menado, North Celebes (*Wallace*). One example in the collection of W. W. Saunders, Esq.

DIMORPHODES MANCUS, n. sp. Elongatus, angustus, scabrosus, cinereo-fuscus; capite oblongo, vertice postice spinoso; pronoto et mesonoto dorso antice spinosis; pedibus

validis, sulcatis, femoribus omnibus parce denticulatis; antennis brevibus, filiformibus, articulo basali magno dilatato subovato; stylis analibus brevibus, foliaceis, ovatis.

Mas. Minor, angustior; capitis spinis obtusis; thorace verrucoso, pronoto et mesonoto antice spinis duabus, lateribus inermibus; tegminibus et alis brevissimis squamiformibus; abdomine apicem versus paulo dilatato et longitudinaliter rugoso. Segmentis omnibus subæqualibus; pedibus concoloribus, femoribus parce denticulatis; segmento ventrali ultimo medio conico-inflato.—Long. corp. 2'' 4'''; anten. 5'''; mesothor. 6'''; metath. 4'''. (Pl. XLIV. f. 3.)

Fœm. Major, robustior; capitis spinis acutis; thorace dorso tuberculato, pronoto antice acute quadrispinoso, mesonoto et metanoto antice bispinosis, lateribus multispinosis; apterus; abdominis lateribus denticulatis, segmentis dorsalibus tribus basalibus antice bispinosis; pedibus validis, femoribus quatuor posticis medio cinereo-fasciatis et supra denticulatis.—Long. corp. 3'' 9'''; anten. 8½'''; mesothor. 9½'''; metath. 6½'''. (Pl. XLIV. f. 8.)

Closely allied to *Dimorphodes Prostasis* (Westw.), notwithstanding the rudimentary condition of the wings and different form of the body of the male. The females of the two species have very great resemblance, almost the only points of difference being the number and form of their spines.

Body in both sexes elongate, parallel-sided, of a dingy-brown colour. Head oblong, and spined or tuberculated behind. Antennæ short, filiform, basal joint large, oval, and dilated. Legs stout, four posterior femora denticulated on their upper surface; anal styles short and compressed or foliaceous. In the male the body is covered with small tubercles, the pro- and metanota having each near their anterior edge a pair of larger and more acute tubercles. The legs are concolorous with the body, and the basal joint of the four hind tarsi is as long as the two following taken together. The abdominal segments are of nearly equal length throughout, and are longitudinally wrinkled towards the apex; the last dorsal segment is quadrate, with the angles rounded and terminal edge sinuated in the middle; the terminal ventral or genital segment is inflated in a conical form, and reaches the end of the penultimate dorsal.

In the female the sides of meso- and metanota and the corresponding sterna have a number of stout spines; their surfaces are also spined, as also those of the three basal dorsal segments of the abdomen, the front edge of each having a pair of larger spines; the pronotum has two pairs of similar spines near its front margin. The sides of the abdomen are minutely denticulated; the penultimate dorsal segment is raised and bicristate behind; the terminal segment is narrowed to the tip, with acute apical angles and broadly-notched apical margin. The operculum is scaphiform, and reaches the apex of the abdomen. The basal joint of the tarsi is much shorter than it is in the male, and the four posterior femora have an ashy belt in the middle.

Hab. Islands of Batchian and Ternate, Malay archipelago (*Wallace*).

There are five examples in Mr. W. W. Saunders's collection, one of them a female pupa, which does not differ in form and armature of the body from the adult, but wants the ashy belt of the four hind femora. One pair are ticketed as having been taken *in copulâ*.

PLATYCRANIA ALPHEUS, Westwood, Cat. Phasmidæ, Brit. Mus. p. 112, pl. iv. fig. 2 ♀.

The examples described by Professor Westwood came from Ceylon and the Philippines. In Mr. Saunders's collection there are three specimens of the female, obtained by Mr. Wallace in various islands of the eastern part of the Malay archipelago, namely Goram, Gilolo, and New Guinea. They all agree pretty well with the description and figure quoted above, but appear to resemble more the Philippine examples than those from Ceylon, in the stronger tuberculation of the mesonotum. All three differ greatly in the length of the tegmina and wings—organs which vary much in dimensions in many of the larger species of Phasmidæ. The examples which served Professor Westwood for his description appear to have had unusually short organs of flight; for he gives the length of the tegmina as one third shorter than the metanotum, and states that the wings, when closed, extend only to the middle of the second abdominal segment. These relative lengths are shorter than in any of the three examples from the Malay archipelago. Thus in the shortest-winged example (that from Gilolo) the tegmina reach the end of the metanotum, and the wings the middle of the third abdominal segment; in the Goram example the organs are a little longer; and in the New Guinea one the tegmina attain the middle of the first abdominal segment, and the wings the end of the fourth. The New Guinea specimen differs also in colour from the two others, being brown instead of green, and having brown tegmina and costal area of wings, with yellow nervures; but in this character it seems to be intermediate between the green examples and those described by Professor Westwood.

There is a male specimen from Amboyna, also in Mr. Saunders's collection, which appears to belong to this species; for although much resembling the male of *Platycrania edulis*, it differs in being much smaller and in wanting the rosy tint at the base of the wings. The following is a short description of it:—

Male. Elongate, slender, greenish-yellow (doubtless light green in life). Head oblong, convex, smooth; antennæ (about 26-jointed) filiform, twice the length of those of the female. Mesonotum covered with conical tubercles. Abdomen smooth, three terminal segments of equal length, apical dorsal segment narrowed behind; anal styles filiform, obtuse. Tegmina oblong-oval, and, with the costal area of wings, greenish-yellow, membranous portion of latter ochreous, longitudinal nervures darker. Legs moderately stout, four posterior thighs with three rows of small tubercles along their under surface.—Long. corp. 3" 1''; anten. 1" 6''; mesothor. 6''; abdom. 1" 10''. Amboyna (*Wallace*).

ACROPHYLLA TESSELLATA, Westwood, Catal. Phasmidæ Brit. Mus. p. 115, pl. xxxv. fig. 1 (♂), fig. 2 (♀).

Three examples (two females and one male) of this elegant species in Mr. Saunders's collection agree remarkably well with the description and figures of Professor Westwood (made from a single pair), with the exception of the part which refers to the anal processes of the male. These are described as of "minute size," and in the figures appear not to project beyond the apex of the abdomen. It is possible that in Professor Westwood's example the organs may have been mutilated; for in the male specimen before me they

are very conspicuous, extending to the length of a line or more beyond the tip of the abdomen. In form they are compressed or foliaceous, and do not differ from the corresponding appendages of the female except in their smaller size.

The terminal abdominal segment of the male is more deeply notched or cleft in the middle than is represented in the fig. 1 above cited; the inner edges of the cleft part on each side are denticulated as given in the fig. 1 *b*.

Hab. All the examples at present known are from Moreton Bay, Australia.

PODACANTHUS VIRIDI-ROSEUS, G. R. Gray, Syn. Phasm. p. 43; Westw. Cat. Phasmidæ Brit. Mus. p. 117 (female). *Mas.* Elongatus, gracilis, filiformis; capite subquadrato, vix convexo, oculis magnis; antennis hirsutis, elongatis, filiformibus (circa 23-articulatis); testaceo-flavus, thorace abdomineque obscure flavis; mesothorace supra spinis octo per paria seriatis, infra tuberculato, metathorace infra rugoso; abdomine lineari, segmento terminali angulis apicalibus valde productis forcipatis intus denticatis, segmentis genitalibus tumidis abbreviatis, stylis analibus maxime elongatis foliaceis compressis; pedibus validis, obscure flavis, femoribus quatuor posticis infra denticulatis, tibiis posticis intus spinosis; tegminibus areaque costali alarum viridibus, antice brunneis; alis membranaceis, roseis, nervis saturatioribus.—Long. corp. 4" 5''; anten. 1" 11''; mesothor. 3''; stylis analibus 5½''; expans. alarum 4" 4''; long. tegmin. 8''.

Male. The body is long and slender, the abdomen not being much thicker than the pro- and mesothorax. Its colour in life is probably light green. The apical dorsal segment has its terminal angles greatly prolonged and incurved, so that the two together form a forceps the inner sides of which are denticulated; the apical margin of the segment is also deeply cleft. The genital segments are tumid, especially the terminal one, which is also keeled, and does not pass, in length, the middle of the eighth dorsal segment. The middle and hind thighs have, beneath, two rows of strong spines; the hind tibiæ are pubescent on the inner side, and have two rows of fine denticulations; the basal joint of the tarsi, as in the female, is not much longer than the second. The tegmina are elliptical in form, and, like the costal area of the wings, green in colour, with a broad brown stripe along the anterior margin; the membranous portion of the wings is of the same rich rosy hue as in the female, the nervures being of a deeper tinge.

Hab. Moreton Bay, Australia. Sent by Mr. Diggles (Coll. of W. W. Saunders, Esq.).

In the same box which contained this insect there was a female example of the same species (now in Mr. Saunders's collection) far surpassing in dimensions the typical specimens that served Professor Westwood for his description. It measures in length of body 4½ inches, and in expanse of wings 6¾ inches, whilst the measurements given by Professor Westwood are 3⅝ inches and 5⅝ inches respectively.

PHASMA CASTANEUM. *Fæm.* Cylindricum, robustum, obscure fuscum, capite antennis pedibusque nigricantibus; tegminibus subovatis, obtusis (carina valde flexuosa, medio obtuse elevata), obscure fulvis, macula virgulæformi nigricante; alis obtusis, area costali castanea, membrana fusca subdiaphana.—Long. corp. 2" 7''; anten. 2"

(circa); prothor. 2''; mesoth. 3''; abdom. 1'' $1\frac{1}{2}''' + 3\frac{1}{2}''' = 1'' 5'''$; tegmin. 4''; alæ 1'' 11'''.

Closely allied to *Ph. putidum*, but more robust in body, and having rather more rounded wings. The great difference, however, is in the form of the tegmina, which are rounded or ovate in outline, and have very strongly flexuous central carinæ, the elevated part of which is not acute, but blunt or broadly rounded; the black spot on the costal side of the elevation is not in the form of a stripe, but a broad comma-shaped spot, occupying the space between the central carina and the subcostal one. The colour of the tegmina is tawny-ochraceous, and the costal area of the wings differs from that of *Ph. putidum* and allied species in being of a uniform tawny-chestnut hue. The membrane is of a very dark brown, and scarcely transparent. The antennæ and legs are wholly blackish. The upper side of head and anterior parts of the thorax are rough on the surface and dingy tawny-brown in colour, and there is a yellowish line along each side of the head behind the eyes. The terminal dorsal segments of the abdomen are slightly raised in the middle of their hind margins. The anal styles are very short and linear. The operculum reaches nearly to the dorsal tip of the abdomen, and is narrowed to a point at the apex.

Hab. Pará, Amazons. One example (♀).

PHASMA PUTIDUM. *Mas et Fæm.* Cylindricum, fuscum, capite pro- et mesothorace et tegminibus pallide griseo-brunneis, his vitta lata nigro-velutina; pedibus rufescentibus, femoribus (basi excepta) nigris; capite subquadrato, supra plano; mesothorace brevi, lineari, acute granulato; tegminibus carina medio valde elevata conica compressa, deinde ad marginem recta; alarum area costali olivacea, venis maculisque obscurioribus, membrana pallide olivaceo-fusca diaphana; stylis analibus brevibus, obtusis; antennis setaceis, elongatis. (Pl. XLV. f. 2.)

Maris segmento dorsali terminali obtuso, segmentis genitalibus valde tumidis, conicis, apice emarginato.

Fæminæ operculo lato, parum convexo, acuminato.

♂ Long. corp. 2'' 3''; anten. 2'' 6''; mesothor. $2\frac{3}{4}'''$; abdom. 1'' $2''' + 3''' = 1'' 5'''$; tegmin. $2\frac{3}{4}'''$; alæ 1'' 5'''.

♀ Long. corp. 2'' 10''; mesothor. 3''; abdom. 1'' $4''' + 3\frac{1}{2}''' = 1'' 7\frac{1}{2}'''$; tegmin. $4\frac{1}{2}'''$; alæ 2''.

Closely allied to *Phasma Menius*, Westw. (Cat. Phasm. pl. xvii. f. 2), but differs in the remarkable compressed-conical and acute elevations of the central part of the median carina and in the uniform dingy-brown colour of the wing-membranes. The body is of a dingy-brown hue; but the upper surface of the head, pro-, and mesothorax is of a pale greyish colour; the tegmina are also of this colour, but they have each a broad black vitta extending from the base to the apex, and covering the costal side of the triangular elevation of the median carina. The costal area of the wings is of a dull olive-green hue, speckled irregularly with darker olive. The legs are pale tawny reddish, with the femora (except near the base) nearly black. The antennæ are blackish, with the bases of the joints pale reddish. The abdomen in the female has the posterior edge of the two or

three penultimate segments elevated in the middle. The three basal joints of the posterior tarsi are produced at their apex (on one side) into a lobe.

Hab. Santarem, on the Amazons. Taken by myself.

The following is an extract from my notebook referring to this insect:—"The commonest species in these woods, and, I think, generally distributed. It moves slowly over the branches and leaves of low trees, and flies readily, but heavily, when disturbed. When seized with the hand, a dark liquor oozes from the mouth and other parts of the body, emitting a most peculiar and disagreeable odour. In copulation the male mounts on the back of the female, his head reaching only as far as the elytra of his partner, and grasps her body strongly with his anterior legs, the flexible apex of the abdomen being curled round to the genital organs of the female underneath the tip of her abdomen."

Hab. There is a male specimen also in Mr. Saunders's Collection, labelled as from Peru.

PHASMA QUADRATUM. *Mas.* Cylindricum, tenue, viride, olivaceo-fusco variegatum; capite subquadrato, supra plano, ocellis patentibus; tegminibus oblongo-quadratis, apice recte subtruncatis, carina ante medium in spinam validam acutam exeunte; alarum area costali olivaceo-viridi plagiata, membrana pallide fusca diaphana; abdomine elongato; stylis analibus brevibus, cylindricis; segmento ventrali 8vo profunde emarginato; pedibus brevibus.—Long. corp. 1" 10''; anten. 1" 10''; mesothor. 2''; abdom. 11'' + 3'' = 1" 2''; tegmin. 3''; alæ 1".

Allied to *Phasma maculatum* (Gray and Westw.), but distinguished by the elongate, oblong, and obtusely but straightly truncated tegmina. The raised part of the carina, in consequence of the prolongation of the apical part of the tegmina, is much nearer the base than the apex, and is, moreover, surmounted by a rather long and sharp spine, inclined towards the apex of the tegmen. The colour of the tegmina, like that of the body, antennæ, legs, and costal area of the wings, is obscure-olivaceous, relieved by indistinct marks of a clearer green. The membrane of the wings is light brown, without trace of deeper shade towards the margins. The legs are extremely short (as in many allied species of *Phasma*, especially from the same country), the hind legs, when extended, being much shorter than the abdomen (10½ lines).

Hab. Forests of the Tapajos, near Santarem. One example (♀).

NECROSCIA LONGICEPS. *Mas.* Cylindrica, tenuis, glabra, lutea, capite thoraceque linea laterali nigra; capite thorace multo latiore, oblongo-elongato, postice haud attenuato, oculis prominentibus; antennis brevibus, filiformibus, basi haud dilatatis; abdomine lineari, segmento dorsali terminali apice utrinque producto lobato, segmentis genitalibus haud tumidis; stylis analibus paulo elongatis, clavatis; tegminibus angustis, medio vix elevatis, apice obtuse truncatis, cum alarum area costali brunneis, medio vitta straminea; alarum area postica carneo-fulva, opaca; pedibus tenuibus, femoribus infra breviter spinosis.—Long. corp. 2''; anten. 8''; capit. 2¼''; mesothor. 4½''; abdom. 11'' + 2'' = 1" 1''; ped. ant. 1" 10½''; ped. intermed. 1''; post. 1" 3''; tegmin. 2½''; alæ 1". (Pl. XLV. f. 6.)

From Serville's description of his mutilated specimen of *N. vittata* (Orthopt. p. 254), the present seems closely allied to that species; it differs, however, in the opaque roseate-tawny hue of the posterior area of the wings. The species belongs to the section of the genus indicated (in the description of our *N. cephalotes*) as distinguished by the great size of the head and short filiform shape of the antennæ. The body is slender and filiform, the head being the broadest part; the colour is pale luteous, but probably green in life, some traces of this colour being seen on the head; and there is a black line extending on each side from the eye to the base of the mesothorax. The antennæ are only one-third the length of the body, and filiform, the base not being much thicker than the remaining part; there are two elevated lines along each side of the mesonotum, and the surface is faintly warty. The apical dorsal segment of the abdomen has its terminal angles each produced into a short curved lobe; and the anal styles project a short distance beyond them, and are clavate in shape. The tegmina are narrow, and obtusely truncated at the apex; their central elevation is but slightly prominent, and their colour, together with that of the anterior field of the wings, is brown, with a straw-coloured vitta extending along the middle from base to apex; the posterior field is of a uniform tawny-pink hue and opaque. The legs are rather short (except the anterior pair); and the intermediate and posterior femora have a row of minute spines along their under surface, the anterior pair having only a few similar spines near their tips.

Kaioa Island, near Batchian (*Wallace*). One example (♂) in the collection of W. W. Saunders, Esq.

NECROSCIA CEPHALOTES. *Fœm.* Cylindrica, robusta, glabra, capite magno, crasso, fulvo, vittis quinque nigris; antennis brevibus, filiformibus, articulo basali haud dilatato; thorace et abdomine luteis, vitta laterali communi nigra; abdominis segmento dorsali 8vo præcedentibus multo longiore; operculo lineari, apicem dorsalem haud attingente; tegminibus angustis, elongatis, apice truncatis, cum area costali alarum brunneis, vitta longitudinali straminea; alis brevibus, area postica sordide lactea; pedibus elevato-lineatis, nigris, fulvo maculatis, femoribus apice infra denticulatis.—Long. corp. 3" 6''' ; capit. 4''' ; anten. 8''' ; mesothor. 9''' ; metath. 3½''' ; abdom. 1" 3½''' + 6½''' = 1" 10''' ; ped. antic. 3" , ped. post. 2" 3''' ; tegmin. 3½''' ; alar. 9½''' .

Resembles much *N. Palinurus*, Westw. (Cat. Phasm. pl. xi. f. 6), but differs in coloration. Cylindrical, robust, tawny-coloured, smooth. Head very large and of equal thickness, oblong, slightly narrowed behind the eyes, unarmed, reddish-tawny, with five black stripes—namely, one central, not reaching the level of the eyes, one on each side from the eye to the occiput, and another quite lateral, abbreviated. Antennæ short, filiform, basal joint not enlarged. Thorax and abdomen dingy-tawny, with a black stripe on each side, extending from the prothorax to the last abdominal segment. Abdomen cylindrical; the eighth dorsal segment the largest of all, and much longer than the seventh; apical segment one-third the length of the eighth, and narrowed to the tip, in the middle of which there is a small but distinct notch. Operculum linear, not convex, and not reaching the apex of abdomen; anal styles exerted, brown, compressed. Tegmina narrow and elongate, central prominence slightly marked, brown, with a central straw-coloured vitta; costal field of the wings of the same colour; posterior field dingy-white,

opaque. Legs moderately stout, ridged, and furrowed; anterior legs much elongated, the tarsi especially extremely long ($7\frac{1}{2}$ lines); all the femora with a single row of denticulations at the apex beneath; colour black, speckled with yellowish.

Hab. Taken by Mr. Wallace in New Guinea. Collection of W. W. Saunders, Esq.

This species, together with *N. capito*, *N. Palinurus*, *N. longiceps* and probably *N. Styxius*, Westw. (Cat. pl. ix. f. 3), and *N. vittata*, Serv., are sufficiently distinct from the other species of *Necroscia*, in their short antennæ and enlarged head, to form a separate genus.

NECROSCIA PICTIPES. *Fœm.* Cylindrica, thorace antice angustiore, pallide viridis, capite supra lineis duabus nigris; tegminibus intus purpureo marginatis, colore purpureo ramum medianum emittente; alarum area costali, postice sanguineo vittata, membrana lactea roseo vix tineta; pedibus flavidis, femoribus anticis maculis duabus, femoribus intermediis annulo unico tibiisque macula subapicali nigris.—Long. corp. 3"; mesothor. $5\frac{1}{4}$ "; abdom. $1'' 5''' + 3''' = 1'' 8'''$; tegmin. 3"; alæ $1'' 10'''$.

Allied to *N. annulipes* (Gray), Westwood (Cat. Phasm. p. 150); but greatly differing in the colour of the wing-membrane, which is of deep rosy hue in *N. annulipes* and whitish-opaque in *N. pictipes* with scarcely a trace of other colour. In other respects the differences are only such as might exist in the opposite sexes of one and the same species, our example of *N. pictipes* being a female, and the specimen described by Mr. Westwood a male. *N. pictipes* is very much stouter (although not longer); and the head is oblong-quadrate, scarcely attenuated behind; the two black lines along the crown do not extend to the thorax, as they do in *N. annulipes*, besides being different in other respects. The pro- and mesothorax are light-green, with a broad reddish-brown stripe down the middle. The tegmina are oblong-quadrate, and their carina is rather strongly elevated in the middle; their colour is pale green, with the inner margin broadly purple, which colour emits a branch in the middle towards the central elevation. The costal area of the wings is also light green, with a reddish-purple vitta running very near the hind margin from base to apex. The legs are moderately short, unarmed, and yellowish; the anterior femora have two blackish spots on their inner side, the middle femora a blackish ring, and the middle tibiæ a brown spot towards their apex; the hind legs are spotless. The abdomen, in its faded state, shows traces of a pale hue on the apical part, with a broad purple stripe down the middle, as in *N. annulipes*; the terminal dorsal segment has its apical angles produced and acute; the genital operculum is unusually short, and is truncated at the apex.

Hab. Chantaboun, Cambodia (*Mouhot*). One example (♀).

NECROSCIA VIRIDILINEATA. *Mas et fœm.* Linearis, olivacea, subtus pallide viridis, tegminibus et alarum area costali viridi-lineatis; pedibus viridibus, tibiis apice nigris; capite curto, suborbiculari, absque ocellis, oculis valde prominentibus; thorace cylindrico; membrana alarum pallide fusca, hyalina.—♂ long. corp. $1'' 10'''$; anten. $2'' 3'''$; mesothor. $3\frac{1}{2}$ "; abdom. $9\frac{1}{2}$ " + $2\frac{1}{2}$ " = $1''$; tegmin. 2"; alæ $1'' 4'''$. ♀ long.

corp. 2" 10''' ; anten. 2" 6''' ; mesothor. $4\frac{1}{2}$ ''' ; abdom. 1" 3''' + $4\frac{1}{2}$ ''' = 1" 7 $\frac{1}{2}$ ''' ; tegmin. 3''' ; alæ 2''.

This is a slender and linear species with remarkably short head, convex and broadly rounded behind the eyes. The head, pro- and mesothorax, tegmina, and costal area of the wings are dark olive-brown, with slender green lines along the principal nervures of the alary parts, the legs (with the exception of the dark apices of the tibiæ) and the under surface of the body being light green. The antennæ are very long and slender, dark-brown, with the bases of the joints pallid. The eyes are very salient. The tegmina are oblong, quadrate, broad at the apex, with the outer apical angle produced, and the central carina conical in the middle. The membrane of the wings is light brown and transparent. In the male, the tip of the abdomen is blackish, the three dorsal apical segments not much abbreviated, and the anal styles short and obtuse; the genital segments are not tumid. In the female, the seventh dorsal segment is not shorter than the sixth, and considerably longer than the eighth or ninth; the last-mentioned is narrowed to the apex, and the genital operculum is broad and scarcely reaches the tip of the abdomen.

Hab. Ceram (*Wallace*). One pair in Mr. Saunders's Collection.

NECROSCIA FRONDOSA. *Fœm.* Valde elongata, cylindrica, pallide flavescenti-viridis; alarum membrana albo-virescente, diaphana, vix roseo tincta; thorace granulato; segmentis dorsalibus tribus terminalibus multo abbreviatis; stylis analibus ultra apicem exsertis, linearibus; operculo angusto, apice inciso; tegminibus oblongis, apice oblique truncatis; carina mediana modice conico-elevata, nigricante.—Long. corp. 3" 9''' ; anten. 3" ; mesothor. $6\frac{1}{2}$ ''' ; abdom. 1" 10''' + 4''' = 2" 2''' ; tegmin. $3\frac{1}{4}$ ''' ; alæ 2 2'''.

Closely allied to *N. Aruana*, Westw. (Cat. Phasm. plate xxxix. fig. 4), but different in colour, being wholly of a pale greenish yellow (probably pale green in life), and the membrane of the wings greenish or yellowish-white, with a very faint rosy tinge. The head is oblong, as in *N. Aruana*, and the thorax (except upper surface of metathorax) uniformly granulated over its whole surface. The tegmina and costal area of the wings are pale greenish in colour, and there is no pale streak extending from the slightly elevated conical carina, which is so characteristic of *N. Aruana*. The legs are uniform yellowish green.

Hab. Menado, Celebes (*Wallace*). One example, female.

NECROSCIA LACTEIPENNIS. *Mas et Fœm.* Filiformis, gracilis, omnino pallide griseo-brunnea, olivaceo marmorata vel maculata, alarum membrana hyalino-sublactea excepta; capite oblongo-quadrato, postice paulo attenuato, supra plano, inermi, absque ocellis, oculis prominulis; antennis tenuibus, longitudine corporis; mesothorace lineari; abdomine maris apice emarginato; stylis analibus brevibus, linearibus; tegminibus breviter oblongis, supra medio haud prominulis; pedibus brevibus, tenuibus.—♂ long. corp. 2" 6''' ; mesothor. $5\frac{1}{2}$ ''' ; abdomin. 1" 3''' + 3''' = 1" 6 ;

tegmin. $1\frac{1}{2}''$; alæ $1''\ 3\frac{1}{2}''$. ♀ Long. corp. $3''\ 6'''$; mesothor. $8'''$; abdom. $1''\ 8''' + 5''' = 2''\ 1'''$; tegmin. $2'''$; alæ $1\ 10'''$.

A slender and delicate-looking species, of a uniform pallid greyish brown colour, faintly marbled with olive-brown; the membrane of the wings transparent and tinged with a milky hue. The body and legs are unarmed; the apical dorsal segment in the male is triangularly emarginated at the apex, and the edge of the emargination has a row of small tubercles. The operculum of the female is simple, and reaches barely to the tip of the abdomen; the anal styles are short and linear, but slightly tapering to the apex.

Hab. Island of Gilolo (*A. R. Wallace*). One pair in the Collection of W. W. Saunders, Esq.

NECROSCIA ACUTIPENNIS. *Fœm.* Cylindrica, elongata, inermis, viridis; alis pallide flavis, apice productis, acutis; tegminibus elongatis. Long. corp. $2''\ 2'''$; anten. $2''\ 3'''$; mesothor. $7'''$; metath. $4\frac{1}{2}'''$. (Pl. XLV. f. 5.)

Elongate, cylindrical, and moderately slender; the body, antennæ, legs, tegmina, and anterior area of the wings pale grass-green; posterior area of the wings very pale greenish yellow, uniform. The head is oblong, plane above, and not at all narrowed behind the eyes, the latter moderately prominent. The mesothorax is much elongated, cylindrical and smooth. The legs are unarmed. The operculum is boat-shaped, and reaches the dorsal tip of the abdomen; the anal styles are small and obtuse. The tegmina are elongated and tapering to the tip, and the central prominence forms a moderately elevated flexuous ridge; an obscure pale line runs down the middle of each tegmen. The wings are produced and acute at the apex.

Hab. Ceylon (*Nietner*). Collection of W. W. Saunders, Esq.

NECROSCIA JANUS. *Fœm.* Major, cylindrica; capite prothorace et mesothorace supra ochraceo-albidis, opacis, infra obscuro-fuscis; tegminibus fuscis, intus cretaceo marginatis; alarum area costali flava, costa late fusca, area postica hyalina, parum fuliginosa; capite oblongo-quadrato, supra plano, oculis valde prominentibus; antennis longitudine corporis, fuscis; pronoto postice unituberculato; abdomine pallide-olivaceo, segmento ultimo dorsali apice obtuso; stylis analibus brevibus, filiformibus, obtusis; operculo lineari, apicem dorsalem attingente; pedibus subgracilibus, elevato-lineatis inermibus.—Long. corp. $3''\ 6'''$; mesothor. $7\frac{1}{2}'''$; abdom. $1''\ 7\frac{1}{2}''' + 4\frac{1}{2}''' = 2''$; tegmin. $3'''$; alæ $2''$. (Pl. XLV. f. 4.)

A large and rather robust species, with moderately elongated but linear mesothorax, and oblong quadrate, plane-crowned head. The upper side of the head, prothorax, and mesothorax is opaque, pallid ochraceous; but the under surface, in striking contrast, is of a blackish-brown hue; the broadish, obliquely and obtusely truncated tegmina and the anterior area of the wings offer a similar contrast of colours, the tegmina being dark-brown, with the inner margin irregularly bordered with chalky-ochraceous, and the costal area of the wings being light yellowish, with a broad dark-brown costal stripe not extending to the tip. The eyes are large and prominent, the pronotum has a small

tubercle in the middle of its posterior portion, the rest of the body and legs are unarmed. The antennæ are setaceous, slender, and of about the same length as the body.

Hab. Tondano, Celebes (*Wallace*). One example (♀), Coll. W. W. Saunders, Esq.

NECROSCIA STYLIGERA. *Fœm.* Major, cylindrica, griseo-brunnea, pallida, fusco vix nebulosa; alarum area postica hyalina, paulo fuliginosa; mesothorace lineari, supra lineis vel rugis longitudinalibus instructo; capite quadrato, supra plano, oculis prominentibus; antennis setaceis, elongatis; pedibus subgracilibus, inermibus; abdominis segmento dorsali ultimo angustato, apice inciso; operculo in stylum acutissimum longe ultra apicem dorsalem prolongato.—Long. corp. 3" 8"; anten. 2" 10"; mesothor. 8"; abdom. 1" 9" + 4½" = 2" 1½"; operculi 9"; tegmin. 3"; alæ 2". (Pl. XLV. f. 1.)

The species in the female sex (the only one known) is distinguished by the peculiar form of the genital operculum, which is $\frac{3}{4}$ of an inch in length and very narrow and horny, tapering into a very sharp, needle-like point; the segment which constitutes the operculum, instead of forming a semitubular or boat-shaped duct, appears like a solid compressed spine, owing to the coalescence above of its up-turned edges. The insect otherwise has nothing remarkable, being very similar in shape and proportions of body and limbs to *N. Janus*; its colour is throughout of a pallid greyish brown, faintly marbled with darker brown, except the membrane of the wings, which is semitransparent and slightly smoky. The mesothorax is longitudinally wrinkled, the antennæ are very slender, the tegmina are short and broad, with the central elevation not very prominent.

Hab. Sula Islands (*A. R. Wallace*). One example (♀), Coll. W. W. Saunders, Esq.

NECROSCIA MUSTEA. *Mas.* Cylindrica, gracilis, pallide brunnea; tegminibus et alarum area costali viridibus, membrana hyalina, fusco perparum tincta; capite suborbiculari; mesothorace granulato; abdomine apice clavato; stylis analibus paulo elongatis, curvatis, apice subincrassatis; tegminibus carina mediana conico-elevata, basi macula elongata, albida; pedibus elongatis; femoribus tibiisque partim viridibus; antennis longissimis.—Long. corp. 2" 1"; anten. 2" 6"; mesothor. 5½"; abdom. 11" + 3" = 1" 2"; tegmin. 1¾"; alæ 1" 1½". (Pl. XLV. f. 8.)

The head is short, and rounded behind the eyes, and not plane above, with very prominent eyes and no ocelli. The antennæ are slender and greatly elongated, their colour a uniform brown. The prothorax is narrowed posteriorly; the mesothorax is slender and linear, and its surface has a number of distinct granulations; the colour of head, thorax, and abdomen, in the faded insect, is brown; the legs are partly brown and partly green; so that the insect is possibly green in the living state. The three terminal dorsal segments are dilated, and the genital segments are strongly tumid, and reach nearly to the tip of the abdomen; the anal styles project much beyond the apex of the abdomen, and are slightly curved upwards and thickened at their tips. The tegmina are oblong and obliquely truncated, their carina rises into a moderate but acute elevation in the middle, and between the elevation and the base there is a whitish streak, the rest of the surface, like the costal area of the wings, being of a clear light

green hue. The membrane of the wings is transparent, and very slightly tinged with pale greenish brown.

Hab. Sula islands (*Wallace*). One example, Coll. W. W. Saunders, Esq.

NECROSCIA AGRIONINA. *Mas.* Linearis, tenuissima, pallide brunnea; alarum membrana hyalina fusco perparum tincta; capite subquadrato, supra plano; oculis valde prominentibus; antennis setaceis, pallidis; mesothorace lineari; abdominis segmento ultimo dorsali bisinuato, apice emarginato; stylis analibus brevibus, linearibus; segmentis genitalibus nullomodo tumidis, apicali acuminato; tegminibus brevissimis, subquadratis, apice valde obliquis; pedibus brevibus, tenuibus.—Long. corp. $1'' 6'''$; anten. $1'' 4'''$; mesothor. $3\frac{1}{4}'''$; abdom. $9''' + 1\frac{3}{4}''' = 10\frac{3}{4}'''$; tegmin. $\frac{1}{2}'''$; alæ $9'''$. (Pl. XLV. f. 9.)

Allied to *Necroscia Osmylus*, Westw. (Cat. Phasm. plate xxxvii. fig. 4), but slenderer, and the terminal dorsal segment of the abdomen of quite a different form. The insect has much the aspect of a slender Dragonfly of the genus *Agrion*. The body, legs, tegmina, and costal area of the wings are a pale brown colour, varied with lighter and darker shades, and apparently not green in life; the upper side of the two basal dorsal segments of the abdomen is darker than the rest in the faded specimen; the membrane of the wings is transparent, and very slightly tinged with brown. The antennæ are very pale-brown, with a number of very small rings of a shade darker hue. The three terminal abdominal segments are of equal length, and much shorter than the preceding segments; the apical segment is bisinuate on each side, and broadly emarginated at the apex, at which point it is scarcely narrower than at the base. The genital segments are short and not at all tumid, the apical segment being narrowed to a point. The tegmina, although tolerably broad, are extremely short, and the central carina is not prominent in the middle.

Hab. Menado, Celebes (*Wallace*). One example (σ), Coll. W. W. Saunders, Esq.

NECROSCIA GRAMINEA. *Fæm.* Cylindrica, pallide viridis, tegminum et alarum marginibus costalibus pallidioribus; capite curto, suborbiculari; mesothorace brevi, cylindrico, supra ruguloso; membrana alarum diaphana, leviter fuscesciente. Long. corp. $2'' 4'''$; anten. $2'' 4'''$; mesothor. $3'''$; abdom. $1'' 1''' + 3\frac{1}{2}''' = 4'' 4\frac{1}{2}'''$; tegmin. $3'''$; alæ $1'' 9'''$.

Closely resembling *N. viridilineata* in form of head and tegmina; differs in its shorter and broader (although still cylindrical) mesothorax and in its colours. The head is short, and broadly rounded behind the eyes, which latter are very prominent, and there are no ocelli. The antennæ are very slender and elongated; their colour is brown with bases of joints pallid. The upper surface of the mesothorax is coarsely roughened. The tegmina are oblong and very obliquely truncated, with the outer angles rather prominent; they are, like the head, pro- and mesothorax, and costal area of the wings, of a light green colour; but the areoles between the nervures are dark olive, and the costa (as well as the costa of the wings) is margined with a paler or yellowish hue. The membrane of the wings is very pale tawny-brown and transparent. The abdomen, mesothorax, and legs are

pallid-brown in their faded state, but probably green in life. The seventh dorsal segment is much shorter than the sixth, and about equal in length to the eighth and ninth; the latter is much narrowed towards the apex, and the apex itself is bluntly rounded. The anal styles are short, linear, and pointed. The genital operculum is flat and suddenly dilated about the middle, tapering thence to a point, so as to resemble altogether in figure a spear-head; its surface is pubescent, and it reaches nearly to the tip of the abdomen.

Hab. Batchian (*Wallace*). One example (♀) in Mr. Saunders's Collection.

NECROSCIA TENEBROSA. *Fœm.* Cylindrica (mesothorace antice et abdomine apice angustatis), inermis, obscure olivaceo-fusca, opaca; alarum area costali nigro multifasciata; pedibus pallide annulatis; alarum membrana pallide fusca, diaphana; capite breviter oblongo, absque ocellis, nigro-trilineato; oculis valde prominentibus; antennis setaceis, elongatis, obscuris; abdominis segmentis quatuor terminalibus subito angustatis; stylis analibus exsertis, porrectis, acutis; segmento ventrali sexto apice inciso; operculo lineari, tenui, apice integro; tegminibus apice late rotundatis, valde convexis, conicis; alis late rotundatis; pedibus elongatis.—Long. corp. 2" 9"; anten. 2" 2"; mesothor. $4\frac{1}{2}$ "; abdom. $1" 3\frac{1}{2}" + 3\frac{1}{2}" = 1" 7"$; tegmin. $2\frac{3}{4}"$; alæ $1" 8"$.

In form this species closely resembles *N. Erechtheus*, Westw. (Cat. Phasm. pl. xiv. f. 6), but it differs widely in colour, the membrane of the wings being pale brown, without a trace of red, and the head, thorax, and coriaceous parts of the wings of a dark olive-brown, marbled and streaked with a darker and blackish tint; the costal area of the wings is crossed by several irregular, oblique, blackish-olive belts, which form about three indistinct broad fasciæ. The thorax is narrowed anteriorly, and is, like the head, free from granulations and spines. The four terminal segments of the abdomen are narrower and shorter than the rest; the anal styles project beyond the extremity, and are pointed. The sixth ventral segment is notched at the apex; and the operculum is short, narrow, and very little convex; its apex is entire and pointed. The legs are rather elongated, the anterior pair being nearly two inches in length; they are of a dusky olive-brown, spotted and ringed with a much paler hue of brown.

Hab. Ceylon (*Nietner*). Two examples (♀) in Mr. Saunders' Collection.

NECROSCIA SMARAGDULA. *Mas.* Filiformis, gracilis, capite, prothorace et mesothorace læte cæruleo-viridibus; metathorace infra læte rufo, eodem supra et abdomine pallide rufo-olivaceis; pedibus rufis; tegminibus et alarum area costali flavis, apicem versus fusco-variis, area postica hyalino-fuliginosa; stylis analibus brevibus, linearibus, valde obtusis; capite orbiculari, ocellis nullis, oculis magnis; mesothorace rugoso; antennis fuscis, articulis basi pallidis, prope apicem annulo lato flavo.—Long. corp. $1" 8"$; mesothor. 3"; metath. $3\frac{1}{2}"$; anten. $1" 10"$. (Pl. XLV. f. 7.)

This elegant and gaily-coloured species is not closely allied to any other that I have been able to examine. The head is suborbicular, being short and regularly rounded behind the large and prominent eyes; it is unarmed, smooth, and without ocelli. The

antennæ are longer than the body, light brown, pale at the bases of the joints, and have a broad yellowish ring before the apex; the basal joint is not greatly thicker than the rest. The prothorax is narrower and rather longer than the head, and smooth. The mesothorax is roughly granulated above and beneath; and the sides of the pronotum have each two distinct raised lines. The colour of head, pro-, and mesothorax is throughout a clear light bluish green. The metathorax above and the abdomen are of a dingy faded brownish hue, but the metathorax beneath is of a light red hue. The abdomen is cylindrical and shining, the terminal dorsal segment is truncated at its apex; the genital segments are smooth, and not very prominent; the anal styles short, cylindrical, and very obtuse at the apex. The legs are quite simple and of a uniform reddish colour. The tegmina are short and truncated at the apex, the prominence in the middle is conical and obtuse; they are of a yellowish colour, brown towards their tips, but sometimes uniform yellow; the wings are obtuse, smoky hyaline, paler towards the base, and their costal area is similarly coloured to the tegmina, *i. e.* yellowish, with brown tips and edges.

Hab. Islands of Gilolo and Batchian, taken by Mr. A. R. Wallace. (Coll. W. W. Saunders, Esq., three examples).

NECROSCIA CONICIPENNIS. *Fœm.* Cylindrica, sordide olivaceo-fusca, granulata; tegminibus et alarum area costali olivaceo-nebulosis, maculis obscurioribus et plagis pallidioribus signatis; capite quadrato, supra plano, declivi, absque ocellis, oculis valde prominentibus, supra fulvo, lateribus olivaceis; antennis setaceis, olivaceis, fulvo multiannullatis; mesothorace cylindrico, (cum prothorace) opaco, granuloso, medio bituberculato; abdominis segmentis dorsalibus tribus terminalibus paulo abbreviatis; stylis analibus filiformibus, curvatis; operculo haud convexo, apice inciso; tegminibus apice late rotundatis, medio valde conico-elevatis; membrana alarum pallide fusca, diaphana; pedibus brevibus, pallidis, olivaceo-nebulosis, femoribus tibiisque apice obscurioribus.—Long. corp. 2" 8"; anten. 1" 10"; mesothor. $4\frac{1}{2}$ "; abdom. $1" 2\frac{1}{2}" + 3\frac{1}{2}" = 1" 6"$; tegmin. 3"; alæ 1" 11".

Resembles *N. Larunda*, Westw. (Cat. Phasm. pl. xxvii. f. 3), in general form and colours, but differs greatly in its shorter tegmina, with extraordinarily high and acute median elevation. The head is rather short and subquadrate in shape, the crown plane (leaving a prominent occiput) and fulvous, while the rest of the head is dull olivaceous. The eyes are very prominent. The antennæ are very slender, and alternately ringed with dark olive and fulvous. The pro- and mesothorax, and under side of metathorax, are rough and opaque, but not acutely tuberculate, the mesothorax having only two faintly elevated and obtuse tubercles in the middle. The genital operculum reaches the dorsal tip of the abdomen, and is of the ordinary oblong shape, with the apex notched in the middle, as in *N. Aruana* (Westw.), *N. Siphylus* (Westw.), *N. Larunda* (Westw.), and several other species. The legs are rather short, and variegated with light and dark brown and olive-brown, with the tips of the femora and tibiæ much darker.

Hab. Sumatra (*Wallace*). One example (Coll. W. W. Saunders, Esq.).

NECROSCIA TORQUATA. *Fœm.* Cylindrica, robusta, capite breviter ovato, convexo, inermi; mesothorace brevi, antice constricto, postice tumido; tegminibus latis, subquadratis, carina media conicana; capite, prothorace, metathorace, pedibus et corpore subtus nigris opacis; abdomine supra rufo; pronoto antice et postice metanotoque antice albo-marginatis; antennis nigris, griseo-annulatis; tegminibus et alarum area costali fusco-nigris, viridi læte maculatis; pedibus brevibus, inermibus.—Long. corp. 2" 6''' ; mesotho. $3\frac{1}{4}$ ''' ; abdom. 1" 2''' + 3''' = 1" 5''' ; tegmin. $3\frac{1}{2}$ ''' ; alæ 1" 9''' . (Pl. XLV. f. 3.)

Resembling very closely, in form and in the proportions of the different parts of the body, *N. hilaris*, Westw. (Cabinet of Oriental Entomology, pl. 38. f. 1), but quite different in colour, and the mesothorax simply tumid behind instead of having two distinct tubercles. The head is short, ovate, convex, and destitute of ocelli; the antennæ are long and setaceous, dusky, ringed with grey. The head, pro- and mesothorax, legs, and body beneath are dull opaque sooty black, but the anterior part of the thorax has two yellowish rings. The abdomen above is reddish, probably bright red in life. The tegmina and anterior area of wings are olive-black, with numerous and distinct spots of a beautiful light green colour; the membrane of the wings is transparent, uniformly tinged with a dusky hue. The legs are all rather short and unarmed. The anal styles are short and linear, and the operculum reaches the end of the abdomen.

Hab. Chantaboun, Cambodia (*Mouhot*). One example (♀), Coll. W. W. Saunders, Esq.



