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ENTOMOLOGICAL NOTES.

I.

BY SAMUEL H. SCUDDER.

[From the Proceedings of the Boston Society of Natural History,
Vol. XI., January 22, 1868.]

CONSIDERATIONS DRAWN FROM THE STUDY OF MOLE CRICKETS.

Mr. S. H. Scudder stated that he had recently been studying the mole crickets, with a view to their classification, and found that they were naturally divisible into two groups. For one

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he retained the name of *Gryllotalpa*, under which all the species had formerly been grouped, and to the other applied that of *Scapteriscus*; these two groups were separated by the following characteristics.

In *Scapteriscus* the posterior margin of the sternum of the eighth abdominal segment of the ♂ is produced into a stout prominent central tooth; in *Gryllotalpa* the margin is entire.

The mesosternal ridge of *Gryllotalpa* is prominent, and almost equally so throughout; that of *Scapteriscus* is never prominent on the anterior half of the segment, and is often limited to the posterior half, or is even obsolescent.

The fore trochanter of *Scapteriscus* is large; the free portion almost always equals the tibial dactyl in length, and is of about the same size at the tip as at the base; that of *Gryllotalpa* is proportionally small, seldom exceeding half the length of the tibial dactyls; the form is cultrate or lenticular.

Scapteriscus is furnished with only two fore-tibial dactyls, both of which are movable; *Gryllotalpa* has two movable dactyls besides a second pair which are immovable.

With but few exceptions, the hind femora of *Scapteriscus* more than equal the pronotum in length, while in *Gryllotalpa* they are always shorter than the pronotum.

In *Gryllotalpa* the length of all the hind tarsal joints taken together seldom exceeds half the width of the pronotum, while they equal its whole width in *Scapteriscus*.

The hind tarsal claws of *Scapteriscus* are clothed with short hairs nearly to the tip; those of *Gryllotalpa* have hairs only at the base.

The tegmina of *Scapteriscus*, with but few exceptions, cover, when at rest, two-thirds of the abdomen; in *Gryllotalpa* they seldom conceal more than one-half of the abdomen.

The nervures of the middle field of the tegmina in the females of *Gryllotalpa* are distant and rather irregular, somewhat resembling those of the males; in *Scapteriscus* they are approximate, regular and straight.

The anal cerci are longer than the pronotum in *Gryllotalpa*; shorter in *Scapteriscus*.

Finally, the ninth, and sometimes the eighth abdominal segments are furnished above, in *Gryllotalpa*, with two transverse lateral rows of long hairs directed inwards, as if to keep the long folded wings in place; these are absent from *Scapteriscus*, where the wings are equally long and similarly folded.

Only one species of *Scapteriscus* has been found without the limits of South and Central America, and that—occurring in a single in-

stance in Europe—must undoubtedly be considered an emigrant from the same warm regions; the members of the genus *Gryllotalpa*, on the contrary, are found throughout the whole world, not excluding Central and South America.

Comparing these two genera with their nearest allies, *Tridactylus*, *Cylindrodes*, etc., we find great and striking differences—differences which are extraordinary compared with those which divide *Scapteriscus* and *Gryllotalpa*; the comparatively simple fore tibia, and the abnormal appendages which supplant the hind tarsi in *Tridactylus*—the abbreviated legs fitting into cavities in the body, and the absence of articulated appendages at the extremity of the abdomen in *Cylindrodes*—these characteristics are far more important than the sexual sculpture of the abdomen, the ultimate neurulation of the tegmina, the length of the legs, the contour of the trochanters, or the digitation of the tibiae, which separate *Scapteriscus* and *Gryllotalpa*.

The facts cited above present two features which bear upon the question of the origin of species.

First: these little mole crickets, so unique in their structure as to be widely separated from their nearest allies, are spread uniformly over the whole surface of the globe; but few species occur in any one place, and at least one is found in every temperate or hot region.

Now, if species originate or change from physical causes, or by “Natural Selection,” why is it that under every physical condition and surrounded by every variety of antagonism possible in their habitat, this same unique structural form has sprung up all over the globe?

Again, how can such theories account for another feature—common, indeed, to all natural groups—that it is not one striking characteristic which separates *Scapteriscus* and *Gryllotalpa*, and which “Natural Selection” might have seized upon, with reference to some special benefit, but a combination of features which have no apparent dependence upon each other, correlated, but not necessarily connected? Why should “Natural Selection,” altering for its own purpose the palm of the four-fingered mole cricket into that of the two-fingered species in South America; or, developing in South America, from some previous synthetic form of mole cricket, both the present four-fingered and two-fingered species, and in other parts of the world the four-fingered species only—destroying at the same time the primæval form all over the surface of the globe—at the same time, place rows of hairs on the hinder part of the abdomen of the tetradactylate group, and none on that of the didactylate? or make the veins of the tegmina of the ♀ of one group distant and irregular, and those of the other straight and approximate? Why furnish the eighth abdominal segment of the ♂ of one with a projecting tooth,

and deprive those of the others of such a prominence? Why give one long and the other short anal cerci, or clothe the hind tarsal nails of one with short hairs and leave the other naked? What have these features to do with the differences of structure we have mentioned in the palm-shaped fore leg, or in the length of the hind leg? These and similar difficulties, arising on every hand, seem to attend every derivative theory of the origin of species.

[From the Proceedings of the Boston Society of Natural History,
Vol. XI., February 5, 1868.]

ON THE RANK OF THE FAMILIES OF ORTHOPTERA.

Mr. S. H. Scudder stated that he had purposed to watch the transformation of our grasshoppers, during the coming summer, to determine the relative rank of the families of Orthoptera. All entomologists, German as well as French, English and American, have placed the Forficulina (unless distinguished as a separate order) at the head of the group, the Blattina second, the Phasmodæ and Mantidæ third, the Gryllodea, Locustina and Acrydii last. Burmeister and De Haan have changed the order of the latter families, but the general arrangement remains the same.

Graber has recently published* some observations which bear directly upon the point, but he has drawn no deductions from them. His studies on the transformations of these insects lead him to divide them into two groups, the saltatorial and non-saltatorial orthoptera.

In the latter group, the first indication of wings in the young insect is a slight expansion of the outer hinder borders of the dorsum of the meso- and meta-notum; this grows larger with succeeding moults, and, just before the final moult, becomes an extensive lappet, which shows no sign of disruption from the segments; the veins of the future wing are already mapped out, but they are only horizontal dorsal extensions of the thoracic segments. In the former group the wings arise as little lappet-like vertical extensions of the pleura of the meso- and meta-notum, and are directed slightly backward; in a second or third period they become separated by a suture from the segments of which they are but prolongations, and in the succeeding stages the wings are bent over, separated clearly from their segments as proper appendages, and assume a dorsal, horizontal or roof-like position instead of their former lateral and vertical one. They have left the embryonic position retained by the other group through life, and have attained a higher one. The saltatorial orthoptera must then be placed above the other groups of orthoptera, contrary to the usage of all previous writers.

*Zur Entwicklungsgeschichte und Reproductionsfähigkeit der Orthopteren, Sitzungsber. der K. Akad. der Wissenschaften zu Wien; Math.-naturw. Classe; Band LV., 307.

[From the Proceedings of the Boston Society of Natural History,
Vol. XI., February 26, 1868.]

NOTICE OF SOME NEW BUTTERFLIES FROM IOWA.

Mr. S. H. Scudder stated that he had recently received a collection of butterflies made by Mr. J. A. Allen, in Iowa; there were forty-six species in all, three of which were new.

One, *Chrysophanus Dione*, was of about the same size as the *C. Thoe*; the sexes were nearly alike in their markings; the upper surface was of a grayish brown, with faint violet reflections; the primaries had two black spots in the cell, and the hind margin of the secondaries was bordered somewhat as in *C. Thoe*; beneath, the coloration and markings were similar to those of *C. Thoe*, but the spots on the secondaries were differently arranged. The second species, an *Apatura*, for which the specific name *Proserpina* was proposed, differed from the species of this genus hitherto found in the United States, in having well rounded hind wings. The coloration agreed in general with that of *A. Clyton*, but the markings were more diffused, the spots more indistinct, and the insect itself much larger, expanding two and two-thirds inches. The third species, *Hesperia Iowa*, differed from *H. Delaware* Edw. in having duller colors, a much broader margin, and a longitudinal streak along the middle of the cell in the primaries of the female.

[From the Proceedings of the Boston Society of Natural History,
Vol. XI., February 26, 1868.]

REMARKS ON TWO NEW FOSSIL INSECTS FROM THE CARBONIFEROUS FORMATION IN AMERICA.

Mr. Scudder also exhibited two fossil insects from the coal measures.

One was found in the iron-stone nodules of Morris, Illinois, which have previously afforded remains of insects. The fragment represents the wing—apparently an upper one—of a neuropterous insect, which he called *Megathentomum pustulatum*. It is gigantic in size, very broad, with distant nervures, simple and slight divarications, and in the outer half of the wing, which alone is preserved, a cross neurotation, composed of most delicate and irregular veinlets. The wing is also furnished with a large number of larger and smaller discolored spots, the surfaces of the larger ones irregularly elevated.

The *vena mediastina* is simple and straight; the *vena scapularis* sends out two branches from its upper side, the first of which does not reach the border but loses itself in a congeries of minute veins, while the second, branching again quite near its origin, supports the tip of the wing; the *vena externo-media* occupies the middle third of the wing, and divides once near the base; each branch is straight and forks again, the upper one a little nearer the border than the second divarication of the *vena scapularis*, the lower still nearer to the mar-

gin; the *vena interno-media* divides several times, the uppermost branches forking again just inside of the border; the *vena analis* does not appear on the fragment.

There are six larger round or squarish spots; four of them form a bent row a little beyond the middle of the wing, the upper three spots being nearly straight and the lower one turned inward at a little more than a right angle; the uppermost spot occurs in the interspace between the *venæ scapularis* and *externo-media*; the others follow in succeeding interspaces. The two other large spots are found in the same interspaces with the upper two of the inner row, and are situated about half way between them and the border. The smaller spots appear to be less regularly distributed; they are usually round, but sometimes oval or elongated; there are three at equal distances from each other in the lower outer interspace formed by the branches of the *vena scapularis*, one occurs just within and above the inner of the three just mentioned, and one near the angle of the last divarication of the *vena scapularis*; there are two between the forks of the upper branch of the same and, in the interspace between the branches one spot is found close to the margin; two larger and elongated spots occur in the same interspace with the lowest of the four large spots and three equidistant round ones in the next interspace below; in the succeeding interspace, probably about half way between the base and the outer border, there is an oval spot; finally two faint ones are situated upon and beneath each of the branches of the *vena externo-media* near the middle of the wing.

The wing was probably a little more than three inches in length; its greatest breadth measured by a line at right angles to the costal border is 1.8 inch; from the apex of the wing, where the upper branch of the *vena scapularis* touches it, to the lowest point of the lower outer angle 2.1 inches; from the centre of the upper, inner large spot to the outer margin 1.05 inches; greatest breadth of an interspace, .34 inches. This insect, apparently allied to the *Coniapterygidae* by the simplicity of its neuration, differs from that family, not only in the cross-veining, but in the mode of branching and the proportion of the wing allotted to each of the veins. Dr. Hagen has shown me in this wing some resemblances to the *Phryganidae*, but I am inclined to believe it is distinct in its family characteristics from any known type of Neuroptera.

The second insect, for which the name of *Archegogryllus priscus* is proposed, was found by Dr. J. S. Newberry in the lowest coal beds at Tallmadge, Ohio. It consists of a broken leg of a cricket and a very small fragment of its wing—apparently a lower one. There are no determinate characters in the wing. The leg was broken into fragments from which a femur and tibia could be made out; they

are quite remarkable, for while the femur is smooth, the tibia is furnished with several prominences of large size; in modern types, the prominences, if they occur at all, are found only on the femur; in this specimen there is a slight rounded prominence on the upper surface at the very base of the tibia and another just beyond the middle; opposite the latter, on the upper surface, is a deeply bifid elevation, its hollow corresponding to the elevation on the upper surface; the basal half of the under surface is occupied by a very broad prominence, abrupt at its edges, of nearly equal height throughout, but slightly depressed in the middle. Length of the femur, .28 inches; breadth of the same, .11 inches; length of the tibia, .26 inches; breadth of the same, .045 inches.

[From the Proceedings of the Boston Society of Natural History,
Vol. XI., March 25, 1868.]

DESCRIPTION OF A NEW SPECIES OF BUTTERFLY FROM FLORIDA.

Thecla Juanita. Head black; a circular pearly white spot between the antennæ, another just behind the summit of the eyes, a long and slender one in front of, and another behind the eyes; base and centre of the palpi white; basal half of antennæ black (remainder broken); a transverse plume of mingled black and white hairs on the vertex, behind which is a collar of shorter white hairs; thorax and abdomen well sprinkled above with bright blue scales on a brownish ground; thorax beneath black; a white dot on the pleura at the base of either wing; legs black with occasional white scales; abdomen beneath orange. Wings above blackish-brown; primaries profusely suffused with bright blue (steel blue by reflected light) on the basal half, especially along the middle of the wing, but not between the divarications of the median nervure; fringe black tipped with gray; secondaries somewhat suffused with bright blue, especially along the area occupied by the median nervure and its divarications; there are two long tails; the upper is the extension of the middle median nervure, the lower, which is twice as long as the other, is the continua-

tion of the first branch of the median nervure; the internal area is slightly excavated near the extremity and the portion beyond curved sharply over and beneath, at fully a right angle to the general plane of the wing; on the lower half of the outer margin of the wing are three spots, made up of yellowish-brassy, greenish-brassy and bluish-brassy scales; that in the internal area is longitudinally oval, that between the median and sub-median nervures, transversely oval, and that between the tails transversely linear and least variable in coloration; the middle spot is also surmounted by a number of inconspicuous deep tawny scales; on the internal area there is another similar but irregularly shaped spot within but close to the outer one; internal area with long bluish gray hairs; fringe, as far as the longer tail, black tipped with gray; beyond white at extreme base; the outer parts black; wholly black beyond the spot on the anal angle.

Beneath, glossy grayish-brown, lightest in tint toward the apices of the wings; extreme base of the primaries velvety black with a longitudinally oblong-ovate, bright, very deep orange-red spot in the costal area, but scarcely reaching the edge of the wing; extreme base of the secondaries velvety black with two bright, very deep orange-red spots; one, circular, similarly situated to that on the primaries, the other, longitudinally oval, in the internal area; there is a transverse curving submarginal row of very bright, brassy-green, transversely ovate spots bordered with black, extending from the middle median nervule to the internal border; there is a row of marginal spots generally similar to those of the upper surface; the deep tawny spots are, however, found in all the interspaces, are more conspicuous and between them and the submarginal row mentioned, is a row of transversely linear spots similar to the marginal spots. Expanse of wings two inches; length of lower tail seven-tenths of an inch.

Mr. Edward Burgess took this exquisite little butterfly on the blossoms of peach trees, in Pilatka, Florida, on the tenth of February. It bears a general resemblance to *Papilio Halesia* of Cramer and *Atilides Dolichos* of Hübner.

Mr. S. H. Scudder stated that he had recently received, from Mr. Lincoecum of Texas, the eggs and egg-cases of the destructive grasshopper, *Caloptenus spretus*, which reappeared in that State on the 19th of February; some of the eggs had hatched on the way, and larvæ both of the first and second stages were found in the box; unfortunately the cold weather has killed them all.

ENTOMOLOGICAL NOTES.

II.

BY SAMUEL H. SCUDDER.

From the Proceedings of the Boston Society of Natural History, Vol. XII, 1868-69.

Mr. S. H. Scudder gave the results of some experiments he had made during the summer, upon the reproduction of lost limbs in the Walking-Stick, *Diaperomera femorata*.

If a leg is cut off beyond the trochantro-femoral articulation, the parts remaining outside of this joint are dropped before the next moult, and are then renewed, either by a straight short stump, in which the articulations are already observable, or by a miniature leg, the femur of which is straight, and the tibia and tarsi curved into a nearly complete circle; if the former, the leg assumes, at the next moult, the appearance it would have had in the second case; the latter form is always changed at the succeeding moult into a leg resembling the normal limb in every respect, excepting size and the absence of the fourth tarsal joint. If the leg is removed anterior to the trochantro-femoral articulation, the limb is never replaced.

The growth of the limb takes place, as in the uninjured limb, during the moult; a leg, of the full size attained during any one stage, is drawn directly out of a pellicle representing the size of the leg in the previous stage; the same thing occurs when the animal leaves the egg; in the egg the mesothorax and metathorax are scarcely larger than the prothorax, thus enabling the femora, which are widely separated in the escaped insect, to lie close together, as in other insect embryos; but by the time the young insect has fairly emerged from the egg, the thoracic segments have attained the normal proportions of the adult animal.

Mr. Scudder also stated that he had recently obtained from a cluster of eggs of *Ædipodu carolina*, a considerable number of Chalciditans of a species apparently undescribed. He believed this to be the first recorded case of parasites living in the eggs of an Acrydian.

A CENTURY OF ORTHOPTERA. DECADE I.—GRYLLIDES.

By SAMUEL H. SCUDDER.

1. *Tridactylus major*. Pale dull yellow, with dull brownish blotches on the front of the head, on the base and tips of the tegmina, and just beyond the middle of the hind femora; intermediate tibiæ crossed by one stripe, and femora by two stripes; the wings extend a little beyond the abdomen; the fore tibia is dilated, especially toward the extremity, where it is armed with very short spines; the hind tibiæ are armed with three laminæ, and protected at the tip by two flattened elongated spines, after the manner of *Rhipipteryx*; there are no other appendages to the hind tibiæ, although the sculpture of the pleura of the pronotum is like that of *Tridactylus*, and not that of *Rhipipteryx*. Length .4 in. Bengal.

2. *Trigonidium pacificum*. Dark fuliginous, mouth parts paler; large basal joint of antennæ fuliginous; second joint blackish;

¹ See these Proceedings, Vol. XI, p. 399.

third luteous; beyond growing dusky; pronotum smooth, shining, nearly destitute of hair; tegmina fully as long as the abdomen, the central field with prominent, irregular, longitudinal veins; wings none; legs dark luteous; anal cerci brownish, very long and slender; ovipositor reddish-brown, blackish along the middle, falciform, upper surface elevated slightly at the middle, apical half broader than basal half, tip produced to a sharp point. Length of body .21 in.; of hind tibiae .15 in.; of anal cerci .15 in.; of ovipositor .09 in. One ♀ from the Hawaiian Islands, given me by Mr. B. P. Mann.

3. *Hapithus quadratus*. This species differs from its more northern ally in having the prothorax scarcely broader behind than in front, and in having, in the ♀, longer tegmina, which cover the entire abdomen and do not divaricate at the tip; the hind legs also seem to be longer and stouter, and, in the ♂, the tegmina differ slightly in venation from those of *H. agitator*, and are also furnished with little brown spots along the outer border of the upper surface. In size it resembles *H. agitator*. Dr. Gundlach sent me one specimen from Cuba; another, collected on the same island by Mr. Wright, was given me by Mr. Uhler, and two others were received from Central Texas, collected by Mr. Belfrage.

4. *Eneoptera annulata*. Of a nearly uniform, sombre, dusty brown; summit of the frontal tubercle blackish; a reddish-black, narrow stripe across the face, uniting the bases of the mandibles; pronotum with a small blackish spot in the middle of both the anterior and posterior border; and a black dot on either side of the middle of the dorsum; tegmina extending beyond the body, nearly to the middle of the hind tibiae, dull luteous brown, with a small, humeral, blackish spot and many of the cross-veins, especially along the sides of the dorsal field, edged with brownish; wings reaching beyond the tegmina, almost to the tip of the hind tibiae; hind femora at the tip annulate with brown; hind tarsi paler than tibiae; ovipositor straight, black, edges of the sheath chestnut; anal cerci pale. Length of body .6 in.; of tegmina .76 in.; of hind tibiae .38 in.; of anal cerci .28 in.; of ovipositor .27 in. One ♀ from Central America, communicated by Mr. P. R. Uhler.

5. *Eneoptera unicolor*. Uniform luteous brown throughout, the hind femora with some slight reddish-brown, inconspicuous dashes; hind tibiae dusky; first joint of tarsi yellowish, armed at the tip with two large, scarcely divergent, brown spines; fore tarsi dilated; ovipositor straight, chestnut color, tipped with black and with a fine longitudinal black line along the middle of either side; anal cerci

long and slender, pale yellowish, slightly dusky toward the tip; tegmina longer than the abdomen, when at rest almost reaching the middle of the hind tibiae; wings overreaching the tegmina and extending to the apical fourth of the hind tibiae. Length of body .44 in.; of tegmina .48 in.; of hind tibiae .26 in.; of anal cerci .16 in.; of ovipositor .14 in. One ♀ from Manila.

6. *Eneoptera obscura*. Head dark brown; prothorax black, varied, especially posteriorly, with dark brown; anterior legs fuscous; tegmina blackish, varied with obscure fuscous; ovipositor mahogany color, with a central, longitudinal, black line; the tegmina are broad, and extend beyond the body in the dried specimen; perhaps they do not surpass it when living; the wings, at rest, reach just beyond the tegmina; the ovipositor is scarcely shorter than the body, straight for twice or thrice its length, and then curved slightly downward; it is slightly enlarged and obliquely docked above at the tip; the form of the ovipositor, the shape of the fore femora, which are strongly incrassated at base, and the presence of a conspicuous but narrow prominence on the front of the head between the eyes, ought properly to separate this species from the genus in which I place it. Length of body .33 in.; of tegmina .31 in.; of ovipositor .28 in. Old Calabar, Mr. Andrew Murray.

7. *Platydictylus bicolor*. Whole upper surface, including upper third of eyes, upper portion of frontal prominence, tegmina and exposed portion of folded wings, very pale yellowish-brown; all other parts of the body, including all the appendages except the antennae, dark brown; the latter are luteous near the base and dark brown toward the tip; summit of head flecked with blackish dots; dorsum of pronotum furnished with fewer blackish dots; some larger ones are found along an indented line, parallel and contiguous to the hind border; a semicircular dusky spot is situated upon the hind border; a few minute black dots are scattered about upon the tegmina; lateral field of the tegmina with oblique blackish veins, the cross-veins pale; tegmina surpassing a little the tip of the abdomen; wings straight, extending far beyond the tip of the tegmina; legs throughout flecked with inconspicuous pale dots; terminal tarsal joint of each of the legs furnished with a broad central annulation of yellowish-brown; terminal hind tarsal joint guarded at base by two spines, the inner three or four times longer than the outer. Length of body, .8 in.; of tegmina, .7 in.; of wings beyond tegmina, .5 in.; of hind tibiae, .66 in.; anal cerci broken. One ♂ from Bogota, P. R. Uhler.

8. *Mogoplistes occidentalis*. Nearly uniform chestnut-brown, slightly banded with brownish fuscous. It differs conspicuously from the European species, by its much greater size and the proportionally greater length of the ovipositor; my specimens are imperfect and are almost entirely deprived of scales. Length of the body .42 in.; of the ovipositor, .32 in. Mr. Uhler sent me two ♀ from Cape St. Lucas, Lower California.

Cycloptilum nov. gen.

Allied to *Ornebius*. Head very small, well and evenly rounded, produced anteriorly; eyes of medium size, subpyriform, the larger end directed upward, but little prominent; antennæ very long and slender, distant at their insertion, the basal joint large, the remaining joints nearly equal; labrum bifid; maxillary and labial palpi apparently similar, the terminal joints a little enlarged and obliquely truncated at the tip. Prothorax very large, nearly as long as the abdomen, greatly broadened and produced posteriorly, the posterior border well rounded, forming nearly a semicircle; pleura shallow and incurved, posteriorly wanting; tegmina almost entirely concealed by the expansion of the pronotum, but with the dorsal field as broad as the pronotum in its widest part, the tips well rounded, like the prothorax, and covering half of the abdomen; the lateral field is also well developed, embracing the abdomen; wings nearly or quite abortive in the single species known to me; legs short, simple; hind femora greatly dilated; hind tibiæ and first joint of tarsi furnished with apical spines. Abdomen depressed, nearly equally broad throughout, slightly tapering at the extremity; anal cerci tapering, more than half as long as the abdomen; whole body, in the single species known to me, covered with scales.

9. *Cycloptilum squamosum*. Head and prothorax yellowish-brown; a dark brown or blackish band behind the eyes, extending to the anterior part of the pronotum, with a scarcely perceptible median carina; pleura of the pronotum covered with whitish scales; tegmina extending three one-hundredths of an inch beyond the prothorax, pellucid, with a few pinkish veins on posterior border; legs pale yellowish, covered with brownish scales, least conspicuous on the hind femora; basal half of abdomen covered with whitish scales, apical half with blackish ones; anal cerci whitish, a few long and distant hairs on the pleura of the pronotum, the femora and the anal cerci. Length of body .25 in.; of pronotum .13 in.; of hind femora .14 in.; of antennæ .5 in.; of anal cerci .1 inch. One ♂, Texas, Belfrage.

10. *Nemobius circumcinctus*. Top of head and pronotum yellowish-brown, marked with blackish-brown, the pronotum edged anteriorly and posteriorly with pale yellow; pleura of pronotum (except lower edges) and front of head, blackish-brown; abdomen black above, pale yellowish-brown beneath; first and second joints of palpi dark brown, third joint dark brown without and whitish within, fourth and fifth joints white; antennæ dark brown; legs and anal cerci brownish-yellow, flecked with blackish spots; the tibiæ and tarsi more dusky; the portions of the tegmina, exposed when at rest, black, the dorsal field with black, the lateral field with luteous veins; entire outer and posterior margin of the dorsal surface of the folded tegmina bordered narrowly—more broadly at the shoulder—with a pale yellow band; concealed portion of tegmina translucent, colorless; tegmina broad, ovate, a little shorter than the abdomen; upper surface flat; wings apparently wanting; hind tarsi composed of only two joints, the outer smaller and not more than half as long as the first. Length of body, .37 in.; of tegmina, .23 in.; of hind tibiæ, .25 in. One ♂, from Orizaba, Mexico, received from Professor Sumichrast.

Mr. S. H. Scudder made the following remarks upon the arrangement of the families of Orthoptera.

About a year ago I attempted to show by the aid of Graber's researches, that the saltatorial Orthoptera rank higher than the non-saltatorial, because in the latter the primitive position of the wings is retained through life, while, in the former, both pairs of wings essentially change their position during the different stages of growth. I now propose, by a closer examination of the relative ranks of these families and of their mutual affinities, to determine the serial order in which they should be treated.

Let us first observe the views which various authors have held.

Linné, in the tenth edition of his *Systema Naturæ*, published in 1760, placed the Orthoptera and beetles in the same division (Coleoptera), dividing the former into three genera, Forficula, Blatta and Gryllus; the latter genus he subdivided into the following sections: Mantis, Acrida (*Truxalidæ*), Bulla (*Tetricides*), Acheta (*Gryllides*), Tettigonia (*Locustariæ*) and Locusta (*Acrydii*).

In 1764, in his *Museum Ulricæ Reginae*, he retained Forficula under Coleoptera, and removed the two other genera to Hemiptera, dividing them as before.

Two years later, in the twelfth edition of his *Systema Naturæ*, he retained nearly the same arrangement, but elevated the section Mantis to the rank of a genus, placing it between Blatta and Gryllus, and omitted Acrida altogether, merging the species formerly referred to that group in the section Locusta.

Geoffroy, in his *Histoire abrégée des Insectes*, published in 1764, divided the Coleoptera into three "Articles," in the second of which he placed Forficula, in company with Staphylinus, etc., and in the third the other orthopteran families, together with Thrips. He divided the third into five "orders," viz.: Blatta, Thrips, Gryllus (*Gryllides*), Acrydium (*Acrydii*), Locusta (*Locustariæ*) and Mantis.

In all the works of Fabricius, published between 1775 and 1793, he included these insects in his class *Ulonata*, dividing them artificially—by the structure of the antennæ—as follows:

- I. *Acrydium* (*Tetricides*).
Gryllus (*Acrydii*).
- II. *Truxalis*.
- III. *Forficula*.
Blatta.
Mantis.
Acheta (*Gryllides*).
Locusta (*Locustariæ*.)

But in the body of his works he always followed a different succession of genera, viz.: *Forficula*, *Blatta*, *Mantis*, *Acrydium*, *Truxalis*, *Acheta*, *Locusta*, *Gryllus*.

DeGeer, in the third volume of his *Histoire des Insectes*, published in 1773, applies the name of *Dermaptera* to this group, and divided it into the genera *Mantis*, *Locusta* (*Locustariæ*), *Acrydium* (*Acrydii*), *Gryllus* (*Gryllidæ*), *Blatta* and *Forficula*.

Latreille, in his *Précis des caractères génériques*, published in 1796, divided the *Orthoptera* into three groups, as follows:

- I. *Forficula*.
- II. *Blatta*.
- III. Fam. 1. *Gryllus* (*Gryllides*).
Locusta (*Locustariæ*).
Mantis.
Fam. 2. *Truxalis*.
Acrydium (*Acrydii*).
Acheta (*Tetricides*).

In his subsequent works, he has uniformly maintained one succession of genera, but has greatly varied his larger divisions at different times. In 1801 and 1807 he arranged the *Orthoptera* under three unnamed sections, as follows:

- Sect. I. *Forficula*.
- “ II. *Blatta*.
- “ III. Fam. 1. *Mantides* { *Spectra* (*Phasmida*).
Raptatoriæ (*Mantides*).
- “ 2. *Gryllidæ*.
- “ 3. *Locustariæ*.
- “ 4. *Acrydiana*.

In 1810 he divided them into two sections, the first containing Forficulariæ, Blattariæ and Mantides, and the second Gryllides, Locustariæ and Acrydii. In 1817 he gave the name of Cursoria to the first division, and that of Saltatoria to the second. In 1825 he divided them again into three sections, differing materially from the three into which he first separated them, viz.:

Sect. I. Forficulariæ.

Blattariæ.

Mantides.

Spectra.

“ II. Gryllides.

Locustariæ.

“ III. Acrydites.

In 1829 he returned to his arrangement of 1810, only dividing the Mantides into two families, as in the last scheme. This method of division was also pursued by Serville, in his *Revue des Orthoptères*, in 1831, and in his general work on the Orthoptera, published in 1839. Lastly, in 1831, Latreille separated the Forficulariæ from the other Orthoptera, under the name of Dermaptera.

Marcel de Serres, in 1809, divided them into five families: Labidoures (Forficulariæ), Blattes, Anomides (Mantides, including also Mantispa), Nemides (Phasmida) and Grylloides. The latter were again separated into five divisions: Taupegrillons (Gryllotalpa), Grillons (Gryllus, etc.), Dactyliions (Xya), Locustaires (Locustariæ) and Acrydiens (Acrydii).

In 1811, Olivier, in the *Encyclopédie méthodique*, first gave the name of Orthoptera to the group, from which, however, he excluded Forficula, as a coleopteron. He presented no special classification of his own.

Lamarek, both in 1816 and subsequently, divided the Orthoptera into four families,—Locustaires (including Locustariæ and Acridii), Mantides (including Mantides and Phasmida), Gryllonides and Coureurs (including Blattariæ and Forficulariæ).

MacLeay, in 1821, with his peculiar views of classification, allowed five families, arranged in a circle; beginning, for instance, with the Phasmida, the Blattaria were reached either directly, or through the medium of the Acrydina, Locustina and Gryllina, while the Dermaptera were conveniently termed an “osculant” group.

Duméril, in his *Considérations générales sur la classe des Insectes*,

published in 1823, divided the Orthoptera into four families: Forficules ou Labidoures, Blattes ou Omalopodes, Difformes ou Anomides (Mantides and Phasmida), and Grylliformes ou Grylloides (Locustariæ, Acrydii and Gryllides).

In 1830, Leach published his elaborate scheme in the ninth volume of Brewster's Encyclopædia, in which the families under discussion were arranged in three orders,—Dermaptera (Forficulariæ), Orthoptera and Dictyoptera (Blattariæ); his Orthoptera were divided as follows:

- Tribe I. Mantides.
 - Fam. I. Phasmida.
 - “ II. Mantida.
- Tribe II. Achetides (Gryllides).
 - Fam. I. Gryllotalpida.
 - “ II. Achetida.
- Tribe III. Locustides (Locustariæ).
 - “ IV. Gryllides (Acrydii)
 - Fam. I. Gryllida.
 - “ II. Acrydida (Tetricides).

Newman, in the second volume of the Entomological Magazine, published in 1834, considered the Orthoptera as a class, and divided them as follows:

- Strips Forficulina,
 - Order Forficulites.
- Strips Achetina (Gryllides),
 - Order Achetites.
- Strips Gryllina (Locustariæ),
 - Order Gryllites.
- Strips Locustina (Acrydii),
 - Order Locustites.
- Strips Spectrina (Phasmidæ),
 - Order Spectrites.
- Strips Mantina,
 - Order Mantites.
- Strips Blattina,
 - Order Blattites.

Burmeister, in 1838, in his Handbuch der Entomologie, separated the Dermaptera (Forficulariæ) from the other Orthoptera, and di-

vided the latter into Latreille's two sections of *Cursoria*,—families *Blattina*, *Mantodea* and *Phasmodea*, and *Saltatoria*,—families *Acridioidea*, *Locustina* and *Grylloidea*. The same arrangement was followed by DeHaan in 1842.

Westwood, in his *Introduction to the modern classification of Insects*, published in 1839–40, separated the *Forficulariæ* from the other *Orthoptera* under the name of *Euplexoptera*; and divided the *Orthoptera* into *Cursoria*,—family *Blattidæ*, *Raptatoria*,—family *Mantidæ*, *Ambulatoria*,—family *Phasmidæ* and *Saltatoria*,—families *Achetidæ* (*Gryllides*), *Gryllidæ* (*Locustariæ*) and *Locustidæ* (*Acrydii*).

Blanchard, in the third volume of his *Histoire naturelle des animaux articulés*, published in 1840, arranges them simply in seven families, as follows: *Forficuliens*, *Blattiens*, *Mantiens*, *Phasmiens*, *Locustiens*, *Grylliens* and *Acridiens*.

Fischer de Waldheim, in his *Orthoptères de la Russie*, published in 1846, separated the *Forficulines* from the other *Orthoptera*, and divided the latter (omitting the *Phasmida*, which did not occur in Russia, to his knowledge) into *Cursoria*,—including *Blattina* and *Mantodea* and *Saltatoria*,—including *Grylloidea*, *Locustina* and *Acridioidea*.

In 1850, Fieber divided the *Orthoptera* as follows:

Sect. I.	Fam. 1, <i>Blattoideæ</i> .
Sect. II.	
Subsect. I.	
A	
a	Fam. 2, <i>Mantoideæ</i> .
b	“ 3, <i>Phasmoideæ</i> .
B	
a	
α	Fam. 4, <i>Acridioideæ</i> .
β	
*	Fam. 5, <i>Locustoideæ</i> .
**	“ 6, <i>Grylloideæ</i> .
b	
*	Fam. 7, <i>Scariphastæ</i> (<i>Gryllotalpidæ</i>).
**	“ 8, <i>Xyaridæ</i> (<i>Xya</i> , etc.).
Subsect. II.	“ 9, <i>Forficuleæ</i> .

In 1854 he proposed a similar scheme, which I have not seen, but which Gerstæcker in his *Bericht* reports substantially as follows: the

Orthoptera are first divided into two tribes, Orthoptera genuina and Harmoptera (Forficulariæ). The Orthoptera proper are again divided into two sections, Sternopoda (Blattariæ) and Pleuropoda. The latter are subdivided into Gressoria,—families Mantodea and Phasmodea, Saltatoria,—families Acridiodea, Locustina and Gryllodea, and Fossoria,—families Gryllotalpina and Xyodea.

H. Fischer of Freiberg, in his Orthoptera Europæa, published in 1853, has exactly reversed Westwood's divisions,¹ and united the Mantides and Phasmodea under Fieber's name of Gressoria.

Lastly, Gerstæcker, in the second volume of Carus' Handbuch der Zoologie, published in 1863, divides the Orthoptera genuina, from which he excludes the Dermaptera (Forficulariæ), into three primary divisions, Cursoria,—including the family Blattina, Gressoria,—including the families Mantodea and Phasmodea, and Saltatoria,—including the families Gryllodea, Locustina and Acridiodea. The Dermaptera he places below them.

Without attempting to discuss whether the Pseudo-Neuroptera should be admitted into the ranks of the Orthoptera, or to prove that the Forficulariæ should not be considered a separate group equal in value to the other Orthoptera as a whole, I will simply point out the way in which these families seem to me to arrange themselves. Having placed the saltatorial group above the non-saltatorial, a much more difficult question arises in determining the order of the three saltatorial families; I am, however, strongly inclined to place the Gryllides and Locustariæ above the Acrydii, on account of the specialization of the organs for ovipositing in the females, and the more perfected structure and higher character of the organs of stridulation in the males. The intimate relation of these two families to each other, both in the features alluded to, and in the close resemblance of such allied forms as *Phalangopsis* and *Rhaphidophora*, shows that the Acrydii cannot be placed between them, and the only remaining question is the relative position of the Gryllides and Locustariæ. Dufour has shown how similar the internal anatomy of *Xya* is to that of many Acrydii, but this is an exceptional case among Gryllides, and should not be allowed too great weight; on the other hand, the great variety of form of almost any given organ among the crickets, compared with its relative uniformity of structure among Locustariæ, seems to indicate the higher character of the former. And I do not

¹ In my remarks in the previous volume of these Proceedings, p. 390, I had overlooked Fischer's statement, that the table given by him was to be considered a *dispositio ascendens*.

think it is without meaning that the crickets often live in company,¹ that they sing both in concert and during day and night, and are the closer attendants upon man; their stridulating organ, too, seems much more complicated and more extensive, and the pitch of their song is higher; that of the *Acrydii* again is lowest of all.

The eggs of *Gryllides* are laid either singly in the ground, in irregular clusters in subterranean passages, or uniformly, in a single row, in the pith of twigs; those of *Locustariæ* are never laid singly, but either in the pith of plants, in regular clusters in the ground, or in regular rows on stems of plants; those of *Acrydii* are always laid in clusters, rarely regular, in the ground.

Lastly, the close resemblance between the hind legs of *Locustariæ* and *Acrydii* shows that these families cannot be widely separated.

The non-saltatorial families present fewer difficulties. The wide and acknowledged separation of the *Forficulariæ* from all other *Orthoptera*, proves that it cannot intervene between any of the families, and must go to the bottom of the scale.

The *Blattariæ* are the nearest allies of the *Forficulariæ*, on account of their flattened shape, the form of the prothorax, etc. From the similarity also of their upper and under wings, their habits of concealment and nocturnal disposition, and their early appearance upon the earth in geological time, they must undoubtedly be ranked next above the *Forficulariæ*.

The specialization of their anterior legs marks the higher structure of the *Mantides*, but they show their affinity to the *Blattariæ*, and their inferiority to the *Phasmida*, in their flattened abdomen, the tendency of the prothorax to become broad and flat, the structure of the external genital organs, the position of the head and the exclusion of the eggs in a single cluster, enclosed in an ootheca.

The relationship of the *Phasmida* to the saltatorial *Orthoptera* is also shown in the cylindrical body, and, to some degree, in the structure of the external genital organs.

¹ It will naturally be objected to this that the *Gryllides* keep company beneath, or upon the *ground*, and are not given to flight; and that many *Acrydii* migrate high in the air, in immense swarms. As a whole, however, the swift and controlled flight of crickets is of a superior nature to that of *Acrydii*, which only use their wings as a parachute, to give greater effect to their leaps, or, at best, beat the air until they raise themselves sufficiently to be borne along by aerial currents; and the company they keep is only the result of their immense numbers and the instinct which leads each one to seek elsewhere the food which its own devastations have made so scarce. Furthermore, there are some *Tittigideans* which, at least to a certain extent, inhabit the water.

The Orthopteran families may then be placed in the following descending order: Gryllides, Locustariæ, Acrydii, Phasmida, Mantides, Blattariæ, Forficulariæ.

This order, if we omit the Forficulariæ and assume that Burmeister proceeded from the lower to the higher groups in his treatment of insects, is exactly the position assigned to them by that distinguished German entomologist.

NOTES ON ORTHOPTERA COLLECTED BY PROFESSOR JAMES ORTON ON EITHER SIDE OF THE ANDES OF EQUATORIAL SOUTH AMERICA. BY SAMUEL H. SCUDDER.

Hitherto, we have known almost nothing of the Orthoptera of the region explored by the party under Professor Orton. Chili on the south and New Grenada on the north are well represented in European cabinets, but the region midway between them has been represented in orthopterological science by a few scattered descriptions, principally of Phasmida and Blattariæ. It is therefore greatly to be regretted that these explorers did not bring home something more than this mere handful of specimens, which have proved such a comparatively great addition to our knowledge of the Ecuãdorian fauna. A single hour's well directed search would certainly have tripled the number of species. Still we may congratulate ourselves upon what we have obtained, since thirty of the forty species enumerated are new and require the establishment of five additional genera; of these species all of the Gryllides, Locustariæ, Mantidæ and Forficulariæ, and all but one of the Acrydii are new; while only one of the four Phasmida and three of the nine Blattariæ have not been described; two of the genera, *Tropidacris* and *Lophacris* have not been characterized here, because they form the subject of comparison with the other gigantic Acrydians, in the succeeding paper.

GRYLLIDES.

1. *Nemobius Ortonii* nov. sp.

Head luteous, varied above and on the vertex with dark fuscous and with two fuscous points on the front, at the base of the antennæ interiorly; mouth parts pallid; antennæ luteous, annulated distantly and minutely with fuscous. Pronotum luteous, with a slight median furrow; the anterior and posterior borders with a narrow, and the middle of the sides with a longitudinal, wavy, broader line of black; the upper surface variegated with black and furnished with short black hairs; on either side of the middle, but not reaching the furrow, and situated just in advance of the middle, a broad naked transverse stripe, reaching the lateral black band, twice as broad above as below. Tegmina

pallid at the sides, above variegated with pallid and dark fuscous, the veins sometimes of one, sometimes of the other color; wings pellucid, the costal border and spaces exposed in folding, discolored. Legs pallid, blotched with dark fuscous; the hind femora very stout, the hind tibiæ abundantly armed with long spines. Anal cerci very long, stout at base, rapidly tapering, dusky, furnished with long hairs; ovipositor scarcely exerted. Length of body .44 in.; of antennæ 1.25 in.; of tegmina .34 in.; of wings .62 in.; of hind femora .28 in.; of anal cerci .22 in. One ♀. Napo or Marañon.

2. *Platydictylus fasciatus* nov. sp.

Pale testaceous, the prothorax darker; head with a dusky line bordering the antennæ and the eyes; first joint of antennæ testaceous, beyond black; eyes large, globose, pyriform. Tegmina longer than body, testaceous with fuscous veins, the inner half with seven or eight obscure, oblique, fuscous bands nearly as broad as the spaces between; wings longer than tegmina, pellucid or slightly clouded, the costal edge fuscous, an obscure clouded longitudinal space at the apex near the bottom of the median field. Abdomen blackish above; ovipositor reddish, black at tip and on the side along the median line; at base curved strongly upwards; beyond bowed slightly in a reverse direction; anal cerci stout, pale, hairy. Length of body .85 in.; of tegmina 1.05 in.; of wings 1.27 in.; of ovipositor .62 in. One ♀. From Napo or Marañon.

3. *Trigonidium gracile* nov. sp.

Vertex of head fusco-luteous, front blackish, mouth part pale; basal two joints of antennæ blackish, beyond pale. Pronotum fusco-luteous, marked with fuscous; abdomen blackish fuscous. Tegmina dark luteous, nearly as long as the abdomen, wings blackish, with luteous veins, reaching far beyond the tegmina. Legs very slender, pale, the hind tibiæ with very long and slender spines on the apical half. Ovipositor reddish brown, blackish along the middle, falciform, slightly swollen at the middle, the tip upturned rather sharply and terminating in a very fine point; anal cerci very long and slender, the basal third pale, beyond fuscous. Length of body .17 in.; of wings .26 in.; of hind tibiæ .16 in.; of anal cerci .055 in.; of ovipositor .07 in. One ♀. Napo River.

LOCUSTARÆ.

4. *Steirodon quadratum* nov. sp.

Head dark brown, sides of front paler; base of labrum black, lobe whitish; mandibles whitish; vertex dark brown, a band above

the eyes very dull luteous; vertex docked squarely in front, the neck constricted; basal joint of antennæ blackish, the rest reddish-brown, their apices blackish. Pronotum dull brownish fulvous, the anterior margin slightly emarginate and yellowish, the hinder margin scarcely raised, broadly rounded and nearly straight, margined distinctly but narrowly with black, the color extending anteriorly along the lateral carinæ more than one-third the way to the anterior margin; lateral carinæ square, sharp posteriorly; pleura marginate, especially in front. Tegmina grass green, the stridulating vein luteous, the margin next the pronotum, when at rest, black. Legs brownish yellow, hind tibiæ greenish. Length of pronotum .31 in.; breadth of same anteriorly .17 in.; do. posteriorly .26 in.; length of tegmina 2.38 in.; breadth of same .71 in.; length of hind tibiæ 1.33 in. One ♂. Guayaquil.

5. *Acanthodis ? antennatus* nov. sp.

Head smooth, green; antennæ pale green, of great length. Pronotum dull green, scabrous with frequent tubercules; front border straight; hind border slightly produced, broadly rounded, nearly straight. Tegmina green, longer than the abdomen, shagreened with an anastomosis of irregular veins, the tip produced anteriorly to a rounded point; wings hyaline, as long as the tegmina. Legs rather stout; foramina of anterior tibiæ large, oblong, obovate, open; foot pads of the terminal tarsal joints largely developed. Ovipositor long, broad, testaceous, the upper edge perfectly straight, basal half of blade of uniform breadth, the tip minutely pointed; anal cerci rather short, conical, luteo-fuscous. Length of pronotum .28 in.; of tegmina 1.35 in.; breadth of same .34 in.; length of antennæ 5.8 in.; of hind tibiæ .9 in.; of ovipositor .7 in.; breadth of same .08 in.; length of anal cerci .1 in. One ♀. Napo River.

6. *Meronicidium conspersum* nov. sp.

Head smooth, testaceous; the summit, vertex, first two joints of antennæ, borders of the antennal sockets and the lateral carinæ of front black; rest of antennæ reddish brown; mouth parts testaceous. Prothorax black above, and along the anterior and posterior borders at the sides, the rest testaceous; black portions very roughly scabrous with rounded elevations; prosternum bimucronate. Tegmina dark testaceous, the inner border black and covered with transverse black bars and spots; hind wings fuscous. Hind femora broad, compressed, the apical half with five or six black spines; hind tibiæ armed with four rows of rather short black spines. Ovipositor broad, sharply pointed, the lower edge slightly rounded, the upper edge nearly

straight, with a slight median elevation; basal half luteous, apical half and lower border black. Length of body 1.88 in.; of tegmina 2.1 in.; of hind tibiae 1.26 in.; of ovipositor .87 in.; breadth of same .18 in. One ♀. Napo or Marañon.

7. *Copiophora gracilis* nov. sp.

Vertical spine squarish at base, the apical two thirds conical; basal half furnished superiorly with a double row of tubercles directed forwards; inferiorly with a single prominent tubercle; above, and a little in advance of this on each side, a single smaller tubercle; the apex sharply pointed and turned a very little downward; front of mandible and upper edge of clypeus black. Tegmina with a few black points along the middle. Hind femora armed along the whole inferior carina with a row of distant sharply pointed spines, curved a little outwards. Length of vertical spine .23 in.; of pronotum .33 in.; of tegmina 1.35 in.; of hind femora .65 in. One ♂. Napo or Marañon.

8. *Conocephalus brevipennis* nov. sp.

Stout; first four joints of antennae, sockets of antennae, front of mandibles and upper edge of clypeus black; antennae luteo-fuscous, distantly and narrowly annulated with fuscous; tubercle of vertex very broad, short, the front slightly rounded, the neck a little constricted. Lateral carinae of pronotum edged with blackish fuscous; pleura well rounded beneath. Tegmina rather broad, sprinkled with black dots. Legs short and rather stout; ovipositor very short, sharply pointed. Length of body 1.25 in.; of pronotum .35 in.; of tegmina 1.7 in.; of hind femora .84 in.; of ovipositor .5 in.; breadth of same .08 in.; distance from centre of eye to tip of vertex .13 in. One ♀. Napo River.

9. *Conocephalus tenuicauda* nov. sp.

Slender, uniformly green. Tubercle of vertex short, broad, the front scarcely rounded, produced beneath to a blunt, very short, conical tooth. Lower edge of pleura of pronotum docked angularly in front. Tegmina slender, immaculate. Ovipositor very slender, long, not very sharply pointed. Length of body 1.1 in.; of pronotum .29 in.; of tegmina 1.57 in.; of hind femora .9 in.; of ovipositor .77 in.; breadth of same .04 in.; distance from centre of eye to tip of vertex .07 in. One ♀. Napo or Marañon.

PANOPLOSCELIS nov. gen.

Allied to *Listroscelis*. Head large, globose, the front very broad but slightly convex, with rather prominent lateral angles, the vertex

regularly and strongly convex, produced in front between the antennæ into a compressed lamina, bilaminæ behind, cut transversely so as to be bidentate in front; sockets of the antennæ produced interiorly into a high rounded lamina; eyes globose, prominent; mandibles very large, hollowed exteriorly; maxillary palpi slender, last joint slightly swollen toward the apex and curved inwards, a little longer than the preceding three joints taken together; labial palpi stouter; first joint of antennæ large and stout, fully as long as the longitudinal diameter of the eye; second joint just half as thick, scarcely longer than broad; remaining joints simple and similar. Pronotum large, divided by two deep curved furrows into three sections; the anterior two as broad as the head; the posterior much broader and produced posteriorly into a high, rounded, nearly vertical lamina, protecting the organs of flight; prosternum bimucronate. Tegmina very short, coarse and stout, produced to a broad rounded point, the δ with greatly developed, laterally prominent, coarse and heavy stridulating organs; wings very short, nearly abortive; meso- and metasternum distantly bimucronate. Legs very long, very stout and very spiny; coxæ heavy, the angles produced to short spines, all the femora stout, the front with a double row of spines beneath, the inner the stouter, with three very large, stout and finely pointed ones on the inner surface near the apex; the middle with a double row beneath, the anterior the stouter; the posterior with a single row beneath externally, growing larger toward the tip; fore and hind tibiæ with four, and middle femora with three rows of stout spines; foramina of anterior tibiæ linear, very small; abdomen large, a little compressed.

10. *P. armata* nov. sp.

Head rugose, especially the front and sides, blackish brown; labrum and mandibles smooth; palpi and first joint of antennæ very dark mahogany brown; rest of antennæ black. Pronotum blackish brown, very rugose, the posterior edge slightly marginated. Tegmina dark brown, not nearly so long as the pronotum, rugulose; wings abortive, not half the length of the tegmina. Legs deep mahogany brown, the tarsi and all the knees darker; the bases of all the tibiæ externally warty, mahogany brown; spines tipped minutely with black. Abdomen obscure, dark mahogany brown, beneath darker, the stigmata yellowish, the appendages dull luteous. Length of basal joint of antennæ .14 in.; of apical joint of maxillary palpi .29 in.; distance from vertical spine to tip of labrum .7 in.; length of pronotum .7 in.; of tegmina .58 in.; breadth of tegmina, exclusive of tympanum .27

in.; breadth of tympanum .22 in.; length of wings .24 in.; of fore tibiæ 1.25 in.; of middle tibiæ 1.15 in.; of hind tibiæ 2.03 in. One ♂. Napo or Marañon.

DISCERATUS nov. gen.

Body curved slightly, a little compressed. Head bluntly rounded anteriorly, the front very declivent; sockets of the antennæ with an elevated rim, and between them the vertex produced into a low crater-like elevation with a slight ridge running from it in front; upper edge of clypeus bearing, on either side externally, a rather long, cylindrical projection, curved slightly downwards and rounded at the tip; eyes of medium size, prominent; palpi rather short and stout. Pronotum produced anteriorly, partially covering the head; posteriorly docked somewhat squarely, scarcely covering the mesonotum; the sides rather short, the lower edge a little rounded, higher behind than in front. Tegmina minute, wings wanting. Legs rather stout, the anterior pair long; the hind femora rather slender, not long; coxæ and sides of thoracic sterna produced into small blunt spines. Ovipositor very broad at base, curved pretty strongly, tapering rapidly, the tip pointed; anal cerci very short.

11. D. nubiger nov. sp.

Head smooth, front reddish, sides greenish yellow tinged with red; vertical projection and a median line posterior to it blackish; antennæ reddish, palpi pale. Pronotum reddish brown, edged with black anteriorly. Legs testaceous, the knees slightly dusky. Tegmina blackish, with luteous veins. Abdomen dark testaceous; ovipositor pale testaceous, bordered on the apical half and minutely dotted on the middle of the sides of the apical half with reddish; the apex sharply pointed; anal cerci pale, very short, blunt, conical. Length of body .95 in.; of pronotum .25 in.; of tegmina .12 in.; of fore femora .35 in.; of hind femora .52 in.; of ovipositor .42 in.; breadth of same at base .12 in.; length of anal cerci .06 in. One ♀. Salto, ten thousand feet above the sea, on the slope of the volcano of Antisana.

ACANTHACARA nov. gen.

Body curved, slightly compressed. Head produced; the vertex prolonged into a sharply pointed, long and curved thorn; front smooth, very declivent; first and second joints of antennæ large, remaining joints slender; eyes rather small, prominent, globose. Pronotum rather long, produced backward a little over the mesonotum, the sides short, rounded, with a broad and shallow lobe in the middle of

the posterior half; meso- and metanotum resembling the abdominal segments, unprovided with wings; the thoracic sterna exteriorly, and the coxæ internally bearing small, short, blunt spines. Legs slender, the posterior femora rather short. Ovipositor broad at base, pointed at tip (?), curved pretty strongly; anal cerci very short, conical.

12. *A. acuta* nov. sp.

Whole upper surface, from the tip of the vertical spine to the ovipositor, testaceous, with a median, blackish, frequently obsolete line from the base of the vertical spine to the penultimate abdominal segment; the sides bordered above with a dark fuscous streak from the eyes to the tip of the abdomen; under surface of vertical spine, and the space between and around the antennæ blackish; first joint of antennæ obscurely fuscous, the remainder luteous, distantly and narrowly annulated with fuscous. Legs luteous, banded and blurred with blackish fuscous; femora armed externally and internally at the tip, with a sharply pointed spine. Ovipositor reddish; anal cerci pale, rapidly tapering, pointed, sparsely pilose. Length of body .62 in.; of pronotum .17 in.; of vertical spine .07 in.; of hind femora .38 in.; of anal cerci .04 in. One ♀. Between Quito and Napo.

ACRYDII.

13. *Proscopia bulbosa* nov. sp.

Of a nearly uniform griseous color. Head somewhat hour-glass shaped, above the jaws tapering, but a little swollen, to a constricted neck, above which and just below the eyes the head expands again; vertex short, as long as the width of the head below the eyes, tapering a little to a rounded apex; surface scabrous with distant elevated points, the back with a median furrow between the eyes and upwards to the tip of the vertex with a slight median carina; front, between the lower edges of the eyes, with a long, lozenge shaped hollowing, containing a median carina. Prothorax swollen next the head and like the mesothorax scabrous with large, irregular, distant, raised points. Legs very slender, the hind femora greatly swollen at the base, rough with longitudinal rows of greatly elevated points; hind tibiæ with very minute spines. Length of head, exclusive of the vertex .28 in.; of vertex .04 in.; of prothorax .42 in.; of hind tibiæ 1.06 in.; breadth of hind femora at base .09 in. One ♂. Napo or Marañon.

14. *Proscopia sajax* nov. sp.

Greenish brown, the legs paler, with dusky tips to the femora; the head with a small testaceous spot just above the base of the mandi-

bles. Head rather smooth, long, uniformly tapering to the eyes, the vertex rather long, marginate, constricted slightly between the eyes; back of the head from between the eyes half way to the prothorax with an insignificant carina; front with a slight median ridge from eyes to labrum. Thorax scabrous with irregular, elevated, rough points, becoming very short, transverse ridges on the dorsum. Legs rather slender (the hind pair lost). Length of head, exclusive of vertex .37 in.; of vertex beyond eyes .08 in.; of antennæ .16 in.; of prothorax .42 in.; of fore tibiæ .52 in. One specimen, the abdomen of which is broken, from Napo or Marañon.

15. *Cephalocæma acuminata* nov. sp.

Body reddish brown. Head smooth, forming a greatly elongated cone, just below the middle of which the eyes are hardly prominent; above the eyes the tubercle becomes quadrate; below the eyes there is a rounded frontal carina. Prothorax slightly rugose with short, transverse, impressed lines and punctures; meso- and metathorax with slightly impressed curving lines and deeper punctures, which markings continue upon the basal segments of the abdomen, the lines becoming finer and more indistinct posteriorly. Legs slender. Length of body, exclusive of head 2.3 in.; whole length of head .8 in.; length of tubercle beyond the eyes .35 in.; of antennæ .16 in.; of prothorax .48 in.; of mesothorax .12 in.; of hind femora 1 in. One ♀. Between Quito and Napo.

16. *Xiphicera octomaculata* nov. sp.

Brownish; antennæ, excepting base, brownish fuscous; tubercle of vertex, viewed from above, twice as long as broad, the apex broadly rounded. Lateral carinæ of pronotum scabrous with frequent tubercles, anterior border with little raised points, posterior border less than a right angle. Tegmina, each with four long and slender, sometimes confluent, dull luteous spots, bordered heavily with black, and arranged along the costal border nearly to the tip; wings yellowish, with luteous veins and a black outer border, which is very broad at the apex and very narrow at the inner angle. Hind tibiæ having the inner row of spines greatly produced, in the plane of the movement of the leg, into long, nearly straight, black tipped spines, the upper ones very broad and flatly compressed at base. Length of body 1.6 in.; of tubercle of vertex .12 in.; of tegmina 1.52 in.; of hind femora 1 in.; of longest tibial spine .11 in. One ♂. Napo or Marañon.

17. *Lophacris Humboldtii* nov. gen. et sp.

Vertex, summit and upper portion of sides of head smooth; front

and lower portions of sides scabrous with minute pittings. Prothorax uniformly rugose, the crest very high, greatly compressed, anteriorly with four lobes, which have rounded summits, and the first of which projects considerably over the head; the anterior portion separated from the posterior by a deep but very narrow transverse excision; posteriorly there is first a single lobe nearly as large as the anterior ones, and behind it much smaller, and generally rather sharply bimucronate elevations; posterior border of prothorax barely making a right angle; prosternal spine long, stout, straight, smooth, or slightly punctured, scarcely tapering, the tip bluntly rounded. Tegmina large and broad; wings large, evidently roseate in part, but as the insect has been immersed in alcohol, the colors have faded. Length of body 4 in.; greatest height of pronotal ridge above a line drawn from the top of the head to the hinder tip of the pronotum .4 in.; length of tegmina 3.6 in.; of hind tibiæ 1.66 in. One ♀ from Napo or Marañon. Another ♀ from Guayaquil, brought home in a dried state, but almost consumed by insects, seems to belong to this species. So far as can be determined, the wings are colored with a delicate shade of pea green, and the veins in the posterior half are roseate; the pronotal crest is hardly so high or so strongly compressed as in the other specimens. The head and ovipositor of still another female, apparently of this species, were brought from Napo or Marañon.

18. *Tropidacris rex* nov. gen. et sp.

Head smooth above, the vertex and a dull reddish band on either side extending to the back of the head from the upper edge of the eye, minutely punctured; clypeus and labrum dull olivaceous brown, punctured; front rugulose; lateral carinæ prominent, sides of head sparsely furnished with fine hairs. Pronotum luteo-fuscous, scabrous with elevated, rounded, whitish points and abbreviated lines; median carina and posterior border edged with black; first and second lobes nearly connate, elevated posteriorly more than anteriorly. Tegmina obscure brownish fuscous, marked with olivaceous on the basal half and with pale luteous apically, the principal veins castaneous, the secondary veins olivaceous and luteo-olivaceous; wings red, marked with a very broad, external, blackish band, and with rows of multitudinous black spots, avoiding the cross-veins, giving the whole wing a tessellated appearance. Hind femora marked within and without with whitish, and furnished with an arcuate band at the tip; spines of hind tibiæ black. Length of body 3.9 in.; of tegmina 4.34 in.; of hind femora 1.72 in.; band on the outer edge of the wings .36. broad. One ♀. Guayaquil.

19. *Acridium occidentale* nov. sp.

Dark brown; the head smooth, with very minute, distant punctulations; frontal and lateral carinae very prominent; tip of labrum and edges of mandibles whitish. Prothorax profusely punctate, the median carina very slight; prosternal spine rather stout, long, scarcely tapering, excepting at tip, straight but inclining slightly backwards. Tegmina obscure brownish, outer half semiopaque with fuscous spots; wings hyaline. Hind femora externally flat and white, the carinae distinct, the hind tibiae with black tipped spines. Length of body 2 in.; of pronotum .39 in.; of antennae .68 in.; of tegmina 1.23 in.; of hind tibiae .96 in. Two ♀. Napo or Marañon.

20. *Acridium labratum* nov. sp.

Head, especially the frontal ridge, punctate, brownish, the edge of the labrum and terminal joints of the palpi pale; the carinae prominent; antennae pale fuscous, darker toward the tip; eyes large, oblong, prominent, separated above by a narrow space. Pronotum brownish, closely punctate, the median carina barely perceptible. Tegmina brownish, blotched indistinctly and abundantly with small fuscous spots; wings hyaline, with blackish veins, tinged with faint yellowish at the base, and blackish fuscous at the apical half of the costal margin. Legs brownish, tarsi edged with blackish; hind femora internally and externally flat and dark brownish fuscous, the external inferior carina yellowish; hind tibiae armed with black tipped spines. Length of body 1.23 in.; of tegmina 1.17 in.; of hind femora .66 in. One ♀. Napo or Marañon.

21. *Chrysochraon* ? *abbreviatum* nov. sp.

Brownish yellow; head smooth; lateral carinae of front distinct, prominent; median carina distinct, growing broader toward the clypeus. Pronotum docked squarely in front, broadly rounded behind, anteriorly smooth, posteriorly punctulate; median carina distinct, slight; lateral carinae not prominent, marked by a black line, which extends forwards to the eye. Tegmina brownish, immaculate, longer than the abdomen; wings pellucid, faintly nebulous, especially, but still very slightly, at the tip; costal margin blackish; hind tibiae obscure fuscous, with pale, black tipped spines; ovipositor reddish. Length of body .6 in.; of tegmina .5 in.; of hind femora .42. One ♀. Between Quito and Napo.

22. *Cedipoda bivenosa* nov. sp.

Head rather smooth, dull luteous, marked with black points and minute reddish brown blotches, arranged in irregular lines; antennae reddish, growing fuscous toward the tip. Prothorax finely scabrous,

less so on the anterior third; a distinct but not high median carina, and distinct, sharp, but not elevated lateral carinæ; posterior border forming a right angle, minutely bordered. Tegmina longer than the abdomen, brownish opaque, growing pellucid toward the tip, marked with blackish and blackish fuscous blotches, of which three are more prominent than the others, and are situated on the principal vein; the first and largest at one third the distance from the base to the apex; the second at one half that distance, and the third and smallest at two thirds that distance; the veins fuscous, excepting one prominent one in the middle of the wing, along the apical two thirds of the basal half, which is luteous; wings pellucid, the veins prominently fuscous, the base faintly washed with pale greenish yellow, the middle of the outer margin slightly nebulous, the basal half of costal margin a little fuscous. Legs brownish, marked with black points and furnished with black tipped spines; ovipositor pale luteous, edged and tipped with black. Length of body .83 in.; of tegmina .85 in.; of hind femora .46 in. One ♀. Ecuador.

23. *Amorphopa caiman* Sauss.

A single ♂, taken between Quito and Napo, is referred with some doubt to Saussure's species.

PHASMIDA.

24. *Bacteria* sp.

One specimen, labelled as coming from Napo or Marañon, the abdomen of which is entirely wanting, is referable to *B. molita* Westw., or *B. gracilis* Burm., but may not belong to either species. The middle pair of legs have both the femora and tibiæ very obscurely fasciated.

25. *Acanthoderus immanis* nov. sp.

Whole body rugose. Head with a median prominence, cleft in the middle nearly to the base, so as to form on either side a divergent, spinulose, compressed spur, three quarters of a line in length, and backed by a strong thorn. A pair of similar but erect thorns on the prothorax; four spines, the middle two of which are scarcely smaller, upon the anterior border of the mesothorax; from the outer edge of the middle of the mesonotum spring two strongly divergent, very stout, subconical prominences, armed at the tip with short but stout spines, and below the tip with elevated warts; these prominences are the largest on the body, and are fully one and one third lines in length, and nearly half a line broad at base; the anterior edge of the

metathorax bears a median prominence similar to that on the head, but with the spurs scarcely so divergent, and bearing at the tip longer and less frequent spinules; posteriorly the lower edge of the pleura of the metathorax is dilated into a flat, depressed, triangular, spinuliferous lamina, protecting the posterior coxæ; it is about four fifths of a line in length. The middle of the anterior half of each of the first five abdominal segments supports a pair of divergent thorns, from each of which a slender spiculiferous lamina extends backwards, those of opposite sides meeting in the middle of the posterior border; the sixth abdominal segment bears a median, elevated, rugose lamina, bifurcate anteriorly, its ridge rounded and armed posteriorly with three equal, triangular, compressed teeth; behind this segment the median carina is elevated and rugose. The legs throughout, but especially the femora, are armed profusely with laminated spines; the hinder portions of the apices of the joints on the basal half of the antennæ swollen. Length of body 1.2 in.; of antennæ 1.05 in.; of hind femora .4 in. It is allied to *A. Tisiphone* Westw. One ♂ from Napo or Marañon.

26. *Phasma putidum* Bates.

One ♂, two ♀ and one pupa from Napo or Marañon. The wings of both of the ♀ measure 2.3 in. in length, or a little more than those of Bates's specimens.

27. *P. Menius* Westw.

One ♀ taken in Ecuador seems to be referable to Westwood's species. The alternate joints of the antennæ are not marked at the base with a broad whitish ring, excepting in a few instances near the tip, and where the pale color extends also over the apex of the preceding joint; the centre of the tegmina is elevated into a triangular perpendicular lamina, the apex of which is rounded. The wings measure slightly more than one and a half inches in length.

MANTIDES.

28. *Stagmatoptera binotata* nov. sp.

Prothorax trigonal, the lateral border with small, flattened, laterally projecting spines, those at the base of the legs smaller and more uniform than the others; the spines of the fore tibiæ and tarsi black, except externally; a median spot on the interior surface of the tibiæ, near the point of reception of the apical tarsal spine, black. Tegmina green, a large median spot ferruginous, the inner edge in the ♂ nearly hyaline; wings hyaline, sprinkled with numerous quadrate,

yellowish spots (perhaps greenish in fresh specimens), seated upon the cross veinlets throughout nearly the whole wing; middle and hind tarsi blackish beneath. Length of prothorax ♂ 1.1 in., ♀ 1.46 in.; of tegmina ♂ 1.98 in., ♀ 1.85 in.; of fore tibiæ ♂ .62 in., ♀ .86 in. One ♂, one ♀. Napo or Marañon.

BLATTARIÆ.

29. *Phyllodromia pallipes* nov. sp.

Head piceous, labrum and clypeus luteous; basal three joints of maxillary palpi pale, apical two fuscous; antennæ black. Pronotum scarcely concealing the whole of the head, black, immaculate, minutely and rather sparsely punctulate; entire border minutely marginate. Tegmina dark castaneous, semidiaphanous toward the tip, costal edge yellowish; wings faintly fuliginous with dusky veins, costal edge, especially near tip, castaneous. Femora and tibiæ and most of the coxæ pale, the tibiæ suffused with yellowish brown, especially toward the apex; tarsi darker. Abdomen black; anal cerci nearly as long as the first hind tarsal joint, rather broad, pointed, black, the apex pale. Length of body, .58 in.; of body, including tegmina, .76 in. One ♂ from Napo or Marañon.

30. *Ischnoptera melana* Walk.?

My single specimen from Napo River does not wholly agree with Walker's description; it is not so dark, the tarsi are not tawny toward the tip, and the tegmina show no dusky markings near the apex.

31. *Periplaneta americana* (Linn.) Burm. One specimen from Napo or Marañon.

32. *Periplaneta australasiæ* (Fabr.) Burm. Two specimens from Napo or Marañon.

33. *Panchlora exoleta* Klug. One specimen from Napo or Marañon.

34. *Zetobora rudis* Walk. One specimen, unlabelled.

35. *Blabera cubensis* Sauss. Two specimens from Guayaquil.

36. " *femorata* nov. sp.

Head black, labrum and lower part of front luteous, the upper part of labrum with a transverse fuscous band; eyes separated from each other by a space greater than the length of the first antennal joint; palpi reddish brown; antennæ thick at base, tapering more rapidly than usual; first eleven joints piceous, shining, beyond dull blackish fuscous, apical third dull ferruginous, the apices of the joints tipped

above with fuscous. Pronotal shield irregularly ovate, the lateral angles equally distant from the front and hind border, the whole border slightly marginate, but the hind border obscurely; the front border well rounded, projected forward so as just to conceal the head, the hinder half of the sides forming an obtuse rounded angle with the hind border; the hind border slightly curved; pronotum ferruginous, whole hind border and half way to the lateral angles broadly bordered with black; a very large and broad discal spot with ill defined borders, its front broadly and deeply concave, so as to make it widely and rather sharply bilobed, with large, quadrangular, lateral expansions, and a well rounded, convex hind border scarcely reaching the marginal band; this spot encloses dull, indistinct, ferruginous markings in the shape of a **⊥**; the whole shield, and especially just in front of and behind the discal spot, minutely and transversely wrinkled. Tegmina fuliginous, paler toward the tip, with a dark fuscous, narrow, humeral stripe, becoming gradually fainter and scarcely extending over half of the tegmina; wings hyaline, costal border testaceous; legs very stout, fuscous above, fusco-luteous beneath; mesothorax and metathorax bordered above posteriorly with pale testaceous. Abdomen above uniformly dark castaneous brown, beneath ferruginous, the sides and terminal segment blackish fuscous; anal cerci short, stout, tapering, fuscous; terminal segment small, subquadrate, in my single specimen asymmetrical. Length of body 1.46 in.; of body including tegmina 1.94 in.; of antennæ 1.25 in.; of pronotal shield .46 in.; breadth of same .67 in. It is allied to *B. marmorata* Brunn. One ♂ from Napo or Marañon.

37. *B. armigera* nov. sp.

Head black, with two circular ferruginous spots just within the bases of the antennæ; eyes separated by a space scarcely so large as half the length of the first joint of the antennæ; antennæ slender, tapering; first fourteen joints piceous, shining; beyond dull fuscous, slightly washed with luteous toward tip. Pronotal shield broadly and irregularly ovate, the whole border slightly marginate, the hinder border obscurely so; the front border well rounded, the middle of the front scarcely produced and barely concealing the head, the lateral borders well rounded, the hind border very slightly produced and obtusely angulated; pronotum luteo-ferruginous, enclosing a large, shield shaped, piceous, immaculate spot, widely distant from the front and lateral borders, and separated from the hind border only by the very margin itself; its front border is subrect, very slightly and angularly excavated in the middle, the upper outer angles rounded, the spot narrowing posteriorly, its sides a little hollowed in

the middle, and its hinder border well rounded. Tegmina testaceous, the costal edge ferruginous, a narrow, black, humeral stripe of equal width throughout, scarcely as long as the pronotum; apical half of the tegmina faintly tinged with fuliginous, commencing at the end of the anal field and widening posteriorly, but not including any of the costal field; wings hyaline; costal border testaceous. Legs black; meso- and metanotum luteous, spotted with blackish fuscous. Abdomen blackish fuscous above, the sides narrowly edged with testaceous; the supraanal plate testaceous, fuscous at base; abdomen below black, with some obscure dull luteous markings on the basal segments; terminal segment narrowly bordered posteriorly with ferruginous; anal cerci moderately long, tapering slightly, bluntly rounded at tip, blackish. Length of body 1.92 in.; of body including the tegmina 2.58 in.; of antennæ 1.3 in.; of pronotum .52 in.; breadth of same .75 in. It is nearly related to *B. gigantea*. One ♂. Napo or Marañon.

Other Blattariæ were obtained, but either young specimens, or too mutilated to bear description.

FORFICULARIÆ.

38. *Chelidura robusta* nov. sp.

Head piceous; labrum slightly reddish; mouth parts and first and part of second joints of antennæ reddish. Prothorax, tegmina, abdomen and forceps piceous; pronotum docked squarely in front, the lateral angles square, the hind border well rounded, convex, the lateral borders slightly marginate; a finely graven median line. Tegmina short, quadrate, smooth; upper surface and sides of abdominal segments minutely, the penultimate segment also profusely punctured. Legs brownish yellow. Forceps stout, trigonal, beneath flat, straight nearly to the tip, the lower surface for this same distance furnished interiorly with a minute blade; the tips are bent toward each other, but not strongly. Length of body including forceps, .9 in.; of forceps, .2 in.; of tegmina, .12 in.; width of pronotum, .12 in. Two ♂. Between Quito and Napo, and at Napo.

39. *Psalidophora nigripennis* nov. sp.

Piceous; pronotum and front of head, shining, the former bordered laterally with dull luteous. Head broader than the pronotum, smooth; the long, basal and minute, second joint of antennæ black; remaining joints, like the palpi, fusco-rufous. Pronotum quadrate, the posterior border broadly rounded; a very slight median carina. Tegmina and exposed parts of wings black, densely and most minutely punctured, and furnished with a very few fine, distant, long, erect hairs. Femora

black, tibiæ and tarsi luteous. Abdomen blackish at the sides and along the posterior edges of the segments, and blackish fuscous in the middle. Length of pronotum, .05 in.; of tegmina, .11 in.; of hind femora, .12 in. One specimen (with forceps broken) was taken between Quito and Napo.

40. *Labia bilineata* nov. sp.

Piceous, with infrequent, short, decumbent, lustrous hairs; head minutely punctured; basal joints of antennæ luteous; palpi blackish fuscous. Pronotum quadrate with a slight median furrow, not attaining either margin; the sides faintly bordered with dull luteous. Tegmina smooth, with a broad, pale luteous, humeral stripe reaching neither the outer border nor the humerus nor apex; exposed portion of wings marked indistinctly with luteous on the inner edge at the tip and near the outer border. Basal half of femora black, outer half luteous; tibiæ brownish fuscous, the apex paler; tarsi dull fusco-luteous, the basal joints paler; abdomen blackish, densely punctured, the hinder edges above fusco-rufous. Forceps straight, parallel, incurved a little at the tip, under surface flat, the inner, inferior edge denticulate. Length of body including forceps, .34 in.; of tegmina, .05 in.; of forceps, .06 in. One ♀, the hind legs of which are lost and the antennæ broken, was taken between Quito and Napo.

A STUDY OF THE GIGANTIC LOBE-CRESTED GRASSHOPPERS OF
SOUTH AND CENTRAL AMERICA. BY SAMUEL H. SCUDDER.

An examination of the gigantic crested grasshoppers, mentioned in the previous paper, has induced me to review the whole group. Some errors have been detected in the work of preceding authors, showing that they have given but comparatively slight attention to these insects or to their representation by earlier writers;¹ in consequence, the synonymy of several well known species, as will be seen beyond, has become greatly confused.²

¹For instance, Serville and Burmeister, in quoting Drury's description and figure of *Gryllus dux*, copy the mistake which Fabricius makes and repeats in all his works, of referring to the first instead of the second volume of the Illustrations of Natural History.

²This seems the more remarkable, since, an examination of many scores of specimens has shown that the variability of these huge Orthoptera is comparatively slight. I have compared over fifty specimens of a single species, *Tropidacris cristata*, occurring in many different localities from Surinam to Rio, and find the variation to be insignificant,—a fact which has given me greater confidence in the opinions I had formed concerning the different species.

This section of the old genus *Aceridium* is divisible into three groups, represented respectively by the familiar species, *Aceridium dux* (Drury), *A. carinatum* (Stoll'), and *A. Olfersii* Burm. *A. cristatum* (Linné) falls into the first group, although the almost total absence of a median crest on the posterior prolongation of the pronotum, as well as several minor characters, separate it from other members of the same division.

These three groups seem to be of generic value, and since *A. tartaricum* (Linn.) Oliv., ought to be taken as the type of the genus *Aceridium* proper, they must all be separated from that genus and may be called respectively *Tropidacris*, *Tüanacris* and *Lophacris*.

TROPIDACRIS (τροπις, ἀκρίς).

Head large, compressed; space between eyes equal to the shorter diameter of the eye;¹ median frontal ridge broader than the length of the first joint of the antennæ; the breadth of the labrum is equal to the distance from the upper edge of clypeus to the upper limit of the median frontal ridge, or one and one half times the longer diameter of the eye (see previous note), or fully one and one half times broader than long; the lateral angles of the front are distinct divergent. Pronotum tapering moderately,—the breadth anteriorly being to that posteriorly as 1:1.2; the angle of the posterior border is a right angle or less; the median crest is much more prominent anteriorly than posteriorly, sometimes obsolete behind; the prosternal thorn rather slender, barely compressed laterally, inclined backward a little, the tip curved slightly backwards and pointed. Tegmina fully five and one half times longer than broad, the costal edge narrow; secondary veins very prominent; internommedian vein furcate; basal branch of the externommedian vein simple, but united by distinct cross veins to the internommedian vein. Wings long and broad, largely spotted with dusky colors; cross veining at tip scarcely more frequent than in other parts of the wing, and perfectly regular; the area between the first and second branches of the anal vein not noticeably broad, broken by cross veins into spaces not more than half as long again as broad (♀), or noticeably broader than the adjoining areas, broken by cross veins into spaces twice as long as broad (♂); second branch of anal vein regular, sending downward one primary

¹ The eyes in the male of *T. Fabricii* are very large, and hence the space between them is a little less than the shorter diameter of the eye; and the breadth of the labrum is equal to only one and one fourth times the longer diameter of the eye.

shoot and sometimes more than one secondary shoot, but usually only forking close to the tip (♀) or irregular, deflected from a regular course (♂); intercalary longitudinal veins of anal area extending fully half way toward the base of the wings. Abdomen comparatively slender; outer surface of hind femora flat or barely convex; terminal segment of the male nearly as narrow at base as at tip, greatly produced and tapering, compressed into a dull carina along the lower edge.

1. T. dux (Drury) Scudder.

Gryllus dux Drury, Illustr. Nat. Hist., II, pl. 40.

“ “ Fabr., Sp. Ins., I, 362 (in part?).

“ “ “ Ent. Syst., II, 47 (in part?).

“ “ “ Mant. Ins., 235 (in part?).

“ “ Gätze, Ent. Beitr., II, 102.

Gryllus (*Locusta*) *dux* Stoll', Repr. des Spectres, etc., Saut. d. Pass., 6, 7, pl. 1^b, fig. 1.

Acridium dux Oliv., Encycl. Méth., VI, 215, pl. cxxvi, fig. 1.

“ “ Latr., Gen. Crust. et Ins., III, 105.

“ “ Flor., v. Sivers, Antill. xii.

Locusta dux Dunc., Introd. Entom., 257, pl. xv, fig. 2.

“ (*Rutidoderes*) *dux* Westw., Drury, Exot. Ent., II, 92, pl. XLIV (in part).

Gryllus cristatus Thunb., Mém. Acad. St. Petersburg, V, 224; IX, 402.

Acrydium Latreillei Fitch, Trans. N. Y. St. Agric. Soc., XVI, 507. Third Rep. Nox. Ins., 172, pls. III, IV.

Pronotal crest tipped with black (perhaps greenish black in life); first and second lobes as distinct as the others; on the posterior half of the pronotum the crest anteriorly is elevated considerably,—more than in the allied species. Tegmina greenish griseous, the veins luteous and luteo-fulvous, variegated with pale blotches, small and frequent on the basal half, confluent about the middle and apically, forming very irregular, rather broad and distant, zigzag bands parallel with the outer border. Wings brick red, rather broadly bordered with black at the hind margin, and furnished with multitudinous black spots over the whole wing; these spots are ordinarily quadrate, transverse, but near the middle of the outer border they become confluent, forming wavy bands along the longitudinal veins; and toward the inner border they form confluent or broken bands subparallel to the hinder border; these spots are less frequent, and often very indistinct in the ♂. Hind femora externally ornamented with a double row of roundish or oval spots, merging into one toward the apex; hind tibiae

furnished with greenish black spines; claws of tarsi tipped with black. Expanse of tegmina, ♀ 215-236 mm., average 227 mm. ♂ 130 mm.

Bay of Honduras (Drury), Surinam (Stoll), Panama (Fitch).

Panama, Texas (Mus. Comp. Zool.), Aspinwall (Smith. Inst.), Nicaragua, Guatemala, Tehuantepec (my coll.).

It is evident that the ordinary application of Drury's name of *dux* to the Brazilian species which I have characterized under the name of *Fabricii* is incorrect. These pages prove that there are two distinct species in Brazil and on the Isthmus, and that Drury's figure and description of *Gryllus dux*, as well as the locality given by him, apply only to the species from the Isthmus.

Specimens from the Isthmus, which I consider to belong to the *A. Latreillei* of Fitch, differ from the description and figures of *A. Latreillei* by Perty, in the following particulars: the tegmina are brownish fuscous and not violaceous; the tarsi are obscure red and not blood-red; the crest resembles that of *T. Fabricii*, only it is more elevated, while in *T. Latreillei* the second and third lobes of the crest are elevated above the others, and the first is much more prominent anteriorly than behind; the spines of the hind tibiae are black throughout, instead of being merely black tipped.

They differ also from Serville's description of *A. Latreillei* in having the spots in the vicinity of the anterior border quadrate and not rounded and punctiform.

Thunberg's descriptions apply best to this species; "postice vix rugosus, crista minori serrulata," or "posticus planus, carina minori, serrulata," spoken of the thorax, cannot apply to the true *cristatus*.

Stoll's figure seems to apply to this species rather than to *T. Latreillei*, the only other one to which it could refer.

2. *T. rex* Scudder.

First and second lobes of pronotum nearly connate, elevated posteriorly more than anteriorly; posteriorly with a mixture of dull and sharp serrulations. Tegmina brownish fuscous, obscure apically, tinged with olivaceous basally; on the basal half the secondary veins are bordered with pale greenish yellow, broadening into spots and irregular blotches in the middle field; on the apical half the spots are paler, more obscure, become dirty white at the apex, and show a tendency to group themselves into narrow distant bands, which (excepting at the extreme apex) cross the tegmina at right angles to the lower border, or even incline a little toward the base. Wings brick red, with a very broad black outer margin and rows of black spots over the whole wing, often confluent, and arranged much as in the

next species. Hind femora externally with a row of quadrate bluish white spots, decreasing regularly in size toward the apex; spines of hind tibiae black; claws of tarsi tipped with black.

Expanse of tegmina, ♀ 228 mm.

Ecuador. Prof. Orton.

3. *T. Latreillei* (Perty) Scudder.

Acridium Latreillei Perty, Delect. Anim. Artic., 123, pl. xxiv, fig. 4.

Acridium Latreillei Serv., Orthopt., 652.

“ “ De Haan, Verh. Nat. Gesch. Ned. Bezitt., Zool., 144, 151.

Not *A. Latreillei* Fitch.

Crest of pronotum considerably elevated, the anterior two lobes merged into one, which is elevated abruptly in front and slopes gradually away behind; the two succeeding higher, angular, parted and deeply cleft; the posterior portion of the crest at once depressed, of nearly uniform height, bluntly serrulate. Tegmina violaceous, varied with pale and yellow spots; wings brick red, with a broad black margin along the whole posterior border, and black quadrate and rounded spots interspersed over the whole wing, forming near the anal border narrow, wavy or irregular, transverse, parallel and approximate bands of black. Hind femora spotted externally with white. After Perty.

An alcoholic specimen (♀, no locality) in the Society's Museum has a pronotal crest, the anterior portion of which agrees altogether in form with that of *T. rex*, but posteriorly the serrulations are blunt; the posterior surface of the pronotum is furnished with irregular tubercles, which are independent, distant, rounded,—not confluent, approximate, linear, as in *T. rex*; the crest and posterior border of the pronotum are not edged with black as in the latter; and the spines of the hind tibiae are only tipped with black, instead of being wholly black; the pale bands on the apical half of the tegmina of *T. Latreillei* are broad and diagonally disposed, not narrow and transverse, as in *T. rex*.

Expanse of tegmina, ♀ 212–222 mm.

Amazons (Perty, Serville); Rio, Para, Bahia (De Haan).

Brazil (Peab. Acad.)

4. *T. Fabricii* Scudder.

Gryllus dux Fabr., Ent. Syst., II, 47 (in part?).

“ “ “ Spec. Ins., I, 362 (in part?).

“ “ “ Mant. Ins., I, 235 (in part?).

Gryllus dux Thunb., Mem. Acad. St. Petersburg., IV, 225; IX, 393, 402.

Acridium dux Oliv., Encycl. méth., VI, 215?

“ “ Serv., Ann. d. Sc. nat., XXII, 283.

“ “ “ Orthopt., 653.

“ “ Burm., Handb. d. Ent., II, 628.

“ “ Brullé, Hist. nat. d. Ins., IX, 225, pl. xx.

“ “ De Haan, Verh. Nat. Gesch. Ned. Bezitt., Zool., 144,

151.

Locusta (Rutidoderes) dux Westw., Drury, Exot. Ent., II, 92, pl. XLIV (in part).

Gryllus (Locusta) cristatus (var. *alæ in aliis antice rubræ*) Linn. Mus. Lud. Ulr. Reg., 137, No. 28.

Not *A. dux* Drury.

The front lobe of crest shorter than the others; the three following equal, rounded, not greatly but regularly arched; posteriorly the crest diminishes rapidly, consisting, as it were, of a single posteriorly elongated lobe, elevated anteriorly and slightly tubercular on the ridge. Tegmina dark green with paler veins. Wings brick red, greenish at the apex in the ♀, with a narrow posterior margin of black and recurrent rows of quadrate and rounded spots following up the principal vein, and especially that along the upper edge of the anal area, growing smaller, and fading out before reaching the base; the spots are generally seated upon the principal veins, but are seldom cut by the cross veins; in the ♀ the black is absent from all but the anal area, excepting at the outer margin. Hind femora ornamented externally with a double row of quadrate whitish spots usually united into one at an angle; hind tibiæ pale greenish, the spines greenish with black tips.

The descriptions cited from Fabricius apply best to this species because he speaks of the tegmina and prothorax as greenish; in all other particulars, the description would answer equally well for this and for *T. dux*. It is also more likely that he saw specimens from Brazil, the home of *T. Fabricii*, than from Central America, the home of *T. dux*. He speaks of his specimen or specimens as coming from meridional America, and as seen in the Banksian Museum; may it not then have been Drury's original specimen? or were there other specimens of this species and of *T. dux*, or of this species only, and were the two confounded by Fabricius? Neither seems unlikely.

Expanse of tegmina, ♀ 182-187 mm. ♂ 130 mm.

Rio, Para, Bahia (De Haan); Brazil (Serville); S. America (Burmeister); Meridional America (Serville, Fabricius).

Rio (Mus. Comp. Zool., Peab. Acad., my coll.); Para (Peab. Acad.).

5. *T. cristata* (Linn.) Scudder.

Gryllus crista thoracis quadrifida Linn., Amœn. Acad., I, 513, No. 21, fig. 4.

Gryllus (Locusta) cristatus Linn., Mus. Lud. Ulr. Reg., 137, No. 28.

“ “ “ Linn., Syst. Nat., 12th Ed., II, 699.

“ *cristatus* Stoll', Repr. d. Spectr., etc., Saut. d. Pass., 21, 22, pl. x^b, figs. 30, 33.

Gryllus cristatus Fabr., Syst. Ent., 288; Ent. Syst., II, 46; Spec. Ins., I, 362; Mant. Ins., I, 235.

Gryllus cristatus Thunb., Mem. Acad. St. Petersburg, V, 224, IX, 402.

Locusta cristata Dunc., Introd. Entom., 257, pl. xvi, fig. 1.

Acridium cristatum Oliv., Encycl. Méthod., VI, 215.

“ “ Latr., Gen. Crust. et Ins., III, 105.

“ “ Burm., Handb. d. Entom., II, 627.

“ “ Serv., Ann. d. Sc. Nat., xxii, 283.

“ “ “ Orthopt., 650.

Acridium cristatum DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Zool., 141, 151.

Acridium cristatum Lam., Hist. nat. Anim. sans Vert., IV, 241.

? *Gryllus grandis* Thunb., Mem. Acad. St. Petersburg, IX, 403.

“ *collaris* Stoll', loc. cit., 99, pl. xxi^b, fig. 80.

On either side of the pronotum the lobes of the pronotal crest are separated by much deeper constrictions than in any other species, posteriorly the prothorax is deeply and irregularly punctured with but a faint and equal indication of a median carina. Tegmina fuscous, blotched faintly with griseous. Wings pale greenish blue, very faint on the upper half of the wing, tessellated with blackish fuscous spots, and furnished with a broad blackish border, fuliginous toward the apex, the cross veins traversing which are frequently bordered narrowly with pale. Hind femora externally with a double row of distant rounded spots, merged into one toward the apex; spines of hind tibiae yellowish, tipped with black.

Expanse of tegmina, ♂ 136–158 mm., average 149 mm.; ♀ 170–203 mm., average 184 mm.

Asia, Africa (Linné); Arabia (Fabricius, Stoll', Thunberg, Linné); America (Stoll', Serville, Linné); S. America (Burmeister); Meridional America, principally Cayenne (Serville); Rio, Para, Bahia (De Haan).

Para, Santarem, Rio, Tajapouru, Manaus, Pernambuco, Hyauary, Villa Bella, Bahia, Tapajos, Surinam (Mus. Comp. Zool.); Rio (Peab. Acad.); Surinam (my coll.).

Thunberg makes no mention of a dark outer border to the wings.

TITANACRIS (*Τίταν, ἀκρίς*).

Head small, compressed; space between eyes less than the shorter diameter of the eye; median frontal ridge as broad as the length of the first joint of the antennæ; breadth of labrum equal to the distance from upper edge of clypeus to the middle of the median frontal ridge, or barely more than the longer diameter of the eye, or as broad as long; lateral angles of front distinct but slight, divergent. Pronotum tapering considerably,—the difference between the breadth anteriorly and posteriorly, being as 1:1.32. Angle of posterior border less than a right angle; median crest forming a regular curve from front to hind border, but rather more prominent anteriorly; prosternal thorn stout, straight, rather long, slightly compressed laterally, neither pointed nor blunt. Tegmina nearly five and one half times as long as broad, the costal edge broad; secondary veins indistinct; internommedian vein furcate; basal branch of externommedian vein simple. Wings long and broad, immaculate; cross veins at tip regular, though much more frequent than in other parts of the wing; area between first and second branches of the anal vein not noticeably broad, broken by cross veins into spaces not more than half as long again as broad (♀), or unusually broad and broken by cross veins into spaces three times as long as broad (♂); second branch of anal vein regular, sending out from under surface one primary shoot and two secondary ones; intercalary longitudinal veins of anal area extending fully half way toward the base of the wing. Abdomen comparatively slender; outer surface of hind femora flat or even hollowed; terminal segment of male not greatly produced, compressed beneath into a sharp carina throughout its length.

1. T. carinata (Stoll) Scudder.

Gryllus carinatus Stoll, Repr. d. Spectr., etc., Saut. d. Pass., 12, pl. v^b, fig. 16.

Acridium albipes Burm., Handb. d. Entom., II, 628.

“ “ De Haan, Verh. Nat. Gesch. Ned. Bezitt., Zool., 141, 151.

Anteriorly the crest of pronotum is quadrilobed, each lobe well

rounded, the edge covered with spinules. Wings violaceous purple posteriorly, dull purple anteriorly, the apex green. After Stoll'.

Expanse of tegmina, ♀ 187 mm. (Stoll').

West Indies, America (Stoll'); S. America (Burmeister, De Haan).

I place the reference to Burmeister here because in his description he says, "*loborum fastigio serrulato*."

2. T. albipes (De Geer) Scudder.

Acridium albipes De Geer, Mem., III, tab. 40, fig. 7.

? " " Goeze, Ent. Beitr., II, 113.

" " Latr., Gen. Crust. et Ins., III, 105.

Gryllus (*Locusta*) *cristatus* var. ♂ Linn., Mus. Ulr. Reg., 137.

Not *Acridium albipes* Burm.

Anteriorly the crest of the pronotum is quadrilobed, each lobe well rounded, smooth. Wings of a dark "solferino" color, or crimson purple; the whole of the apex, and a narrow band running thence to the base of the wing along the upper branch of anal vein, green, the band tinged with purplish.

Expanse of tegmina, ♀ 185 mm.; ♂ 130 mm.

Surinam (De Geer).

Para, Rio (Peab. Acad.); Lago Alexo (Mus. Comp. Zool.).

LOPHACRIS (λόφος, ἀκρίς).

Head large, full; space between eyes equal to or surpassing the shorter diameter of the eye; median frontal ridge broader than the length of the first joint of antennæ; breadth of labrum equal to the distance from the edge of clypeus to the upper limit of the median frontal ridge, or one and one half times the longer diameter of the eye, or broader than long; lateral angles of front not very distinct, barely divergent. Pronotum tapering but little, the anterior breadth being to the posterior as 1:1.13; angle of posterior border a right angle; median crest forming a regular curve from front to hind edge, but rather more prominent anteriorly; prosternal thorn stout, straight, blunt, rather short, not compressed laterally. Tegmina a little more than four times as long as broad, costal edge narrow, outer border not so obliquely docked as in *Tropidacris* and *Lophacris*; secondary veins indistinct; internommedian vein simple; basal branch of externommedian vein furcate. Wings short and broad, immaculate; cross veins at tip degenerating into an irregular anastomosis; area between first and second branches of anal vein noticeably broader than in the adjoining areas, and divided by cross veins into

spaces twice as long as broad (♂ ♀); second branch of anal vein irregular; intercalary longitudinal veins of anal area extending not more than one third of the way to the base of the wing. Abdomen heavy; outer surface of hind femora swollen; terminal segment of male somewhat produced, broad, swollen beneath at the base, much broader at base than at tip, compressed on the apical half into a dull carina.

1. *L. Olfersii* (Burm.) Scudder.

Acridium Olfersii Burm., Handb. d. Ent., II, 628.

“ *semirubrum* Serv., Orthopt., 653.

Gryllus (*Locusta*) *flavicornis* Stoll, Repr. d. Spectr., etc., Saut. d. Pass., 19, pl. VIII^b, fig. 16.

Crest of pronotum green, not high, the anterior four lobes well rounded, the portion behind serrulate. Wings brilliant carmine red posteriorly as far as the second branch of the anal vein; above that hyaline, tinged with green, especially toward apex, and on basal half faintly washed with carmine. Hind femora ornamented outside with a single row of roundish or quadrate white spots; hind tibiae green above and below, the spines rosy, green at extreme base, black at extreme tip.

Expanse of tegmina, ♀ 137–145 mm.; ♂ 96 mm.

China (De Geer); Cayenne (Serville); Rio (Burmeister).

Rio (Peab. Acad., my coll.).

2. *L. Velasquezii* (Nieto) Scudder.

Acridium Velasquezii Nieto, Rev. et Mag. de Zool., 1857, 360; Nouv. Orth. de Mex., 2.

Acridium Olfersii Sauss., Rev. et Mag. de Zool., 1861, 162, 163; Orth. nov. amer., II, 13.

Crest of pronotum green, tipped with red, pretty high, the four anterior lobes rounded, the part behind serrulate, but anteriorly forming a fifth lobe. Wings much as in *L. Olfersii*. Hind femora ornamented externally with small white roundish spots arranged on the basal half in a double, and on the apical half in a single row; hind tibiae roseate above, greenish beneath, the spines green, their tips blackish. After Nieto.

Expanse of tegmina 141 mm. (Nieto).

Vera Cruz, Mexico (Nieto).

Saussure refers this species, but I think incorrectly, to the preceding species.

3. *L. Humboldtii* Scudder.

Crest of pronotum very high; the four anterior lobes greatly com-

pressed, well rounded, the portion posterior to them sharply serrulate. Wings pea green, with roseate veins on the posterior half, and perhaps slightly washed with roseate in this same portion. Outer side of the hind femora ornamented with a row of (apparently) quadrate whitish spots; spines on the upper half of the hind tibiae tipped very slightly with black; those on the lower portion more distinctly.

Expanse of tegmina, ♀ 194 ^{mm}.

Guayaquil. Prof. Orton.

We can give but slight credence to the statements of the earlier authors concerning the home of the insects which they describe; and the same uncertainty and confusion of habitat, on a lesser scale, seems to have clung to these up to the present time. The species of the genus *Tropidacris* were indiscriminately located over the whole of northern South America, whereas it appears, by the sifting of evidence, that, with the exception of one (*T. cristata*), which is somewhat unique in its characters, and extends over the whole Brazilian coast, and to a certain degree into the interior, they are each characteristic of a separate zoölogical province, *T. Fabricii* being found on the Brazilian coast from Rio to Para, *T. Latreillei* in the interior, *T. dux* upon the isthmus of Panama and the surrounding region, and *T. rex* on the west coast. With the exception of the interior of Brazil, each of these provinces also harbors one species of *Lophacris*, viz.: *L. Olfersii* on the Brazilian coast, *L. Velasquezii* in Mexico, and *L. Humboldtii* in Ecuador. The genus *Tüanacris* does not seem to follow the same rule; the special habitat of *T. carinata* has never been given, while that of *T. albipes* is on the Brazilian coast, specimens having been quoted from Rio, Lago Alexo, Para and Surinam.

I am indebted to the Museum of Comparative Zoölogy, the Peabody Academy of Science and this Society, for most of the material used in this study.

REPORT UPON A COLLECTION OF DIURNAL LEPIDOPTERA MADE
IN ALASKA BY THE SCIENTIFIC CORPS OF THE RUSSO-AMERICAN
TELEGRAPH EXPEDITION UNDER THE DIRECTION OF
LIEUT. W. H. DALL. BY SAMUEL H. SCUDDER.

The diurnal Lepidoptera mentioned below were obtained by Mr. Dall, during two successive summers, on different parts of the Yukon River, from Fort Yukon near the British Boundary to the mouth of the river. It is hardly probable that they embrace all the species occurring there, since half of the species are represented in this collection by only a single specimen.

The "Ramparts" mentioned below are cañons, commencing two hundred miles below Fort Yukon, where the river is narrow, deep and swift, running for one hundred and fifty miles between high mountains; neither birds nor many butterflies were found there. The "Mission" is situated a little above the broad southern bend which the river makes near its mouth.

In addition to the species enumerated here, Mr. Dall writes that he frequently saw *Lycænæ* so high in the air as to be difficult to catch, and which may not have been the species mentioned below. He also saw a single specimen of *Vanessa Antiopa* at Nulato, May 20 (?), but could not obtain it. One caught at the same place in July, was afterwards given him, but lost. He also thinks he saw the larva of some species crawling on the snow on the banks of the Unalakleet River (flowing into Norton Sound), Nov. 26th, when the thermometer stood -15° Fahr.

The species of *Erebia*, *Pieris* and *Papilio*, always appeared in large

flights, never singly. Many of the specimens were brought to him by the Indians, which accounts for their poor condition.

Erebia discoidalis Kirby.

Five specimens taken just above the Ramparts, June 15th and 16th, a little above Nowikákat, June 5th, and at Nulato in the latter part of May.

Erebia Mancinus Doubl.

Five specimens taken at Nulato, May 20th, and at the lower end of the Ramparts, June 7th and 10th.

Grapta gracilis Gr. and Rob.

A single worn ♀ of this species was taken June 6th, on the Yukon River, fifty miles above Nowikákat; the ♀ has never been noticed before, but I have other specimens from Lake Winnipeg and New England; it resembles the ♀ of *G. Faunus* Edw., more than that of *G. C-argenteum*.

Melitæa Helvia nov. sp.

Upper surface blackish fulvous, covered with dull white and fulvous spots, mostly arranged in transverse rows. Primaries with a marginal row of roundish fulvous spots; next to it two curved rows of dull whitish spots, curved apically on the upper half and basally on the lower half of the wing; the spots of the inner of these two rows are larger, and those of the outer are smaller than those of the marginal row; a minute fulvous double spot just beyond the tip of the cell, and beyond this two short transverse bands of three spots each, the inner whitish, the outer of mixed fulvous and whitish spots; three spots in the cell,—the inner of mixed whitish and fulvous scales, the next fulvous, and the outer whitish bordered with fulvous; between the median and submedian two whitish spots. Secondaries with four rows of spots on the outer half of the wing, following each other in close succession; the outer marginal row is composed of fulvous spots, the next of whitish, the third of fulvous, and the inner of obscure whitish mixed with some fulvous spots; besides these two or three obscure fulvous and whitish spots in the cell; outer edge of both wings black, the fringe white, dark fuscous at base, interrupted with fuscous at the nervule tips. Beneath cinnamon brown, deeper in tint on the secondaries; primaries with a submarginal row of whitish lunules edged apically with black, and followed basally by a broad band of whitish spots, broken and obscure on the under half of the wing; markings of the cell obscurely repeated. Secondaries with a submarginal row of very large white lunules edged with black, and a

bent and somewhat irregular whitish band just beyond the middle, edged on both sides with black; within this four or five large whitish spots edged with black and irregularly disposed. Expanse of wings 1.5 in. It is closely allied to *M. Anicia* Doubl.

One specimen was taken June 15th, at the upper end of the Ramparts.

Melitæa sp.

One specimen, too much injured to be determined with accuracy, but perhaps belonging to *M. Palla* Boisd., was taken at Fort Yukon June 25th.

Lycæna Lucia Westw.

Four worn ♀ specimens seem to be referable to this species. Two of them were taken June 6th, fifty miles above Nowikakat, and one June 2d, at the mouth of the Melozikakat River.

Pieris venosa Scudd.

The specimens from Alaska on an average seem to be darker than those from California, and as in that country, the ♂ is apparently the more abundant sex. In passing down the valley of the lower Yukon, between the Mission and the sea, Mr. Dall saw no other species of butterfly. The species of *Papilio* and the other showier butterflies were confined to the more wooded portions of the river above.

Fifteen ♂, five ♀. Most of the specimens were taken at Nulato, but also farther down the river, between June 14th and June 30th.

Anthocaris lanceolata Boisd.

One greatly damaged specimen, apparently belonging to this species, was taken on the upper Yukon River.

Colias interior Scudd.

One ♂ taken at Fort Yukon June 25th.

Papilio Turnus Linn.

The specimens from Alaska are remarkably uniform in character, and, unless slightly smaller, differ in no respect from New England individuals; they hardly exhibit so much variation as one often finds among specimens in a limited district,—about the White Mountains of New Hampshire, for instance. In one specimen, however, (taken June 15th, at the upper end of the Ramparts), and in others to a less degree, all the submarginal lunules of the upper surface of the secondaries are distinctly orange-fulvous like the anal spot, instead of being colored like the centre of the wing.

Seventy-two specimens were brought home, all but one of which were collected in June, mostly on the 6th and 7th, but also on the

1st and 5th, and from the 13th to the 16th, inclusive; they were obtained on the upper Yukon River, all the way from Nulato, where they are rare, to Fort Yukon, where they are common, except in the Ramparts. One specimen was taken at Nulato May 12th.

***Papilio Aliaska* nov. sp.**

This species is of the same size and facies as *P. Zolicaon* Boisd., but differs from it in the following points: the base of the upper surface of the primaries is powdered as far as the yellow band with greenish yellow, instead of being simply black; the transverse yellow band is much larger, and the space between this and the submarginal row of roundish spots is of nearly equal width across the whole wing, while in *P. Zolicaon* it broadens considerably in approaching the inner border; the anal spot of the hind wings is of an uniform deep fulvous color, bordered basally with blue, and on the opposite side outwardly with black, and inwardly with a yellow spot; while, in *P. Zolicaon*, the color is paler apically, very distinctly pupiled with black and bordered apically with black only; on the under surface of the wings the black is much less conspicuous than in the Californian species, and in particular there is a more or less distinct, large, yellow spot occupying the basal half of the cell of the primaries, which is wholly wanting in *P. Zolicaon*.

Sixteen specimens were obtained; most of them at Nulato, May 20th–24th, but others June 5th, 6th and 14th, at a short distance below the Ramparts, and also just above them.

Mr. W. H. Edwards sent me a specimen from the east coast of Hudson's Bay, so that this insect occurs over a wide extent of country.

***Parnassius Eversmannii* Ménétr.**

The single specimen, taken June 15th, at the upper end of the Ramparts, does not altogether agree with the illustrations and descriptions given by Ménétries of his single individual from Kansk. In particular, the spots on the under surface of the secondaries differ from those of Ménétries' figure, as those of his representation of *P. Vosnesenskii* do, only the red is of a deep tint, as in the figure of *P. Eversmannii*—that is, the basal spot is not black, but of a bright red edged with black, and the spot at the inner angle is also not black, but bright red bordered with black.

This list of species, though short, is instructive, since it shows that the lepidopteran fauna of the Alaskan peninsula is not nearly so arctic in its character as might have been imagined. Three of the

twelve species occur abundantly in New England, three more extend nearly or quite as far south as the Great Lakes and the St. Lawrence, and two or three are found in California; three occur in, or are intimately allied to others inhabiting the Rocky Mountain region near our own parallel, and one of them has been previously described only from central Siberia. On the whole the fauna does not seem to be a distinctive one, but to unite in itself the characters of the elevated portions of the whole of boreal America, from ocean to ocean, and, in part, those of the neighboring portions of the Asiatic continent; the foundation, however, is formed of types characteristic of the great interior of the continent north of the United States. Judging by the specimens brought home, the three most abundant species are *Papilio Turnus*, *Pieris venosa* and *Papilio Aliaska*; and it is a little remarkable that each of these species is characteristic of one of the three great divisions,—eastern, western and central boreal America.

Mr. S. H. Scudder presented the following notice of a new cave insect from New Zealand.

The long limbed Locustarian of the Mammoth Cave in Kentucky was described at about the same time by de Saussure and by myself as a species of *Rhaphidophora*; subsequently I showed that this insect was the type of a distinct genus, which I called *Hadenæus*, and suggested that one of the cave-Locustarians of Europe, which I had never seen in nature, might belong to the same genus. Specimens of each species received since then have shown both that *Rhaphidophora palpata* (Sulz.) Charp., belongs to *Hadenæus*, and that *R. cavicola* (Koll.) Fisch., belongs to the genus *Ceuthophilus*; therefore no true species of *Rhaphidophora* occurs either in Europe or America.

It gives me pleasure to announce an additional species of *Hadenæus* from quite another quarter of the globe.

***Hadenæus Edwardsii* nov. sp.**

Body uniform brownish fuscous; front pale fuscous; palpi, tarsi and apical third of tibiæ pale; antennæ brownish fuscous. Length of pronotum 6 mm.; of thoracic nota together 11.5 mm.; of antennæ 120 mm.; of maxillary palpi 18.5 mm.; of fore tibiæ 23 mm.; of hind tibiæ 40 mm.

One imperfect specimen of this species, much the largest of the genus, was presented to me by my friend, Mr. Henry Edwards, who captured it himself in a limestone cave at Collingwood, Massacre

Bay, Middle Island, New Zealand. The cave is close to the sea shore, and near a very large coal deposit, which occasionally crops out in the interior. The Hadenæci were rather numerous, but very difficult to catch, disappearing in the crevices of the rocks on the approach of lights. They appeared to be most abundant near the streams of water which percolated through the rocks. The sex of my specimen cannot be determined.

The genus Hadenæcus is of peculiar interest, for its members are confined to the deepest caves, and no other Orthopteran genus is known to be limited in this way. Up to this time three species have been discovered, from very distinct localities; they are the following:—

1. Hadenæcus palpatus Scudder.

Locusta palpata Sulz., Abgek. Gesch. Ins., 83, tab. ix, fig. 2.

Gryllus pupus europæus de Villers, Entomol., I, 451.

Phalangopsis araneiformis Germ., Burm., Handb. d. Entom., II, 722.

Rhaphidophora araneiformis Burm., Handb. d. Entom., II, 1014.

Phalangopsis araneiformis Herr.-Sch., Nomencl., II, 15, 26.

Rhaphidophora palpata Charp., Orth. descr. et dep., tab. XLIV;
Germ., Zeitschr., III, 319.

Rhaphidophora palpata Fisch., Orthopt. Eur., 200, tab. XI, fig. 1, 1.

European caves.

2. Hadenæcus cavernarum Scudder.

Rhaphidophora cavernarum Sauss., Ann. Soc. Ent. de Fr., [4] I,
492.

Rhaphidophora subterranea Scudd., Proc. Bost. Soc. Nat. Hist.,
VIII, 8; Gen. Rhaph., 3.

Hadenæcus subterraneus Scudd., Bost. Journ. Nat. Hist., VII, 441.

North American caves.

3. Hadenæcus Edwardsii Scudder, supra.

New Zealand caves.

Whitaker
1875

ENTOMOLOGICAL NOTES.

III.

BY SAMUEL H. SCUDDER.

From the Proceedings of the Boston Society of Natural History, Vol. XIII, 1870.

DESCRIPTION OF THE LARVA AND CHRYSALIS OF *PAPILIO EURYMEDON* BOISD., OF CALIFORNIA. BY SAMUEL H. SCUDDER.

By the kindness of Mr. Henry Edwards of San Francisco, I have been favored with two specimens of the chrysalis of *Papilio Eurymedon* Boisd., of California, and with a colored drawing of the full-grown caterpillar, made by Mr. R. H. Stretch; their resemblance to the early stages of our common *P. Turnus* gives them an additional interest to entomologists of the Eastern States, and I therefore publish the following descriptions from the material above mentioned.

Larva resembling perfectly in form and general appearance that of *P. Turnus*; the general tint of both head and body apple green, but the last two segments above, and the posterior third of the body at the sides, become gradually much paler; thoracic segments tinged above with purplish, the third segment with a dorso-lateral, transverse, double, circular spot, each portion formed of a minute yellow spot, encircled with black; also with a small, round, distant, subdorsal, yellowish spot; fourth segment with a small, square, dorso-lateral and a small, round, distant, subdorsal, dark blue spot; the suture between the fourth and fifth segments is bordered rather broadly around half of the upper portion of the body with a bicolored band, terminating squarely at the end; in front of the suture it is yellow, behind, blackish blue. The stigmata are marked with blue, and there is a subdorsal and lateral row of blue dots on the seventh to the tenth segments. Prolegs paler than the general hue of the body. Length, when contracted, 35.5 mill.

Chrysalis. The two specimens referred to differ greatly in size and color, the larger one having brownish grey and blackish fuscous, the smaller apple green and yellowish brown markings. There is a rather broad stigmatal band, commencing at the tip of the abdomen, and continuing forward along the hinder edge of the wings to the eye, of a blackish fuscous or yellowish brown color; spiracles of the color of the band; a very broad dorsal band of the same color, but paler in tint, and especially so, anterior to the mesonotal

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tubercle, on the metanotum and the first abdominal segment, and quite obscured by pale on the terminal two or three segments; in the brighter specimen this band is edged faintly with white; space between these either dull white, clouded and streaked with yellowish fuscous or apple green, the abdominal segments with a few short, longitudinal, delicate, black dashes; abdominal tubercles black; wings either blackish fuscous, paler externally, the base of the veins streaked with black, and the tips of the nervules with a black dot; or apple green, the base of the veins marked with pale dull yellowish edged with black, the base of the nervules marked delicately with black, and the wartlets at tip of nervules pale dull yellowish; whole front of abdomen either dirty white, more or less obscured and streaked with fuscous and blackish next wing tips; or whitish, slightly tinged or dotted occasionally with green or black. Legs, antennæ and tongue blackish fuscous, or mingled green and yellowish brown, streaked slightly with black; palpal prominences brownish fuscous, the sides paler, or green, above and within yellowish brown; sides of pronotal tubercle wood brown, or yellowish brown. Compared with *P. Turnus*, the lateral shoulder tubercles are slightly more prominent, the excision between the palpal prominences a little deeper, and the mesonotal tubercle very much larger; the subdorsal abdominal tubercles are also slightly more developed, and there is, in addition, a lateral row of minute tubercles. Length 27.5–36 mill. Height 7.5–9 mill. Length of mesonotal tubercle 2–2.75 mill.; distance of tips of palpal prominences apart 4.5–5 mill.

ON THE SYNONYMY OF *THECLA CALANUS*. BY SAMUEL H.
SCUDDER.

In Eastern North America there are two species of *Thecla*, closely allied, occupying, so far as we know, the same geographical area (from Canada to Virginia or Georgia, and from Massachusetts to Iowa), and, until recently, almost invariably confounded by American entomologists. Messrs. Grote and Robinson first called public attention to the fact of their specific distinctness, although Mr. W. Saunders, both in his correspondence and MSS., had previously urged the same point. As my material was insufficient, and because certain specimens, to which I had constant access, seemed to combine many of the features which generally separated the specimens into two groups, I have hitherto been unwilling to accept the determination of these entomologists. But recently, through the kindness of many friends, I have had the opportunity of examining more than one hundred specimens of each species, and have become entirely convinced of their specific value.

The most prominent points of distinction between the two species are to be found in the general tint of the upper and under surfaces of the wings, in the presence or absence of orange spots near the anal angle of the upper surface of the secondaries, and in the nature of the extra-mesial band upon the under surface.

In one the general color of the upper surface of the wings is a very dark glossy brown; in the other dark greyish slate brown. The tint of the under surface of the first is dark slate brown; of the second ashy slate brown. The orange spots near the anal angle of the secondaries of the first are frequently present in the ♀ (in about one half of my specimens), almost never in the ♂ (about one in seventeen specimens); in the second they are almost always present in the ♀ (in about six out of seven), usually in the ♂ (about twice out of three times); these figures apply, in both cases, to those specimens which have any trace whatever of the spots; when they are distinct in the lower median interspace of the second species, there is almost invariably a pretty distinct, similarly colored spot in the next lower interspace, which is seldom the case in the first species. But it is in the character of the extra mesial band of the under surface that we find the most striking differences between the two species; in the first, the band consists of a series of quadrate spots slightly darker than the tint of the wing, bordered externally with pale bluish scales, and frequently (♀) or almost never (♂) bordered very faintly on the inner side; in the primaries the spots composing the band are usually confluent throughout the whole of their breadth; in the upper half of the secondaries they are generally placed successively a little farther toward the outer border, and are connected by but about one half their breadth; yet even here there is no white edging above or beneath; in the second species the spots composing the band are usually blackish brown in color, roundish oval and transverse, but sometimes—especially on the lower half of the primaries—quadrate or reniform in shape; they are independent, though closely contiguous, and in rare cases, partially confluent, and are completely encircled with whitish scales, although much more distinctly on the outer side than elsewhere.

There are also other differences of less importance; such as the presence, in the second species, of a broad and long, curving patch of orange on the under surface of the secondaries, next the inner margin and just above the anal angle; when this is at all perceptible in the first species, it is indicated only as a slender streak, often much

obscured by blackish scales. Another feature is in the sexual spot on the primaries of the male; in the first species this is rounded obovate, scarcely twice as long as broad, slightly darker than the ground color of the wing; in the second, it is oblong obovate, three times as long as broad, obscure dark greyish fuscous.

To the former species Messrs. Grote and Robinson, in their first discussion of the species, apply the name of *Thecla Falacer* God. and Boisd. and Lec.; and to the latter that of *T. calanus* (Hübner). In a subsequent paper they claim that *Falacer* God. and *calanus* Hübner are the same species, so that the former name must be dropped; and that the first species, formerly considered by them as *Falacer*, is undescribed; they therefore characterize it under the name of *T. inorata*; they also come to the conclusion that, under the name of *Falacer*, Boisduval and LeConte have described *Falacer* and figured *inorata*. "It seems to us," say these authors, "that *T. calanus* and *T. Falacer* [*inorata*] are distinct species, the former to be distinguished by its paler, more brownish color above, and by the fulvous marks of the upper surface of secondaries near anal angle." And again: "From this latter species [*calanus*] *T. inorata* differs by its smaller size, its more blackish color, darker fringes and the absence of the orange lunule on the upper surface of secondaries before anal angle." No mention is made of any trenchant mark of distinction drawn from the discal band of the under surface; we have seen, however, that this forms one of the most important points of separation, while the presence or absence of the colored spot near the anal angle of the secondaries above is but of relative importance, from its want of uniformity.

It is probably owing to this fact that these authors have fallen into the error of supposing that the second of the species which we have briefly characterized above has been figured by Hübner and described by Godart. The very reverse is the fact; and while the first of these species has been described in full, or figured no less than three times under as many different names, the second is yet undescribed, excepting by the short comparative phrases which we have just used, and by Messrs. Grote and Robinson, as quoted above. I propose, therefore, that the latter shall retain the name of *T. Edwardsii*, suggested for it by Mr. Saunders, who probably first recognized its title to independence.

If we examine the illustrations of Hübner in detail, we shall find that his representation of the color of the upper surface of the wings is

not exactly like that of either of the species in question, although it more nearly resembles *calanus*; the color of the under surface in no way resembles that of *Edwardsii*, and is precisely the same as *calanus*; a small orange spot painted near the anal angle of the upper surface of the secondaries in both sexes, occurs more frequently in *Edwardsii*, but is by no means absent from *calanus*; the mesial band consists of a continuous series of quadrate spots, whose connection is so close as to be generally indistinguishable (an unfailing mark of *calanus*), but edged with white scales on the inner side, as distinctly as on the outside, excepting on the primaries of the male—which rarely or never happens in either species, and in one no more frequently than in the other; this sexual distinction is, however, that of *calanus*; the orange lunule of the under surface is given rather as it usually occurs in *Edwardsii* than as in *calanus*, but is not very uncommon in the latter; and finally the sexual patch on the upper surface of the primaries of the male is as in *calanus*. That the extent of the coloring is faulty is shown by several features in which it exaggerates either species, and only when doing so does it approach *Edwardsii* rather than *calanus*; in all features of pure delineation it resembles only *calanus*, so that there can be no possible doubt that Grote and Robinson's *inorata* is the same as Hübner's *calanus*.

Laying as they do, too exclusive stress upon the presence or absence of the orange patch near the anal angle of the upper surface of the secondaries, they have also come to an erroneous conclusion concerning Boisduval and LeConte's plate, which, bad as it is, can certainly only represent *calanus*.

The specimens in the Harris Cabinet all belong to *Edwardsii*.

The synonymy of the two species will then be as follows:—

***Thecla calanus* (Hübner) Westw.**

Rusticus armatus calanus Hübner, Samml. exot. Schmett., I, Lep. I, Pap. II, Gent. I, Rustici, C. Armati, b. figs. 1-4.

Thecla Falacer God., Encycl. méth., IX, 600, 633. Boisd. et Lec., Lép. Am. Sept., x, 92-94, pl. xxix, figs. 1-5. Morris, Cat. Lep. N. Amer., 11; Ib., Syn. Lep. N. Amer., 95. Scudd., pars, Proc. Ess. Inst., III, 164; Ib., Proc. Bost. Soc. Nat. Hist., XI, 378; Ib., Trans. Chic. Acad. Sc. I, 331. Grote and Rob., Trans. Am. Ent. Soc., I, 172-3; Ib., Descr. Amer. Lep., II, 2-3.

Thecla calanus Westw. and Hewits., Gen. Diurn. Lep., II, 486. Weid., Proc. Ent. Soc. Philad., II, 534; Ib., Cat. N. Am. Butt., 34

Thecla inorata Grote and Rob., Trans. Am. Ent. Soc., I, 323-4; Ib., Descr. Amer. Lep., III, 1-2. Saund., Can. Entom., II, 61-64.

Thecla Edwardsii Saund., MS.¹

Thecla Falacer Harr., Treat. Ins. inj. Veg., Ed. 1862, 276. Scudd., pars, Proc. Ess. Inst., III, 164; Ib., Proc. Bost. Soc. Nat. Hist., XI, 378; Ib., Trans. Chic. Acad. Science, I, 331.

Thecla calanus Grote and Rob., Trans. Am. Ent. Soc., I, 172-3, 324; Ib., Descr. Amer. Lep., II, 2-3; III, 2.

ON ASYMMETRY IN THE APPENDAGES OF HEXAPOD INSECTS,
ESPECIALLY AS ILLUSTRATED IN THE LEPIDOPTEROUS GENUS
NISONIADES. BY SAMUEL H. SCUDDER AND EDWARD
BURGESS.

A conspicuous feature in the structure of the higher animals is their bilateral symmetry—the tendency of the organs and frame work to exact reverse repetition upon either side of a longitudinal axis.

This bilaterality is also shared to a certain extent by some of the lower animals, and is generally more noticeable in the external configuration of the body than in the internal organs; it is apparent, not only in those portions of the body which are disposed in pairs, but also in the central organs, the opposite sides of which repeat each other inversely.

In the lower animals the exceptions to the law of bilateral symmetry are frequent and conspicuous, the shells as well as the bodies of mollusks often affording striking examples. Among the higher animals, at least in the exterior sculpture of the body, cases of absolute asymmetry are rare; the most prominent instance occurs in the mature flounders; others well known, such as the very *unequal* development of the tusks of the narwhal, and the two sides of the

skull in many cetaceans. The crustacea, however, present numerous instances of asymmetrical development; for example, in the general form of *Bopyrus* and *Peltogaster*, and in the claws of many decapods.

We are not aware that any cases of asymmetry have been recorded among the worms; and certainly very few among insects; there are occasionally slight differences in the right and left mandibles of some mandibulates, and *Coccus* has recently been referred to by Gerstaecker¹ as an example of asymmetry, without further specification; we have been unable to discover to what he refers. Loew, also, in the first of his monographs of the North American Diptera, states that the hypopygium (the external genital armature) of the males of Syrphidæ and Pipunculidæ is unsymmetrical. We append a figure of this organ in an American species of *Phora*, closely allied to, if not identical with, *P. microcephala* Loew, in which the left clasp (c) is very much stouter and somewhat longer than the right one (c'); the drawing is magnified thirty five times.

In a recent study of the external genital organs of the males of butterflies, we chanced to examine those of certain native species of Nisoniades, and found not only a great difference between allied species, but a most remarkable asymmetry between opposite clasps of the same individual; this has led to an examination of all the North American species of which we could obtain specimens for dissection, and the results are embodied in this paper. The species have been found to be much more numerous than was anticipated; and yet we are aware of several others from distant parts of North America, which we have not been able to obtain; we trust that the new interest, which will hereafter attach to this otherwise inconspicuous group, will lead to important results.²

By referring to Fig. 15 of *N. tristis* Boisd., which we will use for illustration,³ it will be seen that the clasps (15. R., 15. L.) in this genus are developed to an unusual degree, and exhibit more clearly than the central organ the prevailing asymmetry of the parts. With some minor exceptions, which will be specified below, the left clasp is always more highly developed than the right, both in the configuration of the whole, and in the sculpture and armature of the details; each clasp may be divided, for convenience of description,

¹ Bronn, Klassen u. Ordn. d. Thierreichs, v, 33.

² The same organs are asymmetrical in the closely allied genus *Achylodes*.

³ This, and all the succeeding drawings, are magnified twenty diameters.

into two parts — an upper and a lower; the upper portion is ordinarily developed as a broad lobe (1), armed on its upper edge with a row of very long, stiff bristles, pointing backward, not exhibited in the drawings; it has a tendency to expand in two directions, forming what we have called the upper and hind processes (up, up', hp, hp'), according to their position; the lobe is generally smaller in the left clasp than the right; and the hind process either wanting or minute upon the left. The lower part of the clasp is a very long, slender, usually compressed, often twisted and invariably curving blade (b, b'), frequently spined or pointed at tip, its origin marked below by a denticle; it bears, at the base of the upper edge, a short, frequently bent or curving process (p), ordinarily somewhat triangular in shape, and very often armed with spinules; sometimes (as in *N. tristis*) this process is wanting on the right clasp, and is usually more slender and frequently longer on the left than on the opposite side; at their base the clasps form a large, broad, compressed, somewhat gibbous plate.

The upper organ, Fig. 15. U, is much more difficult to describe. It varies exceedingly in shape, so that one has to examine the parts carefully, and through a considerable series to determine with certainty the homologous areas. It also differs much in size, in which particular it appears to bear an inverse ratio to the dimensions of the clasps. In general, it may be said to consist of a gibbous, subovoid main body, contracted toward the tip, and bearing at the extremity a pair of hooks, (h, h'), occasionally consolidated at the inferior junction of which a minute, appressed, central plate, or tooth (t), dentiform on a side view, frequently depends; near the middle of the upper portion of the main body, the surface is either simply a little elevated, or expanded after elevation into nearly horizontal alations; or it rises into a dorsal, usually horse-shoe shaped crest (c), the sides of which sometimes form conspicuous lateral expansions (e, e'), the whole crest being frequently asymmetrical in elevation and lateral extension, and bearing on its upper edge, or surface, an armature of spines; from the middle of the upper surface, lateral arms (a, a') extend downward and then curve backward, meeting behind, and at their united extremities expanding into a transverse, usually broad field, which we have termed the inferior armature (ia), well provided with spines or bristles.

The movement of the clasps is of course lateral, and that of the upper organ vertical; but some of the constituent parts of the latter

have an independent motion, the whole apical apparatus, including the hooks, having a common vertical movement upon the main body, and the central tooth a forward and backward swing upon the apical portion.

Besides the asymmetry of the dorsal crest, to which we have referred, the lateral arms, the terminal hooks and the inferior armature, (as will be seen in the hind view of the upper organ of *N. tristis*), frequently partake of the same peculiarity; indeed, this element seems to pervade every part of the remarkable genital armature in this genus, as a study of the following descriptions and illustrations, in which we pass from the simpler to the more complex form, will show.

One reason, doubtless, that this strange asymmetry has escaped observation, is the entire concealment of the parts by scales, and the want of attention to these appendages in butterflies; the upper organ is protected by an extensive posterior expansion of the terminal segment of the abdomen, which forms a projecting hood, and which is also provided at tip with a heavy fringe of excessively long scales; the clasps are themselves furnished externally with a heavy coating of pretty long scales, which effectually hides the sculpture of the parts; although the disparity in length of the two clasps is readily seen, when it is so marked as in *N. Brizo*.

In endeavoring to assign a reason for this excessive development and remarkable asymmetry of the external genital organs, one cannot but be struck by the fact that the males of this genus are far more commonly met with than the females; whether this is due to the comparative scarcity of the latter, or to the greater seclusion of their haunts—all the species are sylvan—we are not prepared to say; the females, however, are taken in the same stations as the males, and seem entirely at home there; so that we are inclined to adopt the former hypothesis and to believe that, notwithstanding the simplicity of the external genital apparatus in the female, the excessive development of these parts in the male is in correlation with their superior numbers, ensuring, beyond doubt, the impregnation of every female; we do not, however, see how asymmetry gives any superior advantage. It may be mentioned in this connection that when a male of one of these species is taken between the fingers, the insect frequently endeavors to use this apparatus as an organ of defence, or perhaps it might be said, of aggression, much after the manner of a *Panorpa* or a *Staphylinus*.

We have not hesitated to give names to the species described below for the first time, because the parts to which we have confined the descriptions are, certainly, in this sombre genus, the most characteristic; we believe that only those who confine their descriptions to the coloration of the wings will blame us; to them we would say that these descriptions are no more partial than their own, and are based upon features which admit of a better definition.¹ In assigning names we have followed the lead of earlier authors in recalling the Roman poets and satirists.

GROUP I.

Upper organ: crest wanting; terminal hooks separate, slender; tooth reduced to a tubercle and bristle. *Clasps*: blades slender; basal process unarmed.

Nisoniades Persius Scudder. Fig. 1.

Upper organ: Main body short, slender, high. Hooks very long and slender, tapering, slightly compressed, separate at base, basal halves divaricate, but beyond subparallel, curving inequally, the tip hooked downward, tapering rapidly and sharply pointed; from the middle of the ridge which unites their bases, a very minute denticle depends with a projecting bristle. Arms broad at their origin, made one half as small below by an excision of the posterior edge, directed downward and slightly forward, then bent at about a right angle backward, and very soon expanded to a common, very large, spatulate cup, opening upward, its outer half composing the inferior armature of delicate points, widely separate from the base of the terminal hooks.

Left clasp: Main body nearly triangular—the apex at the point of attachment—widening rapidly, a little curved longitudinally and slightly gibbous laterally. Blade very long and slender, the basal fourth rapidly narrowing, beyond nearly equal, depressed, curving inward, at first slightly, afterwards rapidly, so as to be subfalcate; otherwise nearly straight; tip produced to a sharp point; basal process consisting of a gibbous subreniform lobe, not half as long as the blade, constricted at the base, having a general backward direction, curved a little inward, its upper margin strongly arched, its lower excised, rounded at the tip, the basal portion of its lower margin bent inwards and forming a slight, sharp, inconspicuous ridge. Lobe large,

¹ Wherever possible, a large series of specimens has been examined, and we have found the amount of individual variation very small.

broad, uniform in width, as long as the basal process of the blade and twice as broad, directed backward, somewhat upward and a little inward, its outer surface turned slightly upward, its apex rounded and curved slightly inward.

Right clasp: Main body much as in the opposite clasp, but having a broad angle near the middle of the upper margin, beyond which it does not broaden; it is also more deeply excised on the lower margin, Blade as long as that of the left clasp, narrowed at the base and beyond depressed as there, but just beyond the middle it is bent slightly downward, and having its upper margin slightly angulated, or at least curved a little downward in the outer half; close to the tip the inner edge is angulated again, broadening the tip, which terminates in a rounded right angle; basal process consisting only of a small, triangular, rounded, backward prolongation at the extreme base of the upper edge of the blade. Lobe extremely broad and large, half as long as the blade, angulated in the middle of its lower margin, its upper half produced as a narrowing rounded plate, curved strongly over upon itself, the concealed margins armed with a few rather prominent spinules.

New England.

Nisoniades Lucilius Lintner mss. Fig. 2.

Upper organ: Very similar to that of *N. Persius*, differing in being shorter, having shorter terminal hooks; a larger proportion of the cup, forming the union of the lateral arms, seems to be covered with the inferior armature, as it extends almost to the base of the bent portion of the arms.

Left clasp: Main body pretty small, slender, straight, slightly convex laterally, increasing rapidly and pretty regularly from the base, forming a high triangle, whose apex is at the base of the piece. Blade pretty broad at the base and directed a little downward, decreasing rapidly in size, and then uniformly slender, very long, curved backward, slightly upward and considerably and regularly inward, scarcely compressed, its outer surface twisted slightly in the apical half so as to become nearly horizontal and uppermost, very bluntly rounded at the tip, the upper inner angle a little produced; basal process digitate, attenuated, incurved, bowed upward, not compressed, slenderest at the base, rounded at tips, a little more than one third as long as the blade. Lobe forming a slightly longer, broad, nearly equal, flattened plate, a very little narrower and very broadly

rounded at the tip, curved slightly inward and twisted a very little, tending to bring the outer surface uppermost.

Right clasp: Main body like that of the opposite side. Blade similar in size, length, form and direction to the left clasp, but not so broad at the base, equally rounded at the tip and armed apically with a very few minute, inconspicuous spinules; basal process reduced to a slight pointed triangular tooth, connected with the blade by a slight ridge. Lobe very large and broad, reaching downward beyond the base of the blade, fully half as long as it, rounded at tip, directed backward and a little upward, gibbous, curved inward a little more than the blade, the tip bent suddenly upon itself and directed straight forward; the bent apex and incurved lower edge armed, the former with a few very long, the latter with more frequent shorter, minute spinules.

New England.

GROUP II.

Upper organ: crest scarcely elevated, with slight, horizontal, lateral expansions; terminal hooks consolidated, stout; tooth very large. *Clasp*: appendages well armed, very small when compared to main body.

Nisoniades Icelus Lintner MSS. Fig. 3.

Upper organ: Main body short, pretty high, not very slender. Dorsal crest consisting of a pair of very small, horizontal, lateral alations, the posterior angle of each rounded, the anterior produced laterally as a bluntly pointed triangle. Hooks forming a single, stout, slightly curving, pointed beak, directed backward, bearing beneath, just beyond the middle, an appressed, dentiform, backward curving appendage, which is provided, on the outer edges of its apex, with a pair of short, stout, divaricate thorns; on either side of the extreme base of the hook, its upper surface expands laterally to a very slight degree; and from the extreme base of its lower outer surface, an appressed, conical tooth projects downward and slightly outward. Arms broad at base, narrowing rapidly, directed downward and at the bottom bent at nearly right angles backward; they then curve backward, inward and upward, broadening slightly until they meet at some distance below the hook, bearing on the whole of the outer lower surface of the curving portion, the inferior armature of rather distant, comparatively large, short, blunt spines, largest at the most posterior point.

Left clasp: Main body very broad, increasing slightly in breadth from the base half way to the tip, nearly flat and straight, the upper edge produced and curved inward a little near the base, the lower edge a little full near the base. Blade straight, its lower edge continuous with the lower edge of the main body, slender, uniform, slightly compressed, not very long, armed at the apical half with minute, raised points, and terminating in a rounded point; basal process as broad as long, rounded, compressed, its hinder two thirds bent at right angles inwards and a little upwards, and armed along its whole edge and a portion of its upper surface with minute spinules. Lobe rounded, deeply and roundly excised on either side, of about the size of the basal process of the blade, but smooth; just in advance of it the upper edge of the main body is slightly prominent.

Right clasp: Main body similar to that of opposite side. Blade of the same length as that of the left clasp and otherwise similar, but curving very slightly inward and terminating in an unarmed slightly rounded point, a very little angulated at the tip; basal process developed as a dactylate apophysis, directed upward, nearly at right angles to the blade, compressed, but twisted at right angles, so as to appear depressed, a little broader than the blade, shorter by nearly one half, its tip broadly and regularly rounded, and armed with minute spinules. Lobe developed as a bluntly rounded, rather prominent plate in the middle of the upper half of the whole piece.

New England.

Nisoniades Brizo Westwood. Fig. 4.

Upper organ: Main body moderately slender, long and high, strongly arched; from the middle of the extreme posterior slope of the upper surface, a lateral, triangular, slightly curved plate or alation with rounded apex, arises on either side, projecting outward and a little upward, the anterior edge nearly at right angles with the median line of the main body, or even directed a little forward, and a little elevated. Hooks united into one extremely large beak, swollen beyond the middle, the tip pointed, the sides at base compressed and directed downward as small flaps; beyond the middle of the lower surface depends a very large, appressed tooth, the anterior edge nearly straight, the posterior curved sinuously forward, as seen from the side, broad and well rounded, the posterior surface having the edge emarginate, and furnished with a slight median ridge. Arms extremely broad at origin, tapering very rapidly in a downward direction, becoming slender before the lowest point is reached, and then

remaining of nearly the same size; below bent squarely at right angles backward, pursuing a straight horizontal course for half the distance to the tip, then curving inward and upward, expanding a little at the united tips, and bearing the inferior armature of minute raised points — not very distant from the pads at the base of the terminal hooks.

Left clasp: Main body large and gibbous, its base slender, broadening pretty regularly, nearly straight in projection. Blade broad at base, narrowing rather rapidly in the basal half, beyond pretty uniform, the tip rounded and thickened, but obliquely docked; basal process directed horizontally backward, bent or curved at base inwardly, twisted very slightly, with a tendency to bring the inner side uppermost; the whole upper edge is armed with minute recurved denticulations, extending as far as the tip, and on the apical third forming a double row of minuter teeth; the basal process is a rather small rounded lobe, whose general direction is upward, at right angles to the blade, curving a little inward, and having one edge a little concealed by the minute hind process of the lobe; its whole outer edge is covered by recurved denticulations, in continuation of those on the blade; the terminal portion of the outer surface is also minutely spinulate. Upper process of lobe directed upward, curved inward and thickened a little above, its edge showing indications of obsolete denticulations.

Right clasp: Main body similar to that of the opposite side, excepting that it is much broader at the base — nearly as broad as anywhere. Blade short, about half as long as the opposite clasp, broad, compressed, the basal half narrowing somewhat, the tip rounded and scarcely excised, the armature as on the opposite clasp; basal process similar to the opposite, but smaller and twisted, so that its inner surface is directed backward and a little inward, and this face, instead of the outer, is furnished with spinules; the border is armed as in the opposite piece, but the basal border is free from, although concealed by, the lobe. Each of the processes of the lobe is simple and broadly rounded, the hind scarcely the larger.

New England to Florida.

GROUP III.

Upper organ: crest as in Group II; hooks separate, moderate; tooth stout, conical. *Clasp*: blade stout, bent at right angles near the middle; right lobe dactylate.

Nisoniades Martialis Scudder. Fig. 5.

Upper organ: Main body long and slender, not elevated, unusually small; crest consisting of a pair of depressed, slightly curving, lateral expansions, nearly horizontal, the anterior angle produced as a small, narrow, rounded lobe, directed outward and slightly forward. Hooks short, moderately slender, slightly divergent, broadly separated at base; the main body at their extreme base expanding laterally in a ridge nearly or quite continuous with the lateral arms; tooth stout, conical, directed somewhat forward, terminating bluntly with a slightly elevated apical ridge. Arms slender, directed at first forward and slightly downward, then downward and slightly forward, finally bent abruptly at a right angle at the bottom, and continued backward to the inferior armature, which is borne upon its upward curved, slender limb, on either side of, and behind, the tooth.

Left clasp: Main body increasing rapidly in breadth from the base to the commencement of the lobe; transversely it is curved a little, longitudinally it is almost straight. Blade of nearly uniform width, elbowed just before the middle in an upward direction, and at the same time bent at an angle of about forty five degrees inward, the outer surface becoming uppermost, carrying with it the upper half of the basal portion of the blade; the apical third of the outer surface, and particularly the border and broadly rounded, faintly uncinated tip, armed with minute spinules or raised points; a minute tubercle shows the position of the basal process. The region of the lobe is marked by a distinct furrow running far toward the base of the main body; the lobe is of medium size, bent a little inward, with a slight sinuosity, and is rudely triangular; the basal portion of its upper border is a little swollen, its apical half slightly arched and thickened.

Right clasp: Main body similar to that of the left piece but slenderer. Blade compressed and tuberculate at the base of the lower edge like that of the left clasp, but having the upper edge slightly thickened and bent inwards; it is broad at base, narrows slightly and regularly for three fourths the distance to the apex, excepting a central, broad, scarcely elevated denticle on the upper edge; is there bent abruptly inward and slightly upward, then suddenly narrowed and terminates in a bluntly rounded point; this narrowed portion is armed like the tip of the opposite blade; basal process wanting. Lobe broad at the base, narrowing immediately, suddenly and extremely, and then developed into a somewhat compressed polyciform process of nearly uniform size, parallel to the basal portion of the

blade, about as long as its terminal portion, ending in a thickened, bluntly rounded tip.

Northern States.

GROUP IV.

Upper organ: crest elevated as a gibbous protuberance, surmounted by prickles; terminal hooks separate, stout; tooth stout, conical on a side view. *Clasp*: basal process of left blade larger at the tip than at the base, scarcely longer than broad, directed upward; right lobe three times as broad as long.

Nisoniades Terentius nov. sp. Fig. 6.

Upper organ: Main body small, not very slender, short, not high. Crest protruding upward and a little backward into a plump, bulbous ridge, armed with minute points, and, when viewed from above, with a broad furrow a little upon one side of the middle; this may be due to shrinkage. Hooks very short, very stout, curved, bluntly pointed, widely separate at base, divaricate almost at right angles; from the middle of the ridge uniting their bases depends a short, rather small denticle, bluntly conical on a side view, very broadly obcordate on a hind view. Base of the lateral arms greatly produced in a posterior direction; otherwise directed downward, then bent at more than a right angle backward, the lower edge very soon expanding quite broadly, so as to meet the similar portion of the opposite one beneath, and bearing upon this united belt the inferior armature, which occupies with its minute raised points a very large and broad field, reaching nearly to the base of the terminal hooks.

Left clasp: Main body pretty broad, base obliquely and very largely docked above, upper margin deeply, broadly and roundly excised just before the lobe; transversely it is a little gibbous, and longitudinally a very little curved. Blade very long, compressed, its upper edge a little incurved, giving it a solid appearance, gradually twisted so as to bring the outer surface uppermost; it diminishes in size very gradually to the tip, curving very slightly inward in continuation of the curve of the main body; viewed laterally it is slightly sinuous in its course, the apex bent inwards nearly at a right angle, rapidly tapering, squarely docked and armed with very minute teeth at the tip; basal process directed upward and somewhat backward, bent also a little inward, especially by a twist of the hinder edge; it is small, slightly longer than broad, broader at tip than at base, its hinder edge straight and smooth, its front and upper edge rounded

and conspicuously armed with minute teeth, which are borne also, to some degree, upon the outer surface near the tip; at the base it is very closely connected with the lobe. Lobe forming a very broad and very short flap, directed upward and a little outward, its apex scarcely at all rounded, but the outer angle produced into a small, incurved, rounded pad.

Right clasp: Main body similar to that of the other side, with rather deeper excisions and more prominent projections. Blade exceedingly broad and short, its outer surface gibbous, especially near the apex, and twisted a little in its course so as to bring its outer surface somewhat upward, its curve the continuation of that of the main body, as on the opposite side, the lower edge directed a little upward with a sinuous curve, the upper edge curved upward, the apex broader than the bases, squarely docked, the lower angle rounded, the upper square, almost produced and armed with a few minute spinules beyond the central excision of the apical edge; basal process almost entirely concealed; it is a small, narrow, appressed, dentiform, bluntly pointed piece, directed almost straight inward from the base of the upper edge of the blade. Lobe exceedingly broad and very short, nearly twice the breadth of that of the opposite side, and having a similar direction, its apical border excised, the angles forming the upper and hind processes, the former well rounded, gibbous and incurved, the latter greatly produced as a prolonged flap, uniform in breadth, well rounded at apex, gibbous and bent strongly inward at right angles, crowding against and concealing the basal process of the blade, which it equals in length, and almost coming in contact with the blade itself.

Florida.

Nisoniades funeralis nov. sp. Fig. 7.

Upper organ: Main body pretty short, moderately arched, rather broad and high. Posterior extremity of upper surface broadly and bluntly protuberant in an upward, backward direction, and bearing upon its swollen summit a small, horseshoe-shaped, gibbous, elevated crest, opening forward and followed in that direction by a distinct furrow; the crest is completely covered with minute raised points. Hooks small, well rounded, compressed, pretty stout, sharply pointed, divaricate, separated pretty widely at their bases, and supporting there a depending appressed tooth, broader than long, its sides angulated, its otherwise angular tip slightly excised. Arms very small at base, expanding backward very extensively; directed straight down-

ward, then curved backward and inward at nearly a right angle, expanding at tip and on their united apices bearing the inferior armature,—a very large and broad field of raised points.

Left clasp: Main body rather slender, the upper portion of the obliquely docked base slightly full, and just beyond, anterior to the lobe, a little excised; lower edge a little curved; longitudinally almost straight, transversely a little gibbous. Blade directed backward and very slightly upward, long, compressed, slender, sinuous, regularly and slightly tapering, bent a little inward and curving slightly in the same direction; upper half of the outer surface bent strongly inward, especially on the basal half, the apex very slender, bent abruptly inward nearly at right angles, rounded and minutely serrulate at tip; basal process with its anterior edge nearly opposite the denticle on the lower edge of main body, marking the origin of the blade, and consisting of a compressed, slightly gibbous, spatulate, well rounded, almost sessile lobe, directed upward and a little backward, curving, especially the upper half, a very little inward, the upper half, at least, of the outer surface covered with short, blunt spinules; it is scarcely as long as the width of the blade just beyond it. Lobe very broad and very short, curving somewhat inward, rising abruptly from the upper edge of the main body, directed upward and backward, its anterior as long as its posterior margin, but the latter bent over inward at right angles, the broad apical margin nearly straight, the angles sharp.

Right clasp: Main body slender, a good deal like that of the opposite clasp, but more deeply excised. Blade very broad and less than half as long as that of the opposite side, gibbous, twisted so as to bring most of the outer surface nearly horizontal, curved inward, scarcely downward, of nearly uniform breadth throughout, the apex bluntly docked, its outer lower angle broadly rounded, its inner upper angle square, very minutely serrulate and curved a little downward; basal process mostly concealed from the outside, very peculiar, being formed of an appressed pinching of the inner, upper, basal surface of the blade, forming a small, transverse, rounded flap, slightly longer than broad, directed inward and upward, and armed at tip with long spinules. Lobe excessively broad and quite short, directed upward and somewhat backward and inward, transversely rather strongly curved, its outer angles broadly rounded and curved inward, its posterior border strongly rounded and produced, and a little shorter than the anterior, which is slightly excised; as viewed laterally, the

apical margin is nearly straight; in reality it is very broadly and regularly excised.

This Texan species resembles *N. tristis* of California in the white fringe to its wings.

Nisoniades Ovidius nov. sp. Fig. 8.

Upper organ: Very similar to that of *N. funeralis*, but differing from it in having the dorsal crest flattened above, thrust more backward, in having slenderer terminal hooks and the dependent, appressed denticle not so broad and more excised at tip.

Left clasp: Main body much as in *N. funeralis*, but slightly broader, the upper portion of the base not so full, and not followed by an excision. Blade directed backward and slightly upward, pretty long, compressed, moderately slender, regularly and slightly tapering, the apical half curving inward a little, the upper half at base, nearly the whole at tip, curving over gradually inward, the apical portion tapering rapidly by the excision of the lower edge, bent and twisted a little so as to be directed inward, considerably backward, and on its basal portion slightly upward, terminating in a somewhat blunted point, armed with minute serrulations; basal process consisting of a subspatulate, compressed lobe, half as long again as broad, directed upward and scarcely backward, curving over inward considerably, its apical border curved but slightly angulated on either side, and broadly bordered with minute, but not very fine spinules; it is about as long as the width of the blade just beyond, seen laterally. Lobe very broad and short, tapering very rapidly, apical margin straightly docked, anterior and posterior borders equal in length, but the posterior angle produced and broadly and abruptly bent over inward, so as to give the lobe the appearance of being directed backward more than upward.

Right clasp: Main body more slender than on the opposite side, resembling the left clasp, but pretty deeply excised previous to the lobe; blade very similar to that of *N. funeralis* but considerably shorter, yet of equal width, directed a little upward, bent more inward, the tip curved less inward, the outer surface not so strongly twisted; basal process quite similar to that of *N. funeralis*. Lobe almost as broad as in *N. funeralis* and otherwise similar, but the posterior margin is much more produced, the outer angle more prominent and incurved, and the apical margin, even on a side view, is conspicuously excised.

Florida.

GROUP V.

Upper organ: crest slightly elevated, and bearing a backward-facing, bristly shield, expanding above; hooks separate, moderately stout; tooth of moderate size. *Clasps*: basal process of left blade triangular, hind angle greatly produced; right lobe consisting of a long curving finger, directed backward.

Nisoniades Ennius nov. sp. Fig. 9.

Upper organ: Main body rather long and not high, nor greatly curved; posterior part of upper surface much elevated and bearing, near the extremity, a crest in the form of an appressed plate, facing backward and very slightly upward, narrow at base, rapidly and greatly expanding above, the outer angles sharp, the upper border arched, and bearing an extensive armature of slender clustered spinules, curving forward; anterior to it the upper surface has a distinct median furrow. Hooks very short and stout, compressed, bluntly pointed, divaricate, pretty widely distant at base, and bearing at their junction a pretty broad, very short and small, bilobed, appressed tooth. Arms of nearly uniform size, curving in all their course, having at first a general downward direction, then bent in a sharp, angular curve at less than a right angle, beyond which the limb is directed upward, backward and inward, and bears at the united tips the inferior armature, which is a very large and broad belt of raised points. The crest and arms are somewhat asymmetrical.

Left clasp: Main body pretty broad, irregularly gibbous, increasing rapidly in width from the base backward, the terminal edge squarely docked between the lobe and blade. Blade very long and slender, the outer surface facing upward and outward, curving slightly inward and upward, the upper edge with a median, broad, slight denticle, the apex rounded, its inner angle produced to a sharp point, bent inward and a little downward, armed with minute spinules; basal process subtriangular, attached by a narrow neck, one apex, with the smaller half, directed backward, its tip pointed and bent a little inward; the other apex, with the larger half, directed upward and a little forward, bent also strongly inward, and at the same time twisted so as to make the outer surface face a little backward; this part of the surface is armed with minute spinules and the tip is rounded. Lobe widely distant from the basal process of blade, quadrate in shape, nearly twice as broad as long, a little broadest at apex, directed backward and a little upward, curved also somewhat inward

and a little downward, the lower portion of apex a little produced, rather laterally than apically, but rounded.

Right clasp: Main body not broad, nearly equal, the upper portion of the base largely docketed diagonally. Blade long and broad, directed somewhat upward, curved, especially near apex, a little inward, the outer surface twisted a very little upward; it is broadest in the middle and tapers beyond very gradually to a well rounded tip; basal process wanting. Lobe closely contiguous, and at base parallel to the blade, long and slender, directed a little upward, curved inward; the apical half tapers suddenly to a long and very slender, nearly equal, curving dactyl, directed a little downward and nearly straight inward, bluntly pointed and armed at the apex with some very minute spinules.

New England.

Nisoniades Juvenalis Westwood. Fig. 10.

Upper organ: Main body short and moderately high. Posterior part of upper surface not greatly elevated, bearing at the extremity an appressed, slightly sinuous plate, facing backward, comparatively narrow at base, immediately expanding greatly, so as to appear almost sessile; the outer angles, especially that upon the right side, are greatly produced and sharply pointed; the upper border is broadly arched and armed as in *N. Ennius*, and the median furrow is as in that species. Hooks short, very broad at base, bluntly pointed, triangular, depressed, inequally curved, divergent, distant at the base by the width of the tooth, which is so hidden in the only specimen we have been able to examine that it cannot be described without injury. Arms much as in *Ennius*, but slenderer, bearing at their united tips a broad belt of raised points—the inferior armature.

Left clasp: Similar to that of *N. Ennius*, but differing from it in the following particulars: the upper margin of the main body has a slight sharp tubercle just previous to the lobe, indicated in *N. Ennius* only by a scarcely noticeable elevation. Basal half of the blade fully as broad as that of *N. Ennius*, while beyond the median denticle the upper edge is considerably narrowed by a broad rounded excision, making this portion slenderer than in *N. Ennius*, and scarcely more than one third as broad as the basal portion; the apex is much more produced and very finely pointed, and the denticulations more distinct; the basal process differs only in having the hinder portion produced to a greater length and more slender, being nearly one third the length of the inner margin of the blade; while in *N. En-*

nus it is scarcely one fifth of the same. The lobe differs in being much broader at the tip — one half as broad again as the base — and in being less curved inward.

Right clasp: The blade differs from that of *N. Ennius* in being generally broader and in tapering only from beyond the middle of the apical half. The lobe is similar but rather broader on the basal half; the apical half is also much broader — twice as broad as in *N. Ennius*, and more than one half as broad as the base of the lobe — and subspatulate in shape, broadly rounded at the tip.

Southern States.

GROUP VI.

Upper organ: Crest elevated and surmounted by a horseshoe-shaped, infundibuliform, spiculiferous ridge; hooks separate, large and rather stout; tooth as in Group IV. *Clasps:* Basal process of left blade consisting of a long and slender finger parallel to the blade, armed at apex and sometimes on upper edge; upper and hind process of left lobe prominently developed.

Nisoniades Propertius nov. sp. Fig. 11.

Upper organ: Main body rather short, high and slender. Posterior extremity greatly elevated, the crest forming a half funnel-shaped, appressed and gibbous, transverse plate, facing backward and a little upward, and armed with little spicules, which on the margin become very long curving bristles; anteriorly it is supported on either side by a thin, high, compressed ridge, running a long distance forward. Hooks small, stout, strongly curved, pointed, often with secondary denticles near the base, a little divaricate, their bases widely distant and connected by a nearly straight edge, from the middle of which depends a small, smooth, transversely oval, appressed tooth, bending a little forward; at the extreme base of the hooks, on either side, is a recurrent, rather long and slender, blunt denticle, directed downward and a little outward and forward. Arms rather slender, tapering slightly, directed downward and a little forward, at bottom bent abruptly at less than a right angle, a little beyond which they expand and unite beneath, supporting the inferior armature, consisting of a broad, quadrate, gibbous patch of raised points.

Left clasp: Main body large, broad and long, increasing but little in width, quite gibbous, longitudinally nearly straight. Blade excessively long and slender, the outer portion so twisted as to be nearly horizontal and uppermost, and in this position is sinuous and directed

a little upward; it is also bent pretty strongly inward with a very slight curve; it is nearly uniform, tapering slightly on the outer half, the extremity curving downward and slightly rounded, the apex and apical portion of the inner edge armed with very minute denticulations, directed inward; basal process directed at first upward and backward, the posterior portion bent pretty strongly downward; but just beyond the base it turns abruptly at nearly right angles backward, and extends subparallel to the blade for some distance, developed as a subspatulate, slender plate; the whole rounded tip and the inner edge are armed, the former with minute, the latter with heavier serrations. Lobe developed as an extension of the upper posterior angle of the main body, directed backward and upward, and curved also inward, of nearly uniform breadth, twice as long as broad, the tip broadly rounded; the upper edge of the main body is strongly, broadly and roundly excised at the base of the lobe.

Right clasp: Main body similar to that of the opposite side but slenderer. Blade quite similar to that of the opposite clasp, very slightly broader, and beyond the middle expanding slightly instead of diminishing, the tip itself tapering, rounded, and with the outer half of the inner edge very delicately denticulate; basal process broad, triangular, bluntly pointed, directed backward, curving over inward, armed with very minute and very distant serrulations. Lobe developed as a somewhat similar, rather longer plate, more strongly curved inward, directed upward and unarmed, the main body deeply and roundly excised at its anterior base.

California, H. Edwards.

Nisoniades Tibullus nov. sp. Fig. 12.

Upper organ: Main body rather slender, short and high. The crest is composed of a pair of small, broadly rounded, prominently raised, united alations, inclined toward each other at more than a right angle, each facing backward, upward and a little inward, a little gibbous and supported by a sharp, elevated ridge running from either side of the anterior part of the main body; they are completely covered above with longer and shorter spinules, developing, on the upper edge, into quite long, curving, bristly hairs, arranged, when viewed from above, somewhat in the form of a horseshoe. Hooks short, very stout and broad, very widely separate at base, slightly divaricate, asymmetrical, with occasional, more or less developed, lateral denticles; dependent from the ridge uniting their bases is a very short and broad, appressed, fabiform tooth, its edges a little raised.

Arms directed downward and a little forward, of nearly equal size throughout, at bottom curved very abruptly backward and upward, but with the lower edge expanding to meet that of the opposite side, and bearing upon their united limbs the two rounded lobes, directed upward and united at their edge, which form at once the apices of the arms and the inferior armature of raised points.

Left clasp: Main body large, gibbous, the base docked diagonally, increasing a little in breadth outwardly, slightly curved longitudinally, the upper edge incurved and lobed beyond the middle, docked squarely at the apex; the outer half is deeply grooved above the base of the blade. Blade very long and slender, strongly depressed, nearly uniform in width, the apical third narrowing a little, the whole curving strongly inward, the basal half also directed backward in a straight course, the apical half curving a little upward, the extreme tip squarely appressed and bent inward, inner edge excised just before the apex, and beyond minutely denticulate; basal process broad at base, compressed, directed upward, its upper posterior angle produced backward as a somewhat elongate, rounded lobe, separated from the blade, to which it is nearly parallel, by a very deep hollowing; the basal portion of the upper edge curves slightly inward, the whole upper outer margin, together with the apical half of the hind prolongation armed with pretty strong but minute teeth. Lobe small, consisting of a subspatulate flap, projecting from the upper hind corner of the main body, bent strongly inward, but with an equally upward backward course, as long as the upper edge of the basal process of blade and half as broad as long, the tip broadly rounded and the apical half minutely pitted.

Right clasp: Main body much narrower than that of the opposite side, nearly equal, excepting at the base, the upper margin with an acute denticle in the middle, beyond which it is roundly and deeply excised. Blade long and rather slender, strongly compressed, twisted just beyond the base so that the outer becomes the upper surface, on a side view directed at first straight backward, then with a slight upward curve and again at the tip straight backward; viewed from above, curved a little and regularly inward, rounded and minutely denticulate along the inner angle of the apex; basal process wanting. Hind process of lobe consisting of a small, rounded, nearly semi-circular, compressed pad, at the middle of the apex of the main body, directed backward, curved a little inward, the apical half minutely denticulate; upper process composed of a pretty large, sub-

triangular pad, directed upward, curving over inward and even a little downward, the apex rounded, thickened and gibbous.

California.

Nisoniades Horatius nov. sp. Fig. 13.

Upper organ: Main body rather long and slender, not high. Posterior extremity bearing a greatly elevated crest, similar to that of the following species, *N. Virgilius*, formed of a half funnel-shaped plate, slender at base, expanding greatly upward, facing backward but scarcely upward, its upper edge recurved and spiculiferous, its right extremity extraordinarily produced, extending as a sort of bristly finger backward and outward, not upward, and at tip curving downward; its lower edge also sometimes bears a slight bristly tubercle in the middle. Hooks much as in *N. Virgilius*, but the left one almost entirely obsolete; the dependent tooth broad, obpyriform, the edge forming a slightly projecting rim. Arms and inferior armature as in *N. Virgilius*.

It should be mentioned here that the drawing of the upper organ was taken from a larger specimen than that which furnished the illustration of the clasps; the former came from Texas; the latter from Massachusetts.

Left clasp: Main body broad and rather short, slightly gibbous, the upper edge full at base, the lower nearly straight. Blade moderately long, the upper three fourths bent over inward so as to be horizontal, or on the basal half slightly deflected, nearly equal in width, but a little constricted near the middle, the apical fourth tapering to a bluntly rounded apex, which is curved slightly downward; viewed laterally, the blade tapers regularly and slightly, is straight and horizontal; viewed from above it curves a very little inward; basal process developed as a slender, scarcely compressed dactyl, bent over backward from its origin, so as to be nearly horizontal on a lateral view, scarcely curving inward, near one third as long as the blade, a little enlarged at the tip, and armed with a few very minute spinules around the edge of the enlarged portion. The lobe consists of an upward prolongation of the upper hind angle of the main body into a bluntly pointed triangular expansion, curving inward, leaving the apical border of the main body straight, and at right angles with the lower margin.

Right clasp: Main body much as on the opposite side, but the upper portion of the base is not so full, and beyond the middle the upper border is slightly elevated. Blade broad, not very long, directed

slightly upward, especially at the tip, slightly excised along the middle, a very little larger at the apex than at the base, gibbous at the base, beyond flat, twisted so that the outer surface becomes nearly horizontal, curved slightly inward, the apex, especially the upper angle, still more so, the tip docked almost squarely and a little diagonally, so that the apical edge is directed almost straight backward, very broadly rounded, the edge slightly thickened, the angles not sharp; basal process consisting of a small, backward directed, triangular tooth, bluntly pointed and as long as the smallest breadth of the blade, and a little longer than the breadth of its own base. Lobe consisting of an upward, posterior projection of the upper hind angles of the main body, forming a subtriangular, broadly rounded, gibbous pad, curving inward and a little backward, separated from the basal process of the blade by a very broad, deep and regularly curved excision.

New England, Texas.

Nisoniades Virgilius nov. sp. Fig. 14.

Upper organ: Main body long and slender, not high. Posterior extremity bearing greatly elevated asymmetrical alations, united in a somewhat horseshoe-shaped, curving, hollowed plate or crest, excessively produced as a slightly upraised, pointed triangle on the right side, directed backward and upward; the whole crest faces upward and backward, its united upper edge fringed with minute spicules, and is supported on either side by a slender ridge running from near its middle a short distance forward to the side of the main body. Hooks very small, asymmetrical, the right being much the larger, pointed, scarcely curving downward at tip, approximate at base, divergent; tooth small, sessile, spatulate, appressed. Arms asymmetrical, very slender, nearly uniform, curving, having first a general direction downward and slightly forward, afterwards backward, upward and inward, the curve quite regular, expanding slightly at tip and bearing between the extremities the inferior armature—a rather small rounded field of minute raised points.

Left clasp: Main body almost identical in form with that of *N. Horatius*, excepting that the apical border lies at a little more than a right angle with the lower margin, on account of the greater projection of the lobe. Blade as in *N. Horatius*, excepting that the basal half of the upper two thirds is bent over horizontally, the part beyond not quite so much; it is also a little broader, directed slightly upward, the tip bent scarcely

downward; basal process not quite so long as in the *N. Horatius*, and the whole apical half enlarged. Lobe projected further backward than in *N. Horatius*, forming a longer and more slender triangle.

Right clasp: Main body quite as in *N. Horatius*, but a little broader. Blade also similar, but broader throughout and at the tip nearly one half as broad again as in the middle; basal process consisting of a small, elongate, subtriangular tooth, nearly uniform in width, bluntly pointed, fully twice as long as broad at the base and as long as the narrowest breadth of the blade, directed straight backward. Lobe as in *N. Horatius*, but a little larger and longer and scarcely so much incurved.

New England.

GROUP VII.

Upper organ: crest greatly elevated, expanded laterally into very large, curving, prickly, asymmetrical flaps; hooks and tooth as in group V. *Clasps*: much as in group VI.

Nisoniades tristis (Boisduval.) Fig. 15.

Upper organ: Main body long and rather slender, not high, somewhat arched; posterior extremity of the upper surface strongly elevated and then expanded laterally into very unequal, outward and downward curving alations, that of the left side forming an excessively enlarged, broad, rounded lobe, the lower anterior portion bent downward more than the other and produced anteriorly to a considerable extent; the whole upper surface and edges and a portion of the under surface are covered with minute raised points, which become developed on the anterior edge into distinct spinules; that of the left side form a very long and slender, slightly sinuate, unarmed plate, somewhat constricted toward the base, the tip well rounded, not quite as long as that of the opposite side. Hooks moderately stout, short, arching, pointed, scarcely divaricate, rather distant at base, the right nearly abortive; tooth appressed, subcordate, with compressed neck, projecting downward and very slightly backward, the edges unarmed, emarginate. Arms slender, tapering slightly, directed downward, with a slight anterior curve, bent backward abruptly at less than a right angle and then directed backward, upward and inward, bearing between their tips the inferior armature, a rather small, asymmetrical, reniform field of raised points.

Left clasp: Main body very broad, uppermost portion of the base quite full, lower edge very slightly curved; longitudinally nearly straight, laterally but slightly gibbous. Blade long, directed almost horizontally

backward, the distal portion tapering very slightly; viewed from above, it appears to curve slightly inward, to be strongly depressed, the inner margin curved slightly downward in the middle, pretty slender, the basal half of nearly uniform width, just beyond the middle furnished with a slight tooth on the inner edge, beyond which the blade is strongly excised and continues again of nearly equal width, but tapering slightly to the well rounded tip, which is serrulate with incurving hooks; basal process shaped somewhat as in *N. Virgilius*, but smaller and more spatulate, almost the whole margin serrulate with blunt spines. Lobe consisting of a very broad and short, broadly rounded extension of the upper hind angle of the main body, directed backward and upward, its lower corner angular and incurved.

Right clasp: Main body broad, not so full at the base above as on the opposite side but distinctly angulated and even slightly produced in the middle of the upper half. Blade not very long but broad, directed slightly upward, the outer surface twisted over so as to be almost horizontal, the middle of the inner edge depressed still more, the inner edge a little swollen in the middle of the basal half, beyond excised, broadest at the tip, which is obliquely and squarely docked, most minutely serrulate and slightly curved; basal process wanting. Lobe exceedingly broad and very short, directed backward and upward, very gibbous, the upper angle produced roundly and considerably, the lower forming the hind process—a rather small, triangular, bluntly pointed denticle, serrulate on the edge.

California, H. Edwards.

GROUP VIII.

Upper organ: unknown. *Clasps*: left blade exceedingly broad and rapidly tapering; its basal process nearly sessile; upper process of left lobe greatly developed; right lobe developed similarly and parallel to the right blade, but smaller.

Nisoniades Plautus nov. sp. Fig. 16.

Upper organ: This portion of the only specimen we have seen proves to be damaged to such a degree that neither drawing nor description could be made; we can only say that it seems to differ from all the usual types of this extraordinary genus as greatly as the clasps do.

Left clasp: Main body large, broad, widening, quite gibbous, roundly curved longitudinally. Blade excessively broad, more than

half as broad as the main body, directed upward and curved somewhat inward, particularly at the tip; the basal half tapers but slightly; the apical half tapers strongly to a fine point, is bent slightly downward, twisted so as to bring the outer surface uppermost, leaving the posterior inner termination of the basal half protruding inward as a blunt, rounded, gibbous denticle; the apex is hooked slightly inward and armed with very minute denticulations; basal process sessile, consisting anteriorly of a triangular, pointed, spinous, depressed piece, directed inward and forward, and curving slightly upward; and posteriorly of a basal, unarmed, long and slender, compressed but very gibbous, dactyloid plate, directed backward, and curving strongly upward, terminating in a rounded apex. Lobe arising from the upper, hind angle of the main body, directed backward and upward and curved quite strongly and regularly inward, consisting of a compressed, pretty long and broad plate of uniform width, more than twice as long as broad, with a rounded apex, and having its lower margin broadly and slightly excised.

Right clasp: Main body differing extraordinarily from that of the opposite side, being very slender, the base of the blade marked on the lower edge by a greatly produced, pointed, triangular denticle, more prominent than in any species examined by us, and directed downward. Blade long, broad, compressed, directed a little upward, curving a little inward; the basal three fourths of nearly equal width, tapering slightly; gibbous and twisted so as to bring the greater portion of the outer surface uppermost; the apical fourth is quite different, being only half as broad as the basal three fourths, on account of the abrupt excision of the lower half, causing the basal portion to terminate with a sharp lower angle, which, with the apical half of this portion of the lower edge, is bent inwards; the terminal fourth is scarcely half as broad as the basal portion, broadens slightly toward the apex, and is squarely docked at tip, the inner angle produced slightly as a minute, pointed denticle; basal process wanting. Lobe unusually developed, forming a long, compressed dactyl, subparallel to the blade, its outer surface a little twisted so as to face somewhat downward and curved strongly inward, especially near the tip; it is of nearly uniform width, its upper edge slightly swollen opposite the outer half of the larger portion of the blade, and has its tip produced along its lower edge only, tapering rapidly as if by an oblique excision, and ending in a roundly pointed tip, the whole of

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the narrowed portion being bent slightly downward, curving strongly inward and armed with minute denticles.

Florida.

We close with the following statements concerning the synonymy of the species: *N. Ennius* nob. is the northern representative of *N. Juvenalis* Westw., and has generally been taken for that species. *N. Lucilius* Lintn. and *N. Icelus* Lintn. have hitherto been confounded with *N. Persius* Scudd. and *N. Brizo* Westw., but separated from the same by Mr. J. A. Lintner in a paper shortly to be published. *N. costalis* Westw. is probably *N. Juvenalis* Westw., though possibly *N. Ennius* nob., or even *N. Virgilius* nob.; it can hardly be satisfactorily determined without an examination of the type. Either *N. Propertius* nob. or *N. Tibullus* nob. may be the Californian species which Boisduval, in his *Lépidoptères de la Californie*, has considered to be *N. Juvenalis* Westw. *N. Tages* var. *Cervantes* of Boisduval, in the same paper, is an undescribed species which we did not obtain in season to include in this essay. We have seen no Californian species which could possibly be referred to *N. Brizo* of Boisduval, *Lépidoptères de la Californie*. We doubt whether *N. Lherminieri* Westw. can be included in this group; and *N. Catullus* Westw. is certainly the representative of a distinct genus.

Explanation of the Plate illustrating Asymmetry in the genital armor of Insects.
The lettering on all the figures is the same.

U. Side view of the upper organ from the right side.

U₁. Ditto, from the left side.

Ua. Upper organ from above.

Ub. Upper organ from behind.

R. Right clasp.

Rb. Right clasp from above.

L. Left clasp.

Lb. Left clasp from above.

Figs. 1-16 are magnified 20 diameters.

Fig. 17 is magnified 35 diameters.

From the Proceedings of the Boston Society of Natural History, Vol. XVI, 1874.

Mr. Scudder called the attention of the Section to some recent remarks by Mr. Meldola¹ upon *Iphiclides Ajax* (*Papilio Ajax* Auct.).

These remarks were made in connection with investigations "on the amount of substance-waste undergone by insects in the pupal state"; it was presumed *a priori* that, as there was gain of matter in the larval state, and loss during the pupal, the size of an individual of any species "would be, *ceteris paribus*, inversely proportional to the ratio of the pupal to the larval period, or directly proportional to the ratio of the larval to the pupal period."

Mr. Meldola attempted to test this theory by tabulating the statements of Mr. Edwards concerning the duration of the stages in the different polymorphic forms of *Ajax*, and he found "that there was a relationship, but exactly the reverse of that which would be anticipated from the conclusions previously set forth."

The three forms of *Ajax* have been called by Mr. Edwards *Walshii*, *Telamonides* and *Marcellus*, and these increase in size in regular ratio and succeed each other in season in this order; the following table represents the duration of the several stages, and is taken by Mr. Meldola from Mr. Edwards' work:—

	Eggs.	Larva.	Chrysalis.	Total.
<i>Walshii</i> .	7-8 days.	22-29 days.	14 days.	43-51 days.
<i>Telamonides</i> .	4-5 "	15-18 "	11-14 "	30-36 "
<i>Marcellus</i> .	4-5 "	12-19 "	11-14 "	27-38 "

The next table is Mr. Meldola's attempted tabulation of the facts by which he comes to the above conclusion:—

Name of variety.	Ratio of mean pupal to mean larval period.	Ratio of mean larval to mean pupal period.	Mean expanse ♂.
<i>Walshii</i> .	$\frac{14}{25.5} = 0.549$	$\frac{25.5}{14} = 1.821$	2.70
<i>Telamonides</i> .	$\frac{12.5}{16.5} = 0.757$	$\frac{16.5}{12.5} = 1.320$	3.00
<i>Marcellus</i> .	$\frac{12.5}{15.5} = 0.806$	$\frac{15.5}{12.5} = 1.240$	3.35

"It is here seen," says Mr. Meldola, "that the size of the variety is directly instead of inversely proportional to the ratio of the pupal

¹ Ann. and Mag. Nat. Hist., XII, (Oct., 1873), p. 301-307.

to the larval period, and *vice versa*." Unfortunately for this conclusion, the figures given by Mr. Edwards, or their reduction by Mr. Meldola, refer in each case to the *progeny* of *Walshii*, *Telamonides* and *Marcellus*, and do not bear upon the question; in every instance given in the tables the progeny or resultant is *Marcellus*; *Walshii* and *Telamonides* are the produce of wintering Chrysalides, and therefore by Mr. Meldola's rule, should be, as they are, smaller than *Marcellus*, which, on the other hand, is always the result of short lived summering chrysalids; unless, however, some unknown factor plays a part, *Telamonides* should be smaller than *Walshii*, because produced later in the season, from wintering chrysalids; but here the opposite is the truth.

Mr. Scudder further observed that Mr. Edwards had not drawn attention to the fact that *Walshii* and *Telamonides* belonged to the same brood; the former consists of earlier, the latter of later individuals from wintering chrysalids; the second brood of the species (the first from short lived chrysalids) is *Marcellus*, and made up of the mingled progeny of both *Walshii* and *Telamonides*.

Mr. S. H. Scudder called the attention of the Section to a Hesperian, in which ocelli were present.

In a memoir published in 1831 by the Berlin Academy of Science, Klug has reviewed the families of insects in which ocelli are present. He states that they are wholly wanting in the rhopalocerous Lepidoptera, even in the Hesperians, and this assertion has been received up to the present time. But in the male of the *Papilio Accius* of Smith-Abbot a single ocellus is found in the middle of the front, consisting of a slight eminence as broad as the base of the antennæ, smooth and lenticular; in the female, however, this eminence is divided into three minute points, which together are of the same size as the single elevation of the male; this seems to show that the male ocellus is formed of three elements united.

In all the heterocerous Lepidoptera which possess ocelli, these are two in number, and are placed one behind each antenna, probably therefore on the vertex. This difference is not extraordinary, for among the Hemiptera some groups possess ocelli below, some above the eyes, a difference still greater; while in other groups

they are wholly wanting. In the genus *Larema*, to which *Papilio Accius* Sm.-Abb. belongs, two other species have been examined, *L. Pattenii* and *L. Hianna*. In the male of the former (the only sex examined) the ocellus resembles perfectly that of *L. Accius*; but there is not the slightest trace of ocelli either in the male or female of the latter; nor do they exist in the neighboring genera, so far as these have been examined.

1875

ENTOMOLOGICAL NOTES

IV

BY
SAMUEL H. SCUDDER

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REPORT ON THE BUTTERFLIES COLLECTED BY MR. J. A.
ALLEN ON THE YELLOWSTONE EXPEDITION OF 1873.

The twenty-eight butterflies mentioned below were brought home by the Yellowstone Expedition, sent out under the charge of Gen. D. S. Stanley, by the Secretary of War. They were collected by Mr. J. A. Allen, zoologist and botanist of the expedition, and were taken at four different localities, from Heart River (about 1800 feet above the sea) to the mouth of Cedar Creek on the Yellowstone (about 2200 feet above the sea), between June 26 and July 20. The localities were the following:—

1. Heart River Crossing, Dakota Terr., about fifty miles west of the Missouri River, June 26. The collections were almost wholly made in the valley of the river, near or among timber. More than half of the specimens brought home, and nearly three-fourths of the species were taken at this place. The butterflies *not* found here were:—*Min. silvestris*, *Arg. nevadensis*, *Char. Ismeria*, *Chrys. Sirius*, *Chrys. Helloides*, *Amar. Zolicaoon*, the two species of *Erynnis* and *Atryt. Logan*. There was a large proportion of *Nymphales* and *Urbicolæ*, three-fourths of the butterflies belonging to these two families.

2. "Camp No. 8," at the crossing of Big Muddy Creek, about twenty miles northwest of the Heart River Crossing. There was very little timber here, and most, if not all, of the butterflies were taken in the open country, and represent, says Mr. Allen, the usual species of the prairie. The butterflies taken there were:—*Cæn. Galactina*, *Arg. nevadensis*, *Lyc. Anna*, *Chrys. Helloides*, *Hesp. tessellata* and *Ocytes Uncas*.

3. Near the head of Heart River, about one hundred miles west of the two previous localities, July 8. The butterflies were also taken on the prairie, and consisted of *Bas. Dissippe*, *Van. cardui*, *Arg. nevadensis*, and *Chrys. Helloides*.

4. Shell Point, Yellowstone River, at the mouth of Cedar Creek, ten miles above the mouth of Glendive Creek,—landmarks which will doubtless be given on the next good map of this region. The

butterflies were obtained July 18 and 20, among the sage brush of the river valley, and consisted of *Min. silvestris*, *Bas. Weidemeyeri*, *Char. Ismeria*, *Lyc. Anna*, *Col. Philodice*, *Amar. Zolicaon*, the two species of *Erynnis*, and *Atryt. Logan*.

NYMPHALES.

1. **Satyrus Ridingsii** Edw. A single male, rubbed, but not torn, was taken in the river valley, at Heart River Crossing, June 26.

2. **Minois silvestris** (Edw.). Sixteen specimens (11♂, 5♀) were taken on the banks of the Yellowstone River, in the sage brush, July 18 and 20. About half the males were in fair condition; the other half were rather rubbed and frayed; most of the females were pretty fresh, but two of them were a good deal torn. Probably the butterfly appears early in July.

3. **Cænonympha Galactina** (Boisd.) Morr. This species was taken at Heart River Crossing, in the river valley, June 26, and on the open prairie, at the crossing of the Big Muddy, June 28. The males (six) were fresh or very nearly fresh; and the females (fourteen) were all fresh, though some were a little torn, perhaps in capture. The butterfly probably appears toward the end of the month.

4. **Basilarchia Disippe** (God.) Scudd. This butterfly was only taken on Heart River; a male, fresh and very dark, like Floridan specimens, was taken at the crossing in the river valley, June 26; and a female, very badly rubbed, and of the ordinary color of northern specimens, near the head of the river, on the prairie, July 8.

5. **Basilarchia Weidemeyeri** (Edw.) Grote. Three specimens of this beautiful insect were taken; two males, one of them perfect, the other pretty fresh, were found near timber at Heart River Crossing, in the river valley, June 26; the third, a female and ragged, was taken in the sage brush of the river valley, near the encampments on the Yellowstone, July 18. Its periods resemble, therefore, those of *B. Arthemis*.

6. **Vanessa cardui** (Linn.) Ochs. Two males were taken, one fresh, the other very badly frayed; the former on the banks of the Yellowstone, July 18; the latter at Heart River Crossing, June 26; the latter had probably hibernated, and the former was an early individual of the first brood.

7. **Argynnis nevadensis** Edw. Two males and a female of this butterfly, fresh, were taken on the open prairie at the crossing of

the Big Muddy, June 28. On July 8, at the head of Heart River, also on the prairie, thirteen males were taken, most of them in a tolerably fresh condition.

8. *Argynnis Edwardsii* Reak. Four males of this species, either fresh or very nearly fresh, were taken June 26, at Heart River Crossing, near the timber in the valley of the river. The seasons of these two species are therefore nearly identical.

9. *Phyciodes Tharos* (Drury) Kirb. About thirty specimens of this butterfly were taken at Heart River Crossing, June 26, the two sexes in nearly equal numbers; fresh, passable and badly bruised individuals were divided about equally among males and females.

10. *Charidryas Ismeria* (Boisd.-LeC.) Scudd. Only taken on the Yellowstone, among the sage brush in the valley, July 18; six males and two females were captured; a single male in pretty good condition, the others, as well as the females, dull, rubbed and frayed. Probably, therefore, it appears in June.

RURALES.

11. *Lycæides Anna* (Edw.). This butterfly was found in considerable abundance, and in nearly all the localities in which collections were made, viz.: at Heart River Crossing, the banks of the Yellowstone, and at the crossing of the Big Muddy, from June 26 to July 18. At the earliest date, twenty-one males were taken, of which six were fresh and bright, twelve tolerably fresh, and three badly rubbed; while of the six females taken at the same time, four were perfectly, and two tolerably, fresh. Two days later, one fresh and one rubbed male and two rather fresh females were taken; while the single female captured July 18 was badly rubbed and torn. The butterfly probably made its appearance this year at or shortly after the middle of June.

12. *Agriades Minnehaha* nov. sp. Upper surface of male dark violet; the outer margin dark brown, extending more broadly on the front than on the hind wings; upper surface of male rather dark brown, the basal half dusted, not very conspicuously, with blue scales; both sexes have a small black bar crossing the cell of all the wings, larger in the female than in the male; outer margin edged with black, followed interiorly on the hind wings by a line of white scales, upon which are seated small, blackish, interspaceal spots, sur-

mounted, in the female, by small, dull orange, triangular spots. Under surface ashy gray, slightly darker in the male than in the female, the outer border edged with black. Fore wings with a rather large, black discal bar, edged narrowly with white, and midway between this and the outer border a row of small black spots, the upper ones round, the lower oval, all narrowly encircled with white, and arranged in a curve which bends most strongly in the interspaces beyond the cell; there are also two faint rows of transverse, dusky submarginal spots, the inner midway between the border and the outermost portion of the row of black spots. On the hind wings the discal spot is scarcely, if at all, darker than the ground, and distinguishable only by being narrowly encircled with whitish; in the middle of the cell is a small blackish spot, and above it another, both encircled with whitish; beyond is a sinuate series of spots encircled with white, the upper and lower spots black or blackish, the others seldom darker than the ground, and thus indistinct; there is one in each interspace, transverse oval in shape, those in the interspaces beyond the cell lying half way between the discal spot and the border. There is a marginal series of small, round, dark brown spots, often dotted, especially away from the centre, with metallic spots surrounded with yellowish brown, which above, and especially in the female, deepens into dull orange; these spots are again surmounted by very slight, dark brown lunules, bearing pretty large triangular spots of grayish white, pointing toward, and almost reaching, the extra-mesial row of spots. Expanse ♂ 26 mm.; ♀ 24-26 mm.

This butterfly does not seem to have been described, but it accords best with the description of *Lyc. Maricopa* Reak., from California.

One pretty fresh male, another rubbed male, one fresh and one rubbed, dull female were taken at Heart River Crossing, June 26.

13. **Chrysophanus Helloides** (Boisd.) Edw. One pretty fresh female was taken at the crossing of the Big Muddy, on the open prairie, June 28.

14. **Chrysophanus Sirius** Edw. A single male, badly torn and rubbed, was taken on the Yellowstone River, among the sage brush in the valley, July 20.

PAPILIONIDES.

15. **Colias Philodice** God. At Heart River Crossing, near timber in the river bottom, June 26, ten males were taken, mostly in good condition, though two of them were poor. Later, July 18 and

20, a large number of males and a single female were taken on the banks of the Yellowstone River, among the sage brush; of these, most of the specimens taken on the 18th were pretty fresh; but some males were somewhat or considerably rubbed; of those taken on the 20th, only one specimen was fair, the others being very badly rubbed; some of these were very small, one measuring but thirty-seven millimetres in alar expanse.

16. *Colias Eurytheme* Boisd. This species was taken only at Heart River Crossing, near timber in the river bottom, June 26. Three pretty good males and two good females were captured, besides three females, rather badly worn.

17. *Synchlœ Protodice* (Boisd.-LeC.) Scudd. Two females only were taken, both fresh; one at Heart River Crossing, June 26; the other on the Yellowstone, July 18.

18. *Amaryssus Polyxenes* (Fabr.) Scudd. A single female, badly torn and worn, was taken at Heart River Crossing, June 26.

19. *Amaryssus Zolicaon* (Boisd.). A single male, fresh in color, but a little torn, was taken on the Yellowstone, July 18.

URBICOLÆ.

20. *Epargyreus Tityrus* (Fabr.) Scudd. A single female, torn (perhaps in capture) but pretty fresh, was taken at Heart River Crossing, June 26.

21. *Thorybes Pylades* Scudd. A single fresh male was taken at Heart River Crossing, June 26.

22. *Erynnis Persius* Scudd. A single, rather rubbed male, apparently belonging to this species, though differing somewhat from eastern examples in the abdominal appendages, was taken on the Yellowstone, July 18.

23. *Erynnis Lucilius* (Lintn.) Scudd. A single male, not very fresh, was taken with the preceding species. It does not differ from the eastern type, even in the abdominal appendages.

24. *Hesperia tessellata* Scudd. Three fresh males were taken at Heart River Crossing, June 26; but three worn specimens, a male and two females, their fringes all gone, were taken at the crossing of the Big Muddy, only two days later.

25. *Oarisma Hylax* (Edw.). Three pretty fresh males were taken at Heart River Crossing, June 26.

26. A single male butterfly was taken at Heart River Crossing, June 26, which resembles very closely *Amblyscirtes vialis* in the form and neuration of the wings, in the structure of the legs and antennæ, and even in the coloration and markings of the wings, so far as these could be made out from a somewhat rubbed individual; but there is a perfectly distinct indication of a discal dash of raised scales, the sexual mark of the fore wings in so many *Astyci*, which is altogether wanting in *Amblyscirtes*. I await the reception of further material before describing this interesting form.

27. *Ocytes Uncas* (Edw.). One pair, both fresh, were taken at Heart River Crossing, near timber in the valley of the river, June 26. At the crossing of the Big Muddy, on the open prairie, two females, one of them fresh, the other somewhat less so, were taken June 28.

28. *Atrytone Logan* (Edw.) Scudd. A torn and rubbed male and a pretty fresh female were taken on the banks of the Yellowstone, among sage brush on the river bottom, July 18.

REMARKS ON THE OLD GENUS *CALLIDRYAS*.

At the conclusion of his admirable monograph of the *Callidryades*,¹ Mr. A. G. Butler attempts to divide the species into groups, and with a great degree of success. He places, however, all the old world forms in a single genus, retaining for it the name *Catopsilia* (with *Pap. crocale* Cramer as type), and placing *Murtia* of Hübner as a synonyme. It will be a matter of surprise, however, if a further

¹ Lep. exot., parts iii-xviii.

examination does not prove that this old world group will need still further subdivision, and that *Pap. Pyranthe* Linn. can stand as the type of *Murtia*, with its comparatively shorter antennæ and differently formed wings, and slightly differing neuration.

Three species are given by Butler as found within the limits of the United States:—

1. **Phœbis Agarithe**, which he quotes from Texas. The other localities given by him are Brazil, Santa Martha, Caraccas, Yucatan, Nicaragua, Panama, Venezuela and Hayti. Dr. Palmer has recently brought home a fine pair of this species from Key West, the ♀ closely resembling Butler's figure; but the ♂ much larger, as large as Butler's figure of *P. rorata* ♂, from which, however, it differs conspicuously in the extent of the sexual mealy border of the fore wings. There are two males from Texas in the Museum of Comparative Zoology, one of the large and one of the small size, which do not otherwise differ. This is probably the insect catalogued by Mr. Edwards in his Synopsis as *Callidryas Argante*.

2. **Callidryas Eubule**, which he gives from St. John's Bluff and from "N. America," only. This is doubtless the *Callidryas Eubule* of Edwards' Synopsis. I can scarcely understand the figure of the male given by Butler. The mealy border of the fore wings is represented as a comparatively narrow band of nearly equal width, terminating below at the submedian nervure, and forming a couple of short oval patches next the margin of the costal border. I have never seen such an insect, and although the extent of this belt unquestionably varies considerably in *C. Eubule*, I can hardly help supposing that Mr. Butler has overlooked its true limits in the specimen he figures, or else that it was partially obliterated. Specimens collected by Dr. Palmer at Jacksonville, St. John's River, Florida (very near St. John's Bluff, at the mouth of the river), agree in general with those from the northernmost point at which the species has been taken abundantly (Long Island, N. Y.), in having a slender extension of this band along the inner border nearly to its middle, narrowing as it passes toward the base; in all the subcostal interspaces the patches (always separated from each other by the nervures) often extend almost to their very base, leaving but a narrow, free space between the patches and the nervures; this is especially the case in those interspaces which open upon the costal margin; in the lowest subcostal interspace (that lying between the two inferior subcostal nervules, or what the English entomologists call the discoidal ner-

vules), the patch almost invariably extends half-way to the cell, sometimes close up to it.

The under side of this species, both in specimens from the south and from the north, and especially in males, is often almost wholly devoid of markings, excepting the spots at the tip of the cell in both wings; and generally the species bears so close a resemblance to *C. Drya* that it seems probable that these two are identical. If they are distinct, as given by Butler, the specimen from Guatemala, upon which I based my remark on the distribution of *Eubule* in my Systematic Revision, may belong to *Drya*.

3. *Callidryas sennæ*, which he also gives from Texas. Other localities given by Butler are Rio Janeiro, Para, Bahia, Columbia, Santa Martha, Venezuela, Trinidad, Honduras, west coast of Mexico, Jamaica, Hayti, Polochic Valley and San Lorenzo. This is doubtless the *C. Marcellina* of Edwards' list, although the reference to Boisduval and LeConte's plate should have been given to the previous species. Females of this species (which occurs also in Cuba, having been given as the female of *C. Orbis* by Poey) were taken by Dr. Palmer on the Florida Keys in some numbers; but I doubt if it occurs in Northern Florida, unless it be along the western coast of the peninsula.

In addition to these, Edwards gives in his Synopsis, *Metura Cipris* (*Callidryas Cipris*), a species we have not seen, from New Mexico. Butler's only localities are Brazil and Peru. I have also in my collection from Texas a single female of *Callidryas Philea*, the pale form, so common in this and allied genera, without any trace of the deep red color, so striking on Butler's plate. The localities given by Butler are Rio Janeiro, Bahia, Amazons, Bogota, Polochic Valley, Santa Martha, Mexico and Honduras. We have therefore five species in the United States.

I take this opportunity of adding a species to those described by Butler.

***Aphrissa Butleri* nov. sp.**

Upper surface uniform pale buff, the outer half of the costal margin of the fore wings and the outer margin, as far as the lower median nervure, very narrowly bordered with blackish brown, broadest, but still very narrow, at the apex. The sexual mealy border of the wings is of a silvery hoary appearance. On the fore wings it occupies nearly half the upper surface, its interior border passing from the middle of the uppermost subcostal nervule to the middle of

the inner border, by a gentle, rather regular curve, which follows the outer border of the cell; besides, there is a small roundish patch at the extremity of the cell itself, separated from the part outside by the nervures. On the hind wings it is of less extent, its interior border passing in a broad sinuous curve from the tip of the costal nervure to the middle of the lower median interspace, where it terminates abruptly; the band is broadest beyond the cell, reaching two-thirds the distance from the outer border to its outer extremity; the fringe is concolorous, but its basal half is black below the middle subcostal nervure. Beneath, both wings are uniform, immaculate, very pale silvery buff. Expanse of wings 70 mm.

I have not seen the female. Tehuantepec.

This butterfly is undoubtedly most nearly allied to *A. Neleis* (Boisd.) Butl., but differs from it in the coloration of both surfaces, the black edging of the fore wings and the secondary mealy patch of scales in the cell of the same wings.

NOTES ON ORTHOPTERA FROM NORTHERN PERU, COLLECTED BY
PROFESSOR JAMES ORTON.

Nearly six years ago I published an account of the Orthoptera obtained by Prof. Orton on either side of the Andes of Equatorial South America.¹ Prof. Orton has recently placed in my hands another collection, made in 1873 in the same general region, and which is even richer in novelties than the former. A portion of the collection came from the banks of the Amazons, and almost entirely from the Peruvian part of it called the Marañon. A more extensive series was obtained on the road up the Andes, between Yurimaguas on the Huallaga, a tributary of the Marañon, to Chachapoyas, via Balsa Puerto and Moyobamba. For the sake of brevity, I shall speak of the specimens from the former locality as from the "Peruvian Marañon"; of those from the latter as from the "Eastern slope of the Peruvian Andes."

It is not a little strange that only five of the species brought home on these two expeditions of Professor Orton should prove identical. This fact, as well as the number of new forms described, shows how well this field would repay the labors of a systematic collector.²

The number of new generic types these little collections have afforded is also extremely large, while several of the species have otherwise a special interest. Excepting in the Blattariæ, the proportionate number of the species of the different families is about the same as in the previous collection; the mass is composed of Locustarians and Acridians and, with a single doubtful exception, not a single species of these two families could be referred, either in 1869 or now, to any previously described.

Besides the descriptions of the species obtained by Prof. Orton I have added those of one or two others related to them, and have in some instances given more precision to the generic determination of the insects obtained on the previous expedition.

GRYLLIDES.

1. *Gryllotalpa maranona* nov. sp.

Head blackish fuliginous, the labrum lighter, sometimes pale; rest

¹ Proc. Bost. Soc. Nat. Hist., XII, 330-345; Ent. Notes, II, 15-30.

² Professor Orton writes me: "I never before saw such a variety of Orthoptera, especially grasshoppers and walking sticks, as on the rough journey from Balsa Puerto to Moyobamba; it is the paradise of the entomologist."

of body testaceous, the prothorax with a few irregular, small and faint dusky blotches, the veins of the tegmina dark castaneous. Ocelli moderately large, broadly obovate, distinctly, though slightly convex, each distant from the adjacent eye by its own shorter diameter, or even less, and from the opposite ocellus by its own longer diameter or generally less, directed toward the lower margin of the opposite eye. Terminal portion of the lower edge of the fore femora with a pretty sharp, rather shallow excision. Fore trochanter lenticulate, as in *G. hexadactyla*. Tibial dactyls as in that species but not so divergent. Lateral dactyls of tarsi cultrate, the first twice as long as the second, the upper edge of the latter roundly and considerably heeled at the base; acicular claws slender, delicate, finely pointed, about half as long as the greatest breadth of the second tarsal dactyl. Hind tibiae furnished with spines only at the tip, four short ones on the outer side, four of varying length, but some very long, on the inner side; claws of hind tarsi not two-thirds the length of the terminal tarsal joint, the inner slightly the longer. Tegmina in repose reaching but little beyond the middle of the hind femora; wings reaching nearly to the tip of the anal cerci. Eighth and ninth abdominal segments furnished above with lateral longitudinal rows of very long, spinous, rufous hairs; anal cerci greatly thickened at the base for nearly one-fourth their length, about three-fourths as long again as the pronotum.

Length of body, 19.5–23.25 mm.; of pronotum, 5.75–6 mm.; breadth of same, ♂, 4.25, ♀ 4.75 mm.; length of tegmina, 5.75–8.5 mm.; of wings, 21–24 mm.; of hind femora, 5.75–6.5 mm.; of anal cerci, 9.5–10.5 mm.; of upper tibial dactyl, 1.8–2.2 mm. 2 ♂, 2 ♀, Peruvian Marañon.

This species differs from *G. hexadactyla* Perty, to which it is most closely allied, in its much smaller size and slenderer form, its blackish head, the size and relative position of the ocelli, the shortness of the tegmina and length of the wings, the length of the anal cerci, and other minor points which will appear from the description.

It is also distinct from *G. chiliensis* Sauss., as far as one can judge from the very brief and vague diagnosis given in the *Revue de Zoologie*.

2. *Scapteriscus oxydactylus* (Perty) Seudd.

A single female brought home by Professor Orton differs from my description of this species in the *Memoirs of the Peabody Academy* in having no longitudinal lines on the head, the pronotum almost

uniformly covered above with dusky blotches, the femora with three equally distinct and equally distant dark blotches on the upper half of the outer surface, and in having six preapical spines on the inner hinder edge of the hind tibiae; but I have in my collection specimens from the upper Amazons, departing quite as widely from my previous description in the marking, and which have but four preapical spines on the edge of the hind femora. 1 ♀, Peruvian Marañon.

3. *Platydactylus bicolor* Scudd. 2 ♂, Eastern slope of the Peruvian Andes.

4. *Eneoptera* sp.

A single male from the eastern slope of the Peruvian Andes, appears to be an undescribed species, but is too imperfect for description.

LOCUSTARIÆ.

5. The pupa of an unknown insect belonging to a new genus of Locustarians, allied to *Steirodon*, with a flat hexagonal pronotal disc, its side lobate with crenulated edges, and deeply notched behind the middle third, was obtained on the eastern slope of the Peruvian Andes.

STEIRODONOPIS nov. gen.

Head large, as broad as the prothorax; the eyes prominent and widely separated; front and vertex separated by a prominent broken ridge between the eyes, of which the antennal sockets form a part; vertex a little convex, the fastigium reaching just as far forward as the antennal sockets, with a slightly impressed longitudinal sulcation; it is scarcely longer than broad, tapers a little and meets at tip an upturned projection of the front, consisting of a pair of lenticular lobes, at the base of and between which is an ocellus, the others occupying the sides of the fastigium of the vertex. Antennæ very slender. Prothorax slightly concave, longer than broad, the lateral carinae very prominent, parallel, the front margin a little concave, the hind margin convex to a greater degree. Elytra nearly four times as long as broad, subfusiform, tapering from the middle of the basal third, the point rounded off, the principal veins running subparallel to the hind border, with the neuration generally resembling that of Phylloptera. Wings long and comparatively slender, pointed, surpassing the elytra, and therefore furnished with a coriaceous tip. Legs rather short and strongly compressed, notably the tibiae, which

are twice as broad just beyond the base, on a lateral view, as at tip, giving a foliaceous appearance. The foramina of the fore legs are conspicuous, about as large as the terminal joint of the fore tarsi, but are larger at the distal than at the proximal end. All the abdominal appendages are very short. Male only examined.

6. *Steirodonopis bilobata* nov. sp.

Green; a line following the ridge between the eyes and passing backward from the middle of the eyes across the side of the head reddish or pink; labrum white, edged laterally at base with pink; lateral carinae of prothorax with minute and dull denticulations, followed on sides below by a longitudinal, narrow, brownish stripe. Cerci curved upward and inward, with a slight hook at the tip; processes of subgenital plate formed of slight extensions of incurved lateral ridges, each with a minute apical bead-like joint.

Length of prothorax, 7 mm.; breadth of same, 5.75 mm.; length of elytra, 46 mm.; breadth of same, 12.5 mm.; length of hind femora, 20.5 mm.; of wings, 49.5 mm.; of cerci, 2.75 mm. 1 ♂, Peruvian Marañon.

7. *Orophus peruvianus* nov. sp.

Uniform green, the anal area of the tegmina pale brownish fuscous, the tips of the femora and of the tibiae, and the tarsi infuscated. Tubercle of vertex very full and rounded, the sides abrupt only at the tip, with a scarcely perceptible longitudinal carina above, and a distinct, but not conspicuous, transverse carina between the antennae. Pronotum only one-third longer than broad, the hind edge regularly convex, and furnished with a row of very short hairs; posterior half of the disc flat, with distinct and abrupt lateral carinae; anterior half convex, with rounded carinae; a pair of distant impressed lines cross either side of the middle transversely, curving backward as they approach the median line, which they do not reach but fall into a slight shallow double pit a little behind the centre. Tegmina subfusiform, broadest before the middle, the apex produced somewhat but rounded, the inner edge scarcely convex. Wings extending somewhat beyond the tegmina in repose. Spines of tibiae black-tipped. Cerci clavate, and bearing at the tip an appressed, triangular, black-pointed tooth, directed inward; subgenital plate produced, subtriangular, bifid, the two points bearing rather long compressed subspatulate styles.

Length of body, 29 mm.; of tegmina, 41 mm.; of hind tibiae, 27.5 mm.; distance of tip of wings beyond the hind edge of prothorax,

47.75 mm.; length of subgenital plate and styles combined, 5.5 mm.
1 ♂, Eastern slope of the Peruvian Andes.

8. *Phylloptera tripunctata* nov. sp.

Uniform green; the outer third of the costal edge of the tegmina and the corresponding part of the wings dusky; the edges of the apical half of the ovipositor castaneous; the tarsi and tip of femora dusky. Tubercle of vertex scarcely projecting beyond the front line of the eyes, strongly pinched, apically with parallel sides, the upper half separated from the lower by a slender, but pretty deep constriction in the middle between the antennæ. Front edge of pronotum slightly concave; hind edge well rounded, convex; lateral carinæ rounded off but distinctly marked by the abrupt descent of the sides and the flatness or slight concavity of the upper surface; latter traversed a little behind its anterior third by a slight sulcation, which in its middle fifth curves sharply backward, forming a very deep U-shaped bow, its bottom almost reaching the posterior transverse sulcation which crosses the pronotum behind its middle third and is straight, excepting a slight bend in the middle where it crosses the longitudinal sulcation of the posterior half of the pronotum. Fore femora stouter than the middle femora. Tegmina with three little dusky spots at the base of the three principal branches of the lowest longitudinal vein. Ovipositor short and broad, curved sharply upward, broadest in the apical half, tapering rapidly at the apex to a sharply pointed tip, either edge denticulated throughout, the denticulations of the upper straight edge slightly increasing in size apically, lower edge broadly rounded.

Length of pronotum, 5.25 mm.; of tegmina, 34 mm.; of ovipositor, 5 mm.; greatest breadth of ovipositor, 2.2 mm.; distance of tip of closed wings from hind edge of pronotum, 39 mm.; (hind legs wanting).
1 ♀, Eastern slope of the Peruvian Andes.

ANALLOMES nov. gen. (*ἀνά, ἄλλοματ.*)

Allied to *Phanoptera*. Head of equal width with pronotum, of moderate size. Eyes prominent; tubercle of the vertex extending beyond the plane of the eyes, compressed, constricted in the middle between the antennæ and slightly so in the middle of the upper half as seen from above; its superior surface more or less sulcate. Pronotum quadrate, broadening slightly posteriorly, the front edge slightly concave, the hind edge convex; lateral carinæ distinct but

not sharp; the surface varied with a slight longitudinal median sulcation and slighter transverse sulcations. Tegmina moderately broad, three and one-half to four and one-half times longer than broad, the costal edge full next the base, beyond nearly straight, the inner edge slightly and uniformly convex, or also straight in the middle; tip rounded, scarcely produced; stridulating apparatus of male slight, wings ample, broader apically than in allied genera, extending but little beyond the wings in repose. Legs long and slender, the middle femora nearly two-fifths longer than the fore femora, the fore tibiae greatly thickened at base and furnished with a large obovate tympanum, equally distinct on the two sides, about three times longer than broad; hind femora about as long as the body. Ovipositor ensiform, broader in the middle than at base, about half as long again as the thorax, sharply pointed at the tip, either edge denticulate. Cerci of male simple, cylindrical, rather stout, curved inward and a little upward; of female rather slender, conical, delicately pointed.

9. *Anallomes unipunctata* nov. sp.

Uniform green, the tegmina with a single very small dark reddish spot at the base of the first principal branch of the lowest longitudinal vein and one at the extreme base of the principal nervure; spines of legs tipped with dark reddish, the tarsi dusky. Tubercle of vertex slender, strongly compressed but slightly constricted in the middle above, deeply and broadly sulcate above, the sulcation continued to the back of the head as a slight furrow; the constriction of the front between the antennae is very deep, separating the two parts completely. Tegmina about three and one-half times longer than broad, the inner edge gently and regularly convex; wings scarcely extending beyond the tegmina in repose. Cerci tapering only on basal half, bluntly rounded at tip.

Length of prothorax, 3.75 mm.; of tegmina, 28.5 mm.; of hind tibiae, 17.25 mm. 1 ♂, Eastern slope of the Peruvian Andes.

10. *Anallomes maranona* nov. sp.

Uniform green, the tarsi and to a less extent the extremities of the femora and tibiae dusky; the apical half of the upper edge, the apical fifth of the lower and the whole tip of the ovipositor castaneous. Tubercle of vertex compressed but not very slender, strongly constricted in the middle above, broadly but not deeply sulcate above; the constriction of the front between the antennae is only a slender though pretty deep strangulation. Prothorax with a pretty deep longitudinal sulcation, inclosing near the middle a small diamond shaped spot

and in the middle of the posterior half is an equally distinct, slightly curved, transverse sulcation, its concavity facing forward. Tegmina about four and one-half times longer than broad, inner edge straight for most of the length. Wings extending considerably beyond the tegmina in repose. Ovipositor slightly broader in the middle than at the base, beyond it tapering regularly to a delicate point; the denticulations of the edges very slight, the tip of the upper edge smooth.

Length of prothorax, 4.75 mm.; of tegmina, 28 mm.; of hind tibiae, 14 mm.; of ovipositor, 8.5 mm.; greatest breadth of ovipositor, 2 mm.; distance from tip of wings in repose to hind edge of pronotum, 32.2 mm. 1 ♀, Eastern slope of the Peruvian Andes.

CÆLOPHYLLUM nov. gen. (κοῖλος, φῶλλον.)

Head rather small, the middle of the front thrust forward like a great tubercle; fastigium of vertex extending beyond the middle of the basal joint of antennæ, tapering, compressed apically so as to be scarcely more than half as broad as the basal joint of antennæ, sulcate above, its sides hollowed. Antennæ very slender. Prothorax flat above, the lateral angles rounded except at the posterior extremity; front border straight, hind border well rounded. Elytra ample, broader in the apical than in the basal half, costal margin excepting at base and tip straight, inner margin convex, the extremity of the elytra tapering so rapidly as to be almost docked; the two principal veins run side by side down the middle of the elytra; wings very large, longer than the elytra. Legs short and slender, the hind femora not half the length of the elytra; fore coxæ furnished exteriorly with a single slender spine; legs furnished only with abbreviated spines. Ovipositor very short, stout, strongly curved, the edges of the apical half serratulate. The female only seen.

11. *Cælophyllum simplex* nov. sp.

The single specimen examined, from having been immersed in alcohol, has lost its colors, which were doubtless of a uniform green devoid of markings, the principal veins of the elytra probably infuscated and the apical half of the ovipositor blackish. Prothorax with a lightly impressed mediodorsal line. Elytra somewhat more than twice as long as broad, the tip very bluntly angulated. All the spines of the legs very small, scarcely elevated. Ovipositor very broad, its apical half convex, with flattened, squamiform, imbricated tubercles, the edges directed forward.

Length of prothorax, 8 mm.; greatest breadth of same, 6 mm. Length of elytra, 42 mm.; greatest breadth of same, 19 mm. Length of hind femora, 18.25 mm.; length of ovipositor, 6.75 mm.; breadth of same, 3.25 mm. Length of wings, 47 mm. 1 ♀, Peruvian Marañon.

12. *Meroncidius transvittatus* nov. sp.

Allied to *M. innotatus* Walk. Obscure dark brown; head a little duskier above, without vittæ, smooth; inner borders of antennal sockets high, rounded, compressed; tubercle of vertex slight, slender, produced, sulcate superiorly, the ocelli slightly raised. Prothorax moderately and uniformly rugose, with two straight, transverse, pretty deeply impressed lines and between them a nearly equally impressed mediodorsal line; posterior edge slightly thickened, smooth; disc blackish above in advance of the anterior impressed line and behind nearly to the posterior impressed line, forming a pair of characteristic transverse blotches. Prosternum bimucronate. Tegmina and wings unicolorous, the latter fuliginous. Hind femora broad, stout, the apical three-fifths of the lower edge with long moderately stout spines, at the tips slightly curving and black; spines of tibiæ growing duskier toward their tips. Ovipositor darkest at base, broad, tapering pretty regularly, sharply pointed, the upper edge straight, minutely serratulate on the apical half, the lower edge very slightly curved, smooth.

Length of body, 40 mm.; of tegmina, 44 mm.; of hind tibiæ, 24 mm.; of ovipositor, 19 mm.; of antennæ, 69 mm. 1 ♀, Eastern slope of the Peruvian Andes.

13. *Leptotettix tessellata* nov. sp.

Body, legs, tegmina and ovipositor brownish-yellow (after immersion in alcohol), unicolorous excepting an indistinct rather narrow mediodorsal stripe on the prothorax. Head smooth; tubercle of vertex small, triangular, superiorly trituberculate with a deep hollow between the prominences. Prothorax sparsely and irregularly rugulose, with two straight, transverse, rather deeply impressed lines and a mediodorsal line slightly elevated, excepting on either side of the posterior transverse line where it is distinctly impressed; posterior portion of the pronotum somewhat sellate, posterior border smooth, very sparsely ciliate. Wings opaque, the nervures dusky and all the transverse veins broadly bordered with blackish fuliginous, growing fainter away from the costal border and fading away on either side of the cross veins, giving the whole wing a tessellated appearance.

ance. Apical half of the spines on the legs dusky, deepening into blackish toward the tip. Ovipositor slender, pretty regularly but not very strongly curved upward, finely pointed, the upper edge a little protuberant near the base and beyond that very minutely and distinctly denticulate; lower edge regularly curved, the apical fourth minutely and retrorsely denticulate.

Length of antennæ, 103 mm.; of tegmina, 41.5 mm.; of hind tibiæ, 26 mm.; of ovipositor, 12 mm. 1 ♀, Eastern slope of the Peruvian Andes.

14. *Conocephalus infuscatus* nov. sp.

Allied to *C. tenuicauda* Scudd., and *C. exaltatus* Walk. Smoky brown, the under surfaces of all the femora blackish, the apical half of the tibiæ increasingly fuliginous, the tarsi dark fuscous; ovipositor castaneous, becoming infuscated toward the tip, especially along the edges and the median line; wings hyaline, but the veins smoky brown. Head and thorax rugulose, the latter with more or less dusky mottlings. Tubercle of vertex stout, blunt, scarcely longer than broad, extending nearly as far beyond the front border of the eye as it is beyond the front of pronotum, rounded, with a short, blunt, conical, depending tooth and a dusky transverse line below the middle of the front. Ovipositor slender, shorter than the body. Cerci short, slender, tapering more rapidly next the pointed tip.

Length of body, 30 mm.; of tegmina, 44 mm.; of hind tibiæ, 26.5 mm.; of ovipositor, 22.75 mm. 1 ♀, Eastern slope of the Peruvian Andes.

15. *Orchelimum Ortoni* nov. sp.

Almost wholly unicolorous, judging from a specimen dried after immersion in alcohol; the tibiæ and tarsi, especially the tips of the tarsal joints, dusky; antennæ wholly dusky, excepting near the base. A very slender species, with the fastigium of the vertex pinched at its base, so as to be no more than half as broad as at summit. Tegmina slender, reaching, when at rest, a little further back than the ovipositor, wings when closed extending still further beyond the tegmina. Legs slender, the fore and middle tibiæ with black-tipped, the hind tibiæ with wholly black spines. Ovipositor nearly straight, slightly curved upward at its pointed tip.

Length of body, 14 mm.; of antennæ, 47 mm.; of hind tibiæ, 14 mm.; of ovipositor, 9 mm.; distance of tip of closed wings from hind edge of pronotum, 22.25 mm. 1 ♀, Peruvian Marañon.

ACRYDII.

16. *Astroma hastata* nov. sp.

Very closely allied to *A. acuminata* (*Cephalocæma acuminata* Scudd.), but differing from it in its longer and less pointed tubercle of the vertex, its longitudinally vittate head and prothorax, its smooth prothorax¹ and rather stouter legs.

Length of body, exclusive of head, 64 mm.; whole length of head, 21 mm.; length of tubercle beyond the eye, 10 mm.; of antennæ, 5.25 mm.; of prothorax, 16.5 mm.; of mesothorax, 4 mm.; of hind femora, 24 mm. 1 ♀, Eastern slope of the Peruvian Andes.

The generic name *Astroma* (1841) has priority over *Cephalocæma* (1843).

17. *Mastax nigra* nov. sp.

Head, whole upper surface of prothorax and tegmina, together with the terminal joints of the abdomen and the smaller joints of the antennæ, black; rest of body, together with the basal joints of the antennæ, the adjacent parts of the front, the labrum and mouth parts, yellow; anterior four legs yellow, but the tarsi blackish infuscated, and the two superior carinæ of both femora and tibiæ blackish; basal half of hind femora yellowish brown, two superior and two inferior carinæ black; rest of hind legs, including tarsi, black; the middle of the outer half of the femora faintly banded above with yellowish; wings uniform chalky white. Tegmina and wings equal, reaching, when at rest, far beyond the tip of the abdomen.

Length of body, 15.5 mm.; of tegmina, 20 mm.; of hind tibiæ, 16.5 mm. 4 ♂, Eastern slope of the Peruvian Andes.

18. *Mastax Gundlachii* nov. sp.

Head testaceous, the antennæ concolorous, very short. Body brownish testaceous, the lower portion of the lateral lobes of the pronotum with a triangular blackish area, pointed forward; posterior borders of the abdominal joints dusky; hind tibiæ reddish toward tip, the spines largely tipped with black. Tegmina exceedingly minute, no longer than the shorter diameter of the eye, bluntly pointed at tip. Wings wanting.

¹ My description of *C. acuminata* has one very strange inaccuracy; for "Prothorax slightly rugose, with short, transverse, impressed lines and punctures," read: Prothorax sparsely covered with slight, rounded, punctured tubercles, and furnished with slight medio-dorsal and lateral carinæ.

Length of body, ♀, 25.25 mm.; of abdomen and appendages, ♂, 8.75 mm.; ♀, 16.5 mm.; of antennæ, ♀, 3 mm.; of hind tibiæ, ♂, 12, ♀, 17 mm. 1 broken ♂, 2 ♀, Cuba, Dr. Gundlach, with the number $\frac{58}{13}$.

HIPACRIS nov. gen. (*ἵππος, ἀκρίς*.)

Head full, rounded, but the front appressed; tubercle of vertex nearly in same plane with vertex, a little inclined, broad, narrowing beyond the eyes, but squarely docked, flat; the middle of the inner edge of the eyes midway between its tip and the base of the head. Front on a side view vertical, but inclined where it projects forward to reach the tip of the tubercle of the vertex, and here only provided with a frontal costa, which narrows a little below and is shallowly sulcate; space between eyes equal to width of eyes themselves; these are rather small, rather prominent, round, separated by a little more than their own width from the anterior base of the mandibles; the latter exceedingly stout; antennæ more than twice as long as the pronotum, the joints beyond the second depressed and gradually tapering so as to give them somewhat the appearance of a *Truxalis*. Prosternum unarmed; pronotum very large, broadening posteriorly so as to be fully doubly as wide behind as in front; the disc expanded so that the lateral carinæ become very prominent, increasingly so posteriorly, directed outward rather more than upward, and serrulate; it is destitute of a median carina, and is traversed transversely by three slenderly impressed, equidistant, parallel, curved lines, the convexity backward, the hinder in advance of the middle of the disc; front border straight, a little excised in the middle, hind border obtusely and roundly angulated. Tegmina slender, nearly equal, the tip rounded, fully as long as the abdomen. Wings rather narrow. Legs not very stout, the hind femora flattened above with a sharp superior carina and a similar lateral one. Valves of the ovipositor very stout, their tips strongly curved and pointed.

I do not know of any genus to which this is closely allied. By Stål's tables (*Recensio Orth.*, 1) it should belong to the *Truxalidæ*, which the shape of the antennæ favors; but the small size of the eyes coupled with the almost or quite vertical front, and the posterior lobe of the pronotum longer than the anterior, is at variance with his statement. In some respects it resembles *Rhomalea*, in others *Tropinotus*, but the prosternum is wholly devoid of armature.

19. *Hippacris crassa* nov. sp.

Dull brownish yellow; the antennæ a little infuscated, the tips of the femora and base of the tibiæ blackish; tarsal joints tipped with blackish, the apical half of the claws and spines black; tegmina yellow (green in life?), toward the apex subhyaline; wings hyaline, a little sordid, the veins brownish fulvous. Vertex of the head with a few punctures arranged in rows; front deeply punctate; pronotum, especially the posterior half, rugose; the edges of the lateral carinæ irregularly serratulate.

Length of body, 31 mm.; of antennæ, 20 mm.; of pronotum, 11.25 mm.; greatest width of pronotum, 10.75 mm.; length of tegmina, 26 mm.; breadth of same, 6.25 mm.; length of hind tibiæ, 14 mm. 1 ♀, Eastern slope of the Peruvian Andes.

20. *Zonocerus? bilineatus* nov. sp.

Ferruginous brown; the antennæ infuscated beyond the base; the lateral carinæ of the pronotum edged below with a narrow blackish stripe, most intense above, which runs from the hinder edge of the eye to the base of the tegmina. Tegmina blackish fuliginous, mottled with testaceous, the anal area luteous, immaculate. Wings hyaline, faintly fuliginous, increasing slightly in intensity toward the border; costal border blackish, especially beyond the middle. Hind tibiæ infuscated on their posterior third; spines and claws black-tipped.

Length of body, 19 mm.; of antennæ, 10.5 mm.; of hind tibiæ, 6.5 mm.; of tegmina, 15.5 mm. 1 ♀, imperfect, eastern slope of the Peruvian Andes.

21. *Machærocera nigromarginata* nov. sp.

Blackish brown above; rest of head and prothorax pale cinereous. Upper surface of head bluntly rugulose, with a distinct median carina. Pronotum bluntly rugose in front, depressed rugulose behind, with a distinct, rather sharp median carina. Tegmina blackish fuliginous, darkest on the apical half where the nervures are closer; wings dull orange, sulphureous at the base, surrounded by black, which occupies the whole of the costal area, excepting the very base and the outer border nearly to the middle of the wing; spines of hind legs black tipped.

Length of body, 21.75 mm.; of tegmina, 19 mm.; of wings, 17 mm.; of hind tibiæ, 13 mm. 1 ♂, Eastern slope of the Peruvian Andes.

PRORHACHIS nov. gen. (πρω, ῥάχις.)

Allied to Procolpia Stål. Antennæ 22-23 jointed, as long as the abdomen, joints 3-8 broadest and flattened, those beyond punctulate. Eyes very prominent. Tubercle of vertex greatly produced, horizontal, the part in front of the eyes being as long as the rest of the head, slightly concave, tapering, the tip narrow but rounded, the lateral edge with small, slightly upturned, triangular, median denticulations; viewed laterally it is subquadrate, the front edge very strongly compressed to a thin edge without trace of sulcation. Pronotum with small rounded distant tubercles, a slight, uniform, subserrate median carina, the front margin straight, but with a slight triangular projection on either side of the middle; hind border with oblique sides, and a rather large, rounded, median lobe slightly notched posteriorly. Tegmina longer than the abdomen, the front margin considerably and roundly produced near the base; beyond this the tegmina taper and are acuminate. Hind femora moderately stout, tuberculate, rather flattened above; the superior lamina traceable only by the compressed tubercles, but at the extremity of the joint very prominent, compressed, strongly carinate, abruptly docked posteriorly, the carina slightly produced to a point; hind tibiæ with a stout blunt tubercle next the base posteriorly, noticeable only on a side view; interior spines of same tibiæ nearly three times as long as the exterior.¹

22. Prorhachis granulosa nov. sp.

Dusky feruginous. Antennæ reddish brown. Head uniform in

¹ Another genus allied to Procolpia, though not so closely as the foregoing, is *Æolacris* (αἰόλος, ἀκρίς) nov. gen. Antennæ of about the length of the abdomen, joints 3-7 broadest. Eyes very prominent. Tubercle of vertex greatly produced, horizontal, the part in front of the eyes nearly or quite as long as the rest of the head, and separated from it by a transverse sulcation, scarcely concave apically, scarcely tapering, broadly rounded in front; viewed laterally it is triangular, the oblique front edge strongly compressed to a thin edge, but delicately sulcate, excepting above. Pronotum with lateral carinæ which are very stout, coarse, granulate and parallel in the posterior half, noticeable only as a series of granulations and converging in the anterior half; front border angulated on either side of the middle; hind border produced and angulated at slightly less than a right angle. Tegmina longer than the abdomen, subequal throughout, the tip roundly docked. Hind femora slender, a little flattened above, with an equal, very slight dorsal carina; inner row of spines on hind tibiæ excessively long, the upper ones compressed, broadly laminate at the base. Type *Xiphicera octomaculata* Scudd. To this genus also belong *X. Caternaultii* Feisth. and *X. octolunata* Serv.

color. Pronotum with a medio-dorsal, rather broad yellowish vitta, and the lower half of the lateral lobes clouded with the same. Tegmina dark brown, the inner edge yellowish, appearing as a continuation of the pronotal vitta when the tegmina are closed. Wing a little shorter than the tegmina, blackish fuliginous, the cross veins delicately marked in whitish next the longitudinal nervures; the basal portion of the wing, including all that portion lying as near the base as the middle of the front margin, pale, possibly yellowish in life. Legs uniform, the tarsi dull brownish luteous. The tips of the longest spines and all the granulations of the pronotum and hind legs black.

Length of body, 26 mm.; of tegmina, 30 mm.; of wings, 26.5 mm.; of hind tibiæ, 13 mm.; of antennæ, 15.5 mm. 1 ♂, Eastern slope of the Peruvian Andes.

23. *Elæochlora Brunneri* nov. sp.

Brownish cinereous. Antennæ 15-16 jointed, scarcely longer than the pronotum, joints 3-5 equally broadened and noticeably broader than the others. Tubercle of vertex subtriangular, horizontal as viewed from above, the angles much rounded, the upper surface shallowly concave, with two slight, lateral, longitudinal plicæ within the slightly emarginate edge; viewed laterally it is bluntly rounded at the tip, the frontal costa distinctly sulcate almost to the tip. Head with a slight medio-dorsal sulcation. Pronotum coarsely but slightly shagreened and subtuberculate, with a low but distinct and equal mediodorsal carina, the lateral carinæ scarcely perceptible from the arched form of the pronotum; front border straight or slightly rounded; hind border obtusely angulated, the middle slightly produced but bluntly docked. Tegmina scarcely extending beyond the abdomen, tapering, very bluntly pointed, the front border a little and very roundly produced near the base, pale cinereous blotched with darker cinereous. Wings scarcely as long as the tegmina, full and rounded, pellucid (tinged with yellowish in life?) a little clouded next the apical half of the front and outer border, and the nervures and cross veins of this part blackish. Legs of the color of the body, nearly uniform, but the hind femora with a faint transverse median pale band, and the under surface of the tarsi blackish; spines of hind tibiæ and tarsi, as well as claws, black tipped.

Length of body, 27 mm.; of antennæ, 6.5 mm.; of tegmina, 18 mm.; of wings, 16 mm.; of hind tibiæ, 12 mm. 1 ♂, Eastern slope of the Peruvian Andes.

This species differs so much from Stål's description of *Elæochlora*,

that I have placed it there with much doubt; and have also, on that account, given in my description some parts which more properly belong to a generic diagnosis.

APLATACRIS nov. gen. ($\alpha\pi\lambda\alpha\tau\epsilon\iota\varsigma$; $\acute{\alpha}\lambda\phi\alpha\iota\varsigma$.)

Allied to *Lophacris* Scudd. Head large, full; space between eyes equal to (φ), or less than (σ), the longer diameter of the eye; median frontal ridge prominent, narrow, sulcate, no broader than the width of the first antennal joint. Antennæ scarcely shorter than the hind tibiæ. Pronotum with a very high, very stout crest, divided into four sections by very deep, transverse sulcations, all but the foremost of which traverse the whole pronotum, the hindmost breaking the otherwise regular curve of the dorsal carina; anterior edge of pronotum produced forward rather more than in *Lophacris*, and angulated; posterior margin acutely angled; anterior two thirds sparsely covered with very elevated granulations; on the posterior third they are more abundant, more or less confluent and compressed, the spaces between them rugose; prosternal thorn large, stout, straight, bent backward in the σ , conical, bluntly pointed. Tegmina scarcely reaching the tip of the abdomen, but little more than three times as long as broad, equal throughout, the apex pretty regularly rounded, all the nervures prominent; wings shorter than the tegmina, exceedingly broad, rounded, the longitudinal veins distant and the border of the wing full between them; cross veins at tip as regular, and the cells as large, as in other parts of the wing; area between the first and second branches of anal vein not noticeably broader than in the adjoining areas and divided by cross veins into spaces about half as long again as broad, similar in the two sexes; second branch of the anal vein straight in both sexes, emitting a little beyond the middle a stout superior shoot; intercalary veins of anal area reaching at least half way toward the base of the wing. Outer surface of hind femora swollen. Abdomen stout.

24. *Aplatacris colorata* nov. sp.

Greenish testaceous, the male duskier. Upper half of head smooth, lower half distinctly rugulose. Tegmina brown with greenish nervures. Wings blackish purple, the disk broadly chocolate brown and the transverse vein of this part with pellucid borders giving a mottled appearance to the wing. Spines of hind tibiæ pretty stout, blackish.

Length of body, σ 56, φ 79 mm.; of antennæ, σ 29, φ 36 mm.;

of pronotum, ♂ 18.5, ♀ 28 mm.; of tegmina, ♂ 35, ♀ 42 mm.; of wings, ♂ 29.5, ♀ 38.5 mm.; breadth of wing, ♂ 28, ♀ 33 mm.; length of hind tibiæ, ♂ 28.5 ♀ 37 mm. 1 ♂, Eastern slope of the Peruvian Andes. 2 ♀, Peruvian Marañon.

25. *Ommatolampis leucoptera* nov. sp.

Female. Ferruginous brown; a dull pale yellowish streak passes from the upper border of each eye to the base of the tegmina of the same side, generally very indistinct upon the head; tip of the hind femora and base of hind tibiæ strongly infuscated, the rest of the hind tibiæ and hind tarsi dull luteous. Tubercle of the vertex with a shallow longitudinal median sulcation; the eyes separated above by the width of the first antennal joint; last palpal joint conspicuously flattened, ovate; apical half of antennæ infuscated. Pronotum without lateral carinæ, and a barely perceptible dorsal carina, the front border very slightly notched in the middle, the hind margin straight; the whole surface, as well as that of the abdomen, rugose, with rather deep, large, roundish pits having sharply defined though rounded walls. Tegmina oblong obovate, rounded at the tip, about four times as long as broad, pale yellowish white with deep large punctures and stabs. Wings not half as long as the tegmina. Distal half of spines of hind legs black; claws and pads black.

Male. In general color the male is much paler, being dull brownish-yellow, without any trace of the lateral stripe on head and pronotum; the apical two-thirds of the antennæ are infuscated, but only the apical half of the claws, while the pads are scarcely darker than the tibiæ. In addition to these colorational distinctions the tubercle of the vertex is deeply sulcate above, the space between the eyes is distinctly less than the width of the basal antennal joint, the pronotum and abdomen are far less rugose, pitted profusely with comparatively small and shallow indentations without sharply defined walls, the pronotum has no trace of a dorsal carina, and the tegmina are broadly obovate, scarcely twice as long as broad. I should have considered the sexes distinct species, did not precisely similar distinctions hold in the one next to be described.

Cerci short, stout, trigono-pyramidal, the middle of the inner surface with a flattened, pyriform, laminate tooth, directed inward, the produced apex rounded, the plane of the whole vertical.

Length of body ♂ 20.5, ♀ 31 mm.; of antennæ, ♂ 17, ♀ 15 mm.; of tegmina, ♂ ♀ 5 mm.; of hind tibiæ, ♂ 14, ♀ 18 mm. 1 ♂, Peruvian Marañon; 3 ♀, Eastern slope of the Peruvian Andes.

26. *Ommatolampis aptera* nov. sp.

This species differs most conspicuously from the preceding in the total absence of tegmina and wings, but also in the following particulars: the females have no longitudinal stripe on the head and pronotum, the pronotum and abdomen are less heavily and less regularly rugose, the pronotum has no trace of a dorsal carina, the upper surface of the hind femora are deeply punctate, the whole outer surface of the same femora are deeply infuscated, the tubercle of the vertex is not sulcate, the space between the eyes is narrower than the first antennal joint, and the last palpal joint is not so conspicuously ovate. The male, so far as it can, differs similarly from the male of *O. leucoptera*; the sides of the head, the pleura of the pro- and mesothorax and the lower third of the lateral lobes of the pronotum are pale yellow; the cerci are compressed laminate, rather long, bent inward considerably in the middle, beyond the middle slenderer, a little upturned, and furnished on the posterior edge, before the tip, with a triangular laminate tooth lying in the plane of this part of the appendage.

Length of body, ♂ 15, ♀ 23 mm.; of antennæ, ♂ 13.5, ♀ 9 mm.; of hind tibiæ, ♂ 10, ♀ 12 mm. 1 ♂, 2 ♀, Eastern slope of the Peruvian Andes.

27. *Ommatolampis nigroguttata* nov. sp.

Brownish ferruginous; antennæ black, summit of head and whole of thorax punctured and rugose as the pronotum is in *O. leucoptera*; the tegmina black with ferruginous veins, leaving a clear, oval, black patch at the extremity of the upper margin; hind femora slightly infuscated at tip. Tubercle of vertex with a shallow, but distinct sulcation; the space between the eyes about equal to the width of the first antennal joint, scarcely narrower in the male than in the female; last palpal joint ovate, but not so conspicuously as in *O. leucoptera*. Pronotum with a stout but slight median carina, and very slight but coarse lateral carinæ, the front border with a slight median notch. Tegmina oblong obovate, the upper border roundly arched in the middle, and on this account only a little more than twice as long as broad. Cerci of female simple, short, stout, conical; those of male similar, but a little produced at tip, and with a distinct superior perforation next the base. The male resembles the female in all the peculiarities of sculpture and marking, whether of the head, pronotum or tegmina.

Length of body, ♀ 25 mm.; of antennæ, ♂ 10, ♀ 11 mm.; of

tegmina, 4.15 mm.; of hind tibiæ, ♂ 11. ♀ 13 mm. 1 ♂, 3 ♀, Eastern slope of the Peruvian Andes.

28. *Phæoparia curtipennis* nov. sp.

Whole front of head and first eight joints of antennæ reddish luteous; rest of antennæ black, excepting the sides of the eighteenth joint and the tip of the apical, which are dull luteous; rest of body reddish brown, the sides of the head and pronotum blackish, the tegmina and tips of the hind femora deeply, the sides of the hind femora and the basal half of hind femora somewhat, infuscated; rest of legs dull reddish luteous, the spine excepting at the base, and the claws excepting the basal half, blackish. Frontal carina very deeply and broadly sulcate, embracing all but the lateral edges; summit of the apical half of the head and the tubercle of the vertex with a rather slight median carina; whole upper surface of head and whole of pronotum irregularly and rather heavily, as well as profusely rugose; a compressed, rather slight, median carina extends the whole length of the thorax and abdomen; lateral carinæ of pronotum wanting, although the dorsal and lateral field are clearly distinct. Tegmina oblong obovate, the tip rounded, the lower border slightly and roundly excised before the middle, the dorsal and lateral areas clearly distinguished, the whole tegmina rugose, about three times longer than broad, Cerci simple, long, conical, slightly flattened, the apical third much slenderer, nearly cylindrical, incurved, the apex bluntly rounded.

Length of body, 21.75 mm.; of antennæ, 11 mm.; of tegmina, 4.5 mm.; of hind tibiæ, 13 mm. 1 ♂, Eastern slope of the Peruvian Andes.

29. *Acridium* (*Schistocerca*) *occidentale* Scudd. 1 ♀, Eastern slope of the Peruvian Andes.

30. *Acridium* (*Osmilia*) *labratum* Scudd. 3 ♂, 1 ♀, Eastern slope of the Peruvian Andes.

31. *Acridium* (*Osmilia*) *Saussurei* nov. sp.

Ruddy brown, whole front of head, including frontal carina, distantly punctate; antennæ a little infuscated at the tip. Vertex slightly sulcate between the eyes. Pronotum with an indistinct median carina, the anterior half of the disc very indistinctly rugulose, the posterior half more distinctly and profusely, and punctulate in the pits. Tegmina concolorous with the body, the apical half subhyaline, and very faintly blotched with fuliginous. Wings hyaline, the nervures and cross veins of basal half of the wing (excepting close to the costal border) yellowish white, beyond blackish; costal edge

beyond the middle testaceous. Lower exterior carina of hind femora yellowish; hind tibiæ dull luteous, the spines and all the claws black on apical half, the pads dusky.

Length of body, 33 mm.; of antennæ, 9.25 mm.; of tegmina, 32.5 mm.; of hind tibiæ, 16.75 mm. 1 ♀, Eastern slope of the Peruvian Andes.

EUPARNOPS nov. gen. ($\epsilon\upsilon\breve$, $\pi\acute{\alpha}\rho\nu\psi$.)

Allied to *Oxya* Serv. Head shorter than the pronotum, the vertex tumid, the tubercle descending in continuation of the curve of the vertex, broadly rounded in front; the front a little oblique, with a prominent, equal, median carina, having a flat field and passing but half way down the face; lateral carinæ rather sharply prominent; antennæ more than double the length of the pronotum, linear. Pronotum rounded transversely, rather smooth, with a slight median carina, the front border a little full, the hind border very obtusely angulated, the lower edge of the lateral lobes very convex on the posterior half. Tegmina long and slender, nearly equal, well rounded at the extremity; wings a little shorter than the tegmina, rather slender; hind femora furnished at the tip beneath with an acutely angulated laminate lobe; upper posterior edge of apical half of hind tibiæ forming a pretty high, sharp, ciliated lamina; lower spines at tip of hind femora very large, elongated, compressed, and claw-shaped, being upcurved at the tip. Valves of female abdomen denticulate on the outer margins; male abdomen somewhat resembling that of *Arcyptera*, the cerci somewhat compressed, tapering, bent before the middle, the apical portion gently curving.

32. Euparnops cæruleum nov. sp.

Yellowish testaceous, very likely with a greenish tinge in life, the top of the head with a subtriangular black spot pointing forward, extending from the base of the head to the narrowest point between the eyes; a broad blackish brown band extends from the whole hinder edge of the eye to the base of the tegmina; the antennæ are black, excepting the apical three joints, which are luteous, and the outer edge of many of the joints, which are dashed with the same. The tegmina are testaceo-fuliginous, the whole anal area, and the nervures and cross veins of the rest of the tegmina, yellowish. Wings faintly cærulean blue, the apical two-fifths of the costal edge black, and the outer border margined for nearly half its length with fuliginous, the cross veins being black, broadly, or about one-

fifth of the length of the costal margin, above, narrowing below. All the femora, but especially the hind pair, blackish; the lower surfaces and sides of the hind tibiae, excepting a narrow, dull orange belt near the base, blackish; the tarsal joints are more or less blackish, the spines and claws black.

Length of body, ♂ 21, ♀ 25 mm.; of antennæ, ♂ 13, ♀ 10 mm.; of tegmina, ♂ 19.5, ♀ 20.5 mm.; of hind tibiae, ♂ 13, ♀ 13.5 mm. 2 ♂, 1 ♀, Eastern slope of the Peruvian Andes.

CORNOPS nov. gen. (ζόρνοψ.)

Allied to the preceding. Head shorter than the pronotum, the vertex nearly flat, the tubercle scarcely descending, triangular, longitudinally sulcate, bluntly angulated in front; front rather oblique, perfectly straight, with a rather prominent, nearly equal median carina, running down most of the face and shallowly, broadly sulcate; lateral carinae sharply defined throughout, a little sinuous. Antennæ fully half as long again as the head and pronotum together, linear. Pronotum rounded transversely, gently punctulate, with a scarcely perceptible median carina and no lateral carinae, the front margin a little full, the hind border obtusely angulated, lower edge of the lateral lobes full on the posterior half. Tegmina very long and slender, equal, rounded at the tip, but very slightly produced. Wings a little shorter than the tegmina, rather slender. Hind femora with a lower apical lobe, as in *Euparnops*, but not so conspicuous; upper posterior edge of apical half of hind tibiae produced slightly to a laminate edge, and ciliate; lower apical spines of hind tibiae much as in *Euparnops*, but much more pointed, and produced at the tip. Valves of female abdomen very stoutly, coarsely and profusely denticulate on the outer margin.

33. Cornops bivittatum nov. sp.

Luteous; edges of labrum blackish; antennæ, excepting at base, fuscous; a broad straight black band extends from the posterior edge of the eye to the base of the tegmina. The latter fuliginous, the anal area yellowish, the middle of the costal edge blackish, and all the cross veins of the outer half of the central field black. Wings hyaline, with black veins and cross veins, faintly fuliginous on the outer half, deepening toward the margin, and blackish along the costal edge; the vein marking the anterior fold of the wing and the immediately adjacent parts are luteous. Tip of hind femora, base and tip of hind

tibiæ black or blackish, the apical half of all the spines and claws black; denticulations of ovipositor black.

Length of body, 26.5 mm.; of antennæ, 11.5 mm.; of tegmina, 23.5 mm.; of hind tibiæ, 11.5 mm. 1 ♀, Eastern slope of the Peruvian Andes.

34. *Cœlopterna Stålii* nov. sp.

Top of head and pronotum black, inconspicuously and distantly spotted with yellowish; rest of head and pronotum, as well as the abdomen, yellowish; antennæ testaceous at the base, beyond luteous, with dusky incisures, at the tip infuscated. Fore and middle legs yellowish, spotted and indistinctly banded with brownish; hind femora dull yellowish, the upper surface with a basal, ante-median and post-median, the outer border with a post-median transverse bar of dark brownish; hind tibiæ dull luteous. Tegmina blackish brown on basal third, beyond subhyaline, with brownish fuliginous transverse clouds, most distinct on inner border. Wings hyaline, with blackish nervures and cross veins, excepting next the costal margin, where they are fulvous.

Length of body, 16 mm.; of antennæ, 6.5 mm.; of tegmina, 17.5 mm.; of hind tibiæ, 8.5 mm. 1 ♀, Peruvian Marañon.

The genus *Cœlopterna*, as well as the sub-family *Cœlopternidæ*, was founded by Stål upon the *Acrydium acuminatum* of De Geer, of which he says "exempla duo valde mutilata examinavi." Among other parts that were wanting were the hind tarsi, which are very peculiar in the species which I have the pleasure to add to this group. They are excessively slender and strongly compressed; so minute is the middle article that at first I thought them but two-jointed; the first and third joints are equal in length, and either of them scarcely longer than the produced, depressed sulcate apical spines of the tibiæ, between which the basal joint lies; there is a small but well formed pad.

35. *Tettigidea cuspidata* nov. sp.

Blackish brown, the head a little paler; frontal carina of the head compressed, rather prominent, sulcate from the middle of the eyes downward. Whole head and pronotum as well as hind femora covered rather profusely with minute depressed granulations, giving a brighter appearance to the insect from their reflection of the light. Pronotal shield extending behind nearly to the tip of the posterior femora, the front border angulated, and the compressed, slightly elevated, but very distinct, median carina produced anteriorly to a sharp

point, reaching to the upper base of the frontal carina of the head. Tegmina flat with very few and very indistinct granulations, and excessively minute and crowded punctulations. Wings very short, claws sharply spurred at the base; valves of ovipositor rather stoutly serratulate.

Length of body, 17.5 mm.; of pronotal shield, 13 mm.; of hind tibiæ, 8 mm. 1 ♀, Eastern slope of the Peruvian Andes.

PHASMIDA.

36. *Bacteria nigripes* nov. sp.

Head short, obovate, smooth, pale testaceous, gibbous, with a slight dusky medio-dorsal line, and sometimes with longitudinal dashes on the sides; basal joint of antennæ pale testaceous, depressed, largest just before the apex, the remainder black. Pronotum of the color of the head, sometimes infuscated, the anterior angles a little produced laterally, the sides delicately emarginate; all the legs blackish, the coxæ testaceous and very large, so that the fore femora are straight throughout; middle femora with a slight apical lobe posteriorly. Body, excepting at the posterior extremity of the meso- and meta-thorax, blackish, but the terminal three segments of the abdomen again testaceous. Abdomen with a slender medio-dorsal yellowish line; joints of abdomen a little dilated at the distal and a little constricted near the proximal extremity, the last three joints greatly swollen. Styles almost straight, rather stout, cylindrical, roundly and very bluntly terminated.

Length of body, 63 mm.; of hind tibiæ, 37 mm.; of middle tibiæ, 52 mm.; of fore tibiæ, 32 mm. 2 ♂, Eastern slope of the Peruvian Andes.

37. *Bacteria exigua* nov. sp.

Testaceous; very slender. Head subcylindrical, half as long again as broad, with a few distant minute points scattered about, a little appressed anteriorly above, producing a slight, blunt, curved, transverse ridge between the eyes, uniting the posterior bases of the antennal sockets; basal joint of antennæ depressed, of equal width beyond the base. Pronotum of the width of the head, and of equal size throughout, excepting a slight expansion above the coxæ; the front and sides broadly and very slightly emarginate, the anterior half separated from the posterior by a deep sulcation and with a

longitudinal impressed line. Legs unarmed, the anterior femora waved at the base; all the femora faintly annulate with alternate broad bands of testaceous and dusky brown, commencing at the base with testaceous. Joints of abdomen marked only by the incisures, the last three joints, and especially the ante-penultimate, considerably swollen; the posterior angles of the last joint produced posteriorly into two short, rounded lobes, delicately serrated along the inner and posterior edges, the serrations directed inward. Styles moderately slender, cylindrical, a little upcurved and a little incurved, the tip depressed and a little twisted, so that the straightly docked apical edge is oblique, its angles rounded off.

Length of body, 79 mm.; of hind tibiæ, 34 mm.; of middle tibiæ, 24 mm.; of fore tibiæ, 38 mm. 1 ♂, Eastern slope of the Peruvian Andes.

This species is evidently allied to *B. turgida* Westw.

38. *Phasma radiatum* nov. sp.

Blackish, very slender. Head blackish, with smooth parts; excepting apical joints of palpi, and a narrow ferruginous stripe behind the eyes, pale ferruginous; the stripe continued over the whole length of pro- and mesothorax, accompanied by a similar rather broader stripe connecting the fore and middle coxæ. Pro- and mesothorax with a slightly impressed medio-dorsal line, and very slight and very blunt tuberculations above; metathorax and basal joints of abdomen pale above and below. Tegmina scarcely longer than the thorax, the nervures elevated and on the apical half blackish, in contrast to the pale base and interspaces. Folded portion of the wings with a similar effect, the part covered by the tegmina being pale, the rest blackish, with very pale or whitish lines, a median very slender, and one on either side broader but still very slender; rest of wing blackish fuliginous, with a large basal, rounded, very broadly obovate, whitish spot, reaching nearly to the inner border, and in the middle of the wing half way to the outer border. Legs blackish brown, the femora paler at the base and lineate with ferruginous. Styles short, moderately slender, cylindrical, a little upcurved, bluntly rounded and a little thickened at the extremity.

Length of body, 31.5 mm.; of antennæ, 31 mm.; of wings, 21.5 mm.; of fore tibiæ, 7.5 mm.; of middle tibiæ, 5.75 mm.; of hind tibiæ, 9 mm. 1 ♀, Peruvian Marañon.

Apparently allied to *P. ambiguum* Westw.

MANTIDES.

39. *Stagmatoptera binotata* Scudd. Allied to *S. prædicatoria* Sauss. One specimen from the Peruvian Marañon.

40. *Oxyops* sp. A single pupa belonging to this genus was brought from the Eastern slope of the Peruvian Andes.

BLATTARIÆ.

41. *Periplaneta americana* Burm. One larva from the Eastern slope of the Peruvian Andes.

42. *Blabera armigera* Scudd.

Specimens were obtained on the Peruvian Marañon and at Manaos, all of them females, and, as would be expected, somewhat larger than the males, the body and closed tegmina together being nearly three inches long. It should be noted that the lower posterior edge of the basal half of the fore femora is furnished with three small and short, but stout spines.

43. *Panchlora signifera* nov. sp.

Head castaneo-luteous, with two small transverse dark spots, one between the distant eyes and one in the middle of the front; eyes black; antennæ dark castaneous, luteous toward the tip. Pronotum having something of the appearance of that of *Blabera*, smooth, the front and lateral borders slightly emarginate, the centre with a very large roundish spot partially divided in the middle into two sub-renal spots of dark brown, the surface with slight transverse plications and a medio-dorsal series of inequalities. Elytra luteo-fuliginous. Whole under surface dark brown, the abdomen almost black, shining, the rather stout legs fuliginous brown or castaneous, the middle and hind femora with a pair of slight spines. Wings in repose, reaching the extremity of the tegmina.

Length of pronotum, 8 mm.; breadth of same, 10.3 mm.; length of whole body, 24 mm.; of antennæ, 12 mm.; of tegmina, 27 mm.; of hind tibiæ, 7.75 mm. 1 ♀, Eastern slope of the Peruvian Andes.

FORFICULARIÆ.

44. *Thermastris Dohrnii* nov. sp.

Head blackish castaneous; antennæ and palpi brownish castaneous. Disc of the pronotum of the same width as the head,

similarly colored, but the expanded portion luteous, with a slight medio-dorsal impressed line; all the angles are well rounded. Tegmina with the dorsal area nearly three times as long as broad, blackish castaneous, with a broad, posteriorly narrowing, longitudinal, luteous band, extending from close to the base to near the tip, leaving between it and the sutural line a narrow stripe of blackish castaneous. Exposed part of wings (at rest) yellow outwardly, black inwardly, both tegmina and exposed part of wings covered sparsely with very short, erect, rather stout, black hairs. Femora and tibiae blackish; tarsi honey yellow. Abdomen castaneo-piceous above, dark castaneous beneath, broadest beyond the middle; the last segment is subquadrate, gibbous, with lateral carinae growing larger posteriorly, so as to give it a pinched appearance, a broad, sulcate, medio-dorsal depression, deepest in the middle of the segment, at the bottom of which is an impressed line; the sides of the four segments preceding this produced backward into points, increasingly so toward the extremity of the body, the prolongations of the penultimate extending half way down the sides of the last segment. Forceps stout, depressed, subtrigonal, tapering regularly to a blunt point, the apical two-fifths curved more or less strongly inward.

Length of body, exclusive of forceps, 15.5 mm.; of tegmina, 4.6 mm.; of distance of closed wings beyond tip of tegmina, .75 mm.; of forceps, 3.5 mm. 1 ♀, Eastern slope of the Peruvian Andes.

NEOLOBOPHORA nov. gen.

Body moderately convex. Head very slightly convex, of equal length and breadth, narrowing slightly behind; first joint of antennae long and stout, largest at the distal extremity; second as long only as its breadth, cylindrical; third, fourth and fifth increasing a little in length, each more than the last, slightly obconic, the third at least twice, and the sixth and following more than four times as long as broad. Pronotum quadrate, of about equal breadth with the head, the margins, excepting the posterior, which is slightly convex, straight, the angles scarcely rounded. Tegmina short; wings wanting (?) Legs moderately long, slender, third tarsal joint nearly or quite as long as the first, the second very short, lobed beneath, the lobes passing beneath the base of the apical joint. Abdomen rather gibbous, enlarging in size, and especially in breadth, to beyond the middle, when it rapidly narrows again; the last segment alike in the two sexes, sim-

ple, narrowing rapidly, half as long as the breadth of its base; second and third segments with lateral plications, above largest posteriorly. Forceps very long and very slender, cylindrical, and nearly straight, incurved a little at tip.

This genus represents *Lobophora* in the new world, having the peculiar lobe to the middle joint of the tarsi characteristic of that genus, together with the pinched lateral carinæ of the second and third abdominal segments; it differs from that most conspicuously in the broadened abdomen, and slender, cylindrical forceps.

45. *Neolobophora bogotensis* nov. sp.

Head and disc of prothorax piceous, the lateral edges of latter castaneous. Tegmina and abdomen blackish castaneous, the wings wanting. Basal joint of antennæ luteo-fuscous, the rest dull luteous. Legs rufo-luteous, the femora and tibiæ infuscated away from the base. Forceps dark castaneous, trigono-cylindrical, slender, tapering, finely pointed, the apical third gently incurved, with a row of very inconspicuous, distant, bead-like prominences along the whole inner edge.

Length of body exclusive of forceps, 10 mm.; of tegmina, 1.8 mm.; of forceps, 3.5 mm.; of hind femora, 3 mm. 1 ♀, Bogota, received from Mr. P. R. Uhler.

I have introduced the description of this form merely to mention that a second species of the genus was found by Professor Orton in the Peruvian Andes, but it is in the pupal state only.

DESCRIPTION OF SOME LABRADORIAN BUTTERFLIES.

The following descriptions have been drawn up to assist those who would compare certain Labradorian butterflies with those from other parts of the continent or from Northern Europe with which they are closely allied.

Brenthis Triclaris (Hübner) Herr.-Schaeff.

Upper surface of wings deep fulvous, marked with black, with black nervures. *Fore wings* with a narrow, zigzag, transverse, mesial band starting from the apical branch of the sub-costal nervure at a point scarcely three-fifths of the distance from the base to the tip of wing, connected with the costal border by a slender, very oblique streak, directed inward; the first part of this band is arcuate, and takes a general direction toward the middle of the outer border, terminating in the lower half of the subcosto-median interspace; thence it is bent inward along the upper submedian nervule to the point of its nearest approach to the costal border, whence it is bent downward and slightly outward across the next interspace at right angles to the upper submedian nervule, bent again inward following the middle submedian nervule to its origin, from which point it crosses the next interspace, parallel to the preceding portion, and is continued half way across the medio-submedian interspace, bent inward again at right angles and terminates on the submedian nervule, a little past the middle; the upper portion of the band thus forms a **W**, opening inward and upward; a band of similar width borders the outer limit of the cell, within which, with its angle resting on the middle of

it, is a V-shaped band of equal width, opening inward; in the middle of the cell, a rather broad arcuate patch, opening outward, depends from the sub-costal nervure, but does not reach the median, and next to, and separated but little from it, is a slender lunule opening inward, and forming the outer limit, at this point, of the general duskiness of the base of the wing; at the first divarication of the median nervure there starts downward a narrow streak, suddenly bent inward at right angles, generally produced outward slightly at the angle; the outer border of the wing is narrowly, but distinctly edged with black, next to which is a row of slender, not very pointed, sagittate spots, enclosing between them and the border a row of fulvous spots, usually entirely continuous, and generally of a lighter color than the other parts of the wing; midway between the border and the mesial band, not so arcuate as the border, is a row of round black spots, very slightly larger toward the inner border, the lowermost a little outside the curve; midway between this and the mesial band, on the costal border, is a narrow dusky patch, crossing the subcostal nervules. A broad, mesial, transverse band crosses the *hind wings*, the outer narrow, black border of which takes the following direction: it crosses the costo-subcostal interspace at two-fifths the distance from the base, follows along the upper subcostal nervule outward to a point opposite the middle of the costal border, crosses the next interspace at right angles to the nervures and the succeeding very obliquely outward, continuing along the lowest subcostal nervule and crossing obliquely the subcosto-median interspace at about one-fourth of the distance from the cell; thence crossing the next two interspaces by two crescents opening inward, each successively nearer the base, it is lost in the duskiness of the inner border; its interior border takes a direction in general parallel to this, and there is besides a transverse streak crossing the extremity of the cell; within this mesial band the base of the wing is very dusky, almost black, except generally some fulvous spots toward the costal border; the band itself is sometimes almost entirely black, but generally encloses between the black nervules ochraceo-fulvous spots of variable size; the outer border of the wing is much as in the fore wings, but the fulvous spots between the margin and the arrow-head spots, are less frequently continuous, generally lozenge-shaped and of a slightly lighter tint, generally ochraceo-fulvous; midway between the border and the mesial band is an arcuate band of round, equal, black spots, separated toward the base by a narrow, faint, ochraceo-fulvous band, from a series of faint dusky cres-

cents, which form a slender transverse band, bent and generally interrupted in the middle. Fringe pale ochraceous, interrupted with black at the extremities of the nervules, longer on secondaries.

Beneath. *Fore wings* pale fulvous, deepest at the base, the markings of the basal half of upper surface repeated; the outer border has a narrow line of deep fulvous or black, next to which is a rather broad ochraceous band, more or less interrupted at the nervures, except at apex, with fulvous fading into pale fulvous toward inner border, surrounded with slight, sagittate, dusky spots, distinct only in the middle; the arcuate row of black spots of the upper surface is repeated, the upper ones pupilled faintly with white; midway between this row and the mesial band on the costal border is a rather faint narrow patch of pale cinnamon-red, dividing a broad patch of ochraceous; between this and the apex is a quadrate patch of pale cinnamon-red. *Hind wings* cinnamon-red; the mesial band is a repetition of that above, very pale straw-color, occasionally whitish, narrowly edged with black; a rather large spot of same color between each of the nervures at the base, that in the costo-subcostal interspace smallest; another spot above the costal nervure; the outer border is very narrowly margined with black, upon which is a row of silvery-white spots, rather large, pointed inward and margined narrowly with black: midway between the outer border and the mesial band is an arcuate band of round silvery-white spots, bordered with black; above this a narrow band of ochraceous, regularly crenulated, and occasionally bordered with dusky scales toward the base, extending downwards in the subcosto-median and upper median interspaces to the black borders of the marginal silvery spots, but more or less mingled with reddish scales.

Body covered above with fulvous, below with ochraceo-fulvous hairs; legs pale cinnamon-red, femora with ochraceous and black hairs; palpi covered with mingled fulvous and black hairs; stalk of antennæ fulvous, black above, interrupted with white at the base of the joints; club of antennæ black, apex fulvous. Expanse of wings 45 mm. The males and females do not differ. 2 ♂, 2 ♀, Caribou Island, Straits of Belle Isle, Labrador, (A. S. Packard, Jr., S. R. Butler). Specimens have also been taken at Mackenzie River (W. H. Edwards) and in Colorado (T. L. Mead).

Many years ago I distributed specimens of this butterfly under the *ms.* name of *Arg. Lais*.

Brenthis Chariclea (Schneid.) Herr.-Schaeff.

Upper surface deep fulvous marked with black, with black nervures. *Fore wings* with a zigzag, wavy, occasionally broken band of moderate width, extending transversely across the wing, its inner edge starting at the middle of the costal border and terminating at the middle of the internal border; the general direction of the first third being outward, the second third nearly at right angles inward, the last third outward again nearly parallel to the first, but not turned so much outward; the band is formed: first of a straight belt more or less irregular in outline, directed toward a point a little more than two-thirds the distance down the outer border, reaching the median nervure; second, either of two very deep lunules, the lower heaviest limb being parallel to the first band, or of two short, straight bands slightly connected above, having the same general direction, the lunules or bands occupying the next two interspaces; and thirdly, of a broad shallow lunule or band occupying the next interspace and directed at right angles to the lower branch of the median nervure; the inner border behind the submedian nervure is up to this point dusky, as is the whole base of the wing nearly up to the divarication of the median nervure; within the mesial band there are three equidistant transverse bands crossing the cell, and there is another short transverse blotch below the median nervure starting from between the two innermost of those above; the outer edge of the wing is more or less narrowly bordered with black, next to which is a row of triangular slightly arrow-head shaped black spots, enclosing between it and the border a row of small, transverse, fulvous spots, which are usually larger and sometimes continuous at the apex; midway between the band of triangular spots and the mesial band is a slightly curving row of rather large, sometimes squarish spots, the lower one of which falls a little outside the curve, and the upper ones merge at the tip into the band of triangular spots; midway between this row and the mesial band, there is on the costal border a triangular patch, extending, parallel to the mesial band, to the lower branch of the subcostal nervure. *Hind wings*: the mesial band is directed first across the sub-costal nervules at right angles to them, then sharply outward, reaching the upper branch of the median nervure at two-thirds the distance from the base, whence it turns toward the inner border with a sharply indented zigzag course, directed a little outward toward the anal angle; the whole base of the wing within this band is dusky, sometimes quite black, with the excep-

tion of from three to five irregularly shaped, variously-sized, but generally small, fulvous spots upon the upper outer half; the markings upon the apical half of the wing are almost exactly as on the fore wings, except that the curving row of round spots has a deeper curve, the spots are more universally round, and increase in size toward the anal angle. The fringe of both wings is alternately light and dark brown.

Lower surface. *Fore wings* pale fulvous, the markings of basal half of the upper surface with the mesial band repeated, but with less distinctness, though there is no duskiness at the base, and the short streak below the median nervure just before its divarication meets a straight band coming at right angles from the junction of the median and submedian nervures; the roundish spots in the curved row are smaller and more indistinct than above; covering that portion of the space between them and the mesial band, which is traversed by the subcostal nervures, is a triangular pale yellowish patch more distinct outwardly, with a transverse streak of pale cinnamon-red across its middle; beyond the triangular patch the wing is pale cinnamon-red, with a transverse streak of pale yellowish at the extreme apex; the sagittate spots are more delicate, and the nervures beyond them are distinctly yellowish or white. Basal half of the *hind wings* deep cinnamon-red; there are three characteristic pearly white or silvery spots upon the basal half: the first is situated in the costo-subcostal interspace, its centre a little outside the divarication of the subcostal nervure; it is square or oblong, with the ends deeply excised and bordered with black, and has the lower outer angle cut off by the upper subcostal nervule; the second is triangular, the sharp apex outward, and is situated between the approximating branches of the subcostal and median nervure, is traversed obliquely at one-third the distance from the base by the transverse nervule, and extends to the white band crossing the middle of the wing; its base is concave, deeply bordered with black, and extends at one side narrowly along the lower edge of the subcostal nervure, reaching the first spot; the third, also triangular, occupies the medio-submedian interspace; its base as far as the divarication of the median is thus united to the second spot, but is encroached upon from the inside by the cinnamon-red of the base of the wing, which, crossing the median nervule, occupies about one-half of its area and forms in the outer portion a triangular spot bordered with black; there are two minute spots of white along the middle of the subcosto-median interspace, the outer with a black centre, and

another at the base of the costo-subcostal interspace; the costal nervure also is edged above with white throughout its extent; a narrow, zigzag black band extends across the middle of the wing, bordering the upper side of the second silvery spot on its course, itself generally very narrowly edged with white above; within this black band, next the inner border, the surface is frequently powdered with whitish or ochraceous scales; beyond the black band is another broader band of white or silvery lunules whose general trend is nearly straight, but slightly curved; it rests against the outer angles of the black band along the inner half of its course, often indistinct near the middle, and broader and less defined upon the outer half; the spaces left between the black and silvery band at the outer half are ochraceous yellow between the subcostal nervules, and cinnamon-red between the costal and subcostal nervures; the outer border of the wing is narrowly edged with black, and has silvery triangular or lozenge-shaped spots situated between the nervules, tipped with sagittate black spots; the space between these and the silvery band is of a pale cinnamon-red with scattered ochraceous scales, which indeed occupy the greater portion of the interspaces upon either side of the upper median nervule; the row of round black spots of the upper surface is repeated beneath, though often but indistinctly.

Head and front of thorax covered with fulvous hairs; the upper surface of thorax and abdomen with brownish hairs, interspersed with fulvous upon the sides of the abdomen; below pale yellowish; palpi with pale hairs below, mingled fulvous and black upon the tip; stalk of antennæ white below, black above, with fulvous annulations at the extremity of the joints; club of antennæ black with narrow fulvous annulations. Expanse of wings 38.5–45 mm. The males and females do not differ in their markings. 22 specimens, 12 ♂, 6 ♀, 4 doubtful. Labrador (A. S. Packard, Jr.), Fort Simpson, Great Slave Lake, British America (W. H. Edwards), Natashquam, Southern Labrador (W. Couper), Colorado (T. L. Mead).

This is the butterfly quoted by me as *Arg. Boisduvalii* Somm. in Packard's View of the lepidopterous fauna of Labrador,¹ and also distributed by me in former years under the ms. name of *Arg. Oenone*. *Boisduvalii* is a synonyme of *Chariclea*.

Brenthis Freija (Thunb.).

Upper surface rather deep fulvous, marked with black, with black

¹Proc. Bost. Soc. Nat. Hist., XI, 33.

nervures. *Fore wings*: a narrow broken band extends transversely and very irregularly across the wing, commencing and terminating a little beyond the middle of the costal and inner border; its general direction is at first toward a point on the outer border, two-thirds of the distance from the apex, next by a blind zigzag course toward the inner border at a point one-third of the distance from the base, and then straight toward the inner border; it is made up first of a nearly straight band which reaches the upper median nervule, then by three short transverse dashes, in the three succeeding interspaces, the first midway between the termination of the band and the last divarication of the median nervure, the second below that divarication, and the third outside of the second by its own width; within the mesial band are three narrow transverse bands crossing the cell, the innermost not reaching the median nervure; within these is a small lunule, opening outward; below the divarication of the median nervure is a short dash, suddenly bent inward, and then slightly upward; the extreme base of the wing is slightly dusky; at the outer border is a broad band, regularly angulated on inner border, enclosing a series of slender, transverse or linear, fulvous spots, seldom continuous except at the apex, where they are larger; between this and the mesial band is a curved row of roundish spots, the lower one of which falls outside of the curve; at the apex this row merges into the outer band; between this band and the mesial there is on the costal border a dusky triangular spot, extending to the penultimate branch of the subcostal nervure. *Hind wings*: the mesial band extends, with a very irregularly zigzag course, from the middle of the costal border to a point between the subcostal and median nervures three-fifths of the distance from the base, and then, nearly at right angles, to the middle of the inner border; it is generally interrupted and then formed of five dashes: the first, in the costo-subcostal interspace, at a little less than one-half the distance from the base, is directed inward toward the inner border about one-third the distance from the base; the second starting from outside the first crosses the subcostal nervule at right angles; the third at some distance outward crosses the subcosto-median and upper median interspaces, at right angles to the nervules; the fourth crosses the next interspace in the same general direction, but removed by its own width further toward the base; the fifth turned upward and starting just beyond the fourth, crosses the medio-submedian interspace; both the second and the third are occasionally bent; within this band, the subcostal nervure is

broadly bordered with black scales from its divarication to its union with the median, and from the middle of the band so formed a band of equal width crosses the cell to the divarication of the median ; in the middle of the cell is a rather large round spot, and in the costo-subcostal interspace is a black streak, parallel to the mesial band and midway between it and the base; the extreme base of the wing and the inner border are slightly dusky; the outer black border of the wing is rather broad, and within it is a row of large triangular spots, separated from the border by a narrow fulvous stripe, sometimes broken into spots; nearly midway between the row of triangular spots and the mesial band, but approaching the former, is a curved row of rather large round spots in the subcostal and median interspaces. Fringe of outer border dark brown, interrupted with ochraceous.

Lower surface. *Fore wings* pale fulvous with the markings of the basal half and the row of round spots repeated conspicuously; apex pale cinnamon-red, the tip and a streak on costal border midway between it and mesial band, ochraceous; the black border of the upper surface wanting and replaced by very pale cinnamon-red mingled with some ochraceous scales, the extremities of the nervules being ochraceous, tipped toward the round spots with large, triangular, scarcely sagittate, black spots. *Hind wings*; extreme base pale cinnamon-red, with a white spot generally bordered with black between each of the principal nervures at their origin; at about two-fifths the distance from the base, a broad transverse band of pale cinnamon-red crosses the wing, dusted profusely with ochraceous or white scales at its outer and inner limits and especially where it crosses the spaces between the principal nervures; it is bordered within and without with black; the inner black border starts from the costal nervure opposite its divarication from the subcostal, crosses the interspace obliquely inward, takes a sweeping curve along the outer border of the cell back a little past the divarication of the median nervure, and crosses to the inner border by two crescents opening inward; the exterior border is composed of three parts: the first starts from the middle of the costal border and crosses the costo-subcostal interspace in a straight line parallel to the inner border; the second starts from the subcostal nervure opposite the origin of the first and crosses in a straight, sometimes broken, line the next two interspaces, nearly at right angles to the nervures; the third, starting from the lowest branch of the subcostal nervure, passes to the inner border by a series of crescents open-

ing outward, parallel in general direction to the inner border; the narrow outer border of the wing is pale cinnamon-red, resting upon which is a row of transverse, ovoid, white spots surmounted by triangular, somewhat sagittate spots of (sometimes blackish) cinnamon-red; between these and the broad band the space is pale cinnamon-red with scattered ochraceous scales, which, on either side of the last median nervule, near its extremity, form a considerable ochraceous space more or less mixed with reddish scales; but the space between the broad band and the outer border is further occupied by a curving row of round blackish spots, with intermingled reddish scales, bordered delicately with ochraceous; and also by a narrow, nearly straight band, slightly bent and less conspicuous in the middle, where it touches the outer border of the broad band, and formed of pale rosaceous scales, whitish toward the extremities.

Body covered above with greenish-brown hairs, toward the extremity fulvous; beneath ochraceous; palpi with mingled ochraceous and black hairs below, mingled fulvous and black above; stalk of antennæ white below, black above, with white annulations; club of antennæ black, bright fulvous at the tip. Expanse of wings 38.5–43.5 mm. I have only seen males. 5 specimens. Fort Simpson, Great Slave Lake, and Fort Rupert's Land, Eastern coast of Hudson's Bay, British America (W. H. Edwards). Mr. Crotch obtained specimens at Lake Labache. I have never seen specimens from Labrador.

This species is very closely allied to, and representative of *B. Montinus* Scudd., from which it differs principally in the following particulars; the color of the upper surface is not so deep; at the base and along the subcostal interspaces of the hind wings it is not so dusky; upon the lower surface, the markings of the apex of the fore wings are much more conspicuous, as is also the broad mesial band of the hind wings, which here is of a very different tint from the base, while in *B. Montinus* a difference is seldom, and then but slightly, discernible; the submarginal rows of sagittate spots and of round spots are also much more conspicuous, being frequently very nearly obliterated in *B. Montinus*; the space between the arcuate row of round spots and the mesial band is much tinged in *B. Preija* with rosaceous scales, giving it a peculiar appearance; these are present only in a slender band in *B. Montinus*, and then are nearly obsolete; the darker parts of the outer border of the hind wings are darker than in *B. Montinus*, being there somewhat pale cinnamon-red, while here they are rather of cinnamon-brown. In previous remarks on *B. Montinus*, I have

spoken of *B. Freija* as *Argynnis Boisduvalii*, by a mistaken identification.

***Brenthis polaris* (Boisd.)**

Upper surface fulvous with black markings; nervures black except the main stem of the median, which is fulvous bordered with black. *Fore wings*: a mesial band crosses the wing, composed of three parts; the first starting from the costal border at a little more than one-half the distance from the base to tip of wing, runs nearly straight to the upper median nervule beyond its basal curve; it is connected with the costal border by a narrower black band; the second part consists of a blotch crossing the interspace between the upper two median nervules, as broad as the previous part, taking nearly the same general direction, its outer edge continuous with the inner edge of the first part of the band; it generally leaves a little fulvous at the extreme base of the interspace; the third part is an equally broad band crossing the next two interspaces, bent at the lower median interspace and reaching the submedian nervure; its upper half stands in the same relation to the middle portion of the band as that to the first portion, and its inner edge generally starts at the divarication of the middle median nervule, although sometimes the whole base of the interspace is filled with black; its lower half is continuous with the upper but runs at right angles to the nervures; within the mesial band, and narrower than it, are three black streaks which cross the cell; the outer borders its termination; the middle is in close proximity and bent outward in the middle; the last is straight, lies midway between the base and termination of the cell and does not reach the median nervure; below the median nervure, in broken continuation of the inner cell-streak, is a narrow bent streak, the upper portion half crossing the medio-submedian interspace; the other portion bent inward at right angles and sometimes sending a streak outward to meet the mesial band; the duskiess of the base of the wing does not extend over half the cell, and is enlivened by long olivaceo-fulvous hairs; some griseous scales border thinly and broadly the median nervure and its branches as far as the mesial band; the costal border is fulvous, flecked on the basal half rather heavily with griseous, edged with black, with the edge of the wing itself hoary. Beyond the mesial band there are the following markings: two small triangular spots with their bases resting on the subcostal nervure, dividing the distance between the mesial band and the tip of the wing; a row of six circular or subquadrangular spots, of equal size

and about half the diameter of the interspaces lying in the interspaces about midway between the mesial band and the outer border; the upper three lie in a nearly straight line or are parallel to the outer border, the uppermost connected with the outer triangular spot; the lower three have a slight curve in the opposite direction; seated upon the outer border upon the tips of all the nervures are roundish spots about the size of the spots in the last mentioned row, the upper two being elongated, conical; just within this row and sometimes touching it, but lying in the interspaces, is another row of six roundish or transversely oblong spots, which grow gradually larger away from the costal border, those in the middle being about the size of the marginal spots. The fringe is white interrupted with dusky next the marginal spots, though the dusky interruptions are not so broad as the marginal spots. *Hind wings*: a very irregular, often indistinct mesial band crosses the wing; it starts near the middle of the costal border, strikes the subcostal nervure nearly half way between the first divarication and the tip of the nervule, and crosses the next interspace at right angles to the nervules; it crosses the following at right angles also, but removed inward at a distance equal to its own width; from this point it doubles its width and, crossing the subcosto-median interspace, its inner edge removed from the cell at a distance equal to its own increased width, continues in a nearly straight line toward the inner border, subparallel to the outer border, till it is lost in the duskiess of the basal portion of the wing, which covers the whole inner border as far as the median nervure; the duskiess of the base is otherwise about as extensive as on the fore wings and is particularly noticeable in the whole cell; the basal half is covered with hairs as in the fore wings, but more extensively; beyond the mesial band the fulvous color is if anything slightly deeper than on the primaries; a row of six circular spots of equal size, in continuation of that on the primaries, occupies the same interspaces as there, the lowest being seen but faintly, obscured by the duskiess of the internal border; they form a bent row, each half of which is straight and subparallel to the outer border; the marginal bands, similar to those on the fore wings, are so confluent that they may be better described as a broad marginal belt with a crenulate inner border enclosing, in the interspaces, small, transverse, fulvous crescents emitting a streak—sometimes a mere line, sometimes one nearly as broad as the crescent—to the outer border; the fringe is white interrupted with black at the nervule tips, but more narrowly than in the primaries.

Under surface. *Fore wings* slightly paler than above, with black markings; the black markings of the basal half of the wing above are repeated narrowly beneath; the mesial band is usually more or less interrupted, and its upper portion is not straight but bent almost at right angles at the lower subcostal nervule, the angle pointing inward; the row of circular spots is repeated distinctly in black, and the spots are of about the same size as above. The submarginal row of roundish spots is also repeated as a row of dusky circular or triangular spots, and from the centre of each, or at least of the upper ones, a white dash extends to the border, broadened generally at the point of contact with the spot and, always at the border; the costal border is grayish or olive-brown; there are two transverse streaks of yellowish-brown extending from the costal border across the subcostal nervules, one just within the inner row of circular spots, the other just above the outer row; just within each of these the wing is more deeply tinged than elsewhere, approaching ferruginous. *Hind wings* reddish-brown, or ferruginous, flecked with black scales, more or less fulvous on outer half; sometimes the whole wing is deep fulvous, marked with snow-white; an interrupted mesial white band crosses the wing, the borders marked with black, indicating its direction, the interior mainly white but so much interrupted with broad patches of fulvous or ferruginous (lighter than the rest of the wing) especially next the nervures, that the white is especially noticeable as three reel-shaped patches, the longer diameter along the wing, situated, one between the costal and subcostal, one between the subcostal and median, but including generally a part of the lower subcostal nervule, and one between the median and submedian nervures; the band is bordered within by a line which crosses the costo-subcostal interspace before the divarication of the subcostal nervule, is bent at right angles in the middle, its angle outward; is there broken and starts between the two divarications of the subcostal, forms a similar bent line across the cell just within the subcostal nervule and strikes the median at its first divarication; from here it crosses the next three interspaces by similar bent or curving lines to the inner border in such a direction that its general course is at right angles to the previous general course of the line; on the outside the line curves or is bent in the interspaces in a direction opposite to the interspaceal curves of the inner line; in the middle of the wing the last divarication of the median nervure is in the middle of the band, which is of average equal width except in the area occupied by the subcostal ner-

vules, where it is wider; within this mesial band are four pretty large white spots narrowly bordered with black, one circular between the costal and subcostal nervures, two circular in the cell arranged longitudinally, and the fourth larger and oblong between the median and submedian nervures; the row of circular black spots on upper surface is repeated beneath in black with a few mingled ferruginous scales, each spot being surmounted interiorly by a white spot larger than itself, often embracing it at the sides, and those above the upper three produced interiorly to a greater or less extent; the black markings of the border of the upper surface are reproduced beneath faintly and meagerly in dusky scales, while the interrupted fulvous markings of that border are reproduced and increased beneath in white; between the marginal markings and the row of circular spots are fulvous spots of greater or less distinctness, generally more noticeable in the middle of the wing; the costal border is distinctly edged with white which is enlarged into a spot at the shoulder of the wing and extends along the nervure. The inner border is also narrowly and interruptedly edged with white.

Body above black with brownish-olivaceous hairs; beneath the hairs are brownish-fulvous; on palpi and legs the hairs are the same but at the base on the posterior thighs are black. Legs ferruginous. Antennæ brownish-red, banded above with black scales with many intermingled white scales, especially at base; club black, heavily flecked with white, the tip reddish. Expanse of wings, ♂ 40.5–44.5 mill.; ♀, 41.5–46 mill.

2 ♂, 2 ♀, Labrador; from Square Island northward July 14–Aug. 3. (Dr. A. S. Packard.)

Brenthis Frigga (Thunb.) Herr.-Schaeff.

♀. Upper surface fulvous marked with black, the nervures dusky. *Fore wings*: A zigzag, wavy, continuous band, not of great breadth, crosses the middle of the wing; the general direction of the first third is toward the middle of the lower half of the outer border of the wing, that of the middle third nearly parallel with the costal border, and that of the lower third nearly parallel to that of the first third. The first third consists of a series of short broad crescents, or semi-circular discs between the nervules, their inner edges straight and continuous, starting from the costal border at three-fifths of the distance from the base, and reaching the median nervure; the lower third of the spot on the last interspace is the starting point of the middle third of the band; this consists of three equally short bands

in zigzag, the upper and lower narrower than the middle one, the upper crossing the upper median nervule very obliquely, the middle one crossing at right angles the upper median interspace, while the third crosses very obliquely the middle median nervule and extends to its attachment; from just beyond this attachment, the lower third of the band commences; it is broader than any of the other parts of the band, and extends to the submedian nervure, beyond that being merged into the general duskiness of the internal border; it is formed of two halves in the two interspaces which it crosses, the upper half being directed outward more than the lower, and the upper part of the lower removed outward beyond the lower part of the upper by about half the width of the band; but sometimes they are more closely united; the lower half sends inwards a point or narrow streak from its middle. Within the mesial band just described are three equidistant transverse parallel bands crossing the cell; the outer and anal narrowest follows the outer border and is twice as broad above as below; the nervures between it and the mesial band are black and marked a little more heavily than those of other parts of the wing; the middle one is constricted in the middle; its lower extremity rests upon the median nervure between its two divarications; the inner one is simple, and there is still another at a similar distance toward the base, the outer border only of which is manifest, the duskiness of the base obscuring the rest; there is also a more or less distinct V-shaped streak below the median nervure, the V directed to meet the inward projection of the mesial band between the median and submedian nervures, the upper ones being a continuation of the third transverse band of the cell, and the lower directed toward the inner border at less than a right angle to the upper arm; sometimes this V-shaped streak is merged in the general duskiness of the base of the wing, which latter is enlivened by long pale greenish-fulvous hairs. There is a marginal row of blackish triangles, sometimes developed into sagittate spots, with their points directed outward, situated in each of the interspaces opening on the outer margin above the submedian nervure. The space between these and the border is filled with commingled dusky and fulvous scales, the dusky scales predominating along the edge, forming a narrow blackish border, deepest in the middle of the interspaces and the fulvous in excess in the middle of the interspaces; the whole, with the triangular spots, forming a dusky border to the wing, slightly broader than the width of the median interspaces at the margin of the wing. There is also a sub-

marginal row of circular blackish discs midway between the marginal band and the outermost limits of the mesial band, running almost parallel to the marginal band; the upper two between the subcostal nervules fill the whole width of the interspaces and so are confluent, and sometimes touch that of the next interspace; the largest is situated between the upper median nervules, and the smallest, which is also the lowest partially obliterated, occurs in the medio-submedian interspace. The costal border as far as the extremity of the cell is black speckled with fulvous scales, which become more frequent toward the base; beyond the cell the marginal half is uniformly black and sends downward between the mesial band and the submarginal row of spots a triangular black spot of indistinct outline, its apex resting on the first inferior subcostal nervule; on the lower half of the outer portion of the costal border, caused by the interruption mentioned, are a narrow fulvous streak on either side of the first subcostal nervule, a shorter pale fulvous one on either side of the second subcostal branch, and on the inner side of the upper two of the submarginal row of spots a triangular pale fulvous spot, the upper generally the paler. The basal two-thirds of the inner border is blackish dusky and beyond dusky mixed with fulvous; the fringe is dirty pale fulvous mixed with dusky, palest in the middle of the interspaces. On the *hind wings* there is an irregular mesial band composed of very deep lunules in the interspaces. The first four are in a straight line, consecutively nearer the outer border, in passing downward; the first is in the costo-subcostal interspace, and a little outside of the first divarication of the subcostal nervure; the last is in the subcosto-median interspace, at the point of the closest approximation of the bordering nervules; a fifth lunule is found close to the base of the upper median interspace; within this band and within an irregular line from its lower extremity to the tip of the submedian nervure, the whole base of the wing is dusky, covered with pale greenish fulvous hairs as in the fore wing; above the median nervure, however, and just within the band are many interspersed fulvous scales, while the veins are heavily bordered with black, and a narrow transverse black band crosses the cell; in the interspaces opening on the outer border, and in continuation of the submarginal row of spots on the fore wing, is a regularly curving row subparallel to the outer border, of five nearly circular black spots, the outer ones smallest, and all situated midway between the mesial and marginal bands; there is a marginal row of transverse black spots between the nervules of vary-

ing shape, those in the subcostal interspaces being confluent double ones. Beyond them a narrow black band seated upon the margin and expanding upon the nervules to double the width, extending thus between the spots last mentioned and becoming often, and especially about the middle of the border, confluent with them, and thus forming a band as broad as the marginal band of the fore wings; fringe pale fulvous, palest midway between the nervules.

Under surface of *fore wings* dull brownish fulvous marked with dusky and black, with grayish nervures. The markings of the mesial band and of the cell are repeated by narrow black streaks; the marginal and submarginal row of spots are repeated, and of about similar size, in dusky scales; the costal border is grayish with a few greenish hairs at the base; the upper half of the submarginal row of black spots is enclosed in a band of ferruginous scales, the outer border extending to the marginal row of spots, and having above a zigzag outline, the inner border extending to the same distance inward, and meeting a pale yellowish spot which extends to the mesial band; below, the ferruginous band merges gradually into the fulvous; outside the zigzag border of the ferruginous band, extending to the tip of the wing, is a pale yellow spot, with scattered ferruginous scales. Outer half of the *hind wings* rosy ash color, more hoary toward the costal border, broadly bordered internally with diffuse dusky, especially on the lower half and near the costal border; the submarginal row of round spots of the upper surface is repeated with dusky scales, and the marginal row is faintly repeated in a manner very similar to the repetitions of the same band beneath on the fore wings. Occupying the basal three-fifths of the wing above the subcostal nervure is a silvery white spot, limited externally by a black line bent at a right angle in the middle of the interspace, the lower half of the line running at right angles to the direction of the nervures, the upper turned outward; ferruginous scales fill the space between this bent line and the dusky band of the middle of the wing. Within the white band next the base, and above the costal nervure is an ochre-yellow spot, and in the middle of the band is another small ochre-yellow spot half crossing the interspaces, bordered outwardly by a slight black line bent at right angles in an opposite direction to the line on the outside of the white spot; the rest of the extreme base of the wing is occupied by a black spot with a few interspersed ferruginous scales; outside of this and within the ashy rose of the outer half, the wing is ochre yellow, flecked with ferruginous, and broken up

into spots by black lines which border the veins, and form two very irregular lines crossing the wing; the two cells forming the outer half of the subcosto-median interspaces are paler than the others; the outer of the two transverse black lines starts from the upper subcostal nervule, below the middle of the ferruginous spot, and passes in a series of very deep curves in the interspaces, the convex side outward, to the internal nervure near its extremity. The general direction of the line is at first outward, nearly parallel to the lower median nervule, and afterward at right angles to it, bending in the subcosto-median interspace; in the medio-submedian interspace there are two such curves or loops; that in the upper median interspace is small and very deep; the inner of the two black lines runs subparallel to the first, but follows the nervures more closely; first accompanying the subcostal nervure it crosses the subcosto-median interspace at the divarication of the lowest median nervule, and in the medio-submedian interspace there are two curves, as in the outer line, but in opposite direction, meeting the outer line at its termination on the internal nervure, forming a circular ochre spot on the last interspace.

Body above black, with dusky hairs on the abdomen, and olive brown hairs on the thorax; hairs beneath and at tip of abdomen ochraceous brown. Hairs of palpi and legs ruddy brownish. Antennæ testaceous, above banded with brown and white; club blackish, tipped slightly with brown. Expanse of wings, 45 mm.

Labrador, Okak, Rev. T. Weiz, A. S. Packard. 1 ♂. It has also been taken in Colorado by Mr. Mead.

Agriades Aquilo (Boisd.).

Above glossy brown tinged with cærulean, especially in the male, faintly marked with pale cærulean, especially in the female. *Fore wings*: Male glossy brown tinged delicately with cærulean, which is occasionally more distinct in a broad transverse band next the outer border; the outer border itself with the tip of the costal border is black, and is bordered to a greater or less extent with a dark brown band outside the cærulean band; the tip of the cell is marked very faintly with black; fringe dull white. Female glossy brown, sometimes tinged slightly with cærulean, especially near the base and along the inner border; external border of the wing with the dark markings of the male; besides, there are two transverse rows of cærulean spots in the interspaces, generally pretty distinct, but at other times quite faint. The outer row extends across the whole wing, is seated upon the brown marginal band, and has the inner edges of the spots

rounded so as to form a band with a crenulated border; the inner row is formed of five circular or oval spots, of which the upper two are situated midway between the outer row and the tip of the cell, while the lower three form a curving row beneath and a little within these, the open part of the curve outward; the tip of the cell is marked by a distinct transverse black spot bordered narrowly with pale caerulean. *Hind wings*: a dusky spot at the tip of the cell, as in the fore wings of the female, but less distinct than there, and in the male often obsolete; a straight row of small circular dusky spots crosses the wing, midway between the cell and the outer border, not reaching either border; it is generally quite obsolete, always so in the male; upon the outer border, which is edged with black, are seated round pale caerulean spots, separated only by the nervules, extending over the subcostal and median areas; each spot encloses a dusky or blackish spot, sometimes a mere dot, sometimes nearly usurping the place of the whitish spots. These markings are sometimes subobsolete in the male, and generally less distinct there than in the female; fringe whitish.

Lower surface. *Fore wings* pale slate brown, marked heavily with white and spotted with black and fuscous; at the tip of the cell marked distinctly as it is above in the female, but bordered with white in the middle of the cell a similar mark, except that the inner black streak is generally broken in the middle; sometimes one is obsolete or both are very faint, or, indeed, occasionally the whole marking is reduced to a faint whitish spot; there is a submarginal row of six broad, dusky, or fuscous lunules parallel to the outer margin, their outer edge at least an interspace's distance from it; and midway between this row and the tip of the cell a row of six black spots enclosed in white, usually circular; the fourth from the tip, however, is sometimes triangular, and the last ordinarily transverse, or broken into two small ones, one above the other; the second and third are parallel to the outer border outside of the spot terminating the cell, and about midway between that and the submarginal band, though usually slightly nearer the latter; the first is situated above the principle subcostal nervure, nearer the base of the wing than the second, and even in some cases nearly half way between this and that at tip of cell; the fourth is a little nearer the base of the wing than the third, and usually just as much nearer as the first is nearer than the second; the fifth bears the same relation to the fourth as the fourth to the third, and the sixth, in the medio-submedian interspace,

lies below the fifth; the upper five therefore form a curving row around the spot at the tip of the cell. The outer margin is edged narrowly with black, and there is generally a transverse interrupted dusky line midway between the submarginal row of spots and the margin. *Hind wings* dark, slightly olivaceous brown, marked heavily with white and with black spots; in the interspaces next the outer border and separated from it only by its black or fuscous edging, is a series of spots; they are ordinarily white, although those in the median and submedian interspaces are occasionally tinged wholly or in part with pale dull orange; they are separated from one another only by the dusky nervules, are sharply curved on the inside, ordinarily extend up the interspaces to a distance equal to the width of the spaces between the nervule tips, and enclose a black or dusky transverse streak (or sometimes a round spot) which is sometimes obsolete; on the inside these spots are bordered with dusky lunules, increasing to black, which occasionally encroach upon the white spots and form a considerable olivaceous brown band, and whether as lunules, or as a continuous band, are generally heaviest in the median interspaces; these lunules, with more distinct outline on their inner side, are the boundaries of a broad white band, enclosing in the middle of each interspace a small black spot which is sometimes obsolete; the band extends from the costal to the internal nervure, its outer crenulated limit is the row of lunules just mentioned, and is more distant from the outer border at the median than at the subcostal nervules; its inner border is quite irregular; between the subcostal nervules it is not half as broad as the interspaces, abruptly enlarging beyond the cell to fully that width, broadening by regular abrupt changes in successive interspaces until in the lower median interspace it has become fully twice as broad as the interspace, while in the lowest interspace it is sometimes no broader than in the first, but generally a little broader; within this band the wing is of uniform tint, except some grayish scales next the base and the following white spots: a large transverse spot covering the vein closing the cell, which sometimes forms a dusky or blackish streak in it; above and just outside two pretty large confluent circular spots, the upper in the costo-subcostal interspace and a little within the lower, which is in the lower subcostal interspace; they each enclose black spots, the upper one containing the largest, that of the lower being sometimes obsolete; a pretty large circular spot midway between the base of the wing and the upper of the spots just mentioned and occupying the

same interspace; it encloses a minute black dot; in the middle of the cell, seated upon the median nervure, is a white spot a little smaller, containing an ordinarily obsolete black dot; and upon the internal border and the broad white band is another, similar in all respects to that in the cell; these last two white spots are themselves sometimes obsolete.

Body black, covered above with long silver-gray hairs, and blackish scales; beneath with whitish hairs and scales; legs testaceous, covered closely with white scales; scales at the side of the palpi snow-white, the hairs gray; last joint above dark-brown; eyes rimmed with a distinct row of pure white scales, and these bordered on the front with blackish hairs, between which down the middle of the front runs a row of silver-gray hairs. Antennæ very dark velvety-brown, annulated with pure white, narrowly above but with scattered scales, giving the sides and under surface a hoary appearance; club dark velvety-brown above, with a few scattered white scales on the side; beneath dull, dusky ferruginous. Expanse of wings, 24 mm. 5 ♂, 9 ♀.

Hopedale, Aug. 3; Henley Harbor, Aug. 15. First observed at Sloop Harbor, Kynetarbuck Bay, July 19 (Dr. A. S. Packard).

This insect scarcely seems to be the same as that described, by Curtis, in Ross's second Voyage, as *Polyommatus Franklinii*, so much does it differ from the figure and description given there. The upper surface of the wings is not "grayish powdered with silvery-green, especially at the base," as there described; nor is the under surface of the hind wings, "fuscous freckled with gold, but blue at base." The figures given differ from my specimens in the particulars given above, and also in that the mesial row of black spots on under surface of the fore wings has but a very slight curve, while the markings outside of this row along the border are not as in the specimens before me. On the under surface of the hind wings, Curtis's figure represents the broad, white band as reduced to a row of circular white spots, scarcely extending so far across the wing as my specimens always show it, and the markings beyond them along the margin differ from my specimens even more than the border of the fore wing; yet it is undoubtedly very closely allied, and a true representative of this species. Ross's two specimens were taken "on *Astragalus alpinus* near the end of July."

In his article on Labradore Lepidoptera,¹ Möschler has compared the

¹ Wien. Entom. Monatsch., iv, 347.

description of Curtis as translated into German by Gröben with his own specimens, and has made some good criticisms upon the character of the description in its German dress, and without having seen the English of Curtis, has actually translated the doubtful passages better than Gröben. All the objections which he makes to the description fall to the ground when the original of Curtis is used.

A CENTURY OF ORTHOPTERA. DECADE II. — LOCUSTARIÆ.

Stalia nov. gen.

Head of excessive size, very tumid, smooth, with no prominence excepting the rather irregular raised edges of the antennal sockets, in the region of which the head is slightly depressed; labrum very large, circular; last joint of maxillary palpi very slender, obconical, nearly as long as the two preceding joints combined; first joint of antennæ cylindrical, scarcely depressed, nearly twice as long as broad; second

scarcely longer than broad, conical, tapering rapidly; remaining joints filiform, the antennæ being much longer than the body. Pronotum selliform, exceedingly contracted in the middle; the anterior and posterior extremities greatly elevated, covering the head and base of the tegmina, furnished along the lateral carinæ with half a dozen long, acuminate, curving spines; prosternum with a pair of straight acicular spines. Fore femora longer than the middle pair, both provided at the apex, the former anteriorly and a little interiorly, the latter posteriorly and a little exteriorly, with an extensive spinous and deeply serrate, laminate expansion nearly three times as broad as the femora; bases of the fore and middle tibiæ compressed into similar foliate expansions, but not so greatly nor so unequally as the femora; otherwise these limbs are quadrate, sulcate superiorly, enlarged a little at the apex; hind femora exceedingly long and slender, cylindrical, scarcely larger at the base than at the apex, provided apically on either side with a stout divergent spine, and along the entire under surface with a double row of obliquely divergent spines; hind tibiæ conspicuously longer than the femora, slightly sulcate above, the apical spines no larger than the others; first and second tarsal joints bluntly carinate above, the second and third with lateral lobes, those of the third joint larger, bluntly acuminate apically, partially embracing the cylindrical base of the last joint. Tegmina large, exceedingly broad, not so long as the abdomen, erect, the edges broadly eroded, especially below near the apex, the principal vein very prominent, the whole bearing a striking resemblance to a dead leaf; the dorsal and lateral fields are sharply separated by a prominent ridge; wings longer than the tegmina, the exposed portion resembling them. Abdomen very stout, with a single mediodorsal series of small, backward directed spines at the apices of the joints; ovipositor exceedingly broad, compressed, turned abruptly upward in the middle and then rapidly tapering to a point.

This genus, which belongs to the Phyllophoridæ, is very distinct from any other known to me, but is evidently allied, not very distantly, to *Hetrodes*. It is even more hideous in its appearance, and the close resemblance of its tegmina to a dead leaf with the foliate expansion of the two anterior pairs of legs renders it a most striking object. A similar insect, from Silhet, is figured (Pl. VI, fig. 2) in Wood's "Insects abroad" and called there *Sanaa imperialis*; but it differs entirely from the *Acanthodes imperialis* of White.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

11. *Stália foliata*. (Figs 3-5.) Obscure yellowish-brown, the antennæ beyond the base blackish, the foliations of the legs, the tegmina and portions of the wings exposed when at rest, of the colour of a dried leaf; lower edge of the pronotum and sides of the meso- and metathorax yellowish; all the femora, excepting the expansions alluded to, brownish-yellow dotted with brown; the middle smaller portion of the fore and middle tibiæ paler than the rest of the joint; tarsi dusky; all the spines black-tipped; under surface and prosternal thorns yellowish; wings surpassing the tegmina by four millimetres, the parts not exposed deep black. Abdomen blackish; ovipositor not half the length of the abdomen, profusely rugulose, dark yellowish-brown.

Length of body, 55.5 mm.; of tegmina, 35.5 mm.; of hind femora, 44.5 mm.; of hind tibiæ, 53.5 mm.; of ovipositor, 14.5 mm.; greatest breadth of ovipositor, 5.75 mm.; of fore femoral foliation, 8.5 mm.; of fore tibial foliation, 5.5 mm. 1 ♀, Old Calabar; received from Andrew Murray, Esq.

Lirometopum (λιρόψ, μέτωπον) nov. gen.

Body exceedingly stout and heavy. Head large and very short, the entire front completely appressed, declivant, forming less than a right angle with the sides and summit of the head, the trituberculate vertex, the basal antennal joints, eyes and tubercles below them all forming a part of the separating ridge; vertex with a pair of blunt lateral basal tubercles larger than itself, each much larger than and surpassing the basal antennal joint, the minute bidentate apex of the vertex lying between and not surpassing them; the globose prominent eyes are thus separated by a space equal to half the entire breadth of the expanded front, which is itself broader than the pronotum; antennæ slender, longer than the body; mandibles compressed in front with sharp lateral edges. Prosternum unarmed; pronotum well arched transversely without lateral carinæ, the front edge broadly convex, the angle of the posterior humeral sinus large, the posterior border of the upper surface almost straight; legs short, stout, thick; all the femora spined beneath, the fore and middle femora of about equal length; the third tarsal joint prominently bilobed, each lobe produced apically to a sharp angle; tegmina longer than the body, ovate lanceolate, compact; wings not surpassing the tegmina. Ovipositor stout, moderately broad, long and straight.

This most remarkable genus belongs to the Conocephalidæ, but is not closely allied to any of the known genera; its laterally tuberculated and apically bidentate vertical spine allies it to *Vestria* Stål, but the extreme breadth and shortness of this spine, and the extraordinary flatness of the front of the head, distinguishes it at a glance from every other genus.

12. *Lirometopum coronatum*. (Figs 1-2.) Uniform testaceous (but doubtless green in life), the prominences of the head, front of mandibles, labrum and the parts above it, as far as a line uniting the bases of the mandibles, piceous; the apices of the principal cross veins on the posterior border of the tegmina, the spines of femora and tibiæ and the ovipositor marked with ferrugino-testaceous; tips of the claws blackish. The lateral carinæ of the head below the eyes rendered conspicuous by about half a dozen slightly appressed, short, blunt, conical tubercles of about the size of the apical portion of the vertex; front with a few broad, slight, vesicular elevations in the central portions and some scattered rugosities between them and the coronate edges of the face. Pronotum with an exceedingly slight impressed line. Ovipositor longer than the body, equal, excepting close to the tip, where it tapers by the excision of the lower side, terminating in a blunt point.

Length of body, 38 mm.; of (broken) antennæ, 60 mm.; of tegmina, 35 mm.; of hind femora, 19 mm.; of ovipositor, 26 mm.; height of face, 16.5 mm.; breadth of face, 12.75 mm. 1 ♀, Greytown, New Granada; received from Mr. P. R. Uhler.

***Belocephalus* (βέλος, κεφαλή) nov. gen.**

Allied to *Conocephalus*. Body stout. Head of the general form of that of *Conocephalus*, the vertex greatly produced as a stout subcylindrical thorn, tapering apically, bearing an inferior basal tooth, but no lateral teeth; eyes small, not very prominent. Prosternum bispinous; fore coxæ armed with a slender pointed thorn; pronotum equal, arched, the front and hind border equally rounded, the latter not produced and with a scarcely perceptible humeral excision, the lower anterior angle of the lateral lobes distinct, the lower edge nearly horizontal, slightly and roundly excised in the middle; fore and middle femora of about equal length; hind femora slender, tapering very gradually throughout, the lower terminal lobes with a

slight acute spine; tegmina and wings excessively small in the only species known. Ovipositor stout at base but not broad, tapering throughout, very slightly upcurved on the apical half, not very sharply pointed.

13. *Belocephalus subapterus*. Brownish-yellow, perhaps green in life. Mandibles and lower edge of front black; labrum and palpi yellow; the upper surface of the head and pronotum slightly darker and bounded on either side by a faint slender yellowish line, which runs from the upper edge of the sides of the vertical spine to the back of the head, diverging regularly from the opposite line, and continued parallel to it along the pronotum to the inner edge of the tegmina; it is bordered interiorly on the vertex and the pronotum with blackish, which marks above the outer edges of the vertical spine. This is about as long as the head, its basal half, as viewed from above, equal, beyond tapering to a point which is slightly hooked downward and black; the depending tooth is rather stout, triquetral, black. Tegmina minute, padlike; wings obsolescent. Abdomen with a scarcely perceptible, interrupted, mediodorsal carina; ovipositor about as long as the abdomen, deepening in color at the tip.

Length of body, 38.5 mm.; of vertical spine, 3.5 mm.; of tegmina, 4 mm.; of hind femora, 20.5 mm.; of ovipositor 19.5 mm. 2 ♀. One from N. E. Florida, the other from Florida (Wurdeman).

This is figured by Mr. Glover in his unpublished plates (Orth. pl. XVI, fig. 17). It is also described by Mr. Thomas (Bull. U. S. Geol. Surv., II, 71) as *Acanthacara acuta* Seudd., but it is very different from that species, besides being four times as large.

14. *Orchelimum nigripes*. Green, with the usual markings of the genus upon the upper surface of the head and pronotum; but readily distinguishable from all other species by the legs, all the tibiae and tarsi of which, as well as the apical fourth of the hind femora are blackish, though the spines of the hind tibiae are pale at the base. The wings when closed extend slightly beyond the tegmina, and are a little clouded about the tip; the tegmina surpass a little the hind femora. The ovipositor of the ♀ is rather larger than in allied species, somewhat more curved, broadest in the middle and tapering to a delicate point.

Length of body, 18 mm.; of antennae, 80 mm.; of tegmina, ♂ 21 mm.; ♀ 25 mm.; of hind femora, ♂, 16.5 mm.; ♀, 19 mm.; of ovipositor, 10.5 mm.; 1 ♂, 1 ♀, Dallas, Texas, J. Boll.

15. *Xiphidium strictum*. Sides of head and body, together with all the femora and tibiae, green. Summit of the head with a rather broad reddish-brown longitudinal band, extending from the front extremity of the fastigium to the back of the head, edged narrowly with white, distinctly on the fastigium, indistinctly behind it, and traversed by a faint pale mediodorsal line. Pronotum with a narrow lateral stripe of reddish-brown on either side, bordered exteriorly and to a slight extent interiorly with whitish, the two stripes parallel, separated from each other by a sufficient space to include the cephalic stripe between them, united by a slender cross line of reddish-brown next the front edge; tegmina exceedingly short, padlike, greenish next the hind edge, the rest striped longitudinally in brown and sordid white; wings reaching when at rest the tip of the tegmina; tarsi more or less infuscated, spines of tibiae blackish. Abdomen dull reddish-brown above with a pale lateral stripe edged beneath more or less distinctly with dark reddish-brown or blackish; ovipositor excessively long, being longer than the whole body, pale testaceous, tinged near the base with green.

Length of body, 18 mm.; of tegmina, 4.5 mm.; of hind femora, 16.5 mm.; of ovipositor, 25 mm. 2 ♀, taken July 18, and October 5, by J. Boll in Dallas, Texas.

16. *Xiphidium antipodum*. Green, with a broad mediodorsal very dark reddish-brown stripe on the head and pronotum, sometimes intense only at its outer borders and generally indicated on the abdomen by a lateral blackish stripe. Tegmina testaceous; hind femora tipped at the extreme apex with fuscous, all the tibiae tinged with testaceous, the tarsi dusky. Vertex moderately broad, much constricted at the front edge of the eyes, greatly narrowing on the face to meet the slender frontal costa. Pronotum with a faint mediodorsal impressed line; tegmina more (♂) or less (♀) than half as long as the abdomen, broadly rounded at the tip, the veins rather prominent, the tympanum of the male unusually large and coarse; legs rather long. Ovipositor rather slender, fully as long as the abdomen, scarcely upcurved on the tapering apical fourth, delicately pointed.

Length of body, ♂, 17.5 mm.; ♀, 16 mm.; of tegmina, ♂, 8 mm.; ♀, 5 mm.; of hind femora ♂, 14 mm.; of ovipositor ♀, 12 mm.; 1 ♂, 1 ♀, and several immature. N. Zealand, H. Edwards.

17. *Xiphidium meridionale*. Green, with the whole

upper surface rather dark reddish-brown, faintly bordered with yellowish; hind femora tipped with fuscous at the extreme apex, the hind tibiae rather dull green, the tarsi infuscated. Vertex moderately broad, somewhat pinched at the front edge of the eyes, narrowing but little to meet the frontal costa. Tegmina much abbreviated, less than half as long as the abdomen, tapering, sub-triangular, bluntly pointed, the veins moderately prominent; legs rather short, the hind femora with a row of very distant black spines, five in number, along its inferior carina beyond the swollen base. Ovipositor much longer than the abdomen, very nearly straight, rather slender, tapering on the apical fourth, delicately pointed.

Length of body, 14 mm.; of tegmina, 5.5 mm.; of hind femora, 13 mm.; of ovipositor, 13 mm. 1 ♀, Brazil; purchased of Mr. Janson.

18. *Xiphidium ictum*. Green, with a brownish abdomen; the usual dorsal markings of the head and thorax are intense in color, forming a broad dark reddish-brown, almost blackish stripe, extending from the tip of the vertex to the extremity of the pronotum, widening posteriorly, but growing faint at its extreme posterior extremity; it is bordered narrowly with citron-yellow; the tegmina are wood-brown, the tarsi and tips of hind femora a little dusky, the hind tibiae scarcely infuscated. The fastigium of the vertex is moderately broad, scarcely pinched at the front edge of the eyes, narrowing but little on the face to meet the frontal costa. Tegmina as long (♂) or half as long (♀) as the abdomen, rounded at the tip, the cross veins rather prominent. Ovipositor a little longer than the abdomen, perfectly straight, moderately broad and tapering only at tip.

Length of body, ♂, 12 mm.; ♀, 14 mm.; of tegmina, ♂, 8 mm.; ♀, 5.75 mm.; of hind femora, ♂, 10 mm.; ♀, 12 mm.; of ovipositor, ♀, 10.5 mm. 9 ♂, 14 ♀, Mexico, April, Sumichrast; Guatemala, Van Patten.

19. *Xiphidium gossypii*. Green, with the whole upper surface not very dark reddish-brown bordered externally with faint, dull citron-yellow, the antennae and tegmina testaceous; fore and middle femora a little infuscated above, the hind tibiae slightly tinged with testaceous and all the tarsi a little infuscated. Vertex moderately broad, somewhat pinched at the front edge of the eyes, narrowing somewhat to meet the frontal costa. Tegmina about half as long as the abdomen, sub-acuminate, the veins moderately prominent. Ovi-

positor dark testaceous, longer than the abdomen, perfectly straight, tapering only on apical fourth, finely pointed.

Length of body, ♀, 16.5 mm.; of antennæ, ♀, 50 mm.; of tegmina, ♀, 8.75 mm.; of hind femora, ♀, 16 mm.; of ovipositor, ♀, 13.5 mm.; 2 ♀. Texas, Belfrage; Mississippi. This is the insect referred to in the Proceedings of the Boston Society of Natural History, XI, 434-5, as laying its eggs in the stems of the cotton plant. Dr. Hagen's specimens were from Chicot Co., Arkansas. "The eggs were pale yellow, one-fifth of an inch long, cylindrical, bluntly pointed and a little tapering at the end from which the larva emerges; the other extremity was rounded."

20. *Xiphidium nemorale*. Greenish-brown; the usual dorsal markings more or less distinct. Fastigium of vertex broad, but little pinched at the front edge of the eyes, as viewed from above, rapidly narrowing in front to meet the frontal costa. Tegmina covering about two-thirds of the abdomen, the veins and cross veins unusually prominent, giving the tegmina a coarse and scabrous look; they are broadly rounded at tip, and the tympanum of the males is stout and elevated; tip of hind femora and all the tarsi dusky. Ovipositor as long as the abdomen, a little ensiform, rather delicately tapering in the apical half, finely pointed.

Length of body, ♂, 13 mm.; ♀, 14 mm.; of tegmina, ♂, 6 mm.; ♀, 6.25 mm.; of hind femora, ♂, 11 mm.; ♀, 13 mm.; of ovipositor, ♀, 8.25 mm. 14 ♂, 24 ♀, "taken only in groves" by Mr. J. A. Allen, Sept. 1-3, in Dallas Co., Iowa.

SPHARAGEMON,—A GENUS OF ŒDIPODIDÆ; WITH A REVISION
OF THE SPECIES.

Spharagemon (*σφαραγέομαι*) nov. gen.

Body compressed. Head rather tumid above, the vertex as declivant as the back of the head, broad, tapering rapidly, scarcely sulcate, the eyes separated by more than double the width of the basal antennal joint. Front vertical, scarcely convex on a side view, the costa moderately broad, nearly equal, slightly contracted above the antennæ, more or less sulcate throughout, excepting at the extreme upper end, its lateral ridges continuous with those of the vertex, the lateral foveolæ rather small, scarcely sulcate but more or less distinct, triangular, close to the eyes. Eyes rather small, transversely short obovate. Antennæ about as long as the hind femora in both sexes, a little flattened, especially near the base, some of the apical joints very short. Disc of pronotum moderately flat, the median carina cristate or subcristate, strongly compressed almost from its very base, divided obscurely but to the very base by the principal transverse furrow into two parts, the front portion a little the longer, the edge of the ridge straight or nearly straight on the front lobe, and arched more abruptly in front than behind on the hind lobe; lateral carinæ nearly obsolete, excepting behind; the front lobe equal, its front margin very slightly angulated; hind lobe expanding posteriorly, its hind margin generally more acute than a right angle. Tegmina extending beyond the tip of the abdomen, nearly equal, slightly sinuous, obliquely excised apically, traversed by three bands of more or less distinctly agglomerated dark flecks. Wings subtriangular, yellowish at the base, crossed beyond the middle by a continuous broad dark belt. Hind femora rather stout and short, scarcely, if at all, surpassing the tip of the abdomen. Type: *Gryllus æqualis* Say.

Synopsis of the species.

1. Median incision of the pronotal crest distinctly oblique . . . 2.
1. Median incision of the pronotal crest vertical 4.
2. Median carina very high, the height of the front portion of the posterior lobe equalling the height of the eye *crisiatum*.
2. Median carina moderately high, the height of the front portion of the posterior lobe nearly equalling the depth of the eye 3.
3. Tegmina with the usual transversely trifasciate arrangement of fuscous dots *collare*.
3. Tegmina "with a broad stripe of fuscous dots and small spots along the middle field, from the base to the apex" (Thomas) *wyomingianum*.¹
4. Tip of wings infuscated 5.
4. Tip of wings pellucid, excepting the dark veins . *balteatum*.
5. Hind tibiae red, with a distinct pale basal annulus, more or less, generally very broadly and distinctly bordered on both sides with black *Bolli*.
5. Hind tibiae wholly red, or at most with only a faint pale basal annulus *aequale*.

1. Spharagemon æquale.

Gryllus æqualis Say, Journ. Acad. Nat. Sc. Phil., IV, 307; Ib., Ent. N. Amer., ed. LeC., II, 237.

Locusta æqualis Harr., Hitchc. Report, 583; Ib., ib. 2d ed., 576; Ib., Catal., 56; Ib., Ins. Inj. Veg., 1st ed., 144; 2d ed., 165; 3d ed., 178.

Ædipoda æqualis Erichs., Archiv f. nat., IX, ii, 230; Uhl., in Harr. Ins. Inj. Veg., 3d ed., 178; Scudd., Can. Nat., VII, 287; Ib., Bost. Journ. Nat. Hist., VII, 470; ? Thom., Proc. Acad. Nat. Sc. Phil., 1870, 80; Walk., Cat. Derm. Brit. Mus., IV, 731.

Trimerotropis æqualis Scudd., Geol. N. Hampsh., I, 377.

This species has been confounded by Uhler and Smith with *Trimerotropis verruculata* (Kirb.) Scudd., from which it is generically distinct. I have taken it in Vermont, about Boston, on Cape Cod and at Nantucket, Mass., in Minnesota and the Red River of the North. It has been taken in Maine by Dr. Packard and Mr. Smith,

¹ I have never seen this species.

and by other persons in Maryland, Iowa, Dakota and N. Illinois. Walker refers specimens from Florida to this species, and Mr. Boll took a single specimen last year on July 7, in northern Texas. Thomas refers specimens from Colorado and Wyoming doubtfully to this species.

2. *Spharagemon Bolli* nov. sp.

Brownish fuscous, the face with a greyish cinereous (σ) or yellowish cinereous (φ) tinge, distinctly punctate, the pits dusky or blackish; antennæ brownish yellow on the basal half, infuscated beyond, the whole more or less annulate with dusky yellow and blackish in the male. Tegmina flecked throughout with minute blackish spots, and transversely trifasciate with rather broad blackish clouds, much more distinct in the male than in the female. Wings light greenish yellow at the base, with a broad median arcuate band, blackish or almost piceous in color, sending a broad, short shoot toward the base, next the upper border. Beyond, the wing is at first hyaline, with broadly blackish fuliginous veins, while the extreme tip is black as the median band. Hind femora dull brownish, quadrifasciate transversely with dark brown, more distinctly in male than in female, the basal two-fifths of the hind tibiae blackish, with a broad whitish annulus, beyond coral red. Crest of pronotum very high, that of the posterior lobe independently arched, much more elevated in front than behind.

Length of body, σ , 28.5 mm., φ , 36.5 mm.; of antennæ, σ , 16 mm., φ , 18 mm.; of tegmina, σ , 32 mm., φ , 34.5 mm.; of hind femora, σ , 18 mm., φ , 20.5 mm. Described from 4 σ , 4 φ . The males taken Sept. 10, the females July 18 and August 18, 21, 23, at Dallas, Texas, by J. Boll.

This species has been confounded with *S. æquale*, from which it may be readily distinguished by the hind tibiae; the tip of the wings is generally darker, and the median band does not approach the anal angle so closely; the tegmina are more distinctly trifasciate, the front half of the median crest of pronotum is less pinched posteriorly, and the hinder half less arched.

I have specimens also from Vermont, Massachusetts, Maryland and Iowa. They are smaller than those from Texas.

3. *Spharagemon balteatum* nov. sp.

Grayish fuscous, the face generally pale cinereous, dotted obscurely with fuscous; antennæ dusky, paler next the base; tegmina dull testaceous, the usual transverse fasciæ present but obscure,

sometimes very inconspicuous. Wings pale greenish yellow at the base, with a very broad, median, arcuate, blackish fuscous band, emitting near the costal margin a broad short shoot toward the base; the costal margin at the limit of the band, and for an equal space beyond it blackish fuscous, generally a little darker than the band; beyond the median band the wing is hyaline, with brownish fuliginous nervures and cross nervures, and in the male a very slight infuscation at the extreme tip. Hind femora brownish cinereous, transversely fasciate with brown, more or less deep in tint; hind tibiae coral red, unusually sinuous at the base, broadly banded at this point with dull white, bordered broadly, and generally very distinctly, with blackish. Crest of pronotum moderately high, the front lobe usually, the hind lobe always, slightly arched, the two lobes having a slight angle to each other.

Length of body, ♂, 19 mm., ♀, 34 mm.; of antennæ, ♂, 12.25 mm., ♀, 15.5 mm.; of tegmina, ♂, 25 mm., ♀, 35.5 mm.; of hind femora, ♂, 13 mm., ♀, 20 mm.

Described from 1 ♂, N. Jersey; 9 ♀, Norway, Me. (S. I. Smith); Brandon, Vt., on upland; Maryland, Aug. 10, 13, and Sept. 15, 19 (P. R. Uhler); Dallas, Texas, Aug. 13 (J. Boll).

4. *Spharagemon wyomingianum*.

Edipoda wyomingiana Thom., Geol. Surv. Terr., 1871, 462; Ib., Syn. Acrid. N. Amer., 113; Glover, Ill. Orth., pl. 14, fig. 1, pl. 15, fig. 2 (ined.).

Considered by Thomas as possibly a variety of the next species. Eastern Wyoming.

5. *Spharagemon collare*.

Edipoda collaris Scudd., Geol. Surv. Nebr., 250; Thom., Geol. Surv. Terr., 1871, 459; Ib., Syn. Acrid. N. Amer., 113; Glover, Ill. Orth., pl. 13, fig. 8.

This species, first described from the borders of the Platte, in Nebraska, has been taken by Mr. Dodge in Glencoe, Dodge Co., of that State; by Mr. Thomas in Colorado, east of the mountains; in northern Illinois and the Red River of the North by the late Mr. Kennicott; by Mr. J. A. Allen in Jefferson, Iowa, between July 20 and 24, and in Dallas Co., Iowa, Aug. 20-23.

6. *Spharagemon cristatum* nov. sp.

Dark yellowish brown, profusely mottled and flecked with grayish cinereous, the dark color generally predominating, and sometimes becoming blackish upon the summit of the head, the sides of the

pronotal crest, and in a couple of short longitudinal stripes along the anterior half of the lateral lobes of the pronotum; the hinder edge of the pronotum is usually alternately pale and dark; antennæ dusky, yellowish brown at the base, and annulate with yellowish brown for some distance beyond it; tegmina mottled with dark cinereous and blackish brown, the latter most conspicuous in an agglomeration of these spots just before the middle, half way between that and the base, and at an equal distance beyond the middle band; the apical fourth of the wing is obscurely subhyaline, occasionally with a slight concentration of dark spots at the tip; the lighter colors predominate along the costal margin on either side of the median dark patch. Wings light greenish yellow at the base, sometimes tinged to the least possible degree with saffron (more noticeable in the closed wing), with a moderately broad, blackish fuscous, arcuate mesial band, at the costal border (but omitting the costal edge) extending abruptly a short way toward the base of the wing; beyond this band the wing is hyaline, with blackish fuscous nervures, some of the cells near the tip partially or wholly fuligino-fuscous, forming a more or less marked infuscation. Hind tibiae coral red, the extreme base black, followed by a more or less distinct pale annulation. Crest of pronotum exceedingly high, arched pretty regularly, the hinder extremity of the anterior lobe sometimes overlapping the front of the posterior lobe; the posterior border of pronotum very acutely angled.

Length of body, ♂, 26.5 mm., ♀, 36.5 mm.; of antennæ, ♂, 13.5 mm., ♀, 14.6 mm.; of tegmina, ♂, 30.25 mm., ♀, 36 mm.; of hind femora, ♂, 16 mm., ♀, 20 mm.

Described from 11 ♂, 7 ♀, taken in Dallas June 3, 23, Aug. 21, 23, by J. Boll, and one specimen in Waco, as late as Oct. 16, by G. W. Belfrage.

A CENTURY OF ORTHOPTERA. DECADE III.—ACRYDII (PEZOTETTIX, CALOPTENUS).

21. *Pezotettix olivacea*. Bright olivaceous green. Summit of the head with a dark green median stripe, broadening posteriorly; sides of head, and sometimes the front, tinged with yellow; the pronotum covered rather profusely with short longitudinal dashes of lemon yellow, rather irregularly distributed, but distinctly marking the median carina, excepting at its posterior extremity, and also the two extremities of the lateral carinae; antennae green at base, beyond orange, infuscated at the extreme tip. Tegmina half the length of the abdomen, green; legs stout, green, the fore and middle femora more or less tinged with dull orange; the outside of the hind femora slightly infuscated, the tibial spines black-tipped. Terminal segment of the male abdomen acuminate at the tip, but with an apical tubercle; cerci slender, the basal half tapering, the apical half as broad, equal, the tip rounded, but a little produced, the outer surface slightly furrowed on the apical half.

Length of body, ♂, 21 mm., ♀, 29 mm.; of antennae, ♂, 10.5 mm., ♀, 10.5 mm.; of tegmina, ♂, 8.5 mm., ♀, 13.5 mm.; of hind femora, ♂, 13.5 mm., ♀, 17.5 mm. 2 ♂, 1 ♀, taken Sept. 9, at Dallas, Texas, by J. Boll.

22. *Pezotettix acutipennis*. Blackish fuscous, with a dull olivaceous tinge; excepting the abdomen pilose throughout. Head mottled irregularly with darker and lighter shades, a dark triangular spot in the middle of the posterior part of the summit, and generally an obscure dark band passing backward from the hinder edge of the eyes and crossing a portion of the sides of the pronotum; antennae pale yellowish, infuscated at extreme tip. Pronotum delicately rugulose, the median carina distinct, the dorsum sloping more in the female than in the male; wings less than half as long as the body, tapering to a blunt point, dark brown, the veins and cross veins generally paler and olivaceous; legs dusky, the middle femora blackish externally; the hind femora more or less indistinctly trifasciate

with blackish; hind tibiae livid, mottled minutely and profusely with brown; the apical half of the spines black. Extreme tip of abdomen in the male acuminate, but tubercled; cerci slender, tapering, more rapidly in the basal than the distal half, to a dull point.

Length of body, ♂, 20.5 mm., ♀, 24.5 mm.; of antennae, ♂, 10.5 mm.; of tegmina, ♂, 8 mm., ♀, 8 mm.; of hind femora, ♂, 13 mm., ♀, 15 mm. 2 ♂, 1 ♀, Dallas, Texas, J. Boll. In woods on plants and bushes, September – October, Bosque Co., Texas, G. W. Belfrage.

23. *Caloptenus ponderosus*. Brownish testaceous. Front of head and sides of pronotum a little paler, tinged with yellow, the head obscurely flecked with brown; antennae yellow, infusated toward the tip. Slight black markings follow the anterior portion of the lateral carinae of the pronotum and the transverse incisures of its lateral lobes; tegmina as long as the body, light brownish fuscous, rather obscurely mottled with faint dusky quadrate spots in the median area, mostly confined to the basal half of the field; legs stout, a little darker than the under surface of the body, the middle femora infusated, the hind femora obscurely, transversely bifasciate with black, broken by the paler incisures; hind tibiae and tarsi yellow, the former with a slender black basal annulus; the spines black. Vertex between the eyes much broader than (♂) or twice as broad (♀) as the basal antennal joint, the foveola broad, broadening in front, scarcely depressed, the lateral edges sharp; frontal ridge broad, broadening below, broadly and shallowly sulcate excepting above. Pronotum broadening a little on the rugulose posterior lobe, the median carina slight, broken by every transverse furrow; lateral carinae rather distinct, but slight. Terminal segment of abdomen of male produced but rounded; cerci very stout, subspatulate, compressed, largest at tip, the basal two-fifths being equal and straight, the remainder expanding into an obliquely transverse, obovate, rounded lobe, directed upward and more produced above than below, making the tip fully half as broad again as the base.

Length of body, ♂, 30 mm., ♀, 33 mm.; of antennae ♂, 12 mm., ♀, 12.5 mm.; of tegmina, ♂, 21.5 mm., ♀, 23 mm.; of hind femora, ♂, 17.5 mm., ♀, 19 mm. 1 ♂, 1 ♀, taken October 10, at Dallas, Texas, by J. Boll.

24. *Caloptenus robustus*. Brownish fuscous with more or less of a cinereous tint. Front of head livid, very heavily mottled with dark brown; mouth parts pale, the tip of last palpal joint black; antennae pale at base, beyond dull reddish more or less tinged with

yellow, toward the tip infuscated. A slender blackish stripe passes from behind the eyes to the hind lobe of pronotum, sometimes interrupted, sometimes accompanied by an infuscation beneath, broadening the band; upper surface more or less flecked with dark brown, sometimes collected into a V-shaped patch opening forward, the apex at the middle of the posterior lobe; hind border dotted with blackish; posterior lobe profusely, rest of upper surface sparsely, all shallowly, punctate; sides of metathorax with an pale oblique stripe narrowing upward to a point; tegmina blackish or brownish fuscous, flecked rather distantly with brownish spots, relieved by similar pale ones along the middle; legs of the color of the under-surface, the fore and middle femora a little deeper or duskier; hind femora broadly bifasciate with blackish, the apex black at the sides; hind tibiae and tarsi yellow, occasionally tinged with red, paler next the base with a black annulus; spines black. Vertex broader (σ) or much broader (φ) than the first antennal joint, the fastigium with a scarcely perceptible depression (φ) or slightly sulcate (σ), broadening in front; frontal ridge broad, nearly equal, a little sulcate below the ocellus. Median carina of pronotum slight, distinct only on the posterior and anterior lobe, cut by all the transverse furrows; lateral carinae rather distinct, rounded. Last abdominal segment of the male a little produced, rounded; cerci very large and stout, compressed, broadening apically, well rounded, very similar to those of *C. ponderosus*, but not so broad at the tip.

Length of body, σ , 29.5 mm.; φ , 34.5 mm.; of tegmina, σ , 21 mm.; φ , 24 mm.; of antennae, σ , 13.5 mm.; φ , 15 mm.; of hind femora, σ , 17.5 mm.; φ , 21 mm. 3 σ , 4 φ , Dallas, Texas, J. Boll.

25. *Caloptenus devorator*. Yellow, tinged more or less with brown. Head and prothorax yellowish-brown above, bright yellow on the sides and front, with a distinct, well defined, black band, passing from the hinder edge of the eyes to the division between the middle and hind lobes of the pronotum, narrowly interrupted at the front edge of the pronotum and sending a shoot downward around the lower edge of the eye; sides of the thorax with a broad oblique blackish stripe enclosing the spiracle; abdomen yellow obscured with fuscous; antennae yellow at base, dusky beyond; legs yellow, the two front pair of femora tinged with dirty orange above, the upper half of the hind femora blotched with reddish fuscous, the hind tibiae and tarsi and the inferior carina of hind femora bright orange-red; spines black tipped; tegmina yellowish-brown with a few minute

dusky dots scattered through the middle area, especially in the basal half of the wing where it narrows. Vertex of the head very narrow ~~between the eyes~~, scarcely broader than the first joint of the antennæ, the foveola rather deeply sulcate, broadening a little below with high but rounded edges; frontal ridge nearly equal throughout, rather shallowly sulcate at and below the ocellus. Pronotum scarcely enlarged posteriorly; median carina very slight, equal, cut only by the posterior transverse furrow; lateral carinæ obsolescent, posterior lobe of pronotum punctulate. Terminal segment of abdomen of male squarely docked at tip; cerci rather broad at base, tapering on basal half to about half their width, then equal, and slightly incurved, the lower outer angle rounded off and the outer surface slightly ridged.

Length of body, 21.75 mm.; of antennæ, 9.5 mm.; of tegmina 18 mm.; of hind femora, 13 mm. 2 ♂, taken 15 July, at Dallas, Texas, by J. Boll.

26. *Caloptenus deletor*. Brownish fuscous, darkest above, Front of head and sides of pronotum dull, livid brown, with an indistinct maculate dusky band between the eyes and the hind lobe of the pronotum, sometimes reduced to a mere line below the lateral carinæ; antennæ pale reddish, infuscated apically. Tegmina as long as the body, brownish fuscous, with a median line of alternate pale and fuscous spots; fore and middle legs pale dull brownish, the middle femora blackish above, all the tarsi marked with blackish; hind femora with the upper outer half blackish, sometimes broken into very oblique dashes by a median and postbasal yellowish streak; hind tibiæ and tarsi red with a narrow black basal annulus, the tarsal joints tipped with blackish fuscous. Head not elevated, well arched; vertex a little broader than the first antennal joint, the foveola shallow with slight but rather sharp lateral edges, greatly expanding anteriorly; frontal ridge broad, expanding a little next the ocellus and a little sulcate in the same part. Pronotum faintly constricted in the middle, the median carina distinct but slight, nearly equal, cut only by the posterior transverse furrow; lateral carina indistinct excepting on the posterior lobe, the latter obscurely punctate. Terminal segment of abdomen in the male broadly rounded at the tip; cerci long and slender, compressed, a little incurved, broadest at the base, uniformly and very slightly tapering on the basal half, beyond equal, bent a little forward, broadly and roundly docked at tip, and emitting from the posterior angle a slender, compressed, scarcely tapering shoot

rounded at the tip, running in the direction of the upper edge of the basal half of the cerci in the same general plane.

Length of body, ♂, 23.5 mm., ♀, 30.5 mm.; of antennæ, ♂, 11.5 mm., ♀, 12 mm.; of tegmina, ♂, 21 mm., ♀, 22 mm.; of hind femora, ♂, 14.5 mm., ♀, 16 mm. 1 ♂, 1 ♀, Dallas, Texas, J. Boll.

27. *Caloptenus helluo*. Dark yellowish-brown. Head with a superior, median, maculate, black stripe broadening posteriorly, extending from the foveola of the vertex, just behind which it is interrupted, to the hind edge of the head; foveola of vertex and frontal ridge maculate with black; antennæ dusky. A broad irregularly maculate black band passes from behind the eyes to the last transverse furrow of the pronotum; tegmina dusky olivaceous with small, quadrate, nearly equal, dusky spots scattered throughout; legs brownish-yellow flecked with black, the hind femora transversely and rather indistinctly fasciate with blackish; hind tibiæ dull reddish, indistinctly livid along the outer edge and next the base, flecked next the base with dusky specks, pilose throughout; spines black. Head much elevated, rounded; vertex narrow, equalling between the eyes the width of the first antennal joint; foveola more than usually declivant, broadening in front, rather deeply and uniformly sulcate, the lateral edges pretty high and sharp; frontal ridge moderately broad, equal, shallowly sulcate below the ocellus. Pronotum with the posterior lobe expanding; the median carina distinct but cut by all the transverse furrows, distinctly angulated, on a side view, in front of the posterior lobe; the latter rather heavily punctate; lateral carinæ obsolete, excepting in the posterior lobe; whole head and pronotum sparsely pilose.

Length of body, 27 mm.; of antennæ, 12 mm.; of tegmina, 23 mm.; of hind femora, 14.5 mm. 2 ♀, Dallas, Texas, J. Boll.

28. *Caloptenus glaucipes*. Wood brown. Head and pronotum livid brown, flecked heavily with blackish, more heavily and minutely above, giving it a wood-brown appearance; a broad black band extends from behind the eyes to the posterior edge of the pronotum, broadening on the hinder lobe of the latter; antennæ orange red, paler at base. Tegmina as long as the body, brown, with a few dusky flecks along the central field; legs darker or lighter brownish yellow, flecked with dusky, the hind femora bifasciate above with blackish, besides a blackish base and apex; hind tibiæ and tarsi glaucous, with a pale annulus at the base, interrupted in the middle by a blackish glaucous ring. Vertex moderately narrow between the

eyes, scarcely wider than the first antennal joint; foveola of vertex narrow, with sides broadening a little in front, pretty sharply defined, enclosing a moderately deep sulcus, deepest posteriorly; frontal ridge rather broad, the sides nearly parallel, fading out below with a sulcus scarcely perceptible, excepting about the ocellus. Pronotum equal, the median carina very slight, most distinct on posterior lobe, cut by every transverse incision; lateral carinae obsolete. Terminal segment of abdomen in male roundly acuminate; cerci broad at base, scarcely twice as long as broad, subreniform, well rounded, but little smaller on the apical half. Allied to *C. flavolineatus*.

Length of body, ♂, 22.5 mm., ♀, 28 mm.; of antennæ, ♂, 9.5 mm., ♀, 9.5 mm.; of tegmina, ♂, 16 mm., ♀, 18.75 mm.; of hind femora, ♂, 12 mm., ♀, 15.5 mm. 2 ♂, 1 ♀, taken Aug. 18, at Dallas, Texas, by J. Boll.

29. *Caloptenus fasciatus*. Brownish yellow. A broad dark brown, or blackish median band extends from the vertex between the eyes to the posterior extremity of the pronotum, broadest on the latter, and occupying about one-third of it; besides this another band runs from behind the eye to the posterior transverse sulcus of the lateral lobes of the pronotum; this is comparatively narrow, but often sends off streaks of blackish fuscous down the incisures; antennæ yellow, somewhat infuscated apically. Tegmina brownish fuscous, with a row of dusky quadrate spots down the middle of the basal half; legs yellow, tinged with dull orange, the hind femora faintly bifasciate above internally, and with the upper exterior carina black; hind tibiae glaucous, paler and dull at the apex. Vertex quite as broad between the eyes as the first abdominal joint; the fastigium slender, with parallel sides, and rather deeply sulcate; frontal ridge rather broad, equal, scarcely sulcate below the ocellus. Posterior lobe of pronotum expanding a little, the median carina scarcely perceptible, excepting on this part of the pronotum, the transverse furrows distinct. Terminal segment of abdomen of male entire, rounded, but a little produced; cerci rather small, quadrate, squarely docked at tip, nearly equal throughout, but smallest in the middle, strongly compressed, bent inward.

Length of body, ♂, 28.5 mm., ♀, 26 mm.; of antennæ, ♂, 12.5 mm., ♀, 10.5 mm.; of tegmina, ♂, 24.5 mm., ♀, 23 mm.; of hind femora, ♂, 16 mm., ♀, 15 mm. 2 ♂, taken July 16, at Dallas, Texas, by J. Boll. 1 ♀, taken at Glencoe, Nebraska, by C. R. Dodge.

It is closely allied to *C. bivittatus* (Say), but lacks the humeral vitta of the tegmina, and has very different cerci.

30. *Caloptenus minor*. Dark brownish fuscous. Head and sides of pronotum very dark livid brown, mottled obscurely with blackish; summit of the head with a median blackish stripe; and another similar piceous stripe behind the eye, extending over the lateral lobes of the pronotum, where it is broader and distinct, as far as the posterior transverse furrow; antennæ dusky yellow. Tegmina wholly similar in appearance to those of *C. femur-rubrum*; legs yellowish, the femora dusky outside, the hind femora blackish along the middle, the apex black above, dull orange beneath; the hind tibiæ plumbeous, paler toward the tip. Vertex between the eyes about as wide as the first antennal joint, the foveola narrow, equal, deeply sulcate, the sides pretty high and sharp; frontal ridge moderately broad, broadening below, shallowly sulcate below the ocellus. Pronotum broadening very slightly on the posterior lobe, the median carina slight, equal, cut only by the posterior sulcation; lateral carinæ obsolete. Last segment of the male abdomen slightly tuberculate at tip; cerci with the basal portion stout, quadrate, not very strongly compressed, nearly twice as long as broad; the apical portion of the same shape, but broadly rounded at the tip, nearly as long as the basal part, but narrower, bent from it upward at half a right angle, bent also inward, much compressed and shallowly sulcate, with an inferior bounding ridge.

Length of body 17.5 mm.; of antennæ, 7 mm.; of tegmina, 12.5 mm.; of hind femora 9.75 mm. 2 ♂, Nebraska, G. M. Dodge.

REVISION OF TWO AMERICAN GENERA OF CEDIPODIDÆ.

***Encoptolophus* (ἐγκόπτω, λόφος) nov. gen.**

Allied to *Tragocephala* Harr. Head but little tumid above; front vertical above, roundly declivant below the costa, nearly equal, but broadening and fading on approaching the labrum, a little constricted above the antennæ; vertex moderately broad, the eyes being separated by about their own width, the summit of the head minutely and bluntly carinate as far forward as the middle of the fastigium; the latter somewhat declivant, tapering anteriorly, distinctly though not very deeply hollowed; lateral fastigia triangular, slightly transverse, scarcely sulcate; eyes moderately large, shaped as in *Tragocephala*; antennæ as long as (♀) or much longer than (♂) the combined head and pronotum, the joints flattened, on the apical half punctate.

Disc of pronotum nearly flat, the median carina abrupt but not greatly elevated, cut into two equal halves by a distinct though slight notch; lateral carinae distinct but broken, very slightly arcuate; posterior margin of the pronotum forming a rather sharply marked right angle; tegmina rather broad and short, but little surpassing the tip of the abdomen, the basal half of the costal margin sinuate, the apex broadly rounded, scarcely obliquely docked; wings short and broad, pellucid or nearly pellucid, with a post-median costal stigma and more or less duskiness near the outer border, the principal veins of the front area broader than long. Type: *Edipoda sordida* Burm.

The flatter disc of the pronotum, with its slight but abrupt median carina and almost equally distinct lateral carinae distinguish this at once from *Tragocephala*, with which Dr. Stål unites it. As he has pointed out, the intercalary vein of the tegmina approaches the ulnar vein, instead of lying midway between it and the radial vein, as in *Tragocephala*.

Synopsis of the species.

1. Wings most deeply fuliginous at the apex. . . . *sordidus*.
1. Wings most deeply fuliginous next the middle of the outer border. 2.
2. Summit of head with a faint median carina. . . . *costalis*.
2. Summit of head with a distinct, but slight, median carina. *parvus*.

1. *Encoptolophus sordidus*.

Edipoda sordida Burm., Handb. d. Ent., II, 643; Scudd., Bost. Journ. Nat. Hist., VII, 473; Walk., Cat. Derm. Brit. Mus., IV, 732; Thom., Syn. Acrid. N. Amer., 116; Glov., Ill. Orth., pl. 10, fig. 11.

Acridium (Edipoda) sordidum De Haan, Bijdr. Kenn. Orth., 143.

Tragocephala sordida Stål, Recens. Orth., I, 119; Scudd., Geol. N. Hampsh., I, 373.

Locusta periscelidis Say. Ms.; Harr., Cat. Ins. Mass., 56.

Locusta nebulosa Harr., Ins., Inj. Veg., 1st ed., 146; 2d ed., 157; 3d ed., 181; Emm., Agric. N. York, v, 146, pl. 9, fig. 7.

Edipoda nebulosa Erichs., Arch. f. Nat., II, 230; Uhl., in Harr. Ins. Inj. Veg., 3d ed., 181.

This insect is found from middle N. England to Maryland and Tennessee and, more rarely, to N. Florida; and westward to Nebraska, Iowa and Minnesota.

2. *Encoptolophus costalis*.

Edipoda costalis Scudd., Bost. Journ. Nat. Hist., VII, 473; Walk., Cat. Derm. Brit. Mus., IV, 732; Thom., Syn. Acrid. N. Amer., 112.

Tragocephala costalis Stål, Recens. Orth., I, 119.

Known only from Texas.

3. *Encoptolophus parvus* nov. sp. This insect is closely allied to *E. costalis*, from which it differs in its smaller size, comparatively shorter tegmina and wings and in the following other points: the head is less tumid, the fastigium of the vertex much more sulcate and less oblique, the median ridge from the back of the head to the middle of the fastigium much more prominent, the frontal costa deeply sulcate throughout and separated abruptly from the fastigium of the vertex by a not very broad transverse ridge. The disc of the pronotum is not marked by X-shaped pale markings on a dark ground as in *E. costalis*, but is darker in parallel lines along the lateral carinae, deepest and broadest posteriorly; the brevity of the tegmina is entirely confined to the apical portion containing the parallel veins; the transverse pale stripe at their base is much narrower than in *E. costalis*, and followed apically by a uniform fuscous cloud, instead of a cluster of fuscous flecks; the inner transverse stripe is also much narrower; the wing is less heavily clouded.

Length of body, 16 mm.; of antennae, 7 mm.; of tegmina, 15 mm.; of hind legs, 11 mm. 2 ♂, Dallas, Texas, taken Mar. 12 and 24, J. Boll. These two specimens are the only ones I have received and the species appears to be much rarer in Texas than *E. costalis*.

Tragocephala Harris.

Synopsis of the species.

1. Lower apical half of the wings broadly and more or less distinctly fuliginous *viridifasciata*.
1. Lower half of the outer border no darker than, or not so dark as, the upper half 2.
2. Tegmina and wings shorter than the abdomen. *brevipennis*.
2. Tegmina and wings surpassing the abdomen 3.
3. Disc of pronotum delicately scabrous; no distinct median carina on the summit of the head *cubensis*.
3. Disc of pronotum coarsely scabrous; a distinct and sharp median carina on the summit of the head. *pacifica*.

Tragocephala obiona Thom. does not belong to this genus.

1. **T. viridifasciata** Harr., Ins. inj. Veg., 1st ed., 147.

(VIRGINIANA Fabr.)

Acridium viridifasciatum De Geer, Mém., III, 498, pl. 42, fig. 6; Ib., Goeze, Gesch., III, 325, pl. 42, fig. 6; Retz., Gen. et. Spec. Ins., 98.

Gryllus (*Locusta*) *viridifasciatus* Goeze, Beytr., II, 115.

Locusta viridifasciata Harr., Catal., 56.

Locusta (*Tragocephala*) *viridifasciata* Harr., Ins., inj. Veg., 1st ed., 147; 2d ed., 158; 3d ed., 182, pl. 3, fig. 2.

Gomphocerus viridifasciatus Uhl., in Harr., Ins. inj. Veg., 3d ed., 181.

Tragocephala viridifasciata Scudd., Bost. Journ. Nat. Hist., VII, 461; Thom., Syn. Acrid. N. Am., 103, pl., fig. 3; Glov., Ill. Orth. N. Amer., pl. 5, fig. 9; Stål, Rec., Orth., I, 119.

Gryllus virginianus Fabr., Syst. Ent., 291; Ib., Spec. Ins., I, 368; Ib., Ent. Syst., II, 57; Turt., Linn. Syst. Nat., II, 562.

Gryllus (*Locusta*) *virginianus* Goeze, Ent. Beytr., II, 106 Gmel., Linn. Syst. Nat., I, iv, 2078.

Acridium virginianum Oliv., Encycl. méth., VI, 224.

Acridium (*Ædipoda*) *virginianum* De Haan, Bijdr. Kenn. Orth., 143.

Ædipoda virginiana Burm., Handb. Ent., II, 645.

Gryllus (*Locusta*) *Chrysomelas* Gmel., Linn. Syst. Nat., I, iv, 2086; Turt., Linn. Syst. Nat., II, 569.

Acridium marginatum Oliv., Encycl. méth., VI, 229.

Acridium hemipterum Pal. de Beauv., Ins., 145, pl. 4, fig. 3.

(INFUSCATA Harr.)

Locusta (*Tragocephala*) *infuscata* Harr., Ins. inj. Veg., 1st ed., 147; 2d ed., 158, 3d ed., 181.

Gomphocerus infuscatus Uhl., in Harr., Ins. inj. Veg., 3d ed., 181;

Tragocephala infuscata Scudd., Bost. Journ. Nat. Hist., VII, 461. Thom., Syn. Acrid. N. Am., 102, pl., fig. 7; Glov., Ill., Orth., pl. 10, fig. 10; Scudd., Geol. N. Hampsh., I, 373.

Locusta radiata Harr., Cat. 56.

Locusta (*Tragocephala*) *radiata* Harr., Ins. inj. Veg., 1st ed., 148; 2d ed., 159; 3d ed., 183.

Gomphocerus radiatus Uhl., in Harr., Ins. inj. Veg., 3d ed., 181.

This species is not only exceedingly variable, but presents us with an interesting case of dimorphism, which also appears to be repeated in *T. cubensis*. The two forms, for which the names *virginiana* and *infuscata* are retained, differ from each other in the presence (in the former) or absence (in the latter) of bright green colors;

these colours in *virginiana* replace the griseous of *infusata* on the whole of the head, pronotum, thoracic pleuræ and hind femora and on the greater portion of the costo-basal half of the tegmina, besides forming spots at and beyond the middle of their front border, which are pale in *infusata*; these differences are mainly, but by no means exclusively sexual; for out of about one hundred and fifty specimens in my collection, 84 per cent. of the males are *infusata*, and 77 per cent. of the females are *virginiana*; males of *virginiana* are therefore perhaps rarer than females of *infusata*. These proportions are nearly the same in all districts, judging from a comparison of considerable material from New England, Florida and Texas.

Specimens from these three regions, however, differ strikingly from each other, so that I was at first inclined to consider them as distinct species. As, however, a perfectly parallel dimorphism runs through them all, and certain parts of the organization of these insects present some degree of variability within each district, one is forced to the conclusion that they must be identical. The great disparity in the length of the antennæ between New England and Texan specimens is most remarkable, but as individuals from such northern localities as Norway, Me., and the White Mts., N. H., show an exaggerated abbreviation, we can hardly doubt that a southern habitat is favorable to length of antennæ.

The differences between specimens from these several regions will best be presented in a tabular form: —

	<i>New England.</i>	<i>Texas.</i>	<i>Florida.</i>
Antennæ	♂ about three-fourths the length of the hind tibiæ. ♀ from one half to nearly three-fifths the length of the hind tibiæ.	♂ about seven-eighths the length of the hind tibiæ. ♀ scarcely two-thirds the length of the hind tibiæ.	♂ about three-fourths the length of the hind tibiæ. ♀ three-fifths the length of the hind tibiæ.
Fastigium of the vertex	distinctly longer than broad, with elevated bounding ridges, narrower at the extremity than in southern specimens.	distinctly longer than broad, with rather slightly elevated bounding ridges.	of equal length and breadth, with rather slightly elevated bounding ridges.
Pale spots in tegmina of male	obscure, sometimes obsolete.	distinct.	distinct.
Cloudiness of wings	faint, and confined to the distal half of the wing.	rather intense, and confined to the distal half of the wing, and also to the lower half, the upper portion being unusually clear.	moderately intense and diffused, often infringing considerably on the basal half of the wing.

The median carina of the pronotum is also slightly less elevated in specimens from New England than in individuals from the extreme south. Guatemala specimens (probably from the elevated country) resemble mostly the New England type; specimens from the Middle States (Maryland, etc.), also accord best with the New England form, although some of them show a tendency to vary toward the Floridan peculiarities. Specimens from Illinois and Ohio again agree in most points with New England individuals, while a specimen from Missouri has most of the Texan characteristics, although the upper distal half of the wing is somewhat infuscated.

As compared then with New England types, specimens from the South show a tendency toward lengthening of the antennæ, softening of the sculpturing of the head, elevation of the pronotal crest, and intensity (with stronger contrasts) of coloration; toward the southwest the coloration is more sharply defined; toward the southeast more diffuse. These facts are entirely in accordance with the laws laid down by Mr. Allen for the variation of birds, which, according to him and other authors, show toward the south an enlargement of peripheral parts and a greater intensity and extent of the dark colors.

This species occurs from the White Mountains of N. Hampshire to Key West, Florida, Texas and Guatemala, and northwestward, to St. Louis, Mo., and Ogle Co., Illinois.

2. *T. brevipennis* nov. sp. Resembling *T. viridifasciata* in form, but wholly green or greenish yellow, with abbreviated tegmina, and wings and antennæ like those of northern specimens of *T. viridifasciata*. Sculpturing of the head similar to that of *T. viridifasciata*, but with a more sulcate fastigium of the vertex, and with a slight though distinct median carina on the summit; the frontal costa is narrowly sulcate throughout; antennæ not so long as the head and thorax together. Prothorax and its dorsal carina as in *T. viridifasciata*; tegmina shorter than the abdomen; wings still shorter, pellucid, the veins of the upper half blackish, but with no trace of any fuliginous clouds; hind tibiæ more or less dusky, with a very indistinct paler band near the base.

Length of body, 22 mm.; of antennæ, 6 mm.; of tegmina, 12.25 mm.; of wings 9.5 mm.; of hind femora, 12.75. 3 ♀, California, Henry Edwards, Esq.

3. *T. cubensis* nov. sp. Body green (♀), or griseo-cinereous (♂, ♀), in the latter case with the disc of the pronotum often marked with a paler X-shaped spot. Tegmina griseo-cinereous, blotched

with darker and paler markings, similar to those seen in *T. viridifasciata*, with a broad longitudinal green stripe down the middle of the basal half of the wing, in green female specimens; wings sordid hyaline, with a greenish tinge near the base, a diffused black stigma on the costal margin, and very faint and diffused infuscation along the outer border; hind femora of the color of the body, marked above with blackish at the base and tip, and in two spots near the middle; hind tibiae glaucous, the extreme base blackish, followed by a pale annulation. Summit of head well arched, the vertex somewhat declivant, scarcely sulcate, as broad as long, even in the male rather broad at the extremity; frontal costa broadening distinctly between the antennae, rather deeply sulcate throughout, separated from the fastigium of the vertex, at least in the male, by a slender transverse ridge; antennae longer than the head and pronotum together. Pronotum rather delicately scabrous, the median carina low, equal, rather distinctly cut in the middle by the transverse furrow, the disc but little tectiform, the lateral carinae rather distinct, subparallel on the front lobe, divergent behind; front margin of pronotum scarcely angulated; hind margin right-angled, the angle rounded.

Length of body, ♂, 17.15 mm., ♀, 24 mm.; of antennae, ♂, 7 mm., ♀, 7.25 mm.; of tegmina, ♂, 17.5 mm., ♀, 23 mm.; of hind femora, ♂, 11 mm., ♀, 13.3 mm. 10 ♂, 7 ♀, Cuba, Dr. Juan Gundlach (No. 66), Mr. P. R. Uhler (collected at La Firmina, near Bemba, by Charles Wright), Dr. A. S. Packard.

4. *T. pacifica* Thom.

Tragocephala pacifica Thom., Syn. Acrid. N. Am., 101; Glov., Ill. Orth., pl. 16, fig. 9, (ined.).

I have received specimens from California from Mr. Henry Edwards, named for me by Mr. Thomas, and others obtained at San Diego, Cal., by Mr. Crotch.

In the Synopsis of the Acrididae of North America, p. 103, Mr. Thomas says of *T. infuscata* (which, in the explanation of his plate, he places as a variety of *T. viridifasciata*): "This is very closely allied to *T. pacifica*, and if it were not for the widely separated localities in which they are found, they might be considered as varieties of one species." There is, indeed, between the males such a general resemblance as one might expect between species of the same genus, but the females of *T. pacifica*, which Mr. Thomas appears not to have seen, differ extraordinarily from those of *T. viridifasciata*; even the males are so different that Mr. Thomas's remark seems very strange;

this will best appear from a tabular statement of some of the prominent differences; others might readily be added.

	<i>T. pacifica.</i>	<i>T. viridifasciata</i> , var. <i>infuscata</i> .
Summit of head	with a distinct median carina.	without a distinct median carina.
Fastigium of vertex . .	very deeply sulcate.	moderately sulcate.
Frontal costa	very deeply sulcate.	shallowly sulcate.
Its upper extremity . . .	strongly compressed.	but little compressed.
Pronotal crest	moderately high.	high.
Hind border of pronotum	right angled.	acute angled.
Intercalary vein of tegmina	not touching the radial at its tip.	uniting with the radial at its tip.
Wings	very narrowly clouded along the outer margin, especially above.	very broadly clouded near the outer margin, below.
Average length from front of head to tip of closed tegmina	20 mm.	25 mm.

A CENTURY OF ORTHOPTERA. DECADE IV. — ACRYDII.

31. *Chloealtis brunnea*. Brown, sometimes tinged with yellowish, sometimes brownish-green. Head and prothorax rather abundantly but obscurely flecked with brownish atoms, the sides of the face above and the upper limit of the lateral lobes of the pronotum blackish. It differs from *C. viridis* Scudd., to which it is closely allied in the greater tumidity of the summit of the head, the broader vertex between the eyes, which is less hollowed but slightly more declivant, and the less prominent veins upon the dorsal area of the closed tegmina; it seems never to be of so vivid a green.

Length of body, ♂, 19.5 mm.; ♀, 29 mm.; of tegmina, ♂, 9 mm.; ♀, 11.5 mm.; of hind femora, ♂, 12 mm.; ♀, 16 mm. 1 ♂, 3 ♀, taken October 1, at Dallas, Texas, by J. Boll.

32. *Amblytropidia subhyalina*. Dark brownish-fuscous, the head and pronotum obscurely clouded with black, and obscurely, longitudinally vittate above with dull yellowish; antennae infuscated toward the tip; frontal costa shallowly punctulate, the summit of the head faintly rugulose. Pronotum sometimes dotted with black next the posterior border both of disc and lateral lobes, punctate throughout, both median and lateral carinae distinct; tegmina much longer than the abdomen, obscurely dotted throughout with fuscous spots; wings rather sordid hyaline, slightly fuliginous next the apex, the veins blackish; hind femora blackish on the fuller parts externally, deepest above; hind tibiae dull yellowish-brown, merging into blackish on the apical half, especially beneath, the extreme apex pallid and the tips of all the spines black.

Length of body, ♂, 20 mm.; ♀, 28 mm.; of antennae, ♂, 7.25 mm.; ♀, 6.5 mm.; of tegmina, ♂, 18.5 mm.; ♀, 23 mm.; of hind femora, ♂, 14 mm.; ♀, 18.5 mm. 3 ♂, 1 ♀, collected March 10 and 12, at Dallas, Texas, by J. Boll.

33. *Gomphocerus virgatus*. Pretty uniform brown; a broad, straight, blackish stripe, darkest on the pronotum, extends from above each eye to the outer posterior edge of the pronotum, bordered rather faintly and narrowly with yellowish on the inner side throughout its entire length, and distinctly with yellowish-white externally on the pronotum; this latter whitish line marks the slightly raised, nearly straight lateral carinae and is minutely edged on either side with black; the inner border of the broad stripe is marked by an intermediate carina, nearly as high as the median carina, and extending from above the front edge of the eyes to the posterior border of the pronotum;¹ antennae brownish, infuscated on the apical half, scarcely longer than the pronotum, the joints depressed. Tegmina brown with a narrow green stripe just below the costal margin, followed by a longitudinal, scarcely disconnected series of fuscous spots, causing in the middle of the tegmina a mottled appearance; wings pellucid; legs brownish, the outer surface of all the femora infuscated along the middle, or, in the case of the hind femora, the upper portion of the thickest parts; spines black tipped, the outer of the inner, apical, aduncate spines of the hind tibiae of great length.

¹ The same is true of *G. carinatus* Scudd., a species from the Middle States, scarcely differing from this excepting in having decidedly fuliginous wings, becoming infuscated on the apical half of the costal area.

Length of body, 20 mm.; of antennæ, 5.5 mm.; of tegmina, 15 mm.; of hind tibiæ, 14.5 mm. 2 ♀, taken March 26 and May 1, in Dallas, Texas, by J. Boll.

Psoloessa (*ψόλος*) nov. gen.

Allied to *Tragocephala*. Head but slightly tumid above; front regularly arcuate and slightly declivant, the frontal costa broadening constantly in width toward the labrum, acuminate above; vertex narrow, the eyes being separated by a space less than equal to the diameter of one of the eyes, the fastigium scarcely declivant; eyes pretty large, sub-acuminate above; antennæ equal to or shorter than the combined head and pronotum, the joints flattened, on the apical half punctate. Disc of pronotum nearly flat; the median carina distinct but slight, broken once in the middle; lateral carinæ distinct throughout, sinuate, at first approximating a little and then diverging greatly in passing backward; posterior margin bent at more than a right angle; tegmina slender but not extending much beyond the body; wings with the principal cells of the front area longer than broad, pellucid with a more or less fuscous tip; lower interior apical spine of the hind tibiæ nearly, quite, or more than half as long again as the upper one.

34. *Psoloessa texana*. Summit of the head with a very slight mediodorsal carina reaching as far as the base of the fastigium of the vertex; this is about as broad as one of the eyes in the female, slightly narrower in the male, having much the form of that of *P. ferruginea*. Head blackish on the upper half, below paler, livid, with olivaceous tinges on the sides, heavily mottled with yellowish and blackish in front (excepting the frontal costa) and about the mouth parts; extreme basal joints of antennæ yellowish, beyond dusky, darkening toward the tip, joints 4-5 minute, but the sixth longer than broad. Pronotum blackish above, faintly and inconspicuously flecked with dull yellowish, the sides mostly dull yellowish with a blackish, longitudinal, irregular band below the middle; tegmina blackish fuscous, the veins blackish, a few pale dots indistinctly seen in a row near the costal margin beyond the middle; wings faint bluish hyaline, distinctly fuliginous on the apical fourth, fading interiorly; all the veins black; legs brownish-yellow, dashed and dotted with black; the apex of the hind femora blackish, and the spines of hind tibiæ black excepting at base. Abdomen bright reddish, or roseate above, duller beneath and on sides.

Length of body, ♂, 15.5 mm.; ♀, 19.25 mm.; of antennæ, ♀, 6 mm.; of tegmina, ♂, 13 mm.; ♀, 17 mm.; of hind femora, ♂, 10 mm.; ♀, 12 mm. 2 ♂, 1 ♀, taken March 24 and June 6, at Dallas, Texas, by J. Boll.

35. *Psoloessa ferruginea*. Summit of the head with a slight medio-dorsal carina extending nearly or quite to the tip of the vertex; the latter about as broad as one of the eyes on a top view, the sides raised and parallel for a short distance beyond the eyes, then meeting at less than a right angle, the edges still raised. Head dark brown with light brown mottlings and a broad, equal, medio-dorsal stripe, of the width of the vertex, extending from its tip backward, edged laterally with blackish; antennæ dusky, joints 4-6 about as long as broad. Pronotum generally light yellowish brown above, the lateral carinæ slightly paler, the latter edged rather broadly on the outer side anteriorly, on the inner side posteriorly with black; middle of sides of pronotum with some obscure dark markings, the lower border flecked with ashen; tegmina variable, the portion forming the superior field, when closed, of the color of the dorsum of the pronotum; the remainder generally much darker, occasionally with dark dots along the middle field and darker veins; wings hyaline, the veins along the costal area broadly, the rest delicately black; the extreme apex of the wing dark fuliginous; legs brownish-gray mottled with dark brown, the hind femora dotted externally with blackish and the spines black tipped. Abdomen ferruginous above, the sides flecked with brown; beneath paler.

Length of body, ♂, 14 mm.; ♀, 21.5 mm.; of antennæ, ♂, 6.2 mm.; ♀, 6.5 mm.; of tegmina, ♂, 13 mm.; ♀, 17 mm.; of hind femora, ♂, 10 mm.; ♀, 12.2 mm. 1 ♂, 3 ♀, taken March 24 and April 25 and 29 at Dallas, Texas, by J. Boll.

36. *Psoloessa maculipennis*. Summit of the head with a slight medio-dorsal carina extending to the middle of the fastigium of the vertex; the latter about as broad as one of the eyes, short, longitudinally obovate, a little angulated in front, pretty deeply depressed, with sharp sides and a median transverse furrow. Head dark reddish-brown, much and irregularly mottled with darker brown; antennæ fuscous growing darker toward the tip, joints 4-6 about half as long as broad. Pronotum uniformly brown above, excepting a pair of small oblique black dashes situated just behind the middle of either side; the sides of the pronotum as in *P. ferruginea*; tegmina ash-brown, sprinkled rather profusely, excepting in

the middle area, with blackish and whitish fleckings, generally disposed longitudinally; wings hyaline, the veins black, with the slightest possible cloudiness at the extreme tip; legs brown, flecked, and the fore and middle pair delicately subannulate, with blackish; hind tibiae dull yellowish, edged beneath with blackish, the apical half of the spines black. Abdomen dull ferruginous, slightly paler beneath, marked on the sides next the incisures with blackish.

Length of body, 19 mm.; of antennæ, 6.5 mm.; of tegmina, 16.5 mm.; of hind femora, 12.2. 2 ♀, taken March 23 at Dallas, Texas, by J. Boll.

37. *Arphia simplex*. Brownish fuscous. The general color is very uniform, but the lower half of the head, and especially of the face, passes to ashen; lateral foveolæ of the head scarcely distinguishable from the parts below, the lower limits being very obscurely marked. The edges of the lateral lobes of the pronotum are sometimes dotted irregularly with yellowish; pronotum somewhat scabrous; pronotal crest not high nor arched, uniform; tegmina flecked with fuscous dots pretty uniformly distributed over the whole, excepting in being a little crowded in the basal half of the middle area; wings at base red, with a slight orange tinge, bounded by a moderately broad, nearly equal, arcuate, dark fuscous band, passing from the middle of the outer half of the costal border nearly at right angles to the same, until it reaches the opposite border, when it curves inward, following the border more than half way to the anal angle; it sends inward fully half way to the base of the wing, a broad, generally tapering shoot just below the costal margin; beyond the arcuate band the wing is fuligino-pellucid, and at the tip fuliginous, all the veins dusky; hind femora very indistinctly transversely trifasciate, with an indistinct pale annulus just before the tip, the hind tibiae obscure glauco-plumbeous, with a pale annulus next the base.

Length of body, ♂, 24.5 mm., ♀, 32 mm.; of antennæ, ♂, 9 mm., ♀, 9.5 mm.; of tegmina, ♂, 26 mm., ♀, 31 mm.; of hind femora, ♂, 16 mm., ♀, 18.5 mm. 2 ♂, taken June 3 and 6, 1 ♀ taken April 26, in Dallas, Texas, by J. Boll.

38. *Arphia conspersa*. Greyish cinereous or blackish fuscous, the whole head rugulose and punctate with blackish fuscous; antennæ greyish-cinereous more or less dusky at base, beyond blackish. Pronotum somewhat rugose, the median carina rather elevated, gently arched, subincised in the middle; whole of pronotum mottled or sprinkled with dusky dots, noticeable only in the lighter

specimens, in the darker indicated as pale dots along the borders; tegmina light cinereous or brownish fuscous, more or less sprinkled with small dark fuscous spots throughout, generally absent from the inner field and infrequent near the apex; wings coral-red at base with an arcuate, extra mesial, not very broad band of blackish fuscous crossing the wing and emitting baseward a broad shoot, two thirds at least of the distance to the base in the upper area of the wing, separated from the costal margin only by a narrow streak of coral-red; below, the arcuate band follows the border nearly to the anal angle, diminishing only a little in width as it passes; apex of wing pellucid, very slightly fuliginous outwardly, all the veins coarsely black; hind legs brownish yellow quadrifasciate with blackish; hind tibiae dark plumbeo-fuscous, with a whitish annulation next the base.

Length of body ♂, 21 mm.; ♀, 34 mm.; of antennae, ♂, 8 mm.; ♀, 8 mm.; of tegmina, ♂, 23.5 mm.; ♀, 28 mm.; of hind femora, ♂, 13 mm.; ♀, 15 mm. 1 ♂, 3 ♀, taken March 19 and 26, in Dallas, Texas, by J. Boll.

39. *Arphia luteola*. Head dark brown, sometimes blackish above, the sides and face more frequently brownish yellow, not infrequently with a broad, more or less obscure band of this color, extending obliquely on either side, from the middle of the upper edge of the labrum to the middle of either side of the posterior border of the head; above this the front is often much mottled; antennae yellowish at base, beyond dusky. Pronotum rugose, pinched on either side of the middle of the dorsal carina, the latter moderately elevated, scarcely arched, with the slightest possible indication of a central incision; pronotum very variable in color, but usually dark brownish fuscous, sometimes pale yellowish cinereous, the median carina marked by a small V-shaped black spot in the middle, and at the anterior extremity and the posterior extremity of the disc by oblique black dashes broadest next to the border, which they do not generally reach; lateral lobes of pronotum generally marked in the middle by a rather large, quadrate, dusky spot; tegmina dark brownish fuscous, sprinkled profusely with small dark spots, generally larger and more conspicuous in the female, the base of the veins, and generally, at least the basal half of the radial vein, yellowish; wings unusually broad, pale citron yellow, sometimes faintly tinged with orange, with an arcuate, not very broad band of fuscous or blackish fuscous, commencing above in the middle of the outer half of the costal margin and crossing the wing at right angles

to that margin, and then following down the outer margin to its broadest portion; along the border the band is fully half the width of the tegmina; but above this it narrows, and is not half so wide as that in the upper area of the wing, along the lower edge of which it sends a slender acuminate shoot much more than half way toward the base; the apical half of the remaining outer portion of the wing is fuscous, and the part between fuligino-hyaline, with black veins; hind femora brownish yellow or cinereous, broadly bivittate with blackish, the base above and the apex also blackish; hind tibiæ blackish fuliginous at base, followed by a broad conspicuous pallid belt; the rest of the tibiæ dark glaucous, merging at either end into blackish fuliginous, the spines tipped with black.

Length of body, ♂, 28 mm., ♀, 36 mm.; of antennæ, ♂, 10.5 mm.; ♀, 10.25 mm.; of tegmina, ♂, 31.5 mm., ♀, 34 mm.; of hind femora, ♂, 18.75 mm., ♀, 21.5 mm.; of wings, ♂, 29 mm., breadth of same, ♂, 19 mm. 8 ♂, 5 ♀; the males taken April 22, 28, June 3, 6, and July 15; the females June 1, 6, and July 15, 16, at Dallas, Texas, by J. Boll. Mr. Belfrage found it common the last of June, in Bosque Co., Texas, in sandy or dry prairies.

Phlibostroma ($\varphi\lambda\iota\beta\omega$, $\sigma\tau\rho\tilde{\omega}\mu\alpha$) nov. gen.

Somewhat closely allied to *Psinidia* Stål, but with less angular vertex, as seen from the side, and without any intersections of the anterior half of the median carina of the pronotum. Head rather tumid, a little elevated, the summit arched, higher than the pronotum, the eyes separated by a space at least double the width of the first joint of the antennæ; vertex pretty strongly declivant, shallowly sulcate toward the angular apex; lateral foveolæ broad, transverse, sometimes scarcely separable from the parts below; ocelli touching the eye at the extremity of its upper third; front but slightly declivant, frontal costa rather narrow, narrowed above the antennæ, sulcate only below; eyes separated by fully their own length from the base of the mandibles; antennæ linear, in the female much longer than the head and pronotum combined (those of male not seen). Pronotum strongly contracted in the middle above, the lateral carinæ, which are slight though sufficiently distinct, having a clepsydral outline; disc nearly flat, the median carina very slight, distinct, equal, divided once in the middle; hind border roundly and rather obtusely angulated; tegmina surpassing the abdomen a little, rather slender.

equal, broadly rounded apically, the cross veins rather distant; wings moderately broad, hyaline in the species seen, the cells large, in no part exceptional.

40. *Phlibostroma pictum*. Livid brown, with an olivaceous tinge above; upper interior edge of eyes margined with black, and the summit of the head with a more or less distinct dark median stripe; antennæ yellow, a little rufous toward the tip. A triangular brown stripe behind the eye, the apex a little above the middle of the eye, connected with a broad blackish brown stripe on the sides of the pronotum, extending to, and sometimes a little beyond, the principal transverse sulcus, faint in front and enlivened by a short longitudinal white line, extending, a little below the middle of the stripe, from the anterior transverse sulcus forward; posterior lobe of pronotum dusky externally on the disc; tegmina pale cinereous, the middle area with four or five large, oblique, quadratè or triangular, fuscous blotches, darkest at the edges, extending from the base three quarters of the distance to the tip, the outer ones more transverse than the others and directed from below upward and outward; wings hyaline, some of the veins blackish; hind femora cinereous, black at tip, with two or three very oblique, fuscous stripes, all but the basal one covering also the superior sulcation, sometimes confluent on the sides; hind tibiæ pale red, paler toward the base, the extreme tip of which is black.

Length of body, ♂, 16 mm.; ♀, 22.25; of antennæ, ♀, 9.25 mm.; of tegmina, ♂, 16 mm.; ♀, 18 mm.; of hind femora, ♂, 11.5 mm.; ♀, 1.35. 1 ♂, 1 ♀, Glencoe, Dodge Co., Nebraska, G. M. Dodge.

ENTOMOLOGICAL NOTES

V

BY

SAMUEL H. SCUDDER

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REMARKS ON SOME REMAINS OF INSECTS OCCURRING IN CARBONIFEROUS SHALE AT CAPE BRETON.

They were all found upon a single small fragment of stone, and consist of wings of cockroaches (not very uncommon in carboniferous strata) and the well preserved remains of the abdomen of a larval dragon-fly.

Heretofore the earliest indubitable remains of dragon-flies have come from the Lias, several fragments of wings, as well as perfect wings, a head and part of an abdomen having been figured by Rev. Mr. Brodie in his work on the fossil insects of the secondary rocks of England. Goldenberg, however, figures¹ an obscure insect (of which he only says it is possibly a *Termes*, but to which, in a subsequent work he gives the name *Termes Hagenii*), which also is perhaps the larva of a dragon-fly; this was found in the carboniferous beds of the neighborhood of Saarbrücken in the valley of the Rhine. Further I exhibited to this Society some years ago, from the Carboniferous of Cape Breton, a photograph of a curious insect's wing, which I called *Haplophlebium Barnesii*, and which had the general aspect of a dragon-fly's wing, but differed from it in several essential features; it is not impossible that the body now exhibited may prove

¹ Dunker and Meyer's Palæontogr., IV, pl. vi, fig. 8.

the larva of that very insect, so much does it differ from the ordinary type of dragon-fly larvæ. The wing of *Haplophlebius* came from Little Glace Bay, Cape Breton, and was found by Mr. James Barnes. The abdomen now under consideration comes from Cossett's Pit, Sidney, Cape Breton, and from near the horizon of the Millstone Grit, as I am informed by Principal Dawson, to whom I owe the opportunity of studying this interesting fossil. The specimen was found by Mr. A. J. Hill. In both instances the insects are accompanied by fronds of *Alethopteris*, but of distinct species.

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NOTICE OF A SMALL COLLECTION OF BUTTERFLIES MADE BY MR. ROLAND THAXTER, ON CAPE BRETON ISLAND.

The species are but fourteen in number, and were all taken on Cape Breton Island. The two *Urbicolæ* and *Eurymus Philodice* were also taken at Shédiac. The species are the following:—

<i>Basilarchia Arthemis</i> .	<i>Chrysophanus Epixanthe</i> .
<i>Aglais Milberti</i> .	<i>Heodes americana</i> .
<i>Argynnis Cybele</i> .	<i>Eurymus Philodice</i> .
<i>Argynnis Atlantis</i> .	<i>Pieris rapæ</i> .
<i>Brenthis Myrina</i> .	<i>Pieris oleracea</i> .
<i>Phyciodes Tharos</i> .	<i>Limochores Taumas</i> .
<i>Rusticus Scudderii</i> .	<i>Polites Peckius</i> .

The following are the only ones worthy of special notice:

Argynnis Cybele. A single specimen was taken, whose fore-wing measures 37 mm. in length. It has the unmistakeable markings of *A. Cybele*, which has never before been taken so far north.

Rusticus Scudderii. Two males and two females were taken. The males do not differ from the usual form, except in having the

markings of the under surface rather heavier. But the two females are undersized, measuring but 21 mm. in expanse; one of them has but few, and the other no, blue scales on the disk above; neither of them has a trace of any orange spots upon the outer border of the hind wings above, and very little, or no tinge of orange upon the outer border of the fore wings beneath. In all these respects, specimens from the southern coast of Labrador agree better with those from Canada and New York than with those from Cape Breton.

Chrysophanus Epixanthe. Whether *Dorcas* is distinct or not, I do not now venture to assert, but the specimens from Cape Breton belong to *Epixanthe*, and not, as we should expect, to the *Dorcas* type.

Eurymus Philodice. The most interesting insect brought home by Mr. Thaxter is unquestionably our common *E. Philodice*. The males hardly differ at all from the normal type, as found in New England, excepting in possessing a less conspicuous spot at the extremity of the cell in the fore wings above, although there, as here, it varies to a considerable extent. In both sexes it is usually a very pale orange transverse spot, edged narrowly with dusky scales. The female, too, is dimorphic in both places, but whether yellow or pallid, Cape Breton specimens invariably show a uniform and considerable departure from the normal type. New England individuals have a very broad, dark border to the upper surface of the fore wings, extending down to the inner border, almost or quite as conspicuously as in the male, although not extending along this border toward the base; this marginal band encloses a curving submarginal series of ill-defined yellow (or pallid) spots; it is only occasionally so narrow that the spots are situated at its very edge; so, too, there is a marginal band upon the hind wings, like that of the males, though narrower, often broken, and with an ill-defined interior edge; this, however, is occasionally reduced to a few scattered grimy scales between the upper subcostal and middle median nervules, very much as appears in the female of *Eurymus Pelidne*, when they are present at all. Now in the females before me, from Cape Breton, the marginal band of the hind wing is either totally absent, or is reduced to a few scales clustered about the extremity of the subcostal nervules, and is, in only a single instance, continuous along the border between these nervules; while the border of the fore wing, broad indeed next the costal margin, narrows rapidly, and terminates usually at the lower median nervule, or, if it reaches to the submedian nervule, it

is only by a few scattered grimy scales in the intervening interspace; the row of submarginal yellow (or pallid) spots would seldom be noticed, at least below the subcostal interspaces, but for a comparison with the normal type, or its continuance in the broader part of the band above. This is precisely what we find in *Eurymus Pelidne*, and so far as the upper surface of the pallid female is concerned, this species could scarcely be distinguished from the monomorphic *E. Pelidne*. The under surface of the Cape Breton insect, however, is dotted but lightly with griseous, and can be compared only to that of the true *E. Philodice*; although the submarginal spots of the hind wings, which are usually very conspicuous in New England specimens, never occur along the outer border in either sex of the Cape Breton type. The dimorphic pallid female, then, of the Cape Breton form of *Eurymus Philodice* approaches more closely the uniformly pallid female of the Labradorian *E. Pelidne*, than it does the normal dimorphic pallid female of its own species from New England. The gynandromorphic female of *E. Philodice*, whether of Cape Breton or of New England, finds, however, no parallel in Labrador, and the Cape Breton male agrees only with the *Philodice*-type. It should be added in this connection that the butterfly collected by Prof. Hamlin at Waterville, Me., on the strength of which I have once or twice in my list referred *Eurymus Pelidne* to northern New England, is nothing but the pallid female of this Cape Breton type, to which I would give the varietal name *laurentina*. Thirty-nine specimens were collected, of which ten were gynandromorphic females, eight pallid females, and the rest males.

Limochores Taumas. Specimens from this region, as shown both by Mr. Thaxter's collections, and others sent me several years ago by Mr. J. M. Jones, of Halifax, are remarkable for their smaller size, and the almost total absence of dull fulvous dusting upon the under surface of the hind wings, the upper and under surface being almost precisely alike in general tint.

A CENTURY OF ORTHOPTERA. DECADE V.—FORFICULARIÆ
(EXOTIC).

41. *Cylindrogaster nigra*. Head black, minutely punctate, somewhat tumid, thinly covered posteriorly with short castaneous bristles; in front, opposite the upper base of the antennæ, a pair of tau-shaped smooth sulcations, their convexities inward, approaching nearest each other above, and between them, and a little above, a slightly transverse impression; mouth-parts reddish fuscous; antennæ dark reddish brown, the basal joint blackish. Prothorax and mesothorax black, punctate, covered, especially next the borders, with recumbent castaneous bristly hairs; the prothorax with a slight median impression on its anterior half, and on either side two short similar longitudinal impressions from the front edge backward. Femora blackish, the distal extremity and the extreme base of tibiæ luteous; rest of legs castaneous, darkest in middle of tibiæ. Abdomen black, covered beneath profusely, above scantily, with castaneous hairs, golden in a certain light; last segment angularly produced a little above the base of each of the forceps; these are short, conical, curved inward throughout, rather sharply pointed, unarmed. Length of body, excl. forceps, 11 mm.; length of forceps, 18 mm. Described from a single female from Para.

Neither Stål nor Dohrn, the only writers who have treated of the species of this genus, appear to have seen the female. In the one above described, and another which I refer with some doubt to *C.*

gracilis Stål, the structure of the abdomen is very different from that of the male. The ultimate, penultimate, and to some extent the antepenultimate dorsal segments are extremely short; and the forceps also being short, it has the appearance of being partially withdrawn within the body; the extremity of the abdomen is thus suddenly, bluntly rounded, and the last segment, instead of being conspicuous, as in the male, is scarcely visible at all above; beneath it is rather shorter than the others, its extremity broadly and regularly convex. As the tegmina and wings of both the females are wanting they may be immature, but they are otherwise so perfectly formed, and the metathorax resembles so closely that of the wingless genera, that I take them for perfectly developed insects, and conclude that the females of this genus are apterous.

42. *Labidura auditor*. This species differs from *L. riparia* principally in the character of the forceps. In the male these are more strongly and regularly arcuate than in *L. riparia*, not in the least curved upward, but lying in a horizontal plane, the middle tooth small, and scarcely affecting the curve of the interior edge of the forceps. In the female they curve downward rather than upward, and curve inward toward the tip more strongly than usual in *L. riparia*. The wings in both sexes are altogether wanting. In size, color, markings and sculpture, it altogether resembles *L. riparia*. 1 ♂, 1 ♀. Natal.

43. *Chelisoches comprimens*. Head piceous, smooth, the middle of the front a little tumid; mouth-parts dark reddish brown; basal joint of antennæ blackish, joints two to thirteen gradually growing paler, the three following pale yellow, and the remaining (eight or more) pale brownish fuscous. Prothorax blackish castaneous, the sides slightly marginate, a distinct sharp median sulcation and a dull semicircular sulcation uniting the front outer angles. Tegmina and exposed part of wings dark castaneous, the latter less than half as long as the former, together twice as long as the prothorax; tegmina docked with a sinuous curve, much as in *C. morio* (Fabr.). Legs dark castaneous, the tarsi luteous. Abdomen dark castaneous, profusely punctate, the posterior edges of the segments indistinctly beaded; lateral plications of second and third segments more distinct than in *C. morio*, and the whole abdomen not so slender as in that species. Forceps almost precisely as in *C. morio*, rather longer, and of the color of the abdomen. Length of body, 12 mm.;

of antennæ, 13 mm.; of tegmina and wings, 5.75 mm.; of hind femora, 3.3 mm.; of forceps, 5.75 mm. 1 ♀. Africa.

I propose the above generic name (derived from *χηλή* 'οχέω) as a substitute for *Lobophora* Serv., which is preoccupied in Lepidoptera (Curtis, 1825). *Forficula morio* Fabr. is the type.

44. *Ancistrogaster arthritica*. Head, antennæ, thorax, tegmina, wings and legs, covered uniformly and sparsely with short, fine erect hairs. Head and pronotum shining blackish brown, the head with a reddish tinge; antennæ very dark chestnut brown, the mouth parts a little lighter; between the base of the antennæ the front has a pair of triangular, rather deep impressions. Pronotum slightly longer than broad, the sides parallel, the posterior angles distinct, the hind border gently convex; there is a distinct median impression half as long as the pronotum, a little in advance of the middle. Tegmina and wings very dark chocolate brown, the latter with a small luteous spot almost concealed by the tegmina; tip of the tegmina squarely docked. Femora dark brown, the rest of the legs dirty luteous, the tarsi slightly paler. Abdomen dark testaceous above, dark castaneous below, darkest at the sides, on both surfaces profusely and uniformly punctulate; the abdomen broadens in the middle, and besides, the edges of the fourth to the sixth segments expand into lateral depressed teeth of considerable size, curved backward and shaped somewhat as in *A. luctuosa* Stål. They are first directed outward and a little backward, the hinder two with their anterior edges slightly and roundly excised, but otherwise suffering but little diminution in width; and then they bend suddenly backward and taper to a point, each with a greater or less angulation at the bend, most marked in the hinder two; the outer portion of the upper is nearly twice as long as that of the lower, and hence slenderer, and the middle one stands midway in character between the other two. The forceps have the general shape of those of *A. luctuosa*; the basal tooth, in the same place, is very slight and blunt, and is followed posteriorly by two or three granulations; the apex, which is finely pointed, is armed a little before the tip by a slightly recurved small triangular lamellate tooth, before which the edge is sparsely, beyond which it is densely pilose. Length of body, 10 mm.; of tegmina and wings, 5 mm.; of hind femora, 3.5 mm.; of front lateral abdominal tooth, 1.5 mm.; of forceps, 4.75 mm. 1 ♂. Brazil.

45. *Forficula variana*. Head and pronotum luteo-castaneous, the sides of the latter paler. Head smooth, with an oblique, broad,

and rather shallow straight sulcation, extending from the middle of the inner side of the eye backward and inward, nearly following the suture; mouth parts dirty luteous, the palpi darker at base; antennæ 13-jointed, brownish luteous, slightly duskier at the tips of the joints, very minutely pilose. Pronotum smooth, a little depressed in the middle, especially at the sides, with a slight median impressed line; it is a little longer than broad, with the sides very nearly parallel, but diverging slightly; posterior edge a little convex, the posterior angles pretty distinct. Tegmina nearly twice as long as the pronotum, squarely docked at the apex, smooth, brownish fuscous on the inner, pale luteous on the outer half; closed wings extending beyond the tegmina by a distance nearly equal to the width of the pronotum, luteous, the inner edge blackish fuscous, more broadly in front than behind. Legs luteous, the tarsi paler, the femora tinged with castaneous. Abdomen piceous, the last joint or two dark castaneous, the whole sparsely punctate. Pygidium squarely and smoothly docked at the tip. Forceps luteous at base, blackish in the middle, dark castaneous at the tip. They are rather simple, flattened cylindrical, directed toward each other at the extreme base so as to become attingent, beyond straight, curving inward at the pointed tip; within they have a basal triangular expansion, beyond which the inner edge is straight to the curved tip, and finely crenulato-denticulate. Length of body, 8.75 mm.; of antennæ, 6 mm.; of tegmina and wings, 3.25 mm.; of hind femora, 2 mm.; of forceps, 2.75 mm. 1 ♀. Liberia.

46. *Forficula vellicans*. Head luteo-castaneous, smooth, slightly tumid; labrum dusky; palpi dull luteous; antennæ dark brown at base, growing paler beyond, 12-jointed, sparsely pilose. Pronotum quadrate, longer than broad, luteo-castaneous, uniformly and slightly tumid, the sides parallel, a little marginate, the middle with a faintly impressed longitudinal line, the hind margin slightly convex, all the angles square. Tegmina about half as long as the pronotum, squarely docked at the extremity, smooth, dull luteous, the inner edge sometimes a little dusky; wings wanting. Legs luteous; the femora, especially the hind femora, a little infuscated. Abdomen rather dark castaneous, profusely and rather finely punctate throughout, above and below; pygidium small, squarely docked, minutely trifid. Forceps simple, about two-thirds as long as the abdomen, flattened cylindrico-conical, attingent, nearly straight, but a little upcurved, the pointed tips incurved; inner edge slightly

rugulose. Length of body, 11.75 mm.; of antennæ, 8.5 mm.; of tegmina, 2.75 mm.; of hind femora, 3.25 mm., of forceps, 4 mm. 2 ♀, Brazil.

47. *Forficula luteipes*. Dark castaneous, smooth, slightly tumid; palpi luteo-fuscous, the tips dusky; antennæ (broken) very dark fuscous brown at base, paler brown beyond, sparsely pilose. Pronotum quadrate, scarcely longer than broad, dark castaneous, slightly tumid, the sides straight, flattened, scarcely margined, much lighter colored than the middle, a very faintly impressed median line; the posterior border gently convex. Tegmina fully half as long again as pronotum, dull luteous, broadly margined interiorly with fuscous, the tip squarely docked; wings projecting but little beyond the tegmina, the projecting portion about half as long as the pronotum, colored like the tegmina. Legs uniform luteous. Abdomen very dark castaneous, not punctate, but transversely wrinkled with exceedingly fine short wavy lines, occasionally reduced to punctæ. Pygidium small, trifid, the middle tooth larger than the others. Forceps simple, scarcely more than half as long as the abdomen, slightly depressed, cylindrico-conical, attingent, nearly straight, but scarcely upcurved; the pointed tips incurved, the inner edge minutely denticulate. Length of body, 10.25 mm.; of tegmina and wings, 3.25 mm.; of hind femora, 2.5 mm.; of forceps, 3 mm. 2 ♀. Brazil.

This species is closely allied to *F. vellicans* Seudd., differing from it principally in the presence of wings, the non-punctate abdomen and the shorter forceps.

48. *Forficula variicornis*. Head black, with a reddish tinge, with a pair of puckered impressions dividing pretty equally the space between the upper bases of the antennæ; palpi brownish luteous; antennæ 10-11 jointed, the basal three or four joints brownish luteous, the penultimate joint pale luteous, all the others dark brown, verging toward black, all sparsely pilose. Pronotum quadrate, scarcely longer than broad, equal, the sides straight, the hind border gently convex; the middle of the anterior half a little tumid, with an impressed median line, which beyond the intumescence changes to a slight carina; blackish brown, the sides broadly, and the hind border narrowly dull luteous. Tegmina about twice as long as the pronotum, of a rich dark brown, the tip squarely docked. Projecting part of wings of same color, tipped interiorly and minutely with luteous, extending beyond the tegmina to a distance nearly

equal to the width of the pronotum. Legs dull luteous, more or less obscured with fuscous, especially just before the tip of the femora. Abdomen very dark mahogany brown, the lateral plications of second and third segments very prominent, forming blunt conical tubercles; surface of abdomen nearly smooth; last dorsal segment in both sexes with a minute circular central depression. Forceps of male nearly three-quarters as long as the abdomen, flattened beneath, directed at first, for a short distance, horizontally and slightly outward, then, at a superior constriction, bent slightly upward and slightly inward to the incurved tip, which by a sudden constriction at its base resembles a claw; the lower inner edge of the upturned portion is distantly and very delicately denticulate, and the middle of the upper surface bears a large, laminate, compressed, triangular pointed tooth; forceps of female simple, slender, approximated at the base, and beyond attingent and straight to the finely pointed incurved tip; they are nearly horizontal but regularly curved, first downward and then upward, minutely denticulate along inner edge. Length of body, 9 mm.; of antennæ, 7 mm.; of wings and tegmina, 3.5 mm.; of hind femora, 2.5 mm.; of forceps, 3.5 mm. 3 ♂, 4 ♀. Brazil.

49. *Forficula hirsuta*. Head dark mahogany brown, the front tumid, with a pair of short longitudinal furrows dividing the space between the antennæ; palpi dull luteous; antennæ (broken beyond fifth joint) uniformly dark mahogany brown. Pronotum as in *F. variicornis*, but uniformly reddish black, the sides slightly elevated. Tegmina dark reddish brown, twice as long as the pronotum, squarely docked at tip; wings of same color, scarcely tipped with dirty luteous. Femora uniform dark reddish brown; rest of legs dull luteous. Abdomen dark reddish brown, the posterior edges of the segments blackish, the lateral plications of the second and third segments prominent, the surface profusely, minutely and transversely punctato-striate with abbreviated striæ, the last segment with a short median longitudinal impression. Head, antennæ, prothorax, base and lower edge of tegmina, exposed part of wings, legs and abdomen rather sparsely covered with moderately long pile. Forceps nearly as long as the abdomen, very slender, cylindrical, approximated at base, beyond attingent, straight to the incurved pointed tip. Length of body, 9.75 mm.; of tegmina and wings, 4.5 mm.; of hind femora, 2.9 mm.; of forceps, 4 mm. 1 ♀. Brazil.

This species is closely allied to *F. variicornis* Scudd., differing

from it principally in the uniform and dark coloring of the antennæ and femora, the hirsuteness of the whole body, the punctate abdomen and the slender forceps.

50. *Labia arcuata*. Head black, slightly tumid, very minutely rugulose, covered with very short pile, palpi dark brown; antennæ with eleven joints, pilose, blackish brown, the terminal half of the apical joint pale. Pronotum black, the sides scarcely tinged with testaceous, quadrate, scarcely longer than broad, scarcely narrowing posteriorly, the sides straight, the posterior angle well marked, hind edge gently convex; the front half slightly tumid, with a median impressed line, the rest flat. Tegmina glistening black, covered with short pile, more than twice as long as the pronotum, each as broad as the pronotum, the apex roundly excised; exposed part of wings slender, almost pointed, black, nearly as long as the pronotum. Legs dark brown, the apical half of tibiæ and tarsi growing lighter. Abdomen dark mahogany brown above, blackish at the sides, castaneous below, covered wholly with short pile. Pygidium very broad, bifid, with large teeth. Forceps about a third as long as the abdomen, strongly arcuate, trigono-arcuate on basal, straighter half; beyond flattened cylindrical, bent inward, nearly straight, and the apex pointed and not incurved; the inner surface is nearly flat, with an upper and lower edge; the upper edge is smooth, with a minute tooth near the base; the lower edge has a larger triangular laminate tooth slightly further from the base, and directed a little downward. Length of body, 6.4 mm.; of antennæ, 4.1 mm.; of tegmina and wings, 3 mm.; of hind femora, 1.3 mm.; of forceps, 1.6 mm. 1 ♂. Vassouras, one hundred miles north of Rio, Brazil, taken March 5. (B. P. Mann.)

A CENTURY OF ORTHOPTERA. DECADE VI. — FORFICULARIÆ
(N. AMERICAN).

51. *Neolobophora volsella*. Head smooth, glistening, vinous red, the eyes piceous, and the front strongly obscured with blackish, sutures of the head deeply impressed, and either hemisphere of the occiput intumescent; antennæ blackish fuscous, gradually growing a little paler toward the tip, the basal joint often tinged with reddish; thorax and abdomen piceous, the sides of the prothorax dull luteous. Prothorax smooth, with very delicate and faint infrequent transverse furrows, and a very slight median sulcation.

Tegmina slightly longer than broad, the hinder edge cut obliquely in a gentle curve, so that when at rest the combined hinder edges form a slight concave curve. Wings wanting. Legs luteous, the apical half of the fore and middle femora and the apical third of the hind femora black, or blackish fuscous. Abdomen very distantly and very minutely punctulate, each pit giving rise to a minute short hair. Forceps long and very slender, those of the female nearly as long as the abdomen, attingent, subquadrate, straight until close to the tip and then curved slightly inward, unarmed, vinous red, slightly obscured at the tip; those of the male nearly twice as long as the abdomen, the basal half subquadrate, very slightly bowed in opposite directions, the inner edges delicately toothed or granulate, with a slight but distinct tooth in the middle, beyond which the arms of the forceps are subcylindrical, subattingent, and have the curve of the female; the basal half is mostly vinous red, more or less obscured, especially toward the tip, the apical half blackish. Length of body excluding forceps, 12-13 mm.; of antennæ, 8.5 mm.; of tegmina, 2.5 mm.; of hind femora, 3.5 mm.; of forceps, ♂, 10.5 mm., ♀, 5.25 mm. Described from 4 ♂, 3 ♀, taken by Sumichrast (No. 6) in the mountains about Orizaba, Mexico, under bark in the month of January. Smithsonian Institution.

In describing this genus I stated that the terminal segment of the abdomen was alike in both sexes; this is not strictly true, that of the female narrowing much more rapidly than that of the male. I also compared it with the old world *Lobophora*, but failed at the time, for want of proper material, to see its much closer affinity to *Nannopygia*.

52. *Thermastris Chontalia*. Head black, the mouth parts luteo-fuscous, obscured with blackish. Antennæ with more than thirty-four joints, the first and third joints stouter and shorter than in *T. brasiliensis*, the first twelve and thirteen joints blackish fuscous, beyond growing paler fuscous. Prothorax and tegmina blackish brown, with very distant, short, stout, tapering hairs; pronotum nearly flat, with a very obscure median longitudinal depression; tegmina sinuously and obliquely docked at tip, twice as long as the prothorax; the projecting portion of the wings, as in the other species of the genus, is covered with hairs like those on the tegmina, and squarely docked at extreme tip, but unlike the other species is of the same color as the tegmina, with very slightly paler inner edge. Legs dirty yellowish brown; the femora covered sparsely with spinous hairs, the tibiæ and tarsi blackish above. Abdomen dull castaneous, rugulose, the last

dorsal segment with a broad median depression, and the hinder edge scarcely produced angularly over each of the arms of the forceps. Forceps flattened triquetral, moderately stout, as long as the tegmina, straight nearly to the tip, then rather sharply incurved to a bluntly pointed tip; inner double edge irregularly but rather frequently toothed, larger at base than beyond, but furnished with a not very conspicuous broad triangular laminate tooth just beyond the middle. Length of body, 18.5 mm.; of antennæ, 15 mm.; of tegmina and folded wings, 7.75 mm.; of hind femora, 4 mm.; of forceps, 6.25 mm. 1 ♀. Chontales, Nicaragua.

This species differs distinctly from *T. brasiliensis* and *T. Saussurei* in having longer forceps and nearly uniformly dark wings, of the color of the tegmina.

53. *Spongophora forfex*. Dark castaneous brown, the mouth parts scarcely paler, the antennæ castaneous, becoming infuscated beyond the base. Legs luteo-castaneous, the front of the femora blackish fuscous; exposed part of wings pale mahogany brown; tip of the tegmina obliquely docked, slightly and roundly excised, and next the inner edge strongly produced; posterior edge of the abdominal segments with a series of closely crowded minute notches; terminal segment rugulose, with granulations, which are absent from the two stripes down the middle, grow larger and more abundant posteriorly, and bead the posterior edge. Forceps reddish, nearly as long as the body, depressed cylindrical, very slender, nearly straight, slightly incurved on the basal half, beyond straight and then incurved at the tip, the extremity of which is pointed; the inner edge is slightly rugulose, and just before the middle has a slight tooth. Length of body, 22 mm.; of tegmina and wings, 9.5 mm.; of hind femora, 4.25 mm.; of forceps, 19 mm. 1 ♂ from the collection of Dr. Schaum; the locality is unknown, but is doubtless some part of tropical or subtropical America. It belongs to the group of *S. parallela* (Westw.) and *S. proluxa* (*Psalid. parallela* Dohrn nec Westw.), but differs from them in coloration, and in the structure of the forceps.

54. *Ancistrogaster gulosa*. Head very dark castaneous brown with very thin short pile on the occiput; antennæ 12-jointed, pale brown, the basal joint darker; palpi pale brown. Pronotum dark brown, the sides dull luteous, slightly broader than long (♂), or of equal length and breadth (♀), the sides slightly convex, slightly narrowing posteriorly, the posterior margin well rounded; broadly depressed just behind the centre with a faintly impressed median line

and two short longitudinal lines on either side in front; covered throughout with thin pile, as also are the tegmina and wings; tegmina uniform dark brown, squarely docked at the tip, about twice as long as the pronotum, the wings dull luteous. Femora rather light brown, covered sparsely with short pile, the tip paler; tibiæ dirty luteous, tarsi pale yellowish. Abdomen dark brown, finely and sparsely punctulate, the punctulations giving rise to short, fine golden hairs, which also cover the forceps; sides of the fourth and fifth abdominal segments produced posteriorly to sharp angles, but inconspicuous; the abdomen itself broadens and thickens regularly on the first three or four segments, and then narrows more rapidly, and the sides of the last segment are parallel. Forceps of female straight, simple, attingent, curving inward at tip and pointed, unarmed excepting a slight denticulation on the inner edge. Those of the male resemble in their general direction those of *A. arthritica* Scudd., but are more strongly bent near the base; at the extreme base the inner edge bears a prominent, rather stout pointed triangular tooth, and the lower inner edge beyond it is rudely denticulate; the forceps are not depressed as in *A. arthritica*, but trigono-cylindrical, the inner surface flat; but at the tip, which does not diminish in size, they become flattened, and terminate in a nearly straight edge, those of the opposite arms meeting; either end of the blade developing a pointed tooth, the preapical one small and bifid, the apical rather long and incurved. Length of body, 10.5–13 mm.; of antennæ, 11 mm.; of tegmina and wings, 4.5 mm.; of hind femora, 4 mm.; of forceps, ♂, 4.5 mm., ♀, 3.1 mm. Described from 5 ♂, 1 ♀, taken by Sumichrast (No. 4) in Puebla, Mexico (terra frigida) in January. Smithsonian Institution.

55. Forficula vara. Head dark mahogany brown, palpi and antennæ dark luteous, the latter 11–12 jointed; head smooth, full, devoid of impressions. Pronotum subquadrate, scarcely as long as broad, dark reddish brown, the sides lutescent, the front border straight, the sides straight and parallel, the posterior angles broadly rounded; the surface smooth, with a scarcely apparent median sulcation. Tegmina dark brown with a reddish tinge, a little longer than the pronotum, docked with a slight obliquity; wings wanting. Legs luteous, the outer edge of the tibiæ dusky. Abdomen dark mahogany brown, stout and plump, very slightly larger in the middle than at either extremity in the male, enlarging slightly to the fifth dorsal segment, and then suddenly tapering in the female; surface nearly

smooth beneath, thinly pilose; last dorsal segment squarely docked in the ♂, the forceps strongly bowed and widely distant; at base these are flattened, directed outward and upward; then, a little before the end of the basal third, they are turned inward and curve downward and again upward, becoming flattened trigonate, and tapering to a blunt point; the inner edge is rather rudely but minutely denticulate near the base, beyond more or less crenulate; the forceps of the ♀ are simple cylindrico-trigonate, attingent, straight, slightly incurved next the pointed tip, minutely denticulate along the inner edge. Length of body, ♂, 8-9.75 mm., ♀, 7-8 mm.; of antennæ, 6 mm.; of tegmina, 1.5-2 mm.; of hind femora, 2.1-2.8 mm.; of forceps, ♂, 2.9-3.4 mm.; ♀, 2-2.6 mm. Described from 9 ♂, 8 ♀, collected by Sumichrast (No. 2) at Puebla, Mexico (terra frigida), in January. Smithsonian Institution.

This species approaches more closely to the European *Forf. bipunctatâ* Fabr. than any known to me, but it still preserves the characteristic features of the true *Forficulæ* and not of the genus *Anechura*, which I shall propose in another paper for the European species mentioned.

56. *Forficula tolteca*. Head dull castaneous, smooth, but sparsely pilose, slightly tumid, with a transverse brace-shaped slight sulcation between the antennæ; palpi dirty luteous; antennæ with the basal joint dirty luteous, beyond light brown, the tenth pale, excepting at the extremities (beyond broken). Pronotum rufo-luteous, dull luteous at the sides, scarcely broader than long, well rounded posteriorly, with a slightly impressed median line on the anterior, and a slight carina on the posterior half, the whole flat, sparsely pilose. Tegmina dark brown, twice as long as the pronotum, squarely docked at the extremity, sparsely pilose; the exposed part of the wings dull luteous, more or less infuscated on the borders, sparsely pilose, as long as the pronotum. Legs luteous, sparsely pilose, the femora slightly and broadly fuscous toward the tip, the tibiæ still less so toward the base. Abdomen rather short and full, with convex sides, dark castaneous, more or less blackish toward the sides, very delicately and transversely striate, more or less pilose, the lateral tubercles rather prominent. Forceps more than half as long as the abdomen, depressed cylindrical, simple, straight, attingent, incurved at the tip, and very sharply pointed, sparsely pilose throughout, the inner edge very finely denticulate. Length of body, 8 mm.; of tegmina and wings, 3 mm.; of hind femora, 2.75 mm.; of forceps, 2.4 mm. 2 ♀. Mexico, Sumichrast. (Smithsonian Institution.)

57. *Forficula exilis*. Head mahogany brown, smooth, the middle of it slightly tumid, with a pair of broad shallow oblique sulcations between the antennæ, meeting each other above and forming a $\wedge$; labrum dusky; palpi brownish luteous, paler toward tip; basal joint of antennæ mahogany brown; remaining joints (at least as far as the ninth) reddish brown. Pronotum luteous, rufous in the middle, quadrate, slightly longer than broad, scarcely broader posteriorly, the sides straight, the posterior border gently convex, the surface smooth, flat, a little depressed excepting down the middle, which bears an impressed line, fading posteriorly. Tegmina nearly twice as long as the pronotum, luteous, duskily bordered on the inner side; wings scarcely extending beyond the tegmina, similarly colored; legs luteous, the femora slightly tinged with brown. Abdomen very slender, the sides scarcely convex, very dark mahogany brown, the surface minutely and sparsely punctulate; last segment quadrate, the posterior area deeply transversely depressed in the middle, with a slight short longitudinal impressed median line at the anterior limit of the same, preceded by a pair of submedian, almost equally short, very faintly impressed lines; the depression is bordered laterally next base of either arm of forceps by a blunt tubercle. Forceps rather simple, as long as the last four or five dorsal segments, rather broad at base, narrowing suddenly beyond, and then depressed cylindrical, slender and tapering, gently incurved and finely pointed; inner edge slightly tuberculato-denticulate, especially on the basal half, a slightly larger tubercle at the middle of the apical half. Pygidium a pointed flattened triangular lamina. Length of body, 10.5 mm.; of tegmina and wings, 2.5 mm.; of hind femora, 2.1 mm.; of forceps, 3.75 mm. 1 ♂. Texas; received from Mr. P. R. Uhler.

58. *Forficula aculeata*. Head uniform rather dark castaneous, smooth, gently tumid, with a pair of oblique, slightly bent impressions between the antennæ; palpi luteous; antennæ 12-jointed, dark brown, becoming paler away from the base, the extreme tips of some of the basal joints marked with blackish. Pronotum rather dark castaneous, the sides transparent and nearly colorless, quadrate, noticeably longer than broad, the sides parallel and straight, the hind border a little convex with rounded posterior angles, the surface smooth, nearly flat, with a broad and very shallow transverse postmedian impression, and a slight impressed longitudinal line about half as long as the pronotum, starting from a little behind the front edge. Tegmina nearly twice as long as the pronotum, squarely

docked at the tip, smooth, luteous, with the inner half, or nearly as much, obscured more or less heavily with fuscous. Wings wanting. Legs uniform luteous. Abdomen dark mahogany brown, sometimes varying to black, with the sides of the second and third segments blackish, the lateral plications of the third segment rather prominent, all the segments but the last finely punctate, the last as *F. californica* is described by Dohrn. Forceps of female rather more than half as long as the abdomen, simple, slender, attingent, straight to the incurved tip, the inner edge quite straight to the tip, minutely denticulate; those of male about three-quarters as long as the abdomen, the basal fourth moderately stout, triquetral, distant, directed slightly outward and bent at the very base downward, the remainder bent inward, but continuing the downward direction until near the horizontal tip, cylindrical, slender, nearly equal, until a little beyond the middle of the outer half, where at the emission of an inner rather stout tooth, it tapers to a fine point, begins an inward curve and takes on the horizontal direction; the inner side is edged, at base laminate, and rather finely denticulato-tuberculate. Pygidium of ♀ stout, bluntly trifid, of ♂ very slender, acicular, half as long as the last segment. Length of body, 10.75 mm.; of antennæ, 7.5 mm.; of tegmina, 3.1 mm.; of hind femora, 2.8 mm.; of forceps, ♂, 5 mm., ♀, 3.5 mm. 3 ♂, 5 ♀ from N. York (Coll. Uhler), Northern Illinois (Kennicott), Southern Michigan (Prof. M. Miles, No. 124). A single specimen is marked "Cuba?"

This species is closely allied to *F. californica* Dohrn, judging from the description, but differs from it in the total want of wings, and the structure of the male forceps. It appears also to be nearly allied to *F. pulchella* Serv., a species I do not know, but the absence of wings in our species prevents its reference to it. *F. pulchella* is possibly a *Labia*.

59. *Labia rotundata*. Head dark mahogany brown, darkest below, but the labrum lighter, uniformly and slightly tumid; palpi reddish brown, darkest on the apical half; antennæ more than 10-jointed, the basal joint reddish brown, beyond a little duskier, the whole briefly pilose. Pronotum nearly as broad as the head, reddish luteous, paler at the sides, scarcely longer than broad, the posterior angles very broadly rounded, but the hind margin otherwise straight; it is depressed excepting in the middle of the front half, on which is a finely impressed median line; lateral edges almost marginate. Tegmina about half as long again as the pronotum, dull brownish

luteous, squarely docked at tip; wings extending but a little beyond the tegmina, blackish. Legs luteous. Abdomen very broadly expanded, the sides unusually convex, blackish brown above, the apical joints and whole under surface mahogany brown; surface very finely longitudinally striate. Pygidium large, truncate, conical; forceps scarcely one-third the length of the abdomen, simple, widely separated, cylindrical, straight, incurved at tip, finely pointed, briefly pilose, wholly unarmed. Length of body, 6 mm.; of (ten joints of the) antennæ, 2.75 mm.; of tegmina and wings, 2 mm.; of hind femora, 1.6 mm.; of forceps, 1.5 mm. 1 ♀. Mexico.

60. *Labia brunnea*. Head rather dark castaneous, smooth, slightly tumid, with two faint, broad, short, shallow, nearly longitudinal impressions between the antennæ; mouth parts luteo-castaneous. Antennæ 11-jointed, luteo-castaneous. Pronotum nearly as broad as the head, scarcely broader posteriorly than anteriorly, of equal length and breadth, quadrate, the posterior angles rounded, and the hind border otherwise straight, slightly tumid anteriorly, with a slight median impressed line, which posteriorly is supplanted by a pair of closely approximated similar lines, rather dark castaneous, broadly bordered on the sides and hind margin with luteous, which is separated from the castaneous by a blackish fuscous belt. Tegmina castaneo-fuscous, darkest next the base, fully half as long again as the pronotum, squarely docked at the tip; wings rudimentary, useless. Legs castaneo-luteous, the femora slightly infuscated. Abdomen dark castaneous, the posterior borders of the segments marked with blackish, the sides of the abdomen somewhat convex, the lateral plications of second and third segments rather slight, the surface very finely and faintly punctulate. Pygidium of male very coarse and stout, bluntly conical and truncate. Forceps of male more than half as long as the abdomen, simple, trigono-cylindrical, a little depressed, rather stout, horizontal, gently incurved, with a basal and preapical slight triangular depressed pointed tooth on the inner edge; the apex bluntly pointed, depressed. Forceps of female (pupa) about one-third as long as the abdomen, simple, straight on the middle half, but as a whole slightly sinuate, horizontal, depressed, but broadly ridged above, the inner edge delicately toothed, fading out toward tip. Length of body, 6.5 mm.; of antennæ, 2.8 mm.; of tegmina, 1.5 mm.; of hind femora, 1.5 mm.; of forceps, ♂, 2.25 mm., ♀ (pupa), 1.6 mm. 1 ♂, 1 ♀. Cuba (P. R. Uhler).

DESCRIPTION OF THREE SPECIES OF LABIA FROM THE SOUTHERN UNITED STATES.

Labia guttata. Head castaneous black, the labrum dark luteous and the parts above luteo-castaneous; surface smooth, shining, a little tumid, with two pair of inconspicuous punctæ, one above the other, between the antennæ; palpi luteous; antennæ 12-13-jointed, luteous at base, growing infuscated beyond, the apical half brownish fuscous, the whole sparsely pilose. Pronotum slightly narrower than the head in front, of equal width with it behind, of the color of the head, with sides narrowly, but distinctly, and hind border very broadly, but inconspicuously, dull luteous; surface smooth, nearly flat, with a slight median impressed line; sides slightly marginate; hind border scarcely convex. Tegmina very dark castaneous brown, half as long again as the pronotum, tip squarely docked; exposed part of wings half as long as the tegmina, brownish fuscous, with a large, slightly longitudinal, clear luteous spot in the middle of the base, and the entire edge inconspicuously and narrowly margined with dull luteous. Legs uniform bright luteous. Abdomen with the three or four basal joints blackish, beyond blackish castaneous, the terminal joints rich dark castaneous; sides nearly parallel in the ♂, somewhat convex in the ♀, the lateral plications of the second and third segments slight, the surface minutely punctured, but the last segment nearly smooth; this segment is quadrate above in the male, with straight hind border, scarcely depressed posteriorly in the middle, with a short median impressed line not quarter the length of the segment, near the hind border; in the ♀ the dorsal segment is tapering, and has a distinct longitudinal impressed line on the whole apical half of the segment. Pygidium of ♂ as in *L. Burgessii*. Forceps of ♀ of the color of the abdomen, but growing darker toward the tip, moderately stout, more than half the length of the abdomen, depressed trigonate, with a superior ridge, slightly upturned, slightly incurved on apical half, which is almost laminate and bluntly pointed, the inner edge rugose, with a slight blunt extreme basal tooth; forceps of ♂ rather slender, rather more than half as long as the abdomen, shaped as in *L. Burgessii*. Length of body, 6 mm.; of antennæ, 3.5 mm.; of tegmina and wings, 3.1 mm.; of hind femora, 1.6 mm.; of forceps, ♂, 2.5 mm., ♀, 2.25 mm. 1 ♂, 2 ♀. Texas (G. W. Belfrage).

This species agrees better than any I have seen with *Forf. pulchella* Serv., judging from the imperfect descriptions of Serville; but it is

much smaller than that species, does not agree with it in the proportion of its parts, and has no such disparity in the length of the forceps in the two sexes. The forceps of the male of *L. guttata* possesses a postmedian tooth, which could hardly have been overlooked by Serville, and the parti-colored abdomen, if a constant character would distinguish it from Serville's species. It curiously resembles *Spongophora brunneipennis* Serv.

Labia Burgessii. Head rather dark castaneous, tumid, with two slight depressions between the antennæ, lower part of front, labrum and palpi pale luteous. Antennæ 13-jointed, the basal two or three joints pale luteous, beyond brownish luteous becoming duskier toward the tip, the joints sparsely pilose. Pronotum as broad anteriorly as the head, broadening posteriorly a very little, sides straight, posterior border gently convex, the front portion very slightly tumid, a slightly impressed median line, sides slightly marginate and a little paler than the slightly infuscated luteous disc. Tegmina fusco-luteous, but little longer than the pronotum, squarely docked at the apex; wings nearly obsolete, useless. Legs very pale luteous, with a few scattered hairs. Abdomen rather long, with nearly parallel sides, especially in the male, dark rich castaneous with dusky incisures, the last joint generally a little paler; lateral plications of second and third segments slight; last segment of male quadrate, twice as broad as long, of female subquadrate, tapering, about two-thirds as long as broad, of both depressed in the middle posteriorly, with a very short longitudinal impressed line in the anterior half of the depression, and next the inner base of the forceps, especially in the male, a minute blunt roughened tubercle. Pygidium of female small quadrate, scarcely longer than broad, minutely trifid, or rather armed apically with three minute teeth; of male large, quadrate, more than twice as broad as long, the outer angles produced to a minute point, the posterior border sinuato-convex with a slight point, more or less distinct, near the middle of either lateral half. Forceps of ♀ not more than one-third the length of the abdomen, simple, trigonate and straight on basal half, flattened and incurved on apical half, the inferior inner edge roundly and slightly excised at base, and beyond minutely and bluntly denticulate as far as the middle, the superior edge similarly denticulate on the basal half with a slightly more prominent tooth at the base. Forceps of ♂ about one-half the length of the abdomen, slender, horizontal, gently arcuate, longitudinally channeled on basal third above, de-

pressed on apical half, scarcely tapering and bluntly pointed, the inferior inner edge with a basal depressed distinct laminate pointed tooth, the laminate, more gently sloped, anterior edge of which is minutely denticulate, the inner surface with a similar but not laminate and blunter tooth a little farther from the apex than the basal tooth is from the base, the apical tooth occasionally subobsolete. Length of body, ♂, 6.75–8.25 mm., ♀, 7.9–9.35 mm.; of antennæ, 2.6–4.75 mm.; of tegmina, 1.5–1.9 mm.; of hind femora, 1.4–1.7 mm.; of forceps, ♂, 2.5–3.5 mm., ♀, 2.15–3 mm. 7 ♂, 7 ♀, and 7 immature specimens. Pilatka, Florida, Feb., 1868 (E. Burgess).

The pygidium of the immature ♀ is bifid, and the forceps resemble those of the mature animal, but are simpler, irregularly denticulate almost to the tip and lack the regular basal excision. The pygidium of the young ♂ is also bifid, and as long as broad, and the forceps closely resemble those of the immature female, but are slenderer, more cylindrical, and not so closely attingent. It is apparently a female of this species, but with inaccurate coloring, which is figured in Glover's Illustrations of N. Am. Entomology, Orth., pl. vi, fig. 19, and credited to New York.

Labia melancholica. Head reddish black, the lower part of the front and labrum reddish luteous, blotched with blackish, the rest tumid, smooth, shining. Palpi rather bright luteous. Antennæ 13-jointed, bright luteous on basal third, beyond growing more and more fuscous to the completely dusky tip, the joints longer than usual, but distinctly moniliform, very sparsely pilose. Pronotum slightly broadest posteriorly, and here as broad as the head, tumid in a large semicircular area in front, and here reddish black, the remainder flat, rather dark luteous; it is a little longer than broad, the sides slightly marginate, the posterior angles broadly rounded, the hind border otherwise scarcely convex; median impressed line very slight. Tegmina reddish black, nearly twice as long as the pronotum, the extremity squarely docked with a slight obliquity; exposed part of wings nearly two-thirds as long as the tegmina, slender, blackish castaneous. Legs luteous, the middle and hind femora slightly castaneous. Abdomen long and slender, the sides nearly parallel, dark mahogany brown, blackish toward the base, lighter beneath, shining, the surface distantly and very finely and slightly wrinkled or subrugulose; lateral plications inconspicuous; last segment slightly tapering, two-thirds as long as broad, smooth on either side of the middle, slightly tumid and rugulose next base of forceps, and between de-

pressed with a short median longitudinal impressed line. Forceps of female less than half the length of the abdomen, moderately stout, simple, nearly horizontal but slightly curved, the convexity downward, depressed trigonate with a superior ridge, tapering regularly, straight on the basal two-thirds and then gently and regularly incurved, the tip bluntly pointed; inner edge with a superior small basal bifid tooth, and on the inferior edge slight denticulate sinuations on the basal half. Length of body, 8.25 mm.; of antennæ, 4 mm.; of tegmina and wings, 3.6 mm.; of hind femora, 1.75 mm.; of forceps, 2.1 mm. 1 ♀. Waco, Texas; collected by G. W. Beffrage on February 24th.

A slender, graceful and very dark colored species, nearly related to the almost apterous *L. Burgessii*. Probably the male forceps of the two species will prove to be somewhat similar.

ORTHOPTERA FROM THE ISLAND OF GUADALUPE.

The four Orthoptera described below comprise all the species that were collected by Dr. E. Palmer during a recent visit to the Island of Guadalupe, off the coast of Lower California. Two of the species, as will be seen, also occur in the southern part of California, and one of them also in Mexico; the third Acridian will very probably be discovered there, but the *Gryllus*, which appears to be more nearly related to *G. peruvianus* Sauss., than to any other species, will not improbably prove indigenous, and is remarkable for the brevity of its tegmina and wings. None of them appear to have been described.

***Gryllus insularis*.** Of medium size. Head shining black, tumid, with a broad shallow depression between the lateral ocelli and just above the median ocellus; antennæ nearly twice as long as the body, black, growing a little testaceous from end of the basal third toward the tip; middle of mandibles and galea more or less tinged with reddish; palpi blackish brown. Pronotum black, shining, nearly twice as broad as long, with a slight median impressed line more distinct in front; front border straight, or scarcely angulate in front, the angle opening forward; hind border straight, or slightly full in the middle, very delicately marginate, laterally with a few curved

black bristles. Tegmina rather dark testaceous, slightly more (σ) or slightly less (φ) than half as long as the abdomen, rather broad, the reticulation prominent. Wings scarcely as long as the tegmina. Fore and middle legs, as well as the sternum, blackish; the sides of the femora, under surface of the tibiæ and all but the upper edge of the tarsi, suffused more or less with dark red. Hind femora extending beyond the end of the abdomen, large and tumid, reddish, excepting the blackish tip; hind tibiæ and tarsi dark fusco-castaneous. Abdomen black; cerci nearly as long as the abdomen, dark brown, and clothed with black hairs; ovipositor as long as the body, reddish testaceous, with a black base and blackish tip, and a couple of lateral black lines. Length of body, σ , 18 mm., φ , 20 mm.; width of pronotum, σ , 6.25 mm., φ , 6.5 mm.; of antennæ, φ , 39 mm.; of tegmina, σ , 7 mm., φ , 6-7 mm.; of hind femora, σ , 12.5 mm., φ , 13.5 mm.; of cerci, φ , 13 mm.; of ovipositor, 19 mm.

1 σ , 2 φ . Guadalupe Isl., off Lower California (E. Palmer), specimens dried after immersion in alcohol.

Acridium vagum. Size of *A. americanum* (Drury). Head varying from livid to light clay-brown, marked with black; the whole lower half of the head and the region behind the eyes, is heavily blotched with it, in the latter case, mostly arranged in oblique specks, while the rest of the face is serially punctate with black, especially on either side of the carinæ; on either edge of the frontal costa the black dots are clustered into a straight black stripe, which continues past the eyes over the vertex to the back of the head; a black stripe also runs from the lower edge of the eyes to the lower hinder edge of the head (these colours become partially or wholly obliterated after immersion in alcohol); the vertex is slightly concave, the lateral foveolæ flat, equal, punctate, the frontal costa scarcely contracted between the antennæ, slightly widening below, a little channelled at and a short distance below the ocellus; palpi livid, flecked with fuscous; antennæ pale cinereous, a little lighter at the tip. Dorsum and whole posterior lobe of pronotum grayish cinereous, or clay-brown, obscurely flecked with longitudinal dashes of blackish fuscous, especially upon the anterior lobe; lower third of lateral lobes fusco-luteous, surmounted by a very broad blackish belt which fades on entering the posterior lobe; anterior lobe faintly rugulose, posterior coarsely punctate, both with an equal, blunt, not greatly elevated median ridge, cut by transverse furrows in the middle, in the middle of the anterior half and in the middle of the second quarter; front margin

slightly full; hind margin bent at a right angle, the angle broadly rounded. Tegmina with the basal three-fifths pale clay-brown, the apical portion nearly vitreous, the whole very heavily flecked with blackish fuscous, rather lighter apically; these markings are present on the upper area of the closed tegmina only as minute spots or dots, but along the median area, commencing at the very base, they form longitudinal quadrate patches, broadening, becoming less compact and less intense away from the base; the apical half is filled with small, not very unequal, squarish patches, irregularly and profusely distributed. Wings pellucid, scarcely fuliginous, with a faint yellowish tinge at the base, all the nervures black, excepting at the extreme costal border, where just beyond the middle some of them are ferruginous. Hind femora pale hoary blue, with very pale yellowish brown oblique rays on the sides, faintly and distantly punctate with black, with faint ferruginous outer and superior carinæ, the upper surface broadly banded with black in four broken bands; hind tibiæ dusky plumbeous, the upper surface blackish, excepting at the tip, the spines white, with the apical third black. Length of body 45–52 mm.; of antennæ (13 est.)–15 mm.; of pronotum, 9–10.5 mm.; of tegmina, 48–53.5 mm.; of hind femora, 25–28 mm.

8 ♀. Island Guadalupe, off Lower California (E. Palmer); San Diego, California (J. Behrens); California (H. Edwards).

This insect belongs to the division *Schistocerca* of Stål.

***Trimerotropis vinculata*.** Ash gray, blotched with dark fuscous; foveolæ of the head distinct, the costæ being prominent throughout; tip of fastigium with a rather deep circular or posteriorly angulated pit having abrupt sides, reaching the margins of the lateral foveolæ; antennæ dark brown, very obscurely annulate with darker and lighter colors. Median carina of pronotum distinct only on front lobe, and cut behind the middle by the transverse sulcus, the hinder portion of the anterior lobe somewhat corrugate; hind border of pronotum forming a right angle. Tegmina as long as the hind legs, the basal third testaceous, with a fuscous cloud on its apical third, and fuscous dots sprinkled over the rest; middle third ashen, with a fuscous cloud traversing the entire breadth of the wing in the middle, broadest centrally; apical third pellucid, sprinkled with small fuscous spots, fainter than the previous ones, closely clustered basally, distant and fainter apically. Wings very faint lemon-yellow at base, pellucid with black nervules at apex, and near the middle a broad band of blackish fuliginous; it commences on the middle of the costal margin,

half as broad as the tegmina, suddenly broadens by a narrow interior shoot to double or more than double its former width, and then passes nearly at right angles to the costal border, but directed a little obliquely outward, slightly broadening as it goes, to the outer margin, which it turns toward the anal angle, narrowing and fading until it has traversed nearly or quite three-quarters of the anal area; its margins are ill defined and slightly irregular, but its general form is a sickle-like curve, which greatly resembles that of most species of *Spharagemon*. Hind femora ash-gray, with two or three faint, ill defined, slightly oblique fuscous bands. Hind tibiae yellow, the spines black tipped. Length (of an average specimen), ♂, 19 mm., ♀, 28 mm.; of antennae, ♂, 8 mm., ♀, 9.75 mm.; of tegmina, ♂, 24 mm., ♀, 30 mm.; of hind femora, ♂, 11 mm., ♀, 13.5 mm.

6 ♂, 9 ♀. Guadalupe Island, off Lower California (E. Palmer); San Diego, Cal. (H. Edwards, No. 9); Mexico, (Coll. Schaum).

***Trimerotropis lauta*.** Head livid gray, completely sprinkled with fuscous dots, giving a fuscous appearance to the upper surface; antennae dirty dull luteous, annulate with dark fuscous on basal half. Pronotum flat above, the front lobe dirty yellow, its posterior half tuberculate; posterior lobe livid, heavily dotted with reddish brown on the little rugosities; upper half of lateral lobes reddish brown, lower half like the head. Tegmina scarcely shorter than the hind legs, obscure pellucid on basal half, heavily flecked with light brownish fuscous blotches, mostly concentrated into a large broken patch, occupying most of the basal third of the wing, and a triangular patch in the middle of the wing, its apex next the costa; outer half of wing pellucid, sprinkled almost uniformly with small moderately distant subequal faint fuscous spots. Wings pellucid, with no trace of any band, a few of the apical cells filled with a fuscous cloud. Hind femora reaching the tip of the abdomen, ash gray, with a premedian and postmedian narrow lateral oblique brownish fuscous stripe. Hind femora livid, flecked with fuscous, with a faint pale prebasal annulus, the apex infuscated and the spine-tips black. Length of body, 15.5 mm.; of antennae, 8.5 mm.; of tegmina, 18 mm.; of hind femora, 8.5 mm.

1 ♂. Guadalupe Island, off Lower California (E. Palmer). Dried after immersion in alcohol.

Remarkable for the entire absence of a band, which in the other Guadalupe species, *T. vinculata*, reaches the extremest dimensions.

CRITICAL AND HISTORICAL NOTES ON FORFICULARIÆ; INCLUDING DESCRIPTIONS OF NEW GENERIC FORMS AND AN ALPHABETICAL SYNONYMIC LIST OF THE DESCRIBED SPECIES.

In the tenth edition of his *Systema Naturæ*, Linné placed the two common species of European earwigs (*auricularia* and *minor*) in the genus *Forficula*, among the Coleoptera. Fabricius, in all his works, placed this genus at the head of his *Ulonata* (= *Dermaptera* DeGeer, *Orthoptera* auct.) following close upon the Coleoptera. Latreille, in 1796, was the first to recognize the wider separation of the earwigs from the other *Dermaptera*, and divided the whole order into three (unnamed) sections; of which the earwigs formed the first, *Blatta* the second, and the remaining *Dermaptera* the third. Duméril, in his *Zoologie analytique* (1806), recognizing the family value of the group, called it *Labidoures* — a name which, from its gallic dress, has no more claim upon our attention than *perce-oreille*. Kirby¹ subsequently maintained the ordinal character of the group, and gave it the name *Dermaptera*, in which he was followed in 1815 by Leach. But neither can this name be retained, since it was given by DeGeer in 1773 to the whole suborder afterward called *Ulonata* by Fabricius (1775), and—excluding the earwigs—*Orthoptères* by Olivier (1789).² Moreover, Latreille, recognizing it in its true character as a family of *Dermaptera*, had already³ given the group the name of *FORFICULARIÆ*, and this name must be retained. After tabulating the

¹ Trans. Linn. Soc. Lond., XI, 87 note (1813).

² By a strange oversight or neglect, the work of the distinguished Swedish naturalist, who first separated these insects from the Hemiptera of his fellow countryman Linné, has been very generally overlooked, and the term *Orthoptera* has been usually applied to the suborder—a name which, in its Latin form, was not proposed until 1806 by Latreille (in Sonnini's *Buffon*).

³ *Considérations générales sur l'ordre naturel des Crustacés, etc.* (1810).

synonymy of this group, we will examine in alphabetical sequence each of the generic names which have been given to the different members of the family, setting forth in detail its first usage, and so far as necessary its subsequent treatment; and including in the list a few generic names now first proposed. Generic names which cannot be used are followed by an asterisk.

FORFICULARIÆ.

- Labidoures* ou *Forficules* Duméril, Zool. anal., 257 (1806).
Labidoures Serres, Ann. Mus. Hist. Nat., XIV, 65 (1809).
Labidura Burm., Germ. Zeitschr. f. Ent., II, 20 (1840).
Labidouroideæ Agass., Nomencl. Zool. Index, 199 (1846).
Forficulariæ Latr., Cons. Gén., 244 (1810).
Forficulædes Billb., Enum. Ins., 63 (1820).
Forficulidæ Steph., Syst. Cat. Br. Ins., 299 (1829).
Forficulina Newm., Ent. Mag., II, 424 (1834).
Forficulites " " " " " "
Dermaptera Kirb. (nec DeG.), Trans. Linn. Soc. Lond., XI, 87 (1813).
Dermatoptera Burm., Handb. Ent., II, 743 (1838).
Placoda Billb., Enum. Ins., 63 (1820).
Euplekoptera Westw., Zool. Journ., V, 327 (1831).
Euplexoptera Westw., Introd. Class. Ins., I, 398 (1839). (Scr. Euplectoptera Fisch., Orth. Eur., 58, note—1858).
Harmoptera Fieb., Kelch, Orth. Obeschl., 3 (1852).

ANCISTROGASTER.

1855. Stål, Öfv. k. Vet. Ak. Förh., 349: describes a single species, *luctuosus* (from Brazil), which is therefore the type. In 1865, Dohrn, in his monograph, describes other American species allied to this, placing them all in a new world section of a larger group, which contains many species from both hemispheres. To this enlarged group he gives a new name. But even if his view of the generic affinities were correct, the name *Ancistrogaster* would have to be given to the whole group. (See *Opisthocosmia*.) The genus is confined to the tropics of the New World.

ANECHURA.

This generic name (ἀνεχώ, οὐρά) is proposed for the single Fabrician species, *bipunctata*. It approaches the gerontogeic *Opisthocosmia*, and is remarkable for the great breadth of its thoracic sterna, and especially of the metasternum, which is broader than long. The antennæ are 11–12 jointed. The legs are long, the middle pair especially approaching the hind legs in length, at least in the female; these legs are also inserted almost, or quite as near the hind legs as the fore legs, as in certain species of *Forficula* proper. The abdomen is plump and dilated, and has a small tubercle on the sides of the fourth and fifth ventral segments of the male; the forceps are simple in the female, but strangely contorted in the male, bearing a superior basal tooth or angulated shoulder, beyond which the arms are curved strongly downward, and then bent backward. It belongs to Europe.

ANISOLABIS.

1853. Fieber, *Lotos*, III, 257: proposes this name for two European species — *maritima* and *moesta*, which are strictly congeneric. *Maritima* may be considered as the type, since it is the best known and older of these two, and on account of its being absolutely apterous, like most of the other species which must be added to the group.

No reference is made to this name in Marschall's *Nomenclator Zoologicus*. The genus is widespread, occurring in both hemispheres, and in Australasia. See also *Forcinella* and *Brachylabis*.

APACHYS.

1831. Serv., *Ann. Sc. Nat.*, xxii, 35 [*Apachyus*]: *depressus* Pal-Beauv. (sp.) is the only species, and therefore type.

1839. Serv., *Orth.*, 54 [*Apachya*]: the same.

1846. Agass., *Nom. Zool. Ind.*, 27: corrects the spelling as above.

Two species have since been added by Dohrn. The genus belongs to the tropics of the Old World.

APTERYGIDA.*

1839. Westw., *Class. Ins.*, I, 406: proposes this name for Génée's section b, of Division II of *Forficula*,¹ including the species

¹ Saggio di una Monografia delle Forficule indigene. Padova, 1832.

with perfect tegmina but rudimentary wings, viz., *pedestris* Bon. and *decipiens* Gén¹; the former is *albipennis* Meg., and neither of them can be generically separated from *Forficula* Linn.

That genus, it is true, is very large, and contains species differing to a much greater extent than usual from one another, some species having, for instance, the middle pair of legs much closer to the front legs than others; but there are no grounds for separating *albipennis* from *decipiens*; and the latter species is altogether similar to *auricularia* (the type of *Forficula*) except in the brevity of the wings, a feature of great variability even within species in Dermaptera generally. Apterygida, then, having no *raison d'être*, must fall before *Forficula*. There is also an earlier generic name, *Apterygia* (Latr. Moll., 1825).

BRACHYLABIS.*

1864. Dohrn, Stett. Ent. Zeit. xxv, 292, proposes this name for the following species; *mauritanica* Luc., *maritima* Bon., *angulifera* (from Guinea), *chilensis* Blanch., and *modesta* Gén¹.

The only character given common to both sexes, by which to distinguish this genus from his *Forcinella* (= *Anisolabis*) is the lateral plication of the second and third segments of the abdomen, which is wanting in the species grouped by him under *Forcinella*. In other respects, as the author acknowledges, it altogether agrees (*volkommen übereinstimmend*) with that group; and he further adds, that this plication is sometimes very indistinct in the species of *Brachylabis*, especially on the second segment. The males of *Brachylabis* are also stated to be peculiar in having the posterior borders of the fourth and following abdominal segments angular at the sides, and produced to a point; the females possess it to a less degree, so that when the plications are absent it is not always possible to determine into which genus a species should fall.

There is scarcely a genus of *Forficulariæ* in which the lateral plications of the second and third abdominal segments are not either distinctly present in all the species, or else totally absent; it is this feature, doubtless, which has led Dohrn to separate, as he has done, his two groups, *Brachylabis* and *Forcinella*; but in *maritima*, the type of his *Forcinella* (afterwards placed by him in *Brachylabis*!), we find some individuals in which the plications are tolerably distinct, while

¹ Westwood says, "three species are described," but the above are the only two.

there are others in which no trace of them whatever can be found. The species of *Forcinella* also (that is, those presenting no abdominal plications) vary to a considerable degree in the angular production of the sides of the abdominal segments, some in my possession surpassing in this particular the species *maritima*; so that it becomes certain that these distinctions are valueless; and as no others have been found we must group these apterous forms in a single genus, whose facies is then homogeneous. *Forcinella*, as the older name, would then absorb *Brachylabis*, were it not in its turn preoccupied, as we shall see, by *Anisolabis*. It is possible, however, that *angulifera* or *chilensis*, or both, may be generically distinct from the other species placed in the same group by Dohrn, and in that case *Brachylabis* could be retained. I have seen neither of them.

CARCINOPHORA.

This name (*καρκινοφωρ*, *κέρω*) is proposed for the Peruvian species which I described a few years ago under the name of *Chelidura robusta*. The genus is allied to *Anisolabis*, but has fewer joints in the antennæ, and the first joint of the same very long, besides perfectly formed tegmina. The head is subtriangular, much longer than broad, somewhat broader than the pronotum, tumid, the posterior angles broadly rounded; eyes pretty large; antennæ 13-jointed, the first joint as long as the space between the antennæ, slender, increasing but little in size apically, second joint no longer than broad, globular, third three times as long as broad, fourth and fifth equal, together as long as the second and third combined, the others submoniliform, subequal, about as long as the third. Pronotum flat, a little longer than broad, tapering slightly, produced apically with well rounded hind border. Tegmina as long as the pronotum, squarely docked, the sides forming an acute angle with the dorsal area; wings wanting. Legs long, compressed, the middle nearly as long as the hind pair, the middle joint of tarsi minute, but produced beneath the apical joint, not lobed. Abdomen stout, the last segment of ♀ very large, above subquadrate, below almost as long as the rest of the abdomen and triangularly produced; sides of second and third dorsal segments with but slight plication. Forceps stout, short and simple in the ♀. The female only is known to me, and the single species comes from the Peruvian Andes.

CHELIDURA.

1831. Serv., Ann. Sc. Nat., xxii, 36: uses this name for the first time in a Latin form for the single species *aptera* Charp. Previously to this the name has been used in a Gallic form (Chélidoure) by Latreille, in 1825, in his Familles naturelles (410), where neither descriptions of any sort is given, nor mention made of any species; in 1829, in the 2d Edition of Cuvier's Règne Animal (V. 173), he again uses it without species or description, excepting to make it include "ceux qui sont aptères"; the described apterous species at that time were *aptera*, *simplex* and *sinuata* — all congeneric. Serville therefore used the name in the same sense as Latreille did in its Gallic form, and *aptera* must be considered the type.

It has always been used since in the same way, whenever the species have been generically separated from Forficula. The group is confined to Europe and Madeira.

CHELISOCHES. See LOBOPHORA.

CONDYLOPALAMA.

1847. Sund., Forh. Skand. Naturf., iv, 255: proposed for a species called *agilis* found in timber brought to Stockholm from Bahia; this is therefore the type.

The "provisional" description (the only one yet given) is very meagre and unsatisfactory; but in the possession of double-jointed? (tvåledade), blunt edged forceps it is certainly most peculiar. It is said to be extremely slender, destitute of both tegmina and wings, and to be probably a larval form; to have 3-jointed tarsi, 14-jointed antennæ, and the first joint of the hind tarsi large and oval. It is further described as greyish, with a black, smooth and highly polished mesothorax, and as 5 mm. long. It is not mentioned by Dohrn.

.COPISCCELIS.*

1853. Fieber, Lotos, iii, 257: proposes this name for the Linnean *minor*; but it falls before the earlier Labia (q. v.). Marschall's Nomenclator contains no reference to this name.

CYLINDROGASTER.

1855. Stål, Ofv. K. Vet. Ak. Förh., 350: establishes this genus upon the new species *gracilis* (from Brazil).

1858. Stål, Eug. Resa, 306: places this genus under *Diplatys* Serv.

This, as pointed out by Dohrn, in his Monograph, is certainly a mistake, *Diplatys* differing from *Cylindrogaster* in important particulars; Dohrn describes other species, and I have called attention in a previous paper to the characters of the female, hitherto unknown. The genus has never been found outside the limits of Brazil. This generic name has since been used in other groups of animals.

DIPLATYS.

1831. Serv., Ann. Sc. Nat., XXII, 33: proposes this name for *macrocephala* Pal-Beauv., which is therefore the type.

It has not since been used except for the same species by Serville in his later work (*Orthoptères*) and by Stål, erroneously (see *Cylindrogaster*). Dohrn mentions it only to say that he believes he has seen a very poor specimen of the species, and promises further particulars which are not given. The species comes from W. Africa.

ECHINOSOMA.

1839. Serv., Orth., 34: founded upon the single species *afra* Pal-Beauv.

Dohrn has since added several species. They all come from the tropics of the Old World, including northern Australia. Semper has since used this name for a group of Echinoderms.

FORCINELLA.*

1862. Dohrn, Stett. Ent. Zeit., XXIII, 226: establishes this genus in describing the species *azteca* (from Mexico), but directly specifies *Forf. maritima* Génè as the type. Notwithstanding this, while retaining *Forcinella* in his later Monograph, he transfers *maritima* to a new genus *Brachylabis*! Both of these names, however, fall before the earlier *Anisolabis* (q. v.). *Forcinella* is not included by Marschall in his *Nomenclator Zoologicus*.

FORFICESILA.*

1831. Serv. (ex Latr.), Ann. Sc. Nat., xxii, 32: *gigantea* Latr.

Under the Gallic name Forficésile this genus was proposed without mention of species and without further description than "aîlés" by Latreille in his Familles du Règne Animal, 410 (1825). Later, in Cuvier's Règne Animal, 2e éd., v, 173 (1829), still using the French name, he refers to it the winged species with more than 14 joints to their antennæ; *gigantea* alone is specified. Serville therefore uses it wholly in the Latreillean sense. Since then (Serville, Dohrn) it has always been used in the same sense, but as *gigantea* was the type of Labidura as early as 1815, this generic name must fall before it.

FORFICULA.

1758. Linn., Syst. Nat., Ed. x, i, 423: founds the earliest of the genera of Forficulariæ upon the species described as *auricularia* and *minor*.

1810. Latr., Consid., 433, specifies *auricularia* as the type.

In this sense, whether used in a more or less restricted manner, the name has always been employed. Dohrn divides it into three sections, according to peculiarities of the male forceps; perhaps better characters would be found in the pygidium or in the relative position of the middle legs. The genus is by far the richest in species of any of the Forficulariæ, and is more widely spread than any, being found in almost every place where Forficulariæ occur, and on every continent. The genus happily retains the oldest name in the group, and has given its name to the family. Several species have been found in the European Tertiaries.

LABIA.

1815. Leach, Edinb. Encyc., ix, 118: founds this genus upon *minor* Linn., which therefore becomes the type.

Whenever since used it has always been in this sense. Serville does not refer to it in any way either in 1831 or 1839.

The genus should be placed in juxtaposition to Forficula and not be separated from it, as Dohrn has done, by the interposition of Sparrata, Chelisoches, Ancistrogaster and Opisthocosmia. It differs from Forficula principally in the simple character of its middle tarsal joint and in the shorter moniliform joints of the antennæ. It is numerous

in species, and only less widely spread than Forficula, occurring probably over the entire extent of the torrid and temperate part of every continent, excepting Australia. Though abundant in all the East Indies, it has also not been brought from Oceanica. See Copiscelis. Oken proposed the generic name Labio for a group of molusks in 1815.

LABIDOPHORA (see PLATYLABIA).

LABIDURA.

1815. Leach, Edinb. Encyl., ix, 118: bases this name upon the species *riparia (gigantea)*, which, therefore, is the type.

Whenever since employed, it has always been in the same sense. Serville does not even refer to it, either in 1831 or 1839. Although this word in a Gallic form was proposed as early as 1806, for the whole group of earwigs, it did not receive a Latin dress (with the same scope) until 1840,¹ and therefore the present use of this word is not affected. The genus is one of the richest in species and is widely spread in the Old World, especially in the East Indies and in Europe. It has not been found in Australia. But a single species has been described as indigenous to America (Jamaica) and this may prove to be wrongly placed here, as it is an apterous species. Fossil species have been found in the tertiaries of the Rocky Mountains, but these, too, should perhaps be separated from this group. See also Forficesila and Psalis.

LOBOPHORA.*

1839. Serv., Orth., 32: proposes this name for *rufitarsis* (from Java), a species since determined to be identical with the older *morio*, which is therefore the type.

The name has since been employed by several authors (Stål, Dolrn, etc.) but is preoccupied in Lepidoptera (Curtis, 1825). *Chelisoche* (χηλή, ὀχέω) may be used in its place. The genus is mainly, if not exclusively, confined to Australasia, including all the islands of the Indian Ocean and the neighboring main and Oceanica.

¹ See our synonymy of the family name.

MECOMERA.

1839. Serv., Orth., 53: founded upon the single species *brunnea* (from Cayenne), which is therefore the type. It has not been used since, and was unknown to Dohrn.

NANNOPYGIA.

1863. Dohrn, Stett. Ent. Zeit., xxiv, 60: established for a new species, *Gerstaeckeri* (from Ceylon).

NEOLOBOPHORA.

1875. Scudd., Proc. Bost. Soc. Nat. Hist., xvii, 281: established upon a species called *bogotensis* (from Bogota). Another has since been added from Mexico.

OPISTHOCOSMIA.

1865. Dohrn, Stett. Ent. Zeit., xxvi, 76: founded upon the following species: (I) *maculifera* (from Venezuela), *spinax* Dohrn, *luctuosus* Stål, *variegata* (from Venezuela); (II) *devians* (from Brazil), *centurio* (from Luzon), *armata* (from Sumatra), *forcipata* de Haan, *longipes* de Haan, *insignis* de Haan, *vigilans* Stål, *tenella* de Haan, and *ceylonica* Motsch. The first section is considered the equivalent of Stål's genus *Ancistrogaster*, which is thus sunk beneath a new name.

If the group as given by Dohrn is homogeneous, the name *Ancistrogaster* should be preserved for it; otherwise (and we believe this to be the case) *Ancistrogaster* (q. v.) should be retained for the species of the first section, and *Opisthocosmia* for those of the second. *O. devians*, however, would appear to belong rather to *Ancistrogaster*, and this would leave the Old World species alone to *Opisthocosmia*, of which *O. centurio* may be taken as the type.

PLATYLABIA.*

1867. Dohrn, Stett. Ent. Zeit., xxviii, 347: founded upon the following species described as new: *major* (from Celebes), *thoracica* (from Penang and Ceylon), *dimidiata* (from Luzon), and *Guineensis* (from Prince Island) — all from the tropics of the Old World.

The species are all unknown to me, and therefore no type will be designated. The generic name is too close to *Platylabus* (Wesmael, Hym., 1845) to stand, and may be supplanted by *Labidophora* (λαβίς, φέρω).

PSALIDOPHORA.*

1839. Serv., Orth., 29: proposed by Serville to supplant his earlier name *Spongiphora*; the species enumerated are *Lherminieri* (from Guadaloupe), *croceipennis* Serv. and *brunneipennis* (from N. America).

The type of *Spongiphora* was *croceipennis*, and Serville proposes to change the name because (vid. Orth., p. 17) many entomologists had observed to him that the pad was extremely small, and could often not be seen in dried specimens. Since, however, it exists, the first name, involving no inaccuracy, should be retained. The other species added to the group in 1839, are strictly congeneric with the original species, and hence the name must be dropped. See *Sphonophora*.

PSALIS.

1831. Serv., Ann. Sci. Nat., XXII, 34: founded upon *americana* Pal.-Beauv., and *riparia* (*morbida*) from an unknown locality. As Serville afterwards (Orth., 20-21) points out, the generic description of the abdomen is taken from individuals which had been broken and repaired by gluing the abdomen on again *belly upward!* Many of the peculiarities of the genus are taken from features dependant upon this accident. Serville consequently believes that the name should be suppressed, and places the two species in *Forficesila*, between which genus and *Psalis* he had, in 1831, interposed two genera.
1838. Burm., Handb. d. Ent., II, 753: uses it doubtfully for one of the sections into which he divides the single genus, *Forficula*, accepted by him, and places in it *americana* (*procera*) and *gagatina*; *riparia* (*gigantea*) is placed under the section *Forficesila*. Both on this account and because when the generic name *Psalis* was proposed, *riparia* was the type of *Labidura* (Syn. *Forficesila*), *Psalis*, if used at all, must take *americana* as its type. Dohrn places both species in the genus *Labidura*, and indeed at no great distance from each other. But they present so many points of structural dissimilarity that they should be generically separated.

Psalis, as represented by its type *americana*, has the following characters to contrast with those of *Labidura*. The short head, as pointed out by Serville, is more convex above; the antennæ are composed of fewer joints; the basal joint of the antennæ is longer and slenderer, and increases more gradually in size toward the apex; the pronotum is nearly as wide as the head; the prosternum broadens greatly and regularly in front of the legs; the legs are scarcely so slender nor so compressed; especially the fore femora are stouter; the abdomen of the female does not taper at the extremity, the last dorsal segment being quadrate, nearly as long as broad, and scarcely narrower behind than in front; while in *Labidura* it is transverse, nearly twice as broad in front as long, but scarcely broader behind than its length; besides, the penultimate ventral segment of *Psalis* ♀ leaves the sides of the last segment largely exposed; and the last segment itself is parted widely in the middle, while that of *Labidura* is entire. The forceps of the ♀ are much stouter in *Psalis* than in *Labidura*. Since writing the above, I find that Burmeister (Germ. Zeitschrift Ent., II, 82) has already remarked that if genera are to be separated *modo Servilleano*, *americana* and *riparia* (*gigantea*) must be placed apart.

The species of *Psalis* occur in the tropics of both worlds.

PYGIDICRANA.

1831. Serv., Ann. Sci. Nat., XXII, 30 : proposes this name for the single species *v-nigrum* (from Brazil) which thereby becomes the type.

It has since been used by Serville, Burmeister, Stål [*Pydicrana*] and Dohrn in the same sense, each adding other species. Agassiz (Nom. Zool.) proposes *Pygodicrana* as a more correct form of the word (*πυγγί, δίκρανον*). Burmeister (Germar Zeitschr. f. Ent., II, 79) suggests that *Dieranopygia* would have been better. The genus is moderately rich in species, most of which are found in the tropics of the Old World, including Australia; but two or three species are found in northern S. America.

PYRAGRA.

1831. Serv., Ann. Sc. Nat., XXII, 34: founds this genus upon the single species *fuscata* (from Cayenne), which is therefore the type. It is again employed by the author in his later work

(1839) for the same species, but does not seem to have been used since. Dohrn refers to neither genus nor species.

SPARATTA.

1839. Serv., Orth., 51: the genus is founded on *pelvimetra* (from Brazil). Other species have been added by Stål and Dohrn, all from tropical S. America.

SPONGOPHORA.

1831. Serv., Ann. Sc. Nat., XXII, 31 [Spongiphora]: proposes the name for *croceipennis* from Brazil.
1839. Serv., Orth., 29: supplants the name by that of *Psalidophora*, but, as we have remarked under that caption, for insufficient reasons. Guérin (Iconogr. Règne Anim., Ins. 326) referring to the very page where Serville explains his change, remarks that Serville altered the name because all *Forficulariæ* bore a pad between the claws! See *Psalidophora*.
1846. Agassiz, Nom. Zool., 349: proposes the more correct spelling *Spongophora*, adopted by me in 1862.

This group, under the name *Psalidophora*, has been used by nearly every author that has treated of the *Forficularians* and in the same sense. All the known species, with a single exception, come from the temperate and tropical parts of America; *S. quadrimaculata* from temperate S. Africa. I can find no points of generic distinction between a fragmentary specimen of this species and the common *S. brunneipennis* of the U. States.

TAGALINA.

1863. Dohrn, Stett. Ent. Zeit., XXIV, 44: proposes this name for two species, *Semperi* (from Luzon) and *grandiventris* Blanch.

Grandiventris, as the older species, may be taken as the type. The genus is confined to the Australasian islands. The name is unfortunately chosen from its close resemblance to *Tagalis* (Stål, Hem., 1860.)

THERMASTRIS.

1863. Dohrn, Stett. Ent. Zeit., XXIV, 61: proposed for *brasiliensis* Gray and *Saussurei* Dohrn, both formerly placed under *Pygidicrana*; two other species have since been added by myself. *Bra-*

siliensis may be chosen as the type. All the species are from the tropics of America.

TYPHLOLABIA.

This name (τυφλόζ, λαβίς) is proposed for the remarkable form described by Philippi from Chili under the name of *Forficula* ? larva. According to Philippi the head is as broad as long, tapering anteriorly, the angles rounded; it is altogether *eyeless*; the antennæ are *approximate* at the base, as long as the head and thorax, *30-40 jointed*, the first joint short, thick, cylindrical; the *second of equal length*, obconical, the third to the twelfth short cylindrical, the rest moniliform. Prothorax much narrower than the head, and hardly half so long; mesothorax a little broader, but narrower than the head, quadrate with rounded angles; the metathorax similar, but slightly larger. Neither tegmina nor wings are present. The legs are very short, the femora scarcely longer than the coxæ and trochanters together, the tibiæ of similar length, compressed; tarsi *one-jointed*, somewhat shorter than the tibiæ. Abdomen long and slender, the joints of about equal length, broadening up to the sixth, previous to which they are *longer than broad*; the forceps resemble those of *Anisolabis*, which it seems most to resemble; it is, however, exceedingly peculiar in many points of its structure, and especially in the particulars I have italicized above, in which it resembles no known *Forficularians*.

AN ALPHABETICAL CATALOGUE OF DESCRIBED FORFICULARIÆ; WITH OCCASIONAL BRIEF NOTES.

Ancistrogaster arthritica.

Ancistrogaster arthritica Scudd., Proc. Bost. Soc. Nat. Hist., XVIII, 253 (1876).
Brazil.

Ancistrogaster devians.

Opisthocosmia devians Dohrn, Stett. Ent. Zeit., XXVI, 79 (1865).
Brazil.

Ancistrogaster gulosa.

Ancistrogaster gulosa Scudd., Proc. Bost. Soc. Nat. Hist., XVIII, 263-64 (1876).
Mexico.

Ancistrogaster luctuosa.

Ancistrogaster luctuosus Stål, Ofv. K. Vet. Acad. Forh., XII, 349 (1855); Ib., Eug. Resa, Zool. Ins., 306, pl. 5, fig. 1 (1858).

Opisthocosmia luctuosa Dohrn, Stett. Ent. Zeit., XXVI, 78 (1865).
Brazil.

Ancistrogaster maculifera.

Opisthocosmia maculifera Dohrn, Stett. Ent. Zeit., XXVI, 77 (1865).

Forficula Petropolis Wood, Ins. Abroad, 279, fig. 138 (1874).
Venezuela.

Ancistrogaster spinax.

Ancistrogaster spinax Dohrn, Stett. Ent. Zeit., XXIII, 229-30, Pl. I, fig. 1, 1b (1862).

Opisthocosmia spinax Dohrn, Stett. Ent. Zeit., XXVI, 78 (1865).
Mexico.

Ancistrogaster variegata.

Opisthocosmia variegata Dohrn, Stett. Ent. Zeit., XXVI, 78 (1865).

Forficula appendiculata Charp., ms. [cf. Gerst., Bericht. Ent., 1855, 90-91].
Venezuela.

Anechura bipunctata.

Forficula bipunctata Fabr., Spec. Ins., I, 340 (1781); Ib., Mant. Ins., I, 224 (1787); Ib., Ent. Syst., II, 2 (1793); Gmel., Linn. Syst. Nat., I, iv, 2039 (1788); Vill., Linn. Ent., I, 427; IV, 373 (1789); Oliv., Encycl. méth., VI, ii, 467 (1792); Panz., Deutschl. Ins., II, 87, 10, fig. 10 (1802?); Burm., Handb. Ent., II, 754 (1838); Kitt., Bull. Soc. imp. nat. Mosc., XXII, 441-2, pl. 7, figs. 5-6 (1849).

Forficula biguttata Fabr., Ent. Syst., II, 2 (1793); Latr., Hist. nat. Crust. Ins., XII, 91 (1804); Ib., Gen. Crust. Ins., III, 82 (1807); Ib., Nouv. Dict. Hist. Nat., XII, 8, pl. D', figs. 17, 17 (1817); Charp., Horæ Ent., 68 (1825); Serv., Ann. Sc. Nat., XXII, 32 (1831); Ib., Rev. méth. Orth., 5-6 (1831); Ib., Orth., 43 (1839); Génè, Monog. Forf., 12 (1832); Fisch. Wald., Ent. Russ., IV, 40-41, pl. 1, fig. 1 (1848); Kitt., Bull. Soc. imp. nat. Mosc., XXII, 439-40, pl. 7, figs. 3-4 (1849); Fisch. Fr., Orth. Eur., 72-3, pl. 6, figs. 9, 9a=b (1853); Friv., Orth. Hung., 47-8 (1867).

Chelidura anthracina Kolen., Melet., V, 73, pl. 17, fig. 5 (1846).

Forficula anthracina Fieb., Lotos, III, 256 (1853); Ib., Syn. Eur. Orth., 73 (1853).

Forficula Fabricii, Fieb., Lotos, III, 253-4 (1853); Ib., Syn. Eur. Orth., 70-1 (1853).
Europe.

Anisolabis angulifera.

Brachylabis angulifera Dohrn, Stett. Ent. Zeit., xxv, 294 (1864).
Guinea.

Anisolabis annulicornis.

Forficula annulicornis Blanch., Gay, Hist. fis. Chile, Zool., vi, 10-11 (1853); Phil., Zeitsch. ges. Naturw., xxi, 217 (1863).

Forcinella annulicornis Dohrn, Stett. Ent. Zeit., xxv, 290-1.

Chili.

Blanchard says this species has rudimentary tegmina. Dohrn says it has not. Philippi says that one Chilean species is winged and he mentions this species, making some objections to Blanchard's description, but none to the statement that it has tegmina.

Anisolabis annulipes.

Forficesila annulipes Luc., Ann. Soc. Ent. Fr., Bull., 84-5 (1847).

Forcinella annulipes Dohrn, Stett. Ent. Zeit., xxv, 290 (1864).

Forficula (Labidura) annulipes Fisch. Fr., Orth. Eur., 69-70, pl. 6, fig. 6a-c (1853).
S. Europe; Madeira.

Anisolabis Antoni.

Forcinella Antoni Dohrn, Stett. Ent. Zeit., xxv, 289-90 (1864).

Venezuela.

Anisolabis azteca.

Forcinella azteca Dohrn, Stett. Ent. Zeit., xxiii, 226-7 (1862);
Ib., ib., xxv, 291 (1864).
Mexico.

Anisolabis Blanchardi.

Forficula Blanchardi Le Guill., Rev. Zool., 1841, 292 (1841.)

Oceanica.

Anisolabis Brunneri.

Forcinella Brunneri Dohrn, Stett. Ent. Zeit., xxv, 291 (1864).

Australia.

Anisolabis chilensis.

Forficula chilensis Blanch., Gay, Hist. fis. Chile., Zool. vi, 10, pl. Orth. 1, fig. 1 (1851).

Brachylabis chilensis Dohrn, Stett. Ent. Zeit., xxv, 295-6 (1864).

Forficula testaceicornis Blanch., Gay, Hist. fis. Chile, Zool., vi, 11-12 (1851).
Chili.

Anisolabis colossea.

Forcinella colossea Dohrn, Stett. Ent. Zeit., xxv, 286-7 (1864).

A specimen in my collection from N. Caledonia (II. Dohrn) has no middle joint to the tarsi of one of the hind legs, though present on its mate.
Australia and neighboring islands.

Anisolabis geniculata.

Chelidura geniculata Montr., Ann. Soc. Linn. Lyon [n. s.] XI, 222-23 (1864). Woodlark Isl.

This species is more closely allied to *Anisolabis* than to *Chelidura*, but apparently should be placed in a distinct genus.

Anisolabis hottentotta.

Forcinella hottentotta Dohrn, Stett. Ent. Zeit., XXVIII, 344-5 (1867). Caffraria.

Anisolabis janeirensis.

Forcinella janeirensis Dohrn, Stett. Ent. Zeit., XXV, 285-6 (1864). Brazil.

I have not seen this species, but judging from the description, it may belong to *Carcinophora*.

Anisolabis laeta.

Brachylabis laeta Gerst., Arch. f. Naturg., XXXV, i, 221 (1869); Ib., Gled.-Fauna Sans., 49, pl. 3, fig. 8 (1873). Zanzibar.

Anisolabis lativentris.

Forficula lativentris Phil., Zeitschr. ges. Naturwiss., XXI, 217-18 (1863). Chili.

Anisolabis littorea.

Forficula littorea White, Zool. Erebus and Terror, Insects, 24, pl. 6, figs. 4-5 (1846).

Forcinella littorea Dohrn, Stett. Ent. Zeit., XXV, 287-88.

N. Zealand.

Anisolabis major.

Forficula (Forficesila) major Brullé, Webb, Hist. nat. Canaries, II, ii, Ent. 74-75 (1835-42). Canary Isl.

Is it distinct from *A. maxima*?

Anisolabis marginalis.

Forcinella marginalis Dohrn, Stett. Ent. Zeit., XXV, 288-9 (1864). Japan.

Anisolabis maritima.

Forficula maritima Bon., MS.; Géné, Monogr. Forf., 9-10 (1832); Ramb., Faun. Ent. Andal., II, 8-9 (1838).

Forficesila maritima Serv., Orth., 27-8 (1839); Luc., Expl. Alg., III, 5 (1846).

Forficula (Forficesila) maritima De Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 240 (1842).

Anisolabis maritima Fieb., Lotos, III, 257 (1853); Ib., Syn. Eur. Orth., 74 (1853).

Forficula (Labidura) maritima Fisch. Fr., Orth. Eur., 68, pl. 6, figs 4, 4a-d (1853).

Forcinella maritima Dohrn, Stett. Ent. Zeit., xxiii, 226 (1862).

Brachylabis maritima Dohrn, Stett. Ent. Zeit., xxv, 293-4 (1864).

Forficula albipes Mus. Berol. [nec Fabr.?] teste Fieber, Lotos, III.

? *Hodotermes japonicus* Hag., Proc. Bost. Soc. Nat. Hist., xi, 399-400, fig.; xii, 139 (1868).

——— Savign., Descr. de l'Égypte, Planches Orth., pl. 1, fig. 6¹ (1809-13).

Europe; and thence nearly the whole world.

Dohrn says he has seen no great amount of variation in this species, although now so widely spread; I have, however, two males from S. Carolina in which the forceps entirely resemble those of the females, instead of being strongly bent inward in the middle and noticeably asymmetrical; in some specimens, too, the 13th or 14th antennal joints are bicolored, while in others they are similar to the rest; in some specimens again the posterior edge of the terminal dorsal segment of the abdomen is perfectly smooth, while in others it is puckered, as it were, being marked with short sinuous longitudinal striations; in one specimen from Nicaragua it is almost rugose.

Anisolabis mauritanica.

Forficesila mauritanica Luc., Expl. Alg., III, 4-5, pl. 1, figs. 1-1a-d (1846).

Brachylabis mauritanica Dohrn, Stett. Ent. Zeit., xxv, 292 (1864).

Mauritania.

Anisolabis maxima.

Forficula (Forficesila) maxima Brullé, Webb, Hist. Nat. Canaries, II, ii. Ent., 74 (1835-42),

Forcinella maxima Dohrn, Stett. Ent. Zeit., xxv, 288 (1864).

Canary Isl.

Anisolabis moesta.

Forficula moesta Génér, MS.

Forficesila moesta Serv., Orth., 28 (1839).

Anisolabis moesta Fieb., Lotos, III, 257 (1853); Ib., Syn. Eur. Orth., 74 (1853).

Forficula (Labidura) moesta Fisch. Fr., Orth. Eur., 68-9, pl. 6, figs. 5, 5a-d (1853).

Forficula hispanica Herr.-Sch., Nom. Ent., Orth., 29-30 (1840).

S. Europe.

Anisolabis pacifica.

Forficula pacifica Erichs., Arch. f. Naturg., VIII, i, 247 (1842).

Van Dieman's Land.

Anisolabis pectoralis.

Forficula pectoralis Eschsch., Entom., 82-3 (1822); Ib., Œuvr. Ent., I, 85-6 (1835).

Kamtschatka.

Anisolabis spectabilis.

Forficula spectabilis Phil., Zeitschr. ges. Naturw., XXI, 218-19 (1863).

Chili.

Anisolabis Stâli.

Forcinella Stâli Dohrn, Stett. Ent. Zeit., xxv, 286 (1864).

Java.

Anisolabis taurica.

Forficula taurica Motsch., MS.

Forficesila taurica Fisch. de W., Ent. Russ., IV, 47 (1846).

Chelidura ? taurica Fisch. Fr., Orth. Eur., 70 (1853).

Tauria.

Belongs next *A. moesta* unless it is a pupa.

Anisolabis varicornis.

Forficula (Brachylabis) varicornis Smith, Ann. Mag. Nat. Hist., [4] XVII, 450-51 (1876).

Kerguelen Island.

Apachys chartacea.

Forficula (Apachya) chartacea de Haan, Verh. Nat. Gesch. Ned. Bezitt., Zool., 239, pl. XXIII, fig. 7 (1842).

Apachya chartacea Dohrn, Stett. Ent. Zeit., xxiv, 43-4 (1863).

Malay Archipelago.

Apachys depressa.

Forficula depressa Pal.-Beauv., Ins. Afr. Amér., ii, 36-7, Pl. I, fig. 5, 5a (1805).

Apachys depressus Serv., Ann. Sc. Nat., xxii, 35 (1831); Ib., Rev. méth. Orth., 9 (1831).

Apachya depressa Serv., Orth., 55 (1839); Dohrn, Stett. Ent. Zeit., xxiv, 43 (1863).

W. Africa.

Apachys Murrayi.

Apachya Murrayi Dohrn, Stett. Ent. Zeit., xxiv, 44 (1863).

W. Africa.

Carcinophora robusta.

Chelidura robusta Scudd., Proc. Bost. Soc. Nat. Hist., XII, 344 (1869); Ib., Ent. Notes, II, 29 (1869).

Peru.

Chelidura acanthopygia.

Forficula acanthopygia Génér., Monogr. Forf., 13-14 (1832); Fieb., Lotos, III, 256 (1853); Ib., Syn. Eur. Orth., 73 (1853).

Forficula (Chelidura) acanthopygia Fisch. Fr., Orth., Eur., 83-4, pl. 6, figs. 20-20a-d (1853).

Chelidura acanthopygia Friv., Orth. Hung., 50-51 (1867); Dohrn, Stett. Ent. Zeit., xxviii, 342-43 (1847).

Forficula xanthopygia Schmidt, Verz. Krain Orth.,¹ 78 (186-).

Forficula aptera Schmidt (nec Muehlf.), Verz. Krain Orth., 78 (186-).

——— Savign., Deser. Egypte, Orth., pl. 1; figs. 71-1' (18-). Europe.

Chelidura analis.

Forficula analis Ramb., Faun. Ent. Andal., II, 10-11 (1838); Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur. Orth., 72 (1854).

Forficula (Apterygida) analis Fisch., Orth. Eur., 79 (1853).

Europe.

Chelidura aptera.

Forficula aptera Muehlf. MS.; Charp., Horæ Ent. 69 (1825); Aud.-Brullé, Hist. nat. Ins., ix, 29, pl. 1, fig. 2 (1835).

Chelidura aptera Serv., Ann. Sc. Nat., xxii, 36 (1831); Ib., Rev. méth. Orth., 9 (1831); Dohrn, Stett. Ent. Zeit., xxviii, 342 (1867).

Forficula (Chelidoura) aptera Serv., Orth., 47-8 (1839).

Forficula (Chelidura) simplex Lafr. MS.; Germ. Faun. Ins. Eur., xi, pl. 17, figs. a-c (1824-37); Burm., Handb. Ent., II, 755 (1838); Serv., Orth., 48-9 (1839); Fisch. Fr., Orth. Eur., 82-3, pl. 6, figs. 19, 19a-b (1853).

Forficula simplex Fieb., Lotos, III, 256 (1853); Ib., Syn. Eur. Orth., 73 (1854).

Forficula (Chelidura) dilatata Lafr., MS.; Burm., Handb. Ent., II, 755 (1838); Fisch. Fr., Orth. Eur., 80-1, pl. 6, figs. 16, 16a-e (1853).

Forficula dilatata Fieb., Lotos, III, 256 (1853); Ib., Syn. Eur. Orth., 73 (1854).

Forficula alpina Génè, Monogr. Forf., 15 (1832); Fisch. Fr., Orth. Eur., 81-2 (1853); Fieb., Lotos, III, 256 (1853); Ib., Syn. Eur. Orth., 73 (1854).

* *Forficula montana* Génè, Monogr. Forf., 14-15 (1832).

Forficula pyrenaica Génè, Monogr. Forf., 15-16 (1832); [*pyrenaica*] Herr. Schaeff., Nom. Ent. Orth., 30-1 (1840). Europe.

Chelidura Dufouri.

Forficula (Chelidoura) Dufouri Serv., Orth., 49-50, pl. 1, fig. 5, 5a (1839).

¹ The reference is to an extract from some work, with original pagination.

Forficula (Chelidura) Dufouri Fisch. Fr., Orth. Eur., 81, pl. 6, figs. 17, 17a-c (1853).

Chelidura Dufouri Dohrn, Stett. Ent. Zeit., xxviii, 342 (1867).

Labidura vittigera Motsch., MS.

Chelidura vittigera Fisch. de W., Ent. Russ., iv, 48-49 (1846).

Europe.

Chelidura edentula.

Forficula edentula Woll., Ann. Mag. Nat. Hist., [3] i, 20 (1858).

Madeira.

Chelidura paupercula.

Forficula paupercula Gén, Monogr. Forf., 14 (1832); Fieb., Lotos, iii, 257 (1853); Ib., Syn. Eur. Orth., 73 (1854).

Forficula (Chelidura) paupercula Fisch. Fr., Orth. Eur., 83 (1853).

Chelidura paupercula Dohrn, Stett. Ent. Zeit., xxviii, 342 (1847).

Europe.

Chelidura setulosa.

Forficula setulosa Fieb., Lotos, iii, 256-57 (1853); Ib., Syn. Eur. Orth., 73 (1854).

Europe.

Chelidura sinuata.

Forficula sinuata Lafrsn., MS.; Germ., Faun. Ins. Eur. xi, pl. 16, figs. a-b (1824-37); Burm., Handb. Ent., ii, 755-56 (1838); Serv., Orth., 49 (1839); Fieb., Lotos, iii, 256 (1853); Ib., Syn. Eur. Orth., 72-73 (1854).

Chelidura sinuata Fisch. de W., Ent. Russ., iv, 48 (1846).

Forficula (Chelidura) sinuata Fisch. Fr., Orth. Eur., 82, pl. 6, figs. 18, 18a (1853).

Forficula sinuata var. *macrolabia* Fieb., Lotos, iii, 256 (1853); Ib., Syn. Eur. Orth., 72 (1854).

Forficula sinuata var. *cyclolabia* Fieb., Lotos, iii, 256 (1853); Ib., Syn. Eur. Orth., 73 (1854).

Europe.

Chelidura thoracica.

Chelidura thoracica Fisch. de W., Ent. Russ., iv, 50 (1846).

Forficula (Chelidura) thoracica Fisch. Fr., Orth. Eur., 84ⁿ (1853).

Europe (?)

This species, said by Fischer to be found in Finland (!) cannot possibly be referred to *Forficula auricularia* or *Labia minor*, the only species known from Finland.

Chelisoches albomarginatus.

Forficula (Psalidophora) albomarginata de Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 241 (1842).

Labophora albomarginata Dohrn, Stett. Ent. Zeit., xxvi, 75 (1865).

Sumatra.

Chelisoches australicus.

Forficula australica Le Guill., Rev. Zool., 1841, 292 (1841).

Forficula australica Blanch., Voy. Pole Sud., Zool. iv, 351, Orth., pl. 1, fig. 3 (1853).

Lobophora australica Dohrn, Stett. Ent. Zeit., xxvi, 72-3 (1865).
New Holland.

Chelisoches comprimens.

Chelisoches comprimens Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 252-53 (1876).
Africa.

Chelisoches fuscipennis.

Forficula (Psalidophora) fuscipennis de Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 241 (1842).

Lobophora fuscipennis Dohrn, Stett. Ent. Zeit., xxvi, 75 (1865).
Sumatra.

Chelisoches laetior.

Lobophora laetior Dohrn, Stett. Ent. Zeit., xxvi, 73 (1865).
Bathian.

Chelisoches Ludekingi.

Lobophora Ludekingi Dohrn, Stett. Ent. Zeit., xxvi, 73-4 (1865).
Sumatra.

Chelisoches melanocephalus.

Lobophora melanocephala Dohrn, Stett. Ent. Zeit., xxvi, 75-6 (1865).
India.

Chelisoches modestus.

Forficula modesta Stål, Eug. Resa, Zool. Ins., 302 (1858).

Lobophora modesta Dohrn, Stett. Ent. Zeit., xxvi, 74 (1865).
China.

Chelisoches morio.

Forficula morio Fabr., Syst. Ent., 270 (1775); Ib., Spec. Ins., i, 341 (1781); Ib., Mant. Ins., i, 225 (1787); Ib., Ent. Syst., ii, 5 (1793); Goeze, Ent. Beytr., i, 736 (1777); Gmel., Linn. Syst. Nat., i, iv, 2040 (1788); Oliv., Encycl. méth., vi, ii, 468 (1792); Burm., Handb. Ent., ii, 752 (1838).

Lobophora morio Dohrn, Stett. Ent. Zeit., xxvi, 71-2 (1865).

Forficula (Psalidophora) rufitarsis de Haan, Verh. Nat. Gesch. Ned. Bezitt. Orth., 241 (1842).

Lobophora rufitarsis Serv., Orth., 33 (1839).

Lobophora nigronitens Stål, Eug. Resa, Zool., Ins., 305 (1858).

Lobophora tartarea Stål, Eug. Resa, Zool., Ins., 305 (1858).

Lobophora cincticornis Stål, Eug. Resa, Zool., Ins., 305 (1858).

Islands of Pacific and Indian Oceans and neighboring main.

Chelisoches simulans.*Forficula simulans* Stål, Eug. Resa, Zool., Ins., 302 (1858).*Lobophora simulans* Dohrn, Stett. Ent. Zeit., xxvi, 74 (1865).

Malay Archipelago.

Chelisoches superbus.*Lobophora superba* Dohrn, Stett. Ent. Zeit., xxvi, 71, (1865).

Malay Archipelago.

Chelisoches tasmanicus.*Forficula tasmanica* Blanch., Voyage Pole Sud, Zool., iv, 350-51;

Orth., pl. 1, fig. 2 (1853).

Tasmania.

Condylopalama agilis.*Condylopalama agilis* Sund., Forh. Skand. Naturf., iv, 255 (1847).

Brazil.

Cylindrogaster gracilis.*Cylindrogaster gracilis* Stål, Ofv. k. Vet. Akad., Forh., xii, 350 (1855); Dohrn, Stett. Ent. Zeit., xxiv, 58-9 (1863).*Diplatys gracilis* Stål, Eug. Resa, Zool., Ins., 306 (1858). Brazil.**Cylindrogaster nigra.***Cylindrogaster nigra* Seudd., Proc. Bost. Soc. Nat. Hist., xviii, 251-52 (1876). Brazil.**Cylindrogaster Sahlbergi.***Cylindrogaster Sahlbergi* Dohrn, Stett. Ent. Zeit., xxiv, 59 (1863). Brazil.**Cylindrogaster thoracica.***Cylindrogaster thoracicus* Dohrn, Stett. Ent. Zeit., xxiv, 59 (1863). Brazil.**Diplatys macrocephala.***Forficula macrocephala* Pal.-Beauv., Ins. Afr. Amér., ii, 36, pl. Orth. 1, fig. 3 (1805).*Diplatys macrocephala* Serv., Ann. Sc. Nat., xxii, 33 (1831); Ib., Rev. méth. Orth., 7 (1831); Ib., Orth., 51 (1839). W. Africa.**Echinosoma afrum.***Forficula afra* Pal.-Beauv., Ins. Afr. Amér., ii, 35, pl. Orth. 1, fig. 1 (1805).*Echinosoma afrum* Serv., Orth., 34-5 (1839); Dohrn, Stett. Ent. Zeit., xxiv, 63-4 (1863). W. Africa.**Echinosoma horridum.***Echinosoma horridum* Dohrn, Stett. Ent. Zeit., xxiv, 66 (1863).

Java.

Echinosoma parvulum.*Echinosoma parvulum* Dohrn, Stett. Ent. Zeit., xxiv, 66 (1863).

Ceylon.

Echinosoma sumatranum.

Forficula (Echinosoma) sumatrana de Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 241 (1842).

Echinosoma sumatranum Dohrn, Stett. Ent. Zeit., xxiv, 65 (1863).
E. Indies.

Echinosoma Wallbergi.

Echinosoma Wallbergi Dohrn, Stett. Ent. Zeit., xxiv, 64-5 (1863).
Caffraria.

Echinosoma Westermanni.

Echinosoma Westermanni Dohrn, Stett. Ent. Zeit., xxiv, 65-6 (1863).
E. Indies.

Echinosoma Yorkense.

Echinosoma Yorkense Dohrn, Stett. Ent. Zeit., xxx, 234 (1869).
N. Australia.

Forficula aculeata.

Forficula aculeata Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 262-63 (1876). Northern United States, east of the Mississippi.

Forficula africana.

Forficula africana Dohrn, Stett. Ent. Zeit., xxvi, 86-7 (1865).
Africa.

Forficula albipennis.

Forficula albipennis Muehlf. MS.; Charp., Hor. Ent., 68 (1825); Burm., Handb. Ent., II, 755 (1838); Friv., Orth. Hung., 49-50 (1867); Dohrn, Stett. Ent. Zeit., xxvi, 99 (1865).

Chelidura albipennis Steph., Ill. Brit. Ent., Mand., vi, 7, pl. 28, fig. 5 (1835).

Forficula (Apterygida) albipennis Fisch. Fr., Orth. Eur., 77-8, pl. 6, figs. 14, 14 a-b (1853).

Forficula media Hagenb. [nec Marsh.], Symb. Faun. Ins. Helv., 16, figs. 7-8.

Forficula pedestris Bon. MS.; Gén, Monogr. Forf., 13 (1832); Serv., Orth., 45 (1839); Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur. Orth., 72 (1854).

Labidura curta Motsch. MS.

Chelidura curta Fisch. de W., Ent. Russ., iv, 49 (1846).

Forficula Freyi Dohrn, Stett. Ent. Zeit., xx, 106 (1859); Meyer-Dr, Neue Denkschr. allg. Schweiz. Gesellsch., xvii, 28 (1860).

Europe.

Forficula albipes.

Forficula albipes Fabr., Mant. Ins., i, 224 (1787); Ib., Ent. Syst., II, 3 (1793); Gmel., Linn. Syst. Nat., i, iv, 2039 (1738); Oliv., Encyl. mth., vi, 467 (1792).
W. Indies.

This species appears to be nearly allied to *F. bimaculata* Pal-Beauv., if it be not identical with it.

***Forficula ancylura*.**

Forficula ancylura Dohrn, Stett. Ent. Zeit., xxvi, 91-2 (1865).

Phillippines.

***Forficula arachidis*.**

Forficula arachidis Yers., Ann. Soc. Ent. France [3], viii, 509-11, pl. 10, figs. 33-5 (1860).

S. Europe.

***Forficula auricularia*.**

Forficula auricularia Linn., Syst. Nat., ed. x, i, 423 (1758); Fabr., Syst. Ent., 269 (1775); Ib., Spec. Ins., i, 340 (1781); Ib., Mant. Ins., i, 224 (1787); Ib., Ent. Syst., ii, 1 (1793); Goeze, Ent. Beytr., i, 734 (1777); Herbst, Fuessl. Arch. Ins., vii-viii, 183 (1786); Gmel., Linn. Syst. Nat., i, iv, 2038-39 (1788); Vill., Linn. Ent., i, 425-26 (1789); Oliv., Encycl. méth., vi, ii, 466, pl. 246, fig. Forf., 1a-c (1792); Rossi, Fauna Etrusca, i, 316 (1795); Schrank, Faun. Boica, i, ii, 720 (1798); Marsh., Col. Brit., ii, 529, pl. 30 (1802); Ib., Ent. Brit., i, 529 (1802); Panz., Deutschl. Ins., pl. 87, 8, fig. 8 (1802?); Latr., Hist. Nat. Crust. Ins., xii, 190 (1804); Ib., Gen. Crust. Ins., iii, 82 (1807); Ib., Nouv. Dict. Hist. Nat., xii, 8 (1817); Leach, Edinb. Encycl., Amer. ed., viii, 707 (1816); Ib., Zool. Misc., iii, 99 (1817); Ib., Sam. Comp., 216 (1819); Zett., Orth. Succ., 36-8 (1821); Ib., Faun. Ins. Lapp., 443-44 (1828); Ib., Ins. Lapp. descr., 246 (1838); Charp., Horae Ent., 67 (1825); Dufour, Ann. Sc. Nat., xiii, 346-47, pl. 19, figs. 4-8 (1828); Phil., Orth. Berol., 56 (1830); Serv., Ann. Sc. Nat., xxii, 32 (1831); Ib., Rev. méth. Orth., 5 (1831); Ib., Orth., 36-8 (1839); Génée, Monogr. Forf., 10-12 (1832); Stevens, Ill. Brit. Ent., Mand., vi, 4-5, pl. 28, fig. 1 (1835); And.-Brullé, Hist. Nat. Ins., ix, 29-30, pl. 1, figs. 3, 3a (1835); Curt., Brit. Ent., pl. 560, No. 1, lower figures (1835-40); Ramb., Faun. Ent. Andal., ii, 6 (1838); Burm., Handb. Ent., ii, 753 (1838); Guer., Iconogr. Règne An., 326, pl. 52, fig. 2 (1840-44); Fisch. Wald., Ent. Russ., iv, 38-40 (1846); Luc., Expl. Alg., iii, 6 (1846); Borek, Skand. Rätv., Ins. Nat. Hist., 6-11, pl. 1, fig. 1 (1848); Fisch. Fr., Orth. Eur., 74-5, pl. 6, figs. 11, 11 a-t (1853); Fieb., Lotos, iii, 254-55 (1853); Ib., Syn. Eur. Orth., 71-2 (1854); His., Finl. Orth., 9-10 (1861); Dohrn, Stett. Ent. Zeit., xxvi, 98-9 (1865); Friv., Orth. Hung., 48-9 (1867).

Forficula auricularia var. *cyclolabia* Fieb., Lotos, iii, 254 (1853); Ib., Syn. Eur. Orth., 71 (1854).

Forficula cyclolabia Schmidt, Verz. Krain Orth., 77 (186-).

Forficula auricularia var. *macrolabia* Fieb., Lotos, III, 254 (1853);
Ib., Syn. Eur. Orth., 71 (1854).

Forficula macrolabia Schmidt, Verz. Krain Orth., 78 (186-).

Forficula major De Geer, Mém., III, 545-52, pl. 25, figs. 16-25 (1773); Ib., Ed. Goeze, III, 353-57, pl. XXV, figs. 16-25 (1780);
Retz., Gen. Sp. Ins., 101 (1783).

Forficula parallela Fabr. Syst. Ent., 270 (1775); Ib., Spec. Ins., I, 341 (1781); Ib., Mant. Ins., I, 225 (1787); Ib., Ent. Syst., II, 4-5 (1793); Goeze, Ent. Beytr., I, 736 (1777); Gmel., Linn. Syst. Nat., I, iv, 2039 (1788); Oliv. Encycl. méth., VI, ii, 468 (1792).

Forficula media Marsh., Col. Brit., 530 (1802); Ib., Ent. Brit., I, 530 (1802); Steph., Ill. Brit. Ent., Mand., VI, 5, pl. 28, fig. 2 (1835).

Forficula neglecta Marsh., Col. Brit., II, 529-30 (1802); Ib., Ent. Brit., I, 529-30 (1802).

Forficula infumata Muehlf., MS.; Charp., Horae Ent., 70 (1825);
[strigata sic!] Schmidt.

Forficula borealis Leach, MS.; Steph., Ill. Brit. Ent., Mand., VI, 5-6, pl. 28, fig. 3 (1835); Curt., Brit. Ent., pl. 560, No. 2, upper figure (1835-40).

Forficula forcipata Steph., Ill. Brit. Ent., Mand., VI, 6, pl. 28, fig. 4 (1835); Curt., Brit. Ent., pl. 560, No. 3 (1835-40).

Forficula lurida Fisch. Fr., Orth. Eur., 75-6, pl. 6, figs. 12 a-b (1853).

——— Savign., Deser., de l'Égypte, Planches Orth., pl. 1, figs. 4¹, 4^{1'}, 5¹, 5^{1'}, 5², 5^{2'} (1809-13).

Europe, Eastern United States.

Forficula bimaculata.

Forficula bimaculata Pal. Beauv., Ins. Afr. Amér., X, 165, pl. Orth. 14, fig. 1 (1817); Serv., Ann. Sc. Nat., XXII, 32 (1831); Ib., Rev. méth. Orth., 6 (1831); Ib., Orth., 39 (1839). St. Domingo.

Serville says "antennes de dix-sept articles, selon M. de Bauvois."
Beauvois himself says "dix articles aux antennes."

Forficula bolcensis.

Forficula bolcensis Mass., Stud. Pal., 15-16, pl. 1, figs. 5-7 (1856).
Italy [fossil].

Forficula brachynota.

Forficula brachynota de Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 243, pl. 23, fig. 10 (1842); Dohrn, Stett. Ent. Zeit., XXVI, 94 (1865).
E. Indies.

Forficula californica.

Forficula californica Dohrn, Stett. Ent. Zeit., xxvi, 85-6 (1865).
California.

Forficula capensis.

Forficula capensis Thunb., Act. Soc. Reg. Scient. Ups., ix, 52
(1827). Cape of Good Hope.

The generic position of this insect cannot even be conjectured until the species is recovered.

Forficula cingalensis.

Forficula cingalensis Dohrn, Stett. Ent. Zeit., xxvi, 89 (1865).
Ceylon.

Forficula circulata.

Forficula circulata Dohrn, Stett. Ent. Zeit., xxvi, 95-6 (1865).
India.

Forficula decipiens.

Forficula decipiens Géné, Monogr. Forf., 13 (1832); Serv., Orth., 46 (1839); Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur. Orth, 72 (1854); Dohrn, Stett. Ent. Zeit., xxvi, 99 (1865).

Forficula (Apterygida) decipiens Fisch. Fr., Orth., Eur., 76-7, pl. 6, figs. 13a-b (1853).

Forficula decipiens var. *cyclolabia* Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur., Orth., 72 (1854).

Forficula decipiens var. *macrolabia* Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur., Orth., 72 (1854).

Forficula pallidicornis Brullé, Exp. Scient. Morée, III, ii, 81 [pl. 29, fig. 2] (1832); Fieber, Lotos, III, 254 (1853); Ib., Syn. Eur. Orth., 71 (1854). Europe.

Forficula brevis Ramb., Faun. Ent. Andal., II, 9-10 (1838); Fieb., Lotos, III, 255 (1853); Ib., Syn. Eur. Orth., 72 (1854).

Forficula Doumerci.

Forficula Doumerci Serv., Orth., 41 (1839). Cayenne.

Forficula elongata.

Forficula elongata Fabr., Ent. Syst., II, 4 (1793). W. Indies.

It is possible that this may be a Spongophora.

Forficula Erichsoni.

Forficula ruficeps Erichs. [nec Burm.], Archiv. f. Nat., VIII, ii, 246-47 (1842).

Apterygida Erichsoni Dohrn, Stett. Ent. Zeit., xxiii, 231 (1862).
Tasmania.

Forficula erythrocephala.

Forficula erythrocephala Oliv. [nec Fabr.], Encycl. méth., vi, 468 (1792).

? *Forficula natalensis* Stål, Ofv. k. Vetensk. Akad. Förh., xii, 348 (1855). S. Africa.

Forficula exilis.

Forficula exilis Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 262 (1876). Texas.

Forficula fasciata.

Forficula fasciata Thunb., Act. Soc. Reg. Scient. Ups., ix, 52 (1827). Cape of Good Hope.

The genus to which this species should be referred is indeterminable from the description.

Forficula Fedtschenkoi.

Forficula Fedtschenkoi Sauss., Fedtsch. Turkestan, 6, pl. 1, fig. 2 (1874). Sarafschan and Ferghana.

? Forficula flavipennis.

Forficula flavipennis Fabr., Ent. Syst., ii, 5 (1793). Senegal.

Forficula flexuosa.

Forficula flexuosa Fabr. Syst. Ent., 269 (1775); Ib., Spec. Ins., i, 341 (1781); Ib., Mant. Ins., i, 224 (1787); Ib., Ent. Syst., ii, 3 (1793); Goeze, Beitr., i, 735 (1777); Gmel., Linn. Syst. Nat., i, iv, 2039 (1788); Oliv., Encycl., méth., vi, 468 (1792). Cayenne.

Perhaps this is *F. Percheroni* Guér.

Forficula gracilis.

Forficula gracilis Burm., Handb. Ent., ii, 755 (1838). Brazil.

Forficula herculeana.

Forficula herculeana Fabr., Ent. Syst. Suppl., 185 (1798).

St. Helena.

It is impossible to tell from the description to what genus this should be referred, but the species will doubtless be recovered. Perhaps it is an *Opisthoseosmia*.

Forficula hirsuta.

Forficula hirsuta Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 256-57 (1876). Brazil.

Forficula Huegeli.

Forficula Huegeli Dohrn, Stett. Ent. Zeit., xxvi, 92-3 (1865).

Eastern India.

Forficula Jackeryensis.

Forficula Jackeryensis Pal.-Beauv., Ins. Afr. Amér., ii, 36, pl. Orth., 1, fig. 4 (1805); Serv., Orth., 42 (1839). W. Africa.

Forficula Jagori.

Forficula Jagori Dohrn, Stett. Ent. Zeit., xxvi, 94-5 (1865).

Luzon.

Forficula linearis.

Forficula linearis Eschsch., Entom., 81 (1822); Ib., Œuvr. Ent., I, 84 (1835). St. Catherina, Brazil.

Forficula lobophoroides.

Forficula lobophoroides Dohrn, Stett. Ent. Zeit., xxvi, 96 (1865).

Phillippines.

Forficula Lucasi.

Forficula Lucasi Dohrn, Stett. Ent. Zeit., xxvi, 98 (1865).

Syria, Egypt.

Forficula lugubris.

Forficula lugubris Dohrn, Stett. Ent. Zeit., xxiv, 230-31 (1862).

Mexico.

Dohrn does not mention this species in his Monograph.

Forficula luteipennis.

Forficula luteipennis Serv., Orth., 46 (1839) [cf. Burm., in Germ., Zeitschr. f. Ent., II, 81]; Dohrn, Stett. Ent. Zeit., xxvi, 87-8 (1865).

Forficula dichroa Stål, Eug. Resa, Zool. Ins., 301 (1858).

Brazil, Columbia.

Forficula luteipes.

Forficula luteipes Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 255 (1876). Brazil.

Forficula macropyga.

Forficula macropyga Westw., Royle's Himalaya, pl. 9, fig. 12 (teste Dohrn); Dohrn, Stett. Ent. Zeit., xxvi, 93 (1865). N. India.

Forficula metallica.

Forficula metallica Dohrn, Stett. Ent. Zeit., xxvi, 90-1 (1865).

E. India.

Forficula minuta.

Forficula minuta Heer, Urw. d. Schweiz, 367 (1865) *ined.*

Œningen [fossil].

Forficula nigripennis.

Forfiscelia (sic!) *nigripennis* Motsch., Bull. Soc. imp. Nat. Mosc., xxxvi, iii, 1-2 (1863).

Forficula nigripennis Dohrn, Stett. Ent. Zeit., xxvi, 89-90 (1865).

Ceylon.

Forficula oceanica.

Forficesila oceanica Le Guill., Rev. Zool., 1841, 292 (1841).

Forficula oceanica Blanch., Voy. Pole Sud, Orth., pl. 1, fig. 4 (1853). Oceanica.

This belongs to a yet uncharacterized genus, and is not *morio* as suggested by Erichson.

Forficula Orsinii.

Forficula Orsinii Géné MS.; Fieb., Lotos, III, 254 (1853); Ib., Syn. Eur. Orth., 71 (1854); Dohrn, Stett. Ent. Zeit., XX, 107 (1859); Ib., ib., XXVI, 96 (1865).

Forficula (Apterygida) Orsinii Fisch. Fr., Orth. Eur., 79-80 (1853). Europe.

Forficula parvicollis.

Forficula parvicollis Stål, Eug. Resa, Zool. Ins., 304 (1858).

Brazil.

Forficula Percheroni.

Forficula Percheron Guér., Guér. Perch., Gen. Ins., VI, iv, pl. 7 (1835-8).

Forficula Percheroni Dohrn, Stett. Ent. Zeit., XXVI, 85 (1865).

Forficula elegans Klug MS., Burm., Handb. Ent., II, 753 (1838).

Sphongophora bipunctata Sculd., Bost. Journ. Nat. Hist., VII, 415 (1862).

Psalidophora bipunctata Dohrn., Stett. Ent. Zeit., XXV, 419-20 (1864). Brazil.

The figure given by Percheron differs from the type of my *bipunctata* only in having the hind border of the prothorax more rounded, and is very probably an error of the engraver.

The specimen in the Harris Collection (presumably from Massachusetts, but, if so, very probably imported) is marked in his manuscript catalogue, "May 20, 1827. From Z. Cook, Esq."

Forficula plagiata.

Forficula plagiata Fairm., Arch. Ent., II, 257, pl. 9, fig. 3 (1858).

W. Africa.

Judging from a transcript of the description and figure kindly made for me by Dr. LeConte, this seems to be a true *Forficula*.

Forficula primigenia.

Forficula primigenia Heer, Urw. d. Schweiz, 367, fig. 227 (1865).

Æningen [fossil].

Forficula pubescens.

Forficula pubescens Géné MS.; Serv. Orth., 46-7 (1839); Fieb.,

Lotos, III, 255 (1853); Ib., Syn. Eur. Orth., 72 (1854); Dohrn, Stett. Ent. Zeit., XXVI, 99 (1865).

Forficula (Apterygida) pubescens Fisch. Fr., Orth., Eur., 77, pl. 6, figs. 15a-f (1853). Europe.

Forficula pulchella.

Forficula pulchella Serv., Orth., 42 (1839). New York.

Forficula recta.

Forficula recta Heer, Urw. d. Schweiz, 367, fig. 226 (1865).
Eningen [fossil].

Forficula ruficeps.

Forficula ruficeps Burm., Handb. Ent., II, 755 (1838); Dohrn, Stett. Ent. Zeit., XXVI, 88 (1865).

Apterygida ruficeps Dohrn, Stett. Ent. Zeit., XXIII, 231-2 (1862).
Mexico.

Forficula ruficollis.

Forficula ruficollis Fabr., Ent. Syst., Suppl., 185 (1798); Charp., Hor. Ent., 69 (1825); Burm. Handb. Ent., II, 754 (1838); Fieb., Lotos, III, 254 (1853); Ib., Syn. Eur., Orth., 71 (1854); Fisch. Fr., Orth. Eur., 73-4, pl. 6, figs. 10, 10a, a*, b (1853); Dohrn, Stett. Ent. Zeit., XXVI, 97 (1865).

Forficula baetica Ramb., Faun. Ent. Andal., II, 6-7, pl. 1 figs. 6-8 (1838). Europe.

Forficula scabriuscula.

Forficula scabriuscula Serv., Orth., 38-9 (1839). S. America.

Forficula senegalensis.

Forficula senegalensis Lefebvr. MS.; Serv. Orth., 39-40 (1839).
Senegal.

Forficula serrata.

Forficula serrata Serv., Orth., 40 (1839); Dohrn, Stett. Ent. Zeit., XXVI, 97-8 (1865). Africa.

Forficula smyrnensis.

Forficula smyrnensis Serv., Orth., 38 (1839); Fieb., Lotos, III, 254 (1853); Ib., Syn. Eur. Orth., 71 (1854); Fisch. Fr., Orth. Eur., 71-2, pl. 6, figs. 8, 8a (1853); Dohrn, Stett. Ent. Zeit., XXVI, 96-97 (1865). Asia Minor.

Forficula speculigera.

Forficula speculigera Stål, Ofv. k. Vetensk. Akad. Förh., XII, 349 (1855). N. Grenada.

Forficula suturalis.

Forficula suturalis Serv. [nec Burm.] Orth., 40-1 (1839). Brazil.

Forficula taeniata.

Forficula taeniata Dohrn, Stett. Ent. Zeit., xxiii, 230 (1862); *Ib.*,
ib., xxvi, 85 (1865). Southern U. S. to Brazil.

Specimens (♂, ♀) taken by Mr. B. P. Mann, at São Sebastião,
Brazil, agree with specimens from Mexico, except in being of a
lighter color, so that the vittæ of the tegmina are not so conspicuous;
they are also slightly smaller.

Forficula tolteca.

Forficula tolteca Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 261
(1876). Mexico.

Forficula vara.

Forficula vara Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 260-
61 (1876). Mexico.

Forficula variana.

Forficula variana Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 253-
54 (1876). Liberia.

Forficula variicornis.

Forficula variicornis Scudd., Proc. Bost. Soc. Nat. Hist., xviii,
255-56 (1876). Brazil.

Forficula vellicans.

Forficula vellicans Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 254-
55 (1876). Brazil.

Forficula Wallacei.

Forficula Wallacei Dohrn, Stett. Ent. Zeit., xxvi, 88 (1865).
N. Guinea.

Forficularia problematica.

Forficularia problematica Wey., Arch. Mus. Teyl., ii, 28, pl. 3,
figs. 25, 26, 26a (1869); *Ib.*, Ins. Foss. Bav., 28, pl. 3, figs. 25, 26, 26a
(1869). Solenhofen [fossil].

Labia amoena.

Labia amoena Stål, Ofv. k. Vet. Akad. Förh., xii, 350 (1855);
Ib., Eng. Resa, Zool. Ins., 303-4 (1858).

Labia amoena Dohrn, Stett. Ent. Zeit., xxv, 425-26 (1864).
E. Indies.

Labia annulata.

Labia annulata Fabr., Ent. Syst., ii, 4 (1793). W. Indies.

Labia arcuata.

Labia arcuata Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 257 (1876).
Brazil.

Labia bilineata.

Labia bilineata Scudd., Proc. Bost. Soc. Nat. Hist., xii, 345 (1869);
Ib., Ent. Notes, ii, 30 (1869). Peru.

Labia brunnea.

Labia brunnea Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 264 (1876). Cuba.

Labia Burgessii.

Labia Burgessii Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 266-67 (1876).

Forficula sp., Glov., Ill. N. Am. Ent. Orth., pl. vi, fig. 19 (1872). Florida.

Labia chalybea.

Labia chalybea Dohrn, Stett. Ent. Zeit., xxv, 429 (1864). Venezuela.

Labia curvicauda.

Forfiscelia (sic!) *curvicauda* Motschl., Bull. Soc. imp. Nat. Mosc., xxxvi, iii, 2-3, pl. 2, fig. 1 (1863).

Labia curvicauda Dohrn, Stett. Ent. Zeit., 428-29 (1864). Ceylon.

Labia dilaticauda.

Forfiscelia (sic!) *dilaticauda* Motsch., Bull. Soc. imp. Nat. Mosc., xxxvi, iii, 3-4 (1863). Ceylon.

Labia dorsalis.

Forficula dorsalis Burm., Handb. Ent., ii, 754 (1838). Columbia.

Labia Ghilianii.

Labia Ghilianii Dohrn, Stett. Ent. Zeit., xxv, 424-25 (1864). S. America.

Labia gravidula.

Forficula (*Apterygida*) *gravidula* Gerst., Arch. f. Naturg., xxxv, i, 221 (1869); Ib., Glied.-Fauna Sans., 50 pl. 3, fig. 9 (1873). Zanzibar.

Labia guttata.

Labia guttata Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 265-66 (1876). Texas.

Labia luzonica.

Labia luzonica Dohrn, Stett. Ent. Zeit., xxv, 427 (1864). E. Indies

Labia Maeklini.

Labia Maeklini Dohrn, Stett. Ent. Zeit., xxv, 428 (1864). Brazil.

? Labia marginalis.

Forficula marginalis Thunb., Act. Soc. Reg. Scient. Ups., ix, 52 (1827).

? *Forficula ochropus* Stål, Ofv. K. Vetensk. Akad. Förh., xii, 348 (1855).

Labia ochropus Dohrn, Stett. Ent. Zeit., xxviii, 345 (1867). S. Africa

Labia melancholica.

Labia melancholica Scudd., Proc. Bost. Soc. Nat. Hist., XVIII, 267-68 (1876). Texas.

Labia minor.

Forficula minor Linn., Syst. Nat. ed. x, 1, 423 (1758); De Geer, Mém., III, 553-54, pl. 25, figs. 26-7 (1773); Ib., ed. Goeze, III, 358, pl. xxv, fig. 26-27 (1780); Fabr., Syst. Ent., 269 (1775); Ib., Spec. Ins., 1, 340-41 (1781); Ib., Mant. Ins., 1, 224 (1787); Ib., Ent. Syst., II, 3 (1793); Goeze, Ent. Beytr., 1, 735 (1777); Retz., Gen. Sp. Ins., 101 (1783); Herbst, Fuessl. Arch. Ins., VII-VIII, 183 (1786); Gmel., Linn. Syst. Nat., 1, iv, 2039 (1788); Vill., Linn. Ent. 1, 426-27 (1789); Oliv., Encycl. méth., VI, ii, 467-68, pl. 246, fig. Forf. 2, 2² (1792); Rossi, Fauna Etrusca, 1, 316-17 (1795); Schrank, Fauna Boica, 1, ii, 720 (1798); Marsh, Col. Brit., II, 530 (1802); Ib., Ent. Brit., 1, 530 (1802); Panz., Deutschl. Ins., H. 87.9, fig. 9 (1802?); Latr., Hist. Nat. Crust. Ins., XII, 91 (1804); Ib., Gen. Crust. Ins., III, 82 (1807); Ib., Nouv. Dict. Hist. Nat., XII, 8 (1817); Zett., Orth. Suec., 38-9 (1821); Charp., Horæ Ent., 70 (1825), Phil., Orth. Berol., 6-7 (1830); Serv., Ann. Sc. Nat., XXII, 32 (1831); Ib., Rev. méth., Orth., 6 (1831); Ib., Orth., 44 (1839); Géné, Monogr. Forf., 12 (1832); Aud.-Br., Hist. Nat. Ins., IX., 30-31, pl. 1, fig. 4 (1835); Burm., Handb. Ent., II, 754 (1838); Ramb., Faun. Ent. Andal., II, 7-8 (1838); Fisch. Wald., Ent. Russ., IV, 42-4 (1846); Borek, Skand. Rätv. Ins. Nat. Hist., 11-13 (1848); Fisch. Fr., Orth. Eur., 70-71, pl. 6, figs. 7a-d (1853); His., Finl. Orth., 10 (1861).

Labia minor Leach, Edinb. Encycl. Am. Ed., VIII, 707 (1816); Ib., Zool. Misc., III, 99 (1817); Ib., Sam. Ent. Comp., 216-17, pl. 4, fig. 16 (1819); Steph., Ill. Brit. Ent., Mand., VI, 8 (1835); Dohrn, Stett. Ent. Zeit., XXV, 426 (1864); Glov., Ill. N. A. Ent. Orth., pl. x, fig. 3 (1872).

Copiscelis minor Fieb., Lotos, III, 257-58 (1853); Ib., Syn. Eur. Orth., 74-5 (1853).

Forficesila minor Friv., Orth. Hung., 46-7 (1867).

?*Forficula livida* Zschach, Mus. Lesk., 46 (1788); Gmel., Linn. Syst. Nat., 1, iv, 2040 (1788).

Labia minuta Scudd., Bost. Journ. Nat. Hist., VII, 415-16 (1862); Ib., Hitchc. Geol. N. H., 1, 380 (1874); Glov., Ill., N. Am. Ent., Orth., pl. 1, figs. 10, 10 (1872); Prov., Nat. Can., VIII, 18-9 (1876). Europe, N. America.

Labia mucronata.

Forficula mucronata Stål, Eug. Resa, Zool. Ins., 303 (1858).

Labia mucronata Dohrn, Stett. Ent. Zeit., xxv, 423-24 (1864).

E. Indies.

Labia pallidicornis.

Forficula pallidicornis Brullé. pl. 29, fig. 2.

Among the MSS. on Orthoptera of the late Mr. G. R. Gray (now in my possession), is a figure of this insect with the brief reference given above, which I have been unable to extend. The insect hardly appears to differ from *L. minor*.

Labia pilicornis.

Forfiscelia (sic!) *pilicornis* Motschl., Bull. Soc. imp. Nat. Mosc., xxxvi, iii, 2 (1863).

Labia pilicornis Dohrn, Stett. Ent. Zeit., xxv, 427 (1864).

Ceylon.

? Labia pygmæa.

Forficula pygmæa Fabr., Ent. Syst., II, 3 (1793).

Guinea.

Labia quadrilobata.

Labia quadrilobata Dohrn, Stett. Ent. Zeit., xxviii, 346 (1867).

Guinea.

Labia rotundata.

Labia rotundata Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 263-64 (1876).

Mexico.

Labia unidentata.

Forficula unidentata Pal.-Beauv., Ins. Afr. Amér., x, 165, pl. Orth. 14, fig. 3 (1817); Serv., Ann. Sc. Nat., xxii, 32 (1831); Ib., Rev. méth. Orth., 6 (1831); Ib., Orth. 41-2 (1839).

St. Domingo.

Labia Wallacei.

Labia Wallacei Dohrn, Stett. Ent. Zeit., xxv, 427-28 (1864).

N. Guinea.

Labidophora dimidiata.

Platylabia dimidiata Dohrn, Stett. Ent. Zeit., xxviii, 348 (1867).

Luzon.

Labidophora guineensis.

Platylabia guineensis Dohrn, Stett. Ent. Zeit., xxviii, 348-49 (1867).

Guinea.

Labidophora major.

Platylabia major Dohrn, Stett. Ent. Zeit., xxviii, 347-48 (1867).

Celebes.

Labidophora thoracica.*Platylabia thoracica* Dohrn, Stett. Ent. Zeit., xxviii, 348 (1867).

E. Indies.

? Labidura advena.*Labidura advena* Mein., Nat. Tidsskr., [3] v, 279-80, pl. 12, figs. 5-8, 15 (1863). Jamaica.

It is an apterous species, and appears to belong to a distinct group.

Labidura auditor.*Labidura auditor* Scudd., Proc. Bost. Soc. Nat. Hist., xviii, 252 (1876). Formosa.**Labidura castanea.***Forficesila castanea* Serv., Orth., 26 (1839).

Loc. ?

Labidura Dufourii.*Forficula Dufourii* Desm., Faun. Franç. Orth., pl. 1, fig. 7 (1820).*Forficula pallipes* Dufour (nec Fabr.), Ann. Gen. Sc. Phys., vi, 316-17, pl. 96, figs. 7, a-b (1820); Ramb., Faun. Ent. Andal., ii, 4-6 (1838).*Labidura pallipes* Dohrn, Stett. Ent. Zeit., xxiv, 317 (1863).*Forficula lividipes* Dufour, Ann. Sc. Nat., xiii, 340 (1828).*Forficesila meridionalis* Serv., Orth., 26-7, (1839).*Forficula (Labidura) meridionalis* Fisch. Fr., Orth. Eur., 67-8, pl. 6, figs. 3, 3a-c (1853).*Forficula meridionalis* Fieb., Lotos, iii, 255 (1853); Ib., Syn. Eur. Orth., 72 (1854). Europe.**Labidura femoralis.***Labidura femoralis* Dohrn, Stett. Ent. Zeit., xxiv, 321-22 (1863).

Ceylon.

Labidura icterica.*Forficesila icterica* Serv., Orth., 25-6 (1839).

Ceylon.

Labidura indica.*Forficula (Pygidicrana) indica* Hagenb. MS.; Burm., Handb. Ent., ii, 751 (1838).*Forficula (Forficesila) indica* DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 240 (1842).*Forficula indica* Stål, Eug. Resa, Zool. Ins., 300 (1858).*Labidura indica* Dohrn, Stett. Ent. Zeit., xxiv, 320-21 (1863).*Forficula geniculata* Stål, Öfv. k. Vet. Akad. Förh., xii, 349 (1855).

Java.

Labidura lithophila.*Labidura lithophila* Scudd., Bull. U. S. Geol. Surv. Terr., ii, 259-60.

Colorado [fossil].

Labidura marginella.

Forficula marginella Cost., Att. R. Accad. Sc. Napoli, iv, Zool., 50-1 pl., figs. 1, 2 (1839).

Forficula (Labidura) marginella Fisch. Fr., Orth. Eur., 66-7, pl. 6, figs. 2, 2a (1853). Europe.

Labidura plebeja.

Labidura plebeja Dohrn, Stett. Ent. Zeit., xxiv, 284 (1863).

Java.

Labidura quadrispinosa.

Labidura quadrispinosa Dohrn, Stett. Ent. Zeit., xxiv, 311 (1863).

E. Indies.

Labidura riparia.

Forficula riparia Pall., Reis., II, Anh. 30 (1773); Ib., Voyages, Nouv. ed. viii, 155-56 (1794); Goeze, Ent. Beytr., I, 735 (1777).

Forficesila riparia Fisch. Wald., Ent. Russ., iv, 46 (1846).

Labidura riparia Dohrn, Stett. Ent. Zeit., xxiv, 313-16 (1863).

Forficula pallipes Fabr., Syst. Ent., 270 (1775); Ib., Spec. Ins., I, 341 (1781); Ib., Mant. Ins., I, 225 (1787); Ib., Ent. Syst., II, 5 (1793); Goeze, Ent. Beytr., I, 736 (1777); Gmel., Linn. Syst. Nat., I, iv, 2040 (1788); Oliv., Encycl. méth., vi, ii, 468 (1792).

? *Forficula dentata* Fabr., Syst. Ent., 270 (1775); Ib., Sp. Ins., I, 341 (1781); Ib., Mant. Ins., I, 224 (1787); Ib., Ent. Syst., II, 3 (1793); Goeze, Ent. Beytr., I, 736 (1777); Gmel., Linn. Syst. Nat., I, iv, 2039 (1788); Oliv., Encycl. méth., vi, ii, 468 (1792); Thunb., Act. Soc. Reg. Scient. Ups., ix, 52 (1827).

Forficula gigantea Fabr., Mant. Ins., I, 224 (1787); Ib., Ent. Syst., II, 1-2 (1793); Gmel., Linn. Syst. Nat., I, iv, 2039 (1788); Vill., Linn. Ent., iv, 373 (1789); Oliv., Encycl. méth., vi, ii, 466 (1792); Latr., Hist. Nat. Crust. Ins., xii, 90 (1804); Ib., Gen. Crust. Ins., III, 82 (1807); Ib., Nouv. Dict. Hist. Nat., xii, 8 (1817); Charp., Horæ Ent., 67 (1825); Dufour, Ann. Sc. Nat., xiii, 345-46, pl. 19, figs. 1-3 (1828); Phil., Orth. Berol., 5 (1830); Géné, Monogr. Forf., 8-9 (1832); Brullé, Hist. Nat. Ins., ix, 28, pl. 1, fig. 1, 1a-b (1835); Brullé, Webb, Hist. Nat. Canar., II, ii, 75 (1835-42); Ramb., Faun. Ent. Andal., II, 3-4 (1838); Schaum, Peters, Reise Mozamb., II, 107 (1853).

Labidura gigantea Leach, Edinb. Encycl. Am. Ed., viii, 707 (1816); Ib., Zool. Misc., III, 99 (1817); Ib., Sam. Ent. Comp., 217 (1819); Steph., Brit. Ent. Mand., vi, 8-9 (1835).

Forficula (Labidura) gigantea Fisch. Fr., Orth. Eur., 65-6, pl. 6, figs. 1, 1a-f (1853).

Forficesila gigantea Serv., Ann. Sc. Nat., xxii, 33 (1831); Ib., Rev. méth. Orth., 6 (1831); Ib., Orth., 23-4, pl. 1, figs. 2, 2a (1839); Fisch. Wald., Ent. Russ., iv, 44-5, pl. 1, figs. 1*, 1** (1846); Luc., Expl. Alg., iii, 3-4 (1846); Fieb., Lotos, iii, 252-53 (1853); Ib., Syn. Eur. Orth., 69-70 (1854); Friv., Orth. Hung., 45-6 (1867); Glov., Ill. N. Am. Ent., Orth., pl. x, figs. 2, 2a (1872).

Forficula (Forficesila) gigantea Burm., Handb. Ent., ii, 751 (1838); DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 240 (1842).

Forficula bilineata Herbst, Fuessl. Archiv. Ins., vii-viii, 183, pl. 49, fig. 1 (1788); Ib., Fuessl., Arch. Hist. Ins. 170, pl. 49, fig. 1, (1794).

Forficula maxima Vill., Linn. Ent., i, 427, pl. 2, fig. 53 (1789).

Forficula bidens Oliv., Encycl. méth., vi, ii, 466-67 (1792).

Forficula crenata Oliv., Encycl. méth., vi, ii, 467 (1792).

Forficula erythrocephala Fabr., (nec Oliv.) Ent. Syst., ii, 4 (1793).

? *Forficula flavipes* Fabr., Ent. Syst., ii, 2-3 (1793).

Psalis morbida Serv., Ann. Sc. Nat., xxii, 35 (1831); Ib., Rev. méth. Orth., 8 (1831).

Forficula (Forficesila) bivittata Klug. MS.; Burm., Handb. Ent., ii, 751-52 (1839).

Forficula (Forficesila) suturalis Burm., Handb. Ent., ii, 752 (1839).

? *Forficula bicolor* Fisch. Wald., Ent. Russ., iv, 42 (1846).

? *Forficula (Apterygida) bicolor* Fisch. Fr., Orth. Eur., 76 (1853).

Forficula Fischeri Motsch. MS.; Fisch. Wald., Ent. Russ., iv, 354 (1846).

Forficesila Fischeri Fisch. Wald., Ent. Russ., iv, 354-55, pl. 33, fig. 1 (1846).

Forficula (Forficesila) affinis Guér., Sagra, Hist. Phys. Cuba, An. Art., 330-32, pl. 12, figs. 2, 2a (1857).

Forficesila xanthopus Stål, Ofv. k. Vet. Akad. Förh., xii, 348-49 (1855).

Forficula xanthopus Stål, Eug. Resa, Zool. Ins., 300-1 (1858).

Forficula amurensis [ined.] Motsch., Bull. Soc. imp. Mosc., xxxiii, ii, 499 (1859); Ib., Cat. Ins. Amour., 13 (1860).

——— Savigny, Descr. de l'Égypte, Planches Orth., pl. 1, figs. 1¹, 1^a, 1ⁱ, 1^{1'}, 1^o, 1^u, 1^{u'}, 2¹, 2^{1'}, 3¹, 3^{1'}, 3^o, 3^d, 3ⁱ (1809-13).

There is a Labidura in the collection of the American Entomological Society (No. 54) which apparently belongs to this species, but with forceps of a remarkable character. They are as long as the

abdomen (8 mm.) depressed, laminate, perfectly straight, entirely simple and tapering apically to a blunt point.

The entire Old World, whence it has spread into nearly all parts of the western hemisphere.

Labidura rufescens.

Forficula rufescens Pal.-Beauv., Ins. Afr. Amér., ii, 35, pl. Orth. 1, fig. 2 (1805).

Forficula rufescens Serv., Orth., 24-5 (1839). W. Africa.

Labidura Servillei.

Labidura Servillei Dohrn, Stett. Ent. Zeit., xxiv, 316-17 (1863).

E. India.

Labidura tarsata.

Forficula tarsata Westw., Proc. Zool. Soc. Lond., v, 129 (1837).

Labidura tarsata Dohrn, Stett. Ent. Zeit., xxiv, 311-12 (1863).

Manilla.

Labidura terminalis.

Forficula terminalis Serv., Orth., 25 (1839). Mauritius.

Labidura tertiaria.

Labidura tertiaria Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., Ser. 2, 447-49 (1876); *Ib.*, *ib.*, II, 259 (1876). Colorado [fossil].

Labidura Tomis.

Chelidura Tomis Kol., Melet. Ent., v, 74, pl. 17, fig. 6a-b (1846).

Forficula Tomis Fieb., Lotos, III, 254 (1853); *Ib.*, Syn. Eur. Orth., 71 (1854).

Forficula Helmanni Kitt., Bull. Soc. imp. Nat. Mosc., xxii, iv, 438-39, pl. 7, figs. 1-2 (1849).

Forficula elongata Eversm, (nec Fabr.), Bull. Soc. imp. Nat. Mosc., xxxii, 123 (1859). Armenia.

I place Kolenati's and Kittary's species together on the authority of Fieber. I have not been able to consult Kolenati's plate or description, and do not know the insect in nature.

Labidura trispinosa.

Labidura trispinosa Dohrn, Stett. Ent. Zeit., xxiv, 310-11 (1863).

E. India.

Labidura vicina.

Forficula vicina Luc., Expl. Alg., III, 5-6, pl. 1, figs. 2, 2a-e (1846).

Labidura vicina Dohrn, Stett. Ent. Zeit., xxiv, 318-19 (1863).

N. Africa, India, E. Indies.

Mecomera brunnea.*Mecomera brunnea* Serv., Orth., 54 (1839).

Cayenne.

Nannopygia Gerstaeckeri.*Nannopygia Gerstaeckeri* Dohrn, Stett. Ent. Zeit., xxiv, 60-61 (1863).

Ceylon.

Neolobophora bogotensis.*Neolobophora bogotensis* Seudd., Proc. Bost. Soc. Nat. Hist., xvii, 282 (1875); *Ib.*, Ent. Notes, iv, 36 (1875).

Bogota.

Neolobophora volsella.*Neolobophora volsella* Seudd., Proc. Bost. Soc. Nat. Hist., xviii, 237-58 (1876).

Mexico.

Opisthocosmia armata.*Opisthocosmia armata* DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 243, pl. 23, fig. 12 (1842).*Opisthocosmia armata* Dohrn, Stett. Ent. Zeit., xxvi, 80-1 (1865).

Sumatra.

? Opisthocosmia bicuspis.*Forficula bicuspis* Stål, Eug. Resa, Zool. Ins., 301 (1858).

Java.

Opisthocosmia centurio.*Opisthocosmia centurio* Dohrn, Stett. Ent. Zeit., xxvi, 79-80 (1865).

Luzon.

Opisthocosmia ceylonica.*Labia ceylonica* Motsch., Bull. Soc. imp. Nat. Mose., xxxvi, iii, 4 (1863).*Opisthocosmia ceylonica* Dohrn, Stett. Ent. Zeit., xxvi, 83 (1865).

Ceylon.

Opisthocosmia forcipata.*Forficula forcipata* DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 242, pl. 23, fig. 11 (1842).*Opisthocosmia forcipata* Dohrn, Stett. Ent. Zeit., xxvi, 81 (1865).

Sumatra.

Opisthocosmia insignis.*Forficula insignis* Hagenb. MS.; DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 243, pl. 23, fig. 14 (1842).*Opisthocosmia insignis* Dohrn, Stett. Ent. Zeit., xxvi, 81-2 (1865).

Java.

Opisthocosmia longipes.*Forficula longipes* DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 242, pl. 23, fig. 13 (1842).*Opisthocosmia longipes* Dohrn, Stett. Ent. Zeit., xxvi, 81 (1865).

Sumatra.

Opisthocosmia tenella.

Forficula tenella Hagenb. MS.; De Haan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 243 (1842).

Opisthocosmia tenella Dohrn, Stett. Ent. Zeit., xxvi, 82 (1865).

Java.

Opisthocosmia vigilans.

Forficula vigilans Stål, Ofv. k. Vet. Akad. Förh., xii, 350 (1855); Ib., Eug. Resa, Zool. Ins., 302-3 (1858).

Opisthocosmia vigilans Dohrn, Stett. Ent. Zeit., xxvi, 82 (1865).

Java.

Psalis americana.

Forficula americana Pal.-Beauv., Ins. Afr. Amér., x, 165, pl. Orth. 14, fig. 1 (1817).

Psalis americana Serv., Ann. Sc. Nat., xxii, 35 (1831); Ib., Rev. méth. Orth., 8 (1831).

Forficesila americana Serv., Orth., 22 (1839); Wood, Ins. Abroad, 280-81, fig. 140 (1874).

Labidura americana Dohrn, Stett. Ent. Zeit., xxiv, 319-20 (1863).

W. Indies, Central America and Northern S. America.

Psalis bengalensis.

Labidura bengalensis Dohrn, Stett. Ent. Zeit., xxiv, 312-13 (1863).

Bengal.

Psalis gagatina.

Forficula (Psalis) gagathina Klug MS.; Burm., Handb. Ent., ii, 753 (1838).

Labidura gagatina Dohrn, Stett. Ent. Zeit., xxiv, 320 (1863).

Porto Rico.

Psalis procera.

Forficula (Psalis?) procera Burm., Handb. Ent., ii, 753 (1838).

Forficula (Forficesila) distincta Guér., Sagra, Hist. Phys. Cuba, An. Art., 329-30, pl. 12, figs. 1, 1a-b (1857).

Forficesila elegans Stål, Ofv. k. Vet. Akad. Förh., xii, 348 (1855).

W. Indies, Central America and Northern S. America.

Psalis thoracica.

Forficesila thoracica Serv., Orth., 22-3 (1839).

Cayenne.

Pygidicrana angustata.

Pygidicrana angustata Dohrn, Stett. Ent. Zeit., xxiv, 56 (1863).

Ceylon.

Pygidicrana bivittata.

Pygidicrana bivittata Erichs., Schomb. Reis. Guiana, 579-80 (1848); Dohrn, Stett. Ent. Zeit., xxiv, 48 (1863).

Guiana.

Pygidicrana caffra.*Pygidicrana caffra* Dohrn, Stett. Ent. Zeit., xxviii, 343-44 (1867).

Caffraria.

Pygidicrana Cumingi.*Pygidicrana Cumingi* Dohrn, Stett. Ent. Zeit., xxiv, 54-5 (1863).

Ceylon.

Pygidicrana Dæmeli.*Pygidicrana Dæmeli* Dohrn, Stett. Ent. Zeit., xxx, 233-34 (1869).

N. Australia.

Pygidicrana eximia.*Pygidicrana eximia* Dohrn, Stett. Ent. Zeit., xxiv, 49-50 (1863).

N. India.

Pygidicrana Kallipygos.*Pygidicrana Kallipygos* Dohrn, Stett. Ent. Zeit., xxiv, 53 (1863).

E. India.

Pygidicrana liturata.*Forficula liturata* Stål, Ofv. k. Vetensk. Akad. Förh., xii, 347-48 (1855).*Pygidicrana liturata* Dohrn, Stett. Ent. Zeit., xxiv, 57 (1863).

Caffraria.

Pygidicrana marmoricrura.*Pygidicrana marmoricrura* Serv., Orth., 20 (1839); Dohrn, Stett. Ent. Zeit., xxiv, 51 (1863).*Forficula (Pygidicrana) marmoricrura* deHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 239-40 (1842).

Java.

Pygidicrana Nietneri.*Pygidicrana Nietneri* Dohrn, Stett. Ent. Zeit., xxiv, 53-4 (1862).

Ceylon.

Pygidicrana notigera.*Pydicrana (sic!) notigera* Stål, Eug. Resa, Zool. Ins., 299 (1858).*Pygidicrana notigera* Dohrn, Stett. Ent. Zeit., xxiv, 52 (1863).

Brazil.

Pygidicrana ophthalmica.*Pygidicrana ophthalmica* Dohrn, Stett. Ent. Zeit., xxiv, 55-6 (1863); Ib., ib. xxviii, 344 (1867).

Australia.

Pygidicrana pallidipennis.*Forficula (Pygidicrana) pallidipennis* DeHaan, Verh. Nat. Gesch. Ned. Bezitt., Orth., 240, pl. 23, fig. 8 (1842).*Pygidicrana pallidipennis* Dohrn, Stett. Ent. Zeit., xxiv, 50-1 (1863),

Borneo.

Pygidicrana picta.

Pygidicrana picta Guér., Mag. Zool., VIII, pl. 236, fig. 1 (1838); Ib., Voy. Favorite, 70-71, pl. 236, fig. 1 (1838); Dohrn, Stett. Ent. Zeit., XXIV, 50 (1863). India.

Pygidicrana siamensis.

Pygidicrana siamensis Dohrn, Stett. Ent. Zeit., XXIV, 51-2 (1863). Siam.

Pygidicrana valida.

Pygidicrana valida Dohrn, Stett. Ent. Zeit., XXVIII, 344 (1867). Burmah.

Pygidicrana vitticollis.

Forficula vitticollis Stål, Ofv. k. Vet. Akad. Förh., XII, 350 (1855).

Pydicrana (sic!) *vitticollis* Stål, Eug. Resa, Zool. Ins., 299-300 (1858).

Pygidicrana vitticollis Dohrn, Stett. Ent. Zeit., XXIV, 55 (1863). China.

Pygidicrana v-nigrum.

Pygidicrana v-nigrum Serv., Ann. Sc. Nat., XXII, 31 (1831); Ib., Rev. méth. Orth., 4 (1831); Ib., Orth., 19-20, pl. 1, fig. 1, 1a-b (1839); Dohrn, Stett. Ent. Zeit., XXIV, 47-8 (1863).

Forficula (*Pygidicrana*) *v-nigrum* Burm., Handb. Ent., II, 751 (1838). Brazil.

Pyragra fuscata.

Pyragra fuscata Serv., Ann. Sc. Nat., XXII, 34 (1831); Ib., Rev. méth. Orth., 7 (1831); Ib., Orth., 32, pl. 1, fig. 4, 4a-c (1839). Guiana.

Sparatta nigrina.

Sparatta nigrina Stål, Ofv. k. Vet. Akad. Förh., XII, 350 (1855); Ib., Eug. Resa, Zool. Ins., 307 (1858); Dohrn, Stett. Ent. Zeit., XXVI, 70 (1865). Brazil.

Sparatta pelvimetra.

Sparatta pelvimetra Serv., Orth., 52-3 (1839); Dohrn, Stett. Ent. Zeit., XXVI, 68-9 (1865). Brazil.

Sparatta plana.

Forficula (*Apachys*?) *plana* Ill. MS.; Burm., Handb. Ent., II, 752 (1838).

Sparatta plana Burm., Germ. Zeitschr. f. Ent., II, 81 (1840); Dohrn, Stett. Ent. Zeit., XXVI, 69 (1865). Brazil, N. Grenada.

Sparatta rufina.

Sparatta rufina Stål, Ofv. k. Vet. Akad. Förh., xii, 350 (1855);
 Ib., Eug. Resa, Zool. Ins., 307 (1858); Dohrn, Stett. Ent. Zeit., xxvi,
 69 (1865). Brazil.

Sparatta Schotti.

Sparatta Schotti Dohrn, Stett. Ent. Zeit., xxvi, 69-70 (1865).
 Brazil.

Spongophora brunneipennis.

Psolidophora brunneipennis Serv., Orth., 30-1 (1839); Dohrn,
 Stett. Ent. Zeit., xxv, 418-19 (1864).

Eastern and Southern U. States, Arizona, Mexico.

Spongophora croceipennis.

Spongiphora croceipennis Serv., Ann. Sc. Nat., xxii, 31-2 (1831);
 Ib., Rev. méth., Orth., 5 (1831).

Forficula croceipennis Wils., Treat. Ins., pl. 228, fig. 6 (1835).

Forficula (Spongiphora) croceipennis Burm., Handb. Ent., ii, 752-
 53 (1838); Guérin, Iconog. Règne Anim., 326, pl. 52, fig. 1 (184-);
 Gray, Griff. An. King., pl. 104, figs. 1, 1b (1832).

Psolidophora croceipennis Serv., Orth., 30, pl. 1, figs. 3, 3a-b (1839);
 Dohrn, Stett. Ent. Zeit., xxv, 418 (1864).

Forficula flavipennis Burm. [nec Fabr.], Handb. Ent., ii, 752
 (1838). Brazil.

Spongophora forfex.

Spongophora forfex Scudd., Proc. Bost. Soc. Nat. Hist., xviii,
 259 (1876). Loc.? (probably Central America.)

Spongophora frontalis.

Psolidophora frontalis Dohrn, Stett. Ent. Zeit., xxv, 422-23
 (1864). Venezuela.

Spongophora insignis.

Psolidophora insignis Stål, Ofv. k. Vetensk. Akad. Förh., xii, 349
 (1855). N. Grenada.

Spongophora Lherminieri.

Psolidophora Lherminieri Serv., Orth., 29-30 (1839).

Burmeister believes this to be the same as his *flavipennis* = *S. cro-*
ceipennis (cf. Germ. Zeitsch. Ent., ii, 80). Guadeloupe, Brazil.

Spongophora nigripennis.

Psolidophora nigripennis Scudd., Proc. Bost. Soc. Nat. Hist., xii,
 344-45 (1869); Ib., Ent. Notes, ii, 29-30 (1869). Peru.

Spongophora parallela.

Forficula parallela Westw. (nec Fabr.), Guér. Mag. Zool., pl. 178 (1838).

Forficesila longissima Wood, Ins. Abroad, 279–80, fig. 139 (1874).
Central America.

Spongophora parvicollis.

Forficula parvicollis Stål, Eug. Resa, Zool. Ins., 304 (1858).

Psalidophora parvicollis Dohrn, Stett. Ent. Zeit., xxviii, 345 (1867).
Brazil.

Spongophora prolixa.

Psalidophora parallela Dohrn [nec *Forficula parallela* Westw.] Stett. Ent. Zeit., xxiii, 227–29, pl. 1, figs. 3, 3b (1862); *Ib.*, *ib.*, xxv, 418 (1864).
Mexico.

Spongophora punctipennis.

Forficula punctipennis Stål, Eug. Resa, Zool. Ins., 304 (1858).

Psalidophora punctipennis Dohrn, Stett. Ent. Zeit., xxv, 421 (1864).
S. America.

Spongophora pygmaea.

Psalidophora pygmaea Dohrn, Stett. Ent. Zeit., xxv, 421–22 (1864).
Brazil.

Spongophora quadrimaculata.

Forficula quadrimaculata Stål, Ofv. k. Vet. Akad. Förh., xii, 348 (1855).

Psalidophora quadrimaculata Dohrn, Stett. Ent. Zeit., xxv, 420–21 (1864).
S. Africa.

Spongophora stigma.

Psalidophora stigma Dohrn, Stett. Ent. Zeit., xxviii, 345 (1867).
Venezuela.

Tagalina grandiventris.

Forficula grandiventris Blanch., Voy. Pole Sud, Zool., iv, 349–50, Orth., pl. 1, fig. 1 (1853).

Tagalina grandiventris Dohrn, Stett. Ent. Zeit., xxiv, 46 (1863).
Isle St. George (Arch. Salom).

Tagalina Semperi.

Tagalina Semperi Dohrn, Stett. Ent. Zeit., xxiv, 45 (1863).

Luzon.

Thermastris brasiliensis.

Forficula brasiliensis Gray, Griff. An. Kingd., xv, 184, pl. 78, fig. 2 (1832).

Thermastris brasiliensis Dohrn, Stett. Ent. Zeit., xxiv, 62 (1863).

Forficula (Pygidicrana) opaca Burm., Handb. Ent., II, 751 (1838).

Forficula aspera Stål, Eug. Resa, Zool. Ins., 300 (1858). Brazil.

Thermastris chontalia.

Thermastris chontalia Scudd., Proc. Bost. Soc. Nat. Hist., XVIII, 258-59 (1876). Nicaragua.

Thermastris Dohrnii.

Thermastris Dohrnii Scudd., Proc. Bost. Soc. Nat. Hist., XVII, 280-81 (1875); Ib., Ent. Notes, IV, 34-5 (1875). Peru.

Thermastris Saussurei.

Pygidicrana Saussurei Dohrn, Stett. Ent. Zeit., XXIII, 225-26, pl. 1, fig. 2 (1862).

Thermastris Saussurei Dohrn, Stett. Ent. Zeit., XXIV, 63 (1863). Mexico.

Typhlolabia larva.

Forficula ? larva Phil., Zeitschr. Ges. Naturw., XXI, 219-21 (1863). Chili.

Note. In the List of Genera the name

FORFICULARIA.

was overlooked. It was given to a fossil form by Weyenbergh in 1869 (*loc. cit.*), differing, as restored by Weyenbergh, in no respect from Forficularia.

ENTOMOLOGICAL NOTES

VI

BY

SAMUEL H. SCUDDER

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A CENTURY OF ORTHOPTERA. DECADE VII. — ACRYDII.

61. Caloptenus nigrescens. Dull wood-brown, the sides and tegmina marked with black. Antennæ reddish brown, a little infuscated at the tip; front of head more or less infuscated; the upper border of the eye margined by a pale yellowish stripe followed inferiorly behind the eye by a more or less distinct broad blackish

belt, which extends onto the thorax, where it infuscates the upper third of the deflected lobes, especially anteriorly, and deepens to black next the lateral carinæ; metathoracic epimera yellowish or pale yellowish brown, edged on either side with black; anal field of tegmina testaceous, the remainder black, the extreme tip testaceous; fore and middle legs dull fusco-testaceous; the hind femora yellow, more or less tinged with brownish, with a broad black band on either side of the middle, whose edges follow the impressed lines, the basal one sending a median shoot to the base; hind tibiæ vinous red, a little infuscated at the base, the spines black. Vertex between the eyes broader than (♀) or scarcely as broad as (♂) the basal joint of antennæ, broadly and shallowly sulcate; frontal costa broad, subequal, sulcate throughout excepting just above the antennæ. Pronotum with equal sides, the transverse sulcations moderate, continuous, nearly straight, the median carina distinct on the posterior lobe. Tegmina only half as long as the abdomen, tapering, the inner margin convex, wings slightly shorter. Hind femora stout and long. Male abdomen normal, the cerci moderate in size, compressed, tapering and straight on the middle half, with an obscure inner superior basal tubercle; beyond the middle bent inward and a little upward, equal, the tip squarely docked with rounded angles; last inferior segment pointed. Length, ♂, 23 mm., ♀, 26.5 mm.; of antennæ, ♂, 13 mm., ♀, 11; of tegmina, ♂, 9 mm., ♀, 9.5 mm.; of hind femora, ♂, 13.5 mm.; ♀, 16.5 mm.

1 ♂, 1 ♀. Georgia, H. K. Morrison.

Paroxya (Oxya, nom. gen.) nov. gen.

Body straight, subcylindrical. Head moderately large, subdeclivant, the eyes large, prominent, separated from each other above by fully (♂) or very much more than (♀) the width of the basal joint of antennæ; the fastigium rather broad, slightly depressed, the frontal costa as in *Caloptenus*; antennæ long, equal, of similar length in the two sexes, the joints sub-depressed, beyond the middle punctate. Pronotum simple, smooth (the posterior lobe punctulate), the median carina slight, equal; the anterior scarcely longer than the posterior lobe, the hind border of latter obtusely and bluntly angled; lower border of deflected lobes very obtusely angled in the middle; tubercle of prosternum prominent, subcylindrical, bluntly pointed, at the base laterally compressed, at least in the male; mesosternal lobes

separated in both sexes by the width of the mesothoracic trochanters; metasternal lobes either closely approximate (σ) or as distant as the mesosternal lobes (φ). Tegmina and wings about reaching the tip of the abdomen, slender. Hind femora reaching (σ) or surpassing (φ) the tip of the tegmina, moderately stout but tapering very regularly, unarmed above, the genicular lobes produced but rounded; spined margin of hind tibiæ smooth, scarcely dilated toward the tip. Edges of inferior valve of ovipositor smooth; anal cerci of male having the general structure of those of *Caloptenus*.

This genus bears a close general resemblance to the gerontogæic *Oxya* Serv., but differs strikingly from it in the separated metasternal lobes of the female, the blunt tips of the geniculations of the hind femora, and the want of lateral carinæ on the upper surface of the hind tibiæ.

62. *Paroxya atlantica*. Dull olivaceous, excepting the top of head, thorax and tegmina, which vary from light to dark brown. Head olivaceous yellow on face and sides, in the female more or less infuscated; above the antennæ brownish fuscous, more or less tinged with castaneous; behind the eye a broad, straight, horizontal, black band, edged more or less distinctly, both above and below, with yellowish; antennæ not half so long as the body in the male, pale yellow at base, at least in male, beyond testaceous, deepening into fuscous toward the tip. Upper surface of pronotum of the color of the top of the head, the upper half of the deflected lobes with a very broad black band, in continuation of that on the head, anteriorly edged more or less distinctly, both above and below, with yellowish, and fading out before, or abruptly terminating at, the posterior lobe; pleura with a horizontal stigmatal stripe running backward from the hinder edge of the mesothoracic episterna (sometimes confined to the mesothoracic epimera), and an oblique stripe nearly following the division line between the metathoracic episterna and epimera; when the lower stripe is complete it renders the metathoracic episterna conspicuous, especially in the male, on account of the wedge-shaped oblique yellow dash which lies between these two black stripes. Tegmina nearly uniform brownish fuscous, with a faint line of small fleckings down the middle in the female. Legs of the color of the body, the middle and hind femora generally more or less infuscated on their outer face, the upper half of the genicular lobes of latter black; hind tibiæ glaucous with black or blackish spines. Length, σ , 21 mm., φ , 28 mm.; of an-

tennæ, ♂, 10 mm., ♀, 12 mm.; of tegmina, ♂, 16 mm., ♀, 18 mm.; of hind femora, ♂, 13 mm., ♀, 15.25 mm.

10 ♂, 9 ♀. New Haven, Conn., Prof. S. I. Smith; Middle States, Baron Osten Sacken; Georgia, H. K. Morrison.

63. *Paroxya recta*. Olivaceous yellow, brighter and more yellow in the male, duller and more greenish in the female; the upper surface of head and thorax and the tegmina wood-brown with a slight olivaceous tinge. Front of head slightly plumbeous; antennæ two thirds as long as the body in the male, yellow at the extreme base, beyond castaneous, the apical half dark fuscous with pale incisures; sides of head and thorax marked as in the preceding species, but with more brightly contrasting colors, and with only inconspicuous and incomplete pleural stripes. Tegmina of female like those of the male, without flecks, and with a slight olivaceous tinge. Sides of hind femora deepening to greenish, the hind tibiæ of a deeper glaucous than the preceding species. Besides these points of distinction from *P. atlantica*, it is a considerably larger species, and appears to have a less sharply angulated hinder border of pronotum. Length, ♂, 29 mm., ♀, 41 mm.; of antennæ, ♂, 19 mm., ♀, 15.5 mm.; of tegmina, ♂, 18 mm., ♀, 25.25 mm.; of hind femora, ♂, 15.5 mm., ♀, 21 mm.

3 ♂, 4 ♀. Georgia, H. K. Morrison. Enterprise, Florida, May 15, E. A. Schwarz, No. 423.

64. *Mermiria alacris*. Yellowish green, marked with roseate ferruginous and fuscous. Head green, with a broad median longitudinal ferruginous stripe, more or less infuscated anteriorly (occasionally obsolescent), and a slightly brighter, though sometimes infuscated and almost equally broad belt behind the eye; a similar but narrower stripe passes from the base of the antennæ to the anterior base of the mandibles, broadening below; antennæ ferruginous. Pronotum marked as in *M. neomexicana*, but with roseo-ferruginous instead of blackish ferruginous. Tegmina green, the posterior half more or less infuscated or tinged with ferruginous. Hind femora dull green, linearly infuscated; hind tibiæ pale and rather dull red, the spines pale on the basal, black on the apical half. Length, ♂, 33 mm., ♀, 46 mm.; of antennæ, ♂, 15 mm., ♀, 16 mm.; of tegmina, ♂, 23 mm., ♀, 35 mm.; of hind femora, ♂, 18 mm., ♀, 25 mm.

32 ♂, 2 ♀. Georgia, H. K. Morrison. This species resembles the most closely *M. neomexicana* (*Opsomala neomexicana* Thom., *M. Belfragei* Stål), being, like the latter, clearly distinct from *M. livit-*

tata (*Opomala bivittata* Serv.), in the shape of the fastigium of the vertex. All three species occur in Georgia, so that Thomas' name is unfortunate. *M. alacris* differs from *M. neomexicana* in having the fastigium of the vertex still more produced and more pointed, the anal cerci of male a little shorter, the last ventral segment of the same sex less produced, in the lighter coloring, roseate or roseo-ferruginous taking the place of dark fuscous or blackish, and in the greater diffusion of green over the tegmina.

65. *Hippiscus lineatus*. Frontal costa expanded at the ocellus, more constricted below than above, expanding toward and extending to the clypeus. Head brownish yellow, mottled with ferruginous, the antennæ blackish beyond the basal third. Pronotum darker than the head, the superior surface minutely punctate and a little rugulose in short straight ridges, those of opposite sides slightly diverging. Tegmina brownish fuscous, flecked with clustered spots of dark brown, sometimes deepening on the basal half into blackish; they are mostly confined to narrow irregular bands, one of which is premedian, a second lies nearly half way between this and the base, and a third as far toward the apex, beyond which the spots are small, few and irregularly distributed; the ulnar veins and its immediate borders (forming the angle of the closed tegmina) are pale yellow, forming a stripe nearly the entire length of the tegmina. Wings pale yellow at base, pellucid at tip with one or two small obscure fuliginous spots and black nervules; and in mid-wing a broad black arcuate band, which follows the outer border, diminishing in width as it goes, fully two thirds the way to the anal angle; the outer limit of this band is a nearly straight line from a point on the costal margin, about three fifths the distance from the base, to the tip of the second or third anal ray; it is divided narrowly by a narrow straight pale yellow stripe (which, as in the tegmina, follows the ulnar vein), and extends broadly above the ulnar vein half way to the base. Hind femora brownish yellow, with a couple of faint oblique darker bands; tibiae dull yellow, darkest below (perhaps reddish in life), the spines black tipped. Length of body, 32 mm.; of antennæ, 11 mm.; o tegmina, 31 mm.; of hind femora, 15 mm.

Described from a single female, dried after immersion in alcohol, taken by Dr. A. S. Packard in Manitou, Colorado.

66. *Trimerotropis picta*. Head yellowish brown, obscurely dotted with fuscous, the front more or less ashen or pallid; fronta costa deeply sulcate excepting above; lateral foveolæ equitriangular;

fastigium flat, distinctly declivant, the sides gradually raised, the space between the eyes nearly double that of the frontal costa; antennæ reddish, testaceous on the basal, blackish fuscous on the apical half. Pronotum yellowish or brownish testaceous above, flecked with black dots, the sides more or less cinereous, with an obsolescent blackish stripe next the lateral carinæ; the front lobe rather constricted, its median carina seldom cut distinctly by the transverse sulcus, being generally but little lower where it meets it, than elsewhere. Tegmina with a series of large, irregular, light brown or cinereous spots along the costal border, each made up of a series of clustered blackish dots on a pale ground, next to which the tegmina are black or brown, often deepening to black; paler again on the anal area, but flecked with black dots; the costal spots generally consist of a long basal spot reaching nearly to the middle of the wing, and broader or less broken in its apical half, a smaller, generally subquadrate spot, opposite the tip of the ♂ abdomen when at rest, and midway between that and the tip one or two smaller, similar, often triangular spots. Wings with a large, subquadrate spot of a somewhat umber yellow color, with ragged borders, occupying the basal third; the rest of the wing blackish fuliginous, sometimes almost black, with a pellucid or semipellucid, narrow, transverse, preapical, straight band, broadest and clearest in a subtriangular space above, the middle of which lies below the apex of the castaneous stigma; extreme edge of preanal area white. Hind femora cinereous, crossed, either side of the middle, by two narrow transverse blackish fuscous bands; hind tibiæ coral red, cinereous at base, the spines red, black tipped. Length, ♂, 20 mm., ♀, 25 mm.; of antennæ, ♂, 10.5 mm., ♀, 11 mm.; of tegmina, ♂, 24 mm., ♀, 25.5 mm.; of hind femora, ♂, 11 mm., ♀, 12.5 mm.

42 ♂, 17 ♀. Florida, P. R. Uhler; Cedar Keys, June 4, E. A. Schwarz, No. 441; Ft. Reed, J. H. Comstock; Georgia, H. K. Morrison.

67. *Leprus ingens*. Head rather tumid, rugulose throughout, uniform dirty brown; eyes separated above by fully their own width; vertex with a very slight median carina, which scarcely enters the fastigium, lateral foveolæ inconspicuous, scarcely depressed, with no carina separating them from the front border of the eyes; frontal costa broad, equal excepting at the ocellus (where it expands considerably), broadly, shallowly and somewhat irregularly sulcate; antennæ scarcely as long as the pronotum, variegated, but with a general livid brown color. Pronotum of the color of the head, rugose, with the

anterior lobe subtumescient in the middle posteriorly, and with a broad and deep transverse depression on the front of the posterior lobe, divided into halves by the sharp, but only here at all elevated median carina; posterior border crenulate, broadly rectangular, the lateral carinae sharp but not elevated, confined to the posterior lobe. Tegmina as long as the head and pronotum together, broad, subfusiform, tapering rather rapidly and regularly on the apical half, the apex well rounded, the whole of the color of the thorax, flecked with rather large, roundish, inconspicuous, dusky spots, the larger ones mostly collected in two transverse submedian rows, the smaller ones scattered about the apex. Wings short and broad, lemon yellow on the basal two thirds, or more; beyond it, in the anal field, a transverse straight dusky fuliginous band, which unites above with a broader longitudinal similar band running halfway to the base next the upper border of the anal field, and gradually fading; beyond these the wing is pellucid, with black veins, and at the very tip again a little infuscated. Hind femora clay-brown mottled with griseous, the broad superior and inferior expansions grimy, but their extreme edges yellow; the interior surface dark blue, pale salmon at tip; hind tibiae pale coral red, the outer posterior face (and base of spines), especially above, white; tips of spines black. Length of body, 37 mm.; of antennae, 10.5 mm.; of pronotum, 11.5 mm.; of tegmina, 19 mm.; of hind femora, 21.5 mm.; breadth of same, 8 mm.

1 ♀. Sauzalito (near San Francisco), California, June 7, Mr. J. Behrens. Another species of this genus was taken by Baron Osten Sacken, in Sonoma Co., California.

68. *Brachystola Behrensii*. Of the same size and general appearance as *B. magna* (Gir.), but differing from it strikingly in its markings and some minor points of sculpture. The carinations of the head are the same; the eyes are scarcely larger; antennae luteous, with black incisures on the basal half, blackish fuscous beyond. Sides of the upper surface of the pronotum more declivant, the median carina slightly sharper, the hind border produced and well rounded; upper surface dark brown mottled with yellowish, the front and hind border of lateral lobes narrowly, and the inferior border broadly, yellowish, the remainder of the lateral lobes black. Tegmina a very little smaller than in *B. magna*, roundish, black, with yellow longitudinal veins. Hind femora noticeably slenderer than

in *B. magna*,¹ rather flatter above, transversely marked with dull yellow and brown, the apex black; hind tibiae yellow, infuscated at the extreme tip, the spines wholly black. Abdomen brownish yellow, the dorsum with a broad median fuscous stripe, sometimes enlivened by a median luteous line, separated by a narrow subdorsal luteous stripe from a broad, black or blackish, dorso-pleural stripe. Indications of similar markings may often be seen in *B. magna*, but they are never so unequal nor so intense. Length of body, ♂, 46 mm., ♀, 55 mm.; of antennæ, ♂, 27 mm., ♀, 25 mm.; of pronotum, ♂, 15.25 mm., ♀, 17.25 mm.; of tegmina, 8 mm., width of same, 6.75 mm.; length of hind femora, ♂, 30.75 mm., ♀, 25.75 mm.

1 ♂, 1 ♀. Sinaloa, Mex., J. Behrens.

69. *Tettigidea obesa*. Shining nigro-fuliginous, the dorsum of pronotum sometimes dull plumbeo-testaceous; lower two thirds of face of male and lower third of deflected lobe of pronotum pale clay brown; legs and tegmina black, the hind femora sometimes with an inferior premedian and superior preapical minute testaceous spot. Body very robust and unusually smooth, the entire head and pronotum being depressed, rugulose and shining; all the angles are rounded. The fastigium of the vertex is broadly rounded in front, scarcely projects beyond the eyes, but the median carina, continuous with the frontal carina, is conspicuous and prominent, compressed, though with rounded surface; the frontal costa is very prominent, broadens slightly below, and is very narrowly sulcate; seen from the side, it projects beyond the eyes fully half their width, and is broadly convex. The pronotum reaches the tip of the abdomen only, is produced and very convex in front, and, at least in the females, is fully twice as broad in the middle as in front; its sides are considerably deflected, so that the median carina is elevated and equal throughout, though blunt, and on a side view somewhat arched. The tegmina are almost smooth, and the wings scarcely longer than the pronotum. Length, ♂, 9 mm., ♀, 12 mm.; of antennæ, ♂, 3.75 mm., ♀, 4 mm.; of hind femora, ♂, 6 mm., ♀, 8 mm.

3 ♂, 3 ♀. Georgia, H. K. Morrison. The heavy, smooth and rounded body of this insect readily distinguishes it from any other Tettigidean known to me.

70. *Tettigidea prorsa*. Varying from dark testaceous to blackish, generally darkest on the sides, but the face and lower third

¹The hind femora of the females are much slenderer than those of the males in this genus.

of pronotum generally pale yellow in the male; antennæ luteous, black on apical fourth or less. Face more than usually oblique; eyes not so prominent as usual; fastigium broadening greatly in front, its anterior edge forming with the contour of the eyes an almost continuous curve, subangulated in front, giving the head a bluntly conical aspect, very different from that of any species known to me; near the extreme tip of the fastigium commences a low, blunt, but moderately stout carina, continuing down the face as the frontal costa, where it is very prominent, compressed, equal, convex on a side view and slenderly sulcate. Pronotum rather slender, but only as long as, or even shorter than, the abdomen, scabrous, the front margin broadly convex, the median carina distinct, but not very elevated, the outer edges beyond the sinus marginate, and between them and the median carina two or three vein-like dull longitudinal ridges. Tegmina nearly smooth, wings no longer than pronotum. Length of body, ♂, 8.5 mm., ♀, 11 mm.; of antennæ, ♂, 3 mm., ♀, 3.6 mm.; of hind femora, ♂, 5 mm., ♀ 7 mm.

3 ♂, 3 ♀. Georgia, H. K. Morrison.

NEW FORMS OF SALTATORIAL ORTHOPTERA FROM THE SOUTHERN UNITED STATES.

Gryllus Saussurei. Head ample, tumid, smooth, piceous; the front, sides and margins of the eyes, excepting behind, luteous; antennæ luteo-fuscous, lighter at base; mouth parts luteous, irregularly infuscated. Pronotum broader than long, slightly narrower behind than in front, the anterior border slightly concave, the posterior straight; blackish, faintly irrorate with luteo-fulvous, the front margin sometimes faintly edged with the same; the lower half of the deflected lobes pale luteous, edged very narrowly below with black, the upper half of the lobes darker than the upper surface and uniform; front and hind border with a few curved black bristles. Tegmina covering about two thirds of the abdomen, testaceous, the humeral angle blackish, the basal half of the lateral field pale luteous; wings almost wanting. Legs yellowish brown, the hind tibiæ and sometimes the apical half of hind femora infuscated externally; tympanum of the fore tibiæ fully one third the length of the tibiæ on its outer face, wanting on the inner face. Abdomen black; cerci fusco-luteous, about as long as the hind femora. ♂. Length of body, 11.5 — 13.5 mm.; of antennæ, 18 — 20 mm.; of tegmina, 6 mm.; of hind tibiæ, 5.5 — 5.75 mm.; of cerci, 8 mm.

Georgia. This species, one of the smallest in N. America, resembles the larger *G. personatus* Uhl. in general appearance, especially in the pale sides of the pronotum, which in *G. personatus* are devoid of black, excepting a small spot above.

Nemobius carolinus. Head and unicolorous antennæ varying from dull luteous to dusky brown, furnished with rather long, curving, distant, black, bristly hairs. Pronotum of the color of the head, but more or less mottled, a little broader than long, supplied with long bristly black hairs rather less abundant than in *N. vittatus*, its anterior two thirds with a distinctly impressed median line. Tegmina shining black, the borders and angles testaceous, those of the male rather ample and reaching the tip of the abdomen, those of the female covering but half of the abdomen, the dorsal members in the latter sex straight to the tip; wings wanting. Hind legs dull testaceous, the tibial spines pale near the tip. Cerci varying from testaceous to brownish, very slender, as long as the abdomen; ovipositor castaneous, a little upcurved, moderately stout, shorter than the hind tibiæ, the apical denticulate field longer than usual and nearly equalling one fourth the entire length of the ovipositor. Length of body, ♂, 7.3 mm., ♀, 9.4 mm.; of antennæ, ♂, 15.5 mm., ♀, 16.5 mm.; of tegmina, ♂, 4.2 mm., ♀, 4 mm.; of hind tibiæ, ♂, 4.1 mm., ♀, 4.5 mm.; of cerci, ♀, 4 mm., ♀, 5.6 mm.; of ovipositor, ♀, 3.8 mm.

North Carolina. This species appears to be nearly allied to Saussure's *N. toltecus* from Mexico; it is slightly smaller than *N. vittatus* and of a similar appearance, but the males have larger tegmina, and the females longer ovipositors.

Nemobius volaticus. Head rather full and convex, projecting above the surface of the pronotum, black, with bristly hairs as in the preceding species; antennæ dark brown, with pale incisures; palpi varying irregularly from pallid to dusky, the terminal joint nearly twice as long as the third, and about three times longer than the fourth. Pronotum black, broader than long, slightly broader behind than in front, the anterior half or more with a distinct median furrow, the whole surface with scattered black bristles. Tegmina narrow, nearly as long as the abdomen, piceous, the interspaces between the nervures more or less testaceous, especially in the female, the nervules of the dorsal surface in the latter straight; wings very long, the tip of the closed tegmina lying midway between the tip of the wings and the front of the head. Legs testaceous, more or less infuscated, especially above, the hind femora rather slender, the

tibial spines slightly paler at tip. Cerci slender, dusky, about as long as the hind tibiæ; ovipositor very much as in the preceding species, castaneous, similarly armed at tip. Length of body, ♂, 7.25 mm., ♀, 6.75 mm.; of antennæ, ♂, 13 mm., ♀, 14 mm.; of tegmina, ♂, 4 mm., ♀, 4.4 mm.; of wings (closed), ♂, 8.5 mm., ♀, 8.5 mm.; of hind tibiæ, ♂, 3.75 mm., ♀, 3 mm.; of cerci, ♂, 4 mm., ♀, 4.25 mm.; of ovipositor, ♀, 3 mm.

Georgia. This slender species is doubtless nearly allied to *N. cubensis* Sauss., with which it agrees very well in size; the tegmina however are longer, the head is decidedly more convex, and the last palpal joint is comparatively longer.

Nemobius socius. Head castaneous, heavily striped with straight longitudinal black bands, and covered with moderately short black bristles, abundant only in front; it is rather full and convex, rising considerably above the level of the pronotum; antennæ castaneous at base, dusky beyond, deepening to blackish brown apically. Pronotum blackish, both upper and lower borders of the deflected lobes marked with luteo-castaneous, the surface sparsely covered with rather short black bristles as on the head, the anterior half with a distinct median furrow. Tegmina (♀) shining black, the tip, the common margin of the dorsal and lateral fields and the inner border more or less castaneous; they are as long as the body, and the nervules of the dorsal field, or at least the outer ones, curve inward strongly at the well rounded tip. Legs fusco-castaneous, the upper half of the hind femora darker than the rest. Cerci nearly as long as the hind tibiæ; ovipositor as long as the hind femora, the apical field as in *N. vittatus*. ♀. Length of body, 9.5 mm.; of antennæ, 11 mm.; of tegmina, 6 mm.; of hind tibiæ, 5 mm.; of ovipositor, 6.25 mm.

Georgia. This species is nearly allied to our common *N. vittatus*, with which it agrees in size, although a little slenderer; the tegmina however are much longer, and the ovipositor proportionally a little shorter.

Hadenœcus puteanus. Dark fuliginous brown, slightly tinged with castaneous. Head and under surface of body dull luteous; antennæ luteo-fuscous, darkest on the basal half; palpi slightly infuscated beyond the base. Upper surface of thorax and abdomen sparsely covered with excessively short hairs, giving it a punctulate appearance. All the femora and tibiæ brownish fuscous, the base of the femora and the extreme tips of the tibiæ a little paler; tarsi, as

well as the longer tibial spines, pale luteous. Cerci brownish luteous; ovipositor testaceo-luteous, slender, not very long, in the apical half gently tapering, the tip upcurved, finely pointed. Length, ♂, 11 mm., ♀, 17 mm.; of antennæ, ♂, 60 mm., ♀, 80 mm.; of maxillary palpi, ♂, 7 mm., ♀, 9.5 mm.; of hind tibiæ, ♂, 18 mm., ♀, 20.5 mm.; of cerci, ♂, 4.6 mm., ♀, 5 mm.; of ovipositor, ♀, 7.75 mm.

This insect, found in North Carolina by Mr. H. K. Morrison, under boards covering an old well about forty feet deep, and on the wooded sides of the same, near the top, is one of the most interesting insects recently discovered in the country, from its close affinity to *Had. cavernarum* (*Rhaph. cavernarum* Sauss; *Had. subterraneus* Scudd.), which inhabits the Mammoth Cave of Kentucky. I shall take an early occasion to discuss the relation of these two species to each other and their allies, and will only mention here that the present species has several points of structure in which it approaches the allied genus *Ceuthophilus*. I have before received the species, in poor condition, from the Smithsonian Institution, collected by Miss Helen Jennison at Monticello, Mississippi.

Aegipan (*Αἰγίπαν*) nov. gen.

Slender, with long appendages. Head not very large nor full, the front nearly flat, the sides somewhat compressed, the posterior border bluntly but distinctly marginate; fastigium broad posteriorly, narrowing anteriorly, moderately prominent, with a distinct fusiform sulcation; eyes vertically obovate, twice as long as broad, prominent; antennæ very long and moderately slender, with the basal joint appressed, about twice as long as broad; second, cylindrical, smaller, tapering a little, considerably longer than broad; third, slender, cylindrical, as long as the first; the remaining joints subequal; apical joint of maxillary palpi nearly as long as the third and fourth joints together, thickened at tip and covered sparsely with short erect hairs. Pronotum subselliform, smooth, with a scarcely raised median line, the front border transverse, scarcely produced behind the eyes, the hind border almost rectangular, produced and more or less rounded, the humeral sinus slight; deflected lobes declivant, much longer than broad, barely reaching the lower edge of the epimera, the front and lower borders meeting at rather more than a right angle; prosternum unarmed; meso- and metasternum with small rounded posterior lobes. Tegmina long and slender, extending far beyond the end of the

body, the costal margin distinctly expanded on the basal fifth or less, increasing slightly in breadth apically, the tip narrowing and rounded; wings almost half as long again as the tegmina, reaching as far backward as the tips of the femora. Legs exceedingly long and slender, the hind femora very slightly thickened; all the coxæ with an inferior, the anterior coxæ also with a superior spine; under surface of all the femora with a row of exceedingly delicate distant spines; fore femora nearly twice as long as head and pronotum together; geniculations of hind pair apically denticulate on either side; all the tibiæ sulcate externally, the foramina of the front pair elliptical, about three times as long as broad; hind tibiæ equal throughout, much longer than the femora, furnished beneath with two apical spines; second joint of all the tarsi apically bidentate above. Abdomen compressed, with a median ridge on the basal half; subgenital plate of male apically bidentate, destitute of styles ovipositor of female very short and broad, upturned, strongly compressed, very bluntly pointed.

The excessive length of the legs gives this genus a very peculiar appearance. It is allied to *Acrometopa* Fieb.

Aegipan grallator. Green. A faint pinkish stripe behind the top of the eye, crossed longitudinally by a slightly curving, tapering, white line. Anterior lobe of pronotum with an oblique white line on either side marking a ridge, approximating posteriorly, often bordered above with pink; posterior border of pronotum edged rather broadly on the deflected lobes, narrowly above, with white, everywhere delicately margined with pink. Limitation of the anal and median field of tegmina marked with dull pink; the hind femora often, and occasionally the other femora tinged, excepting at the extremities, with pink. Abdomen with a faint whitish lateral line bordered distinctly below, faintly and narrowly above, with pink. The tympanum of the male tegmina as long as the pronotum. Inner margins of the apical denticles of the subgenital plate meeting at the middle of its apex; ovipositor of female green, pinkish apically at the edges, considerably longer than broad, externally scabrous with raised points directed apically, the edges serrate, with small but stout serrations. Length of body, ♂, 16.5 mm., ♀, 18.5 mm.; of antennæ ♂, 56 mm., ♀, 60 mm.; of tegmina, ♂, 23 mm., ♀, 26.25 mm.; of wings, ♂, 32.75 mm., ♀, 34.5 mm.; of hind tibiæ, ♂, 37 mm., ♀, 39 mm.; of ovipositor, ♀, 4.2 mm.

Texas; frequently attracted to the light from May to August. G. W. Belfrage; also collected by J. Boll, June 13 to 26.

Aegipan phalangium. Very similar to *A. grallator* with precisely similar markings, excepting that the abdomen appears to lack the lateral stripe; the tegmina, wings and legs, are distinctly longer; the tympanum of the male tegmina is shorter than the pronotum the male cerci are stouter, and the subgenital plate is squarely docked at tip, the base of the apical denticles being widely separated; the ovipositor of the female is formed as in *A. grallator*, but is broader being scarcely longer than broad. Length of body, ♂, 15.5 mm., ♀ 19 mm.; of antennæ, ♂, 68 mm., ♀, 61 mm.; of tegmina, ♂, 29 mm ♀, 30.5 mm.; of wings, ♂, 36.5 mm., ♀, 37.5 mm.; of hind tibiæ, ♂ 41 mm., ♀, 41.5 mm.; of ovipositor, ♀, 5.2 mm.

A few specimens were taken in Georgia by H. K. Morrison.

Caloptenus clypeatus. Brownish testaceous. Front of head varying from dull luteous to dull reddish brown, faintly dotted with fuscous; tips of mandibles and lower edge of labrum marked with black; antennæ luteous, infuscated on the apical third. Top of head and pronotum dotted faintly with fuscous, the deflected lobes of the latter paler, marked next the lateral carinæ with a black streak which narrows and disappears posteriorly, broadens anteriorly, and extends slightly upon the head. Tegmina a little shorter than the body, the costal field dark testaceous, the central field blackish, and the anal field light testaceous or wood brown. Front and middle legs of the color of the body; hind femora blackish on their outer face (the inferior outer carina yellow); black interrupted with luteo-testaceous on the inner face, beneath vinous red; hind tibiæ varying from vinous to coral red, the spines black. Vertex between the eyes a little (♂) or much (♀) broader than the basal antennal joint, very slightly depressed centrally, at least in the male; frontal costa broad subequal, slightly depressed at the ocellus. Pronotum scarcely enlarging posteriorly, even, with but slight transverse incisions and a slight median carina, equal in the female, interrupted slightly in the middle third in the male; lateral carinæ indistinct, rounded. Tegmina bent rather distinctly between the middle and anal fields; wings reaching the tip of the closed tegmina. Hind femora long, but moderately stout. Abdomen of male considerably thickened at the tip, forming a subglobose mass; supra-anal plate of same sex shield-shaped, being triangularly produced at the extreme tip, narrowly and deeply sulcate down the middle; anal cerci of male stout, com-

pressed, constricted in the middle, beyond incurved, expanded, especially above, the posterior edge much compressed, convex in the middle half. Length of body, ♂, 28.5 mm., ♀, 36 mm.; of antennæ, ♂, 15 mm., ♀, 14.5 mm.; of tegmina, ♂, 17 mm., ♀, 18.5 mm.; of hind femora, ♂, 17 mm., ♀, 21 mm.

Georgia.

Mr. S. H. Scudder offered some remarks on the phenomena of Circulation in Insects, a subject upon which very contradictory views had been held.

The juices of the digested food appear to pass through the thin walls of the alimentary canal directly into the general cavity of the body; from here they are pumped into the hinder extremity of the

pulsatory dorsal vessel by its alternate contraction and dilatation; certain portions appear also in many cases to enter the sides of the vessels, just in advance of the valves, which aid the pulsating action by allowing a free passage to the fluids only in a forward direction; in the larval state, the vascular walls of the pseudocardium are often so slight as scarcely to be perceptible; but they are distinct in the perfect stage, and as the vessel contracts toward the head of the larva its nature becomes more apparent. More than a century ago, Lyonet showed that the dorsal vessel of *Cossus* has only a single outlet for the passage of the fluids, namely, where it terminates with a flaring opening at the extreme front of the head, just above the base of the œsophagus, into a cavity closed by membrane. The direct passage of the fluids thence has never been observed, but they must in some way enter at once the peritrachean passages, since they are next found circulating in them all over the body. Other writers have described the anterior extremity as branching, but in like manner have not traced the passage of the fluids beyond the main trunk.

Mr. Scudder observed that the only large tracheal vessel connecting the two sides of the body, lay in the first segment behind the head; and that, according to the recent and little known studies of Barthélemy,¹ this transverse tracheal conduit appears at the earliest formation of the system in the embryo, before any regular distribution of fluids over the body can be observed; from the middle line of this transverse trachea half a dozen or more prominent branches pass directly forward, and some at least of their branches penetrate the cavity into which the dorsal vessel empties its contents; it is therefore highly probable that through them the fluids enter the peritracheal system; for by this channel the fluids would pass in the easiest possible manner to every part of the body, from the moment that the pulsations of the embryo commence. This, therefore, is the principal point toward which it is desirable that future investigation should be directed; and especially the structure of the tracheal threads which enter this cavity should be minutely studied.

The tracheæ, as shown by Dufour, Blanchard, Agassiz, Williams, Kunkel and others, consist of two entirely distinct parts; but though these authors do not wholly agree in their explanation of the structure of the tracheæ, there appears to be little doubt that it is substantially as follows: first, a main stem and its branches, in which,

¹ *Récherches d'Anatomie et de Physiologie générales sur la classe de Lépidoptères.* 4°. Toulouse, 1864.

between investing tunics, lies a closely coiled spiral thread; and outside of and enveloping which is the peritracheal vessel, whose outer walls are not limited by the extent of the tracheæ proper, but extend beyond the spiral coil to form the second and distinct part of the system, — namely, capillary tubes, penetrating every portion and organ of the body, and terminating in a mesh-work of interlacing branches. In other words, this portion of the circulatory system consists of branching tubes, which enclose within all but their ultimate ramifications the similarly branching tubes of the respiratory system. The fluids, therefore, forced by the dorsal vessel into the peritracheal cavities, become thoroughly aerated before passing into the tissues of the body to perform their functions; when they have done their work they empty into the general cavity of the body, and mingling with the fluids newly expressed from the alimentary canal, join the general currents which, as first shown by Carus, appear to set, in regular channels at the sides and floor of the body, often, however, with no vascular boundaries, toward the hinder extremity of the body, or toward the sides of the dorsal vessel, to enter again the initial point of the circulation.

THE FLORIDA ORTHOPTERA COLLECTED BY MR. J. H. COMSTOCK.

As no attempt has yet been made to tabulate the Orthoptera from any district in the southern United States, it has seemed desirable, in naming for Mr. Comstock the species collected by him in the spring of 1876, to print a list of them, with descriptions of those which prove to be new. The collection was made almost entirely at two localities — Jacksonville on the St. Johns, and Fort Reed in Orange Co., about three miles south of Mellonville, at the head of navigation on the St. Johns. So far as I am aware, no collections of any importance have before been brought from the upper St. Johns, so that this portion of the collection, and the larger one, has more than ordinary interest. A few notes sent me by Mr. Comstock are appended under the species to which they refer; and occasional notices of captures by others in other parts of the State, or of neighboring States, are added. The Collection is in the Museum of Cornell University.

GRYLLIDES.

Gryllus assimilis (Fabr.) Goeze. 1 ♂, 1 ♀, found under boards on the beach near Sanford, April 6; 1 ♀, Ft. Reed, April 21; 1 ♀, Jacksonville, May 6. This agrees altogether with Sausure's description of the small black United States form of the species, excepting that the wings extend no further back than the tips of the cerci.

Gryllus pennsylvanica Burm. 2 ♂, 4 ♀, found under boards on the beach near Sanford, with the preceding, April 6; 3 ♀, Ft. Reed, April 20-22. One of the first mentioned females is much larger than the rest, but appears to be the same species. Although Saussure considers this a northern species, not occurring in the south, these specimens agree well with a specimen from Maryland, compared with Burmeister's type in the Halle Museum, and marked as agreeing therewith; the same specimen was indicated by Mr. Uhler as agreeing with specimens sent by him to Mr. Walker under this name, and which probably served as the base of Walker's determination. This form at least of the species I have never seen north of Maryland, and hence it appears to be a southern type. Saussure, however, considers the forms described by me from New England under the names of *G. niger* and *G. neglectus*, as identical with this.

Nemobius ambitiosus nov. sp. Allied to *N. carolinus* Scudd., but smaller and darker. Head not very convex, subappressed, the top dingy fulvous with broad dusky or blackish longitudinal stripes; whole front piceous with a moderately narrow pallid transverse stripe, widening slightly at the middle, and on the lower edge at each lateral ocellus; ocelli pale; antennæ fusco-luteous, much longer than the body, the basal joint subcastaneous; palpi, excepting the pallid penultimate joint, black. Pronotum quadrate, its borders straight with a rather strongly marked impressed line next the front edge black, sometimes heavily and obscurely blotched with dark fulvous, covered sparsely, like the top of the head, with long curving black bristles. Tegmina of ♂ black, more than half as long as the abdomen, quadrate, more than half as long again as broad, as broad at apex as at base, the tip broadly rounded and in the middle subexcised, the entire margin and the edge between the dorsal and lateral fields conspicuously bordered with pale yellow; tegmina of ♀ with the lateral field black, the dorsal field testaceous blotched with black, the veins dusky; less than half as long as abdomen, the inner apical angle strongly and roundly excised. Legs black, blotched heavily with luteo-testaceous, the hind tibial spines dull testaceous, mostly black or dusky in the middle half. Ovipositor black, straight, rather shorter than the hind femora; cerci varying from dull testaceous to castaneous.

Length of body, 7.75 mm.; of antennæ, 9 mm.; of pronotum, 1.6 mm.; breadth of pronotum, 2 mm.; length of tegmina, ♂, 3.5 mm.;

♀, 2.6 mm.; of hind femora, 5.5 mm.; of cerci, 4 mm.; of ovipositor 4.5 mm. 6 ♂, 5 ♀, Ft. Reed, April 20-22.

Cyrtoxipha delicatula nov. sp. A slender species, appearing the more slender from the great length of the wings; it is entirely of an amber color with a slight infuscation on the head, pronotum and hind femora, and with a few brownish dots at the insertion of hairs on the head and pronotum, especially next the hinder margin of the latter; antennæ three times as long as the body, of the same color, delicately pubescent with blackish hairs, and about every sixth joint dusky; penultimate joint of palpi decidedly longer than the preceding joint, the last triangular joint dusky at its broad apex. Pronotum twice as broad as long, rapidly and regularly increasing in size from in front backward, the front and hind borders straight, with a median impressed line and a few long curving dark tawny hairs, mostly arranged in four equidistant transverse rows. Tegmina of ♂ slightly longer than the body, the tympanum and all the open spaces of the dorsal field rugulose with irregular longitudinal lines, the accessory vein ("veine adventive" of Saussure) distinct throughout the lateral field with a very few faint, distant, transverse veins; wings fully twice as long as the tegmina; spines of hind tibiae dusky or blackish at tip.

Length of body, 5.5 mm.; of body and closed wings, 11 mm.; of antennæ, 19 mm.; of pronotum, .95 mm.; greatest breadth of pronotum, 1.9 mm.; length of tegmina, 5 mm.; of hind femora, 5 mm.

1 ♂, Ft. Reed, April 23. I have also received a male of the same species from Sand Point, Florida, collected May 1, by Messrs. Hubbard and Schwarz (No. 409). The excessive length of the wings is a striking feature of this insect, which differs in several respects from *C. Gundlachi* Sauss., said by him to occur in the southern United States.

This species, excepting in the length of its wings, bears a close resemblance to the insect considered by Orthopterologists in this country as *Acheta exigua* of Say. Say's description does not fit the latter well, but in the absence of any insect yet found which agrees better with the characters he mentions, it has been, and may still be, considered the same. It is an Anaxipha, and occurs throughout the southern states from Texas to the Atlantic seaboard, and on the latter as far north as Maryland (Uhler). It was placed by Saussure doubtfully in *Nemobius*, but is not the insect referred to by me in the Boston Journal of Natural History (VII, 429) under that name. Mr. Comstock did not meet with any species of Anaxipha.

LOCUSTARIÆ.

Thyreonotus dorsalis (Burm.) Scudd. 2 ♂, 1 ♀, taken at Ft. Reed, April 4-20. This species does not agree in structural characteristics with any of the genera of Decticeidæ given by Herman, but approaches *Thyreonotus* more closely than any other.

Belocephalus subapterus Scudd. (*Acanthacara acuta* Thom. nec Scudd.) A larval ♂ was found at Ft. Reed, April 17.

Xiphidium ensiferum Scudd. A single pupa of this or an allied species was taken at Ft. Reed, April 21.

Amblycorypha rotundifolia (*Phylloptera rotundifolia* Scudd.). A single female came with the collection of Mr. Comstock, but unlabelled. As some western specimens were sent, this may not have been taken in Florida. I have received it from as far south as Georgia.

Microcentum retinervis (Burm.) Scudd. A male, a female and two pupæ were taken at Ft. Reed between April 4 and May 2.

ACRYDII.

Dictyophorus reticulatus Thunb. A considerable number of larvæ and pupæ were taken May 6. They differ rather remarkably from the perfect insect, being of a very deep metallic bronze-green color approaching black, marked with yellow deepening into red in spots, or wholly with blood-red; this is most conspicuous in a slender dorsal stripe the whole length of the creature, extending over the fastigium half way down the lateral edges of the frontal costa; the lateral carinæ of the head, the lower border of the front and the lower half of the posterior border of the head are also marked broadly with it, as also the hinder edge of the pronotum; the antennæ are black throughout.

Aptenopedes (ἄπτῆς, πηδάω) nov. gen.

Head projecting, front strongly oblique, whole summit of head horizontal, scarcely convex, triangular; the eyes nearly meeting above, and the fastigium in advance of them slightly tumid; front subappressed, particularly in the ♀; frontal costa distinct and equal throughout; eyes long oval, not prominent, in the ♀ depressed and tapering above; antennæ moderately slender, linear, subdepressed, about as long as (♀) or slightly longer than (♂) the pronotum; palpi rather small, the last joint nearly cylindrical, not in the least expanded. Pronotum regularly expanding posteriorly in the ♀, only

expanding at the very tip and then but slightly in the ♂; front margin slightly convex, hind margin slightly and angularly excised; surface uniformly rugulose, tectiform, especially in the ♀, the median carina distinct but not prominent, lateral carinae wanting; the posterior lobe separated from the anterior by a scarcely perceptible sinuate furrow, the posterior itself distinctly divided in the middle by a transverse furrow subparallel to the hind border severing the median carina; lateral lobes nearly twice as long as broad, narrowing downward, the exterior edge very broadly angled, the posterior margin roundly excised; prosternum with a blunt conico-cylindrical spine; inner margin of mesosternal lobes broadly convex, the lobes subapproximate in the ♂, distant from each other by half their width in the ♀; metasternal lobes approximate in both sexes. Tegmina linear, about as long as the pronotum; wings wanting. Hind femora extending nearly to (♀) or a little beyond (♂) the tip of the abdomen, the superior edge unarmed; hind tibiae with their outer edges smooth, the spines on either side equal; first and third tarsal joints equal, the second less than half as long as either of them. Abdomen indistinctly carinate throughout.

The genus has an aspect not unlike that of *Sphenarium*, but it belongs to the subfamily of Acrididae and appears to be somewhat closely allied to *Rhytidochrota*. *A. sphenarioides* may be considered as the type.

Aptenopedes sphenarioides nov. sp. Green, the upper surface a little infuscated in the male. Head with the whole front flecked with fuscous or blackish punctæ. Antennæ with the first two joints pale or greenish, beyond growing testaceous, the apical third blackish fuscous. Pronotum uniformly and dull rugulose, more obscurely on the deflected lobes than above, like the head furnished with very scattered delicate inconspicuous short white hairs and with a white or very pale pink straight lateral stripe running from the upper posterior border of the eye to the hind edge of pronotum; this stripe is bordered more (♂) or less (♀) distinctly with black beneath; lower edges of pronotum a little pale, especially in the male; prosternal spine terminating bluntly. Tegmina reaching the end of the first abdominal segment, white above, black below, in continuation of the pronotal stripe; metapleura more or less distinctly striped with black and white, in imitation of the tegmina. Hind femora green exteriorly, more or less infuscated, especially above, in the female, the outer carina obscurely marked with black, the space between this

and the upper carina more or less distinctly testaceous in the male; hind tibiae green with a plumbeous tinge, the spines black tipped. Abdomen obscurely punctate on the basal half, with small indistinct dorso-pleural spots of mingled white and blue-black dots on the posterior extremity of the segments, which in the male lie at the outer limit of a broad dorsal testaceous stripe which is bordered externally with blackish and so obscures the spots.

Length of body, ♂ 17 mm., ♀ 25 mm.; of antennae, ♂ 7 mm., ♀ 7 mm.; of tegmina, ♂ 3 mm. ♀ 4 mm.; of hind femora, ♂ 10 mm., ♀ 11.25 mm.

8 ♂, 4 ♀, Ft. Reed, April 8-28. I have also received the species from Jacksonville, Fla., collected by C. J. Maynard in April.

Aptenopedes rufovittata nov. sp. Green, more or less infuscated above. Face minutely and rather sparsely dotted with blackish fuscous, the mouth-parts and the lower part of the face often decidedly pink; antennae with the first two joints green, beyond either dull green, more or less infuscated (♂), or with the basal half reddish or pinkish brown and the apical half olivaceo-fuscous (♀); eyes as in *A. sphenarioides*. Pronotum rugulose, much more heavily in the ♂ than in the ♀, and the dorsum of the other thoracic joints and the basal abdominal joints similarly marked; pronotum with a distinct (♀) or inconspicuous (♂) median carina, obscurely infuscated in the ♂, generally marked distinctly but narrowly with testaceous in the ♀, the surface of the whole pronotum with a few scattered hairs, even more sparsely distributed than in *A. sphenarioides*; position of the lateral carinae (which are wanting) marked by a slender black stripe, followed above by a somewhat broader rufous band, fading to yellowish and narrowed in the female; this stripe does not extend upon the head. Tegmina wanting in the ♂, very slender, linear, straight and green in the ♀. Legs green, the hind femora tipped, at least in the male, with rufo-testaceous and black, the hind tibiae glaucous, hind tarsi red with black-edged pad and black-tipped red claws. Abdomen with an obscure testaceous medio-dorsal stripe in the female, extending onto the thorax, and on the abdomen followed by an obscure pleuro-dorsal series of small dark spots, or with a similar distinct stripe in the ♂, bordered by a more or less distinct narrow or broad edging of black, fading laterally into fuscous; anal cerci of ♂ tapering almost uniformly, while in *A. sphenarioides* they taper only on the basal half and beyond are equal.

Length of body, ♂ 15.5 mm., ♀ 20.5 mm.; of antennae, ♂ 6.5 mm.;

♀ 5.4 mm.; of tegmina, ♀ 1.85 mm.; of hind femora, ♀ 8.5 mm.
♀ 10 mm.

4 ♂, 3 ♀, Ft. Reed. April 10 (♂), April 20-21 (♀).

Aptenopedes aptera nov. sp. Green. Eyes narrower than in *A. sphenarioides*, more closely approximated above and the fastigium in advance of them less swollen. Thorax with similar sculpturing but wholly devoid of any lateral stripe. Pronotum a little shorter than in the preceding species; no trace of tegmina. Legs as in the previous species, except in wanting the testaceous color on the upper outer surface of hind femora. Abdomen green, with a medio-dorsal stripe of testaceous, having an obscurely infuscated edge extending also to the hinder edge of pronotum.

Length of body, 24 mm.; of antennæ, 6.5 mm.; of hind femora 10.5 mm. 1 ♀, Ft. Reed, April 7th.

Acridium americanum (Drury). 3 ♂, 2 ♀, Ft. Reed, and Jacksonville, from April 10 to May 6.

Acridium appendiculatum Uhl. 13 ♂, 2 ♀, taken at Fort Reed between Mar. 26 and April 22, and 1 ♂ taken at Jacksonville, May 6. Appalachicola (Thaxter). *A. distinctum* Uhl., Mss. is the male of this species.

Abbé Provancher has sent me this species from Quebec! It is his *A. rugosum*.

Caloptenus femur-rubrum (DeG.) Burm. The common southern species, with the hind tibiæ varying from pale red to pale yellowish green, and which I provisionally refer to this species, was taken at Fort Reed April 8 to 23, and Jacksonville May 6, in abundance. Pupæ were taken at Ft. Reed April 2 to 28.

Pezotettix rotundipennis nov. sp. Caloptenoid in form. Head livid yellowish brown, the summit deeply infuscated, the whole more or less mottled with small fuscous spots; antennæ dull brownish red, apically infuscated, at extreme base more or less livid. Pronotum above brownish fuscous, mottled slightly with dusky yellow, the median carina black; lateral lobes brownish yellow below, above occupied by a broad piceous stripe running from the eye nearly to the middle of the abdomen, broader and with vague boundaries on the abdomen and partially interrupted by a slender oblique brownish yellow stripe on the crest of the metapleural episterna. Tegmina but little longer than broad, rotund, ovate, black, concealed by profuse rufous veins. Legs dull yellowish brown, the middle and hind femora heavily spotted with black, the hind tibiæ dull fusco-glaucous,

pale at base. Head not very large; vertex between the eyes scarcely so broad as the basal joint of antennæ, shallowly and broadly sulcate in advance of the eyes; frontal ridge moderately broad, shallowly sulcate throughout, slightly and regularly expanding beneath, obsolescent next the clypeus. Pronotum broadening slightly and regularly throughout, the anterior lobe almost twice as long as the posterior, its surface very faintly and very sparsely punctate, the median carina sharp but slight and equal; posterior lobe with the median carina not sharp but rather inconspicuous, the surface of the lobe both above and on sides delicately rugulose; lateral carinæ wholly obsolete. Terminal segment of male strongly upcurved, tumid posteriorly; cerci rather stout but laminate, tapering at the very base, beyond nearly equal, moderately broad, directed inward and backward and bent obliquely a little downward, slightly expanded, well rounded and scarcely thickened at the tip.

Length of body, 15.5 mm.; of antennæ, 8 mm.; of tegmina, 3 mm.; of hind femora, 10 mm. 1 ♂, Jacksonville, May 6.

Pezotettix puer nov. sp. Caloptenoid in form. Head livid brown, heavily mottled with dusky brown in small spots, often deepening, especially above, to blackish brown; antennæ dull yellowish brown, deepening to dark fuscous beyond the middle, the basal joint longitudinal, streaked more or less noticeably with blackish. Pronotum brownish yellow, more or less infuscated above, the upper portion of the deflected lobes, especially in the male and in front, heavily marked with piceous, sometimes scarcely infuscated in the female only. Tegmina shaped and colored as in the preceding species, but paler in the female than in the male, widely separated. Legs variable in color, but generally dull yellowish brown, the hind femora generally twice banded above, besides the black apex, the hind tibiæ dull yellow mottled with brown at base and extreme tip, the rest purplish glaucous. Head and pronotum shaped and sculptured as in the preceding, excepting that the lateral carinæ are distinct throughout and straight, but not sharp. Terminal segment of male a little upturned, the anal cerci slender beyond the thickened base, scarcely tapering, gently incurved, the tip bluntly pointed.

Length of body, ♂, 10.5 mm., ♀, 16 mm.; of antennæ, ♂, 5.5 mm., ♀, 7 mm.; of tegmina, ♂, 2.2 mm., ♀, 2.5 mm.; of hind femora, ♂, 8 mm., ♀, 10 mm.

5 ♂, 4 ♀, Ft. Reed, April 8-10. This is the smallest American species of the genus known to me.

Paroxya recta Scudd. 3 ♂ and a pupa were taken at Ft. Reed May 1-2; another pupa April 10; taken at Enterprise, Florida, by Messrs. Hubbard and Schwarz, May 15 (No. 423).

Paroxya atlantica Scudd. 6 ♂, 2 ♀, were taken at Ft. Reed: the ♂ April 2-20, the ♀ April 23.

Arnilia chlorizans (Walk.). 10 ♂, 2 ♀, Ft. Reed, April 21 - May 1. Appalachicola (Thaxter).

Leptysma marginicollis (Serv.) Stål. 7 ♂, 2 ♀; Ft. Reed, April 7 - May 2; taken at Enterprise, May 25, by Messrs. Hubbard and Schwarz (No. 421), and at Appalachicola by Mr. Thaxter.

Achurum brevipenne (Thom.). A large number of mature specimens were taken at Ft. Reed between April 5 and May 1, together with a few pupæ. It appears to have been an abundant species, and Mr. Comstock remarks that both the form and coloring of the insect appear to be protective; the insect occurs on the "wire-grass" which grows in the sand among the saw-palmettos; and so closely do their brown linear bodies resemble dry grass, that it is very difficult to perceive them.

Amblytropidia subhyalina Scudd. 8 ♂, 4 ♀, mostly at Ft. Reed, April 17 - May 1; taken at Ft. Capron in April, by Messrs. Hubbard and Schwarz (No. 435), and at Appalachicola by Mr. Thaxter.

Abbé Provancher has sent me this species from Quebec, Canada! It was described by him as *Chloealtis canadensis*.

Chloealtis viridis Scudd. 19 ♂, 21 ♀, mostly at Ft. Reed (the others at Jacksonville); the males April 11 - May 6, the females April 22 - May 6; a large number of larvæ and pupæ were also taken at Ft. Reed, April 8-28; taken May 18th at Enterprise, by Messrs. Hubbard and Schwarz (No. 449).

Chrysochraon obscurus nov. sp. Dark yellowish brown. Head prominent, projecting, the face more than usually oblique in the male; fastigium of vertex moderately broad, elongated, acute-angled, convex, scarcely declivant, bluntly rounded at the tip; lateral foveolæ pretty strongly depressed in front, with obscure inner border ovate-subquadrate, about twice as long as broad; frontal costa deeply sulcate, especially above the ocellus, narrowing at summit, broadening on lower half; whole front distantly and faintly punctate; whole head dotted very sparsely with black, and in the male striped above and on sides with the same; summit of head transversely and faintly wrinkled; antennæ a little depressed, light brown, deepening

to dark fuscous beyond the base. Pronotum rather roundly constricted just in advance of the middle. front and hind borders straight, median and lateral carinæ equal and slight; surface punctato-subrugose, the region of the lateral carinæ more or less deeply, and narrowly (♀), or broadly (♂) marked with blackish; both disk and lateral lobes with occasional, irregularly distributed, large blackish dots, sometimes obsolete. Tegmina three-quarters (♂), or scarcely half (♀) as long as the abdomen, fusiform, tapering apically (♀) or linear (♂), yellowish brown, with a median dusky stripe often broken into alternate blackish and paler spots. Legs dark yellowish brown, the hind femora more or less and variably infuscated; hind tibiæ pale yellowish brown; the spines pale at base, black at tip. Abdomen more or less mottled with brownish yellow and dark fuscous.

Length of body, ♂, 13.5 mm., ♀, 21.5 mm.; of antennæ, ♂, 7 mm., ♀, 6 mm.; of tegmina, ♂, 6.6 mm., ♀, 6 mm.; of hind femora, ♂, 9.4 mm., ♀, 12 mm.

3 ♂, 1 ♀, Ft. Reed, April 8-11.

Stenobothrus maculipennis Scudd. 29 ♂, 17 ♀, and 8 pupæ taken at Ft. Reed, April 8-May 2, and Jacksonville, May 6. The individuals are considerably larger than those from the north, first described under this name.

Tomonotus Zimmermanni Sauss. 22 ♂, 4 ♀, at Ft. Reed and Jacksonville, March 26-May 6. Appalachian (Thaxter). This species is not mentioned by Thomas in his *Acrididæ* of North America.

Chimarocephala viridifasciata (DeGeer) Scudd. 27 ♂, 11 ♀, of the type *infuscata*; 2 ♂, 25 ♀, of the type *virginiana*. Both sexes of both forms were taken, as early as March 26, and as late as May 6, with the exception of the two *virginiana* ♂, which were both taken May 6. Five sixths of the females of both forms were taken after April 21, and two thirds of the ♂ of *infuscata* after that date; so that there appears to be no evidence that one form is earlier than the other. 11 larvæ and pupæ were taken at Ft. Reed, April 10-25.

Hippiscus discoideus (Serv.) Stål. 4 ♂, 3 ♀, were taken at Jacksonville, May 6; and three larvæ and pupæ at Ft. Reed, April 5-10.

Dissosteira carolina (Linn.) Scudd. A single ♂ was taken on May 6, at Jacksonville; it was taken at Enterprise May 10, by Messrs. Hubbard and Schwarz (No. 426).

Psinidia eucrata (Harr.). 24 ♂, 18 ♀, and 2 pupæ, Jacksonville and Ft. Reed, mostly the latter, between April 6 and May 6; taken at Ft. Capron, April 19, by Messrs. Hubbard and Schwarz (No. 442), and at Appalachicola by Mr. Thaxter. Mr. Comstock took this insect on white sand, and remarks that the lighter parts of the body and tegmina exactly resemble the color of the sand where they occur, while the darker parts correspond to the burnt vegetable matter always found mingled with the sand; and the mottling produces so perfect a mimicry that he has often been unable to distinguish a grasshopper which he had seen alight within six feet from where he stood.

Trimerotropis picta Scudd. 16 ♂, 13 ♀, and 5 larvæ and pupæ, Ft. Reed and Jacksonville, at the same time as the preceding; taken at Cedar Keys, by Messrs. Hubbard and Schwarz, June 4 (No. 441), and at Appalachicola by Mr. Thaxter.

Tettix rugosus Scudd. 10 ♂, 19 ♀, taken at Ft. Reed April 22-26, and 1 ♂ taken April 6, at the same place. Mr. Comstock found all the species of Tettigidiæ in damp places on black muck.

Tettix arenosus (*Tettix arenosa* Burm.). 4 ♀, Ft. Reed, April 20-21. I have recently received the same species from Georgia; it is closely allied to *T. rugosa* Scudd., but the wings scarcely surpass the pronotum, a feature which appears to be constant.

Tettigidea lateralis (Say) Scudd. 19 ♂, 17 ♀, and 14 larvæ and pupæ were taken at Ft. Reed April 20-26; taken at Appalachicola by Mr. Thaxter.

Batrachidea cristata (Harr.) Scudd. 5 ♂, 6 ♀, and 2 pupæ were taken at the same time and place as the preceding.

A few immature Tettigidiæ remain undetermined.

MANTIDES.

Oligonyx graminis (*Thespis graminis* Bates' Mss.). Body filiform. Head strongly depressed, with a transverse central sulcus; eyes large, obovate, very prominent, diverging posteriorly; posterior border of head tuberculate at outer angles; clypeus, and all parts in advance of eyes, forming a small triangle, at the apex of which is the minute mouth; ocelli very large and prominent, equidistant, obovate; antennæ pubescent; whole head testaceous, obscurely dotted with black, the ocellar scrobes black. Prothorax very long, linear, a little expanded at the base of the legs, in front of them gently

tapering; median carina slight, fading in front of the legs; lateral carinae equally slight, minutely denticulate; surface smooth, very sparsely and briefly pubescent, brownish testaceous, obscurely dotted with black. Tegmina minutely pubescent, slender, reaching the tip of the third abdominal segment, rounded at tip, very light uniform translucent brown, very faintly iridescent; wings extending beyond the tegmina by more than half the length of a segment of the abdomen, colored like the tegmina. Front legs long, pubescent; coxæ and femora of equal length, lighter than the prothorax, marked irregularly, or dotted with blackish fuscous, furnished with long spines on apical third; tibiæ extremely short, enlarging apically with four apical black tipped spines, of which one is much longer than the others; tarsi reaching just beyond the middle of the femora. Abdomen very long and slender, of the color of the pronotum, and more abundantly pubescent, with longer white hairs; supraanal plate long and tapering, triangularly lanceolate, carinate, projecting far beyond the abdomen; cerci long, equal, depressed, pubescent, 7-jointed; styles slender, tapering, nearly half as long as the supraanal plate.

Length of body, 47 mm.; of antennæ, 23 mm.; of prothorax, 12.75 mm.; greatest width of same, 1 mm.; length of tegmina, 18 mm.; of fore femora, 8 mm.; of fore tibiæ, 1 mm.; of hind tibiæ, 10.5 mm.; of cerci, 4 mm.

1 ♂, Ft. Reed, April 24. The species has also been taken in Florida, by Mr. Norton, and I have others from Georgia, all of them males. It differs conspicuously from *O. Scudderi* Sauss., supposed to come from Georgia, in the length of the prothorax. The specimens in my collection agree perfectly with those labelled *Thespis graminis* Bates' Mss., in the British Museum; as Mr. Bates is understood to have abandoned his purpose of preparing a monograph of the Mantidæ, based on the British Museum collection, I have no hesitation in describing it, and adopting therefor the appropriate specific name he has applied.

A male pupa of another Mantid was taken at Ft. Reed, April 7, apparently belonging either to *Miopteryx* or to *Thespis*; but certainly not to *T. cubensis* Sauss., the only species of either genus recorded from the neighborhood of the Southern States.

BLATTARIÆ.

Phyllodromia germanica (Linn.) Serv. A number of specimens in various stages of growth, were taken at Ft. Reed, March 27.

A single specimen of a second species of the genus was taken at the same place, but is in an indeterminable condition.

Ischnoptera unicola (Scudd.) Brunn. Specimens were taken in houses at Fort Reed from March to May.

Platyzosteria ingens nov. sp. Dark mahogany-brown, nearly uniform, but deepening toward the sides and extremity of the abdomen, and especially on the tegmina, which sometimes become nearly black, the head and under surface lighter. Head obscurely mottled with dusky, with a pale dot next the inner edge of the antennæ, the eyes black, the labrum and mouth-parts mottled with yellow; antennæ marked with black on the basal joints, throughout pubescent, as long as the body. Pronotum semi-orbicular, gently convex, with minutely dilated edges and scarcely shagreened surface. Tegmina subquadrate, the outer margin gently marginate and scarcely rounded, the inner edge slightly convex, especially next base, the outer margin almost straight, but owing to the slightly produced and rounded outer angle, a very little concave; they just cover the mesonotum, and together cover the whole breadth of the same, excepting at a scutelliform space in front in the middle; their surface is punctate. Legs stout, profusely spined, the coxæ heavily blotched with yellow, and the under surface of tarsi clay-yellow. Abdomen broad, scarcely broader beyond the base, the extremity broadly rounded, the surface, especially behind, rugulose; joints produced laterally, especially the apical ones, where the lateral angle becomes a distinct pointed tooth. Supraanal plate broadly and roundly excised on hind border, ciliate with rufous hairs, and the outer angles rounded (♂), or rather deeply and angularly excised, the outer angles sharp (♀); cerci depressed, tapering, pointed, either longer (♂) or shorter (♀) than the supra-anal plate.

Length of body, ♂, 31 mm., ♀, 35 mm.; of antennæ, ♂, 31 mm., ♀, 30 mm.; of pronotum, ♂, 9 mm., ♀, 9 mm.; breadth of same, ♂, 14 mm., ♀, 14 mm.; length of hind femora, ♂, 9 mm., ♀, 9 mm.; of hind tibiæ, ♂, 10.5 mm., ♀, 10 mm.; of hind tarsi, ♂, 7.5 mm., ♀ 6.5 mm.

3 ♂, 1 ♀, houses at Ft. Reed, March—May. I have also received the species from unspecified localities in Florida, from Messrs. Norton

and Osten Sacken, and from Volusia (Samuels), Green Cove Springs (Boardman), Appalachicola (Thaxter) and Ft. Capron in April, Messrs. Hubbard and Schwarz, No. 588, and from Cuba (Uhler), in all 5 ♂, 5 ♀. Some of these specimens I have compared with the types of the Cuban *P. opaca* Brunn., in Brunner's collection, from which this species is certainly distinct (as Mr. Brunner agrees with me in believing) in its slenderer legs, longer tegmina, and in the absence of certain spines on the hinder abdominal segments. I noticed this species in the Berlin Museum, but failed to note from what locality they came.

Platyzoisteria sabalianus nov. sp. Head mahogany-brown, growing yellow toward labrum, blotched everywhere with fuscous, and with a pale spot below either antenna; eyes black; palpi, especially apical joints, more or less infuscated; antennæ of the color of the head, growing paler toward the tip, pubescent, though at base but very sparsely, longer than the body. Pronotum longer than half the breadth, well rounded, the sides very delicately marginate, surface smooth, black, with the centre of posterior half rufo-castaneous, the sides with a broad yellow band, just avoiding the margin, narrowing in front by a broadly rounded excision of its inner border; the band extends with fully equal breadth upon the mesonotum, and to a greater or less extent on to the metanotum, and is very conspicuous; on the meso- and metanotum, which are rufo-castaneous, it is broadly margined interiorly with black. Tegmina wholly wanting. Legs moderately stout, profusely and coarsely spined, the coxæ fuscous, blotched with pale yellow, the rest of the legs dark castaneous, some of the tarsal joints partially infuscated. Abdomen dull rufo-castaneous, very broadly bordered laterally, and more narrowly apically with black, with an almost imperceptible median carina, the lateral edges produced apically to a delicate point, the last three joints with very distant, very brief rufous hairs springing from raised points. Supraanal plate rather deeply and angularly excised, the lateral projections bluntly pointed; cerci depressed and tapering, pointed, twice as long as the supraanal plate.

Length of body, 20 mm.; of antennæ, 23 mm.; of pronotum, 6.3 mm.; breadth of same, 10.5 mm.; length of hind femora, 6.1 mm.; of hind tibiæ, 7.5 mm.; of hind tarsi, 5 mm.

2 ♂, Sanford, in tops of the Cabbage Palmetto (*Sabal Palmetto*) April 6. It is closely allied to *P. mysteca* Sauss.

Periplaneta americana (Linn.) Burm. 4 ♂, 3 ♀, and young, from houses at Fort Reed, March, April and May.

Periplaneta australasiæ (Fabr.) Burm. Several young of this species were taken at Ft. Reed during March, April and May. This cosmopolitan species was first sent to me from Green Cove Spring, Florida, by Mrs. Mary Treat, under the name of "the Florida cockroach," and she reports that it frequently occurs in the pitchers of *Sarracenia*,¹ and has been extremely abundant in Florida for eighteen years, the torment of housekeepers. Yet it has never before fallen into my hands, nor has it been hitherto recorded from the United States. A single specimen in the collection of Dr. Harris is marked "introduced; in ships from China."

FORFICULARIE.

Labidura riparia (Pall.) Dohrn. A single specimen taken at Ft. Reed, April 24. Taken at Indian River, by Messrs. Hubbard and Schwarz, April 27; at Appalachicola, by Mr. Thaxter.

Labia guttata Scudd. One specimen taken at Ft. Reed, March 26.

NOTE ON THE WING OF A COCKROACH FROM THE CARBONIFEROUS FORMATION OF PITTSBURGH, PENN.

It lies on a piece of black carbonaceous shale, and was found in the interconglomerate beds, or at not far from the same level as the fossil cockroach described by Lesquereux from Frog Bayou, Arkansas. It is a nearly perfect upper wing, an insignificant portion of

¹ See Harper's Magazine for October, 1876.

the extreme tip and base only wanting. It may be called *Blattina fascigera* from the grouping of most of the principal nervules into bundles, although this feature is not very conspicuous. The anal vein is very deeply impressed; the marginal area is very broad and in its basal half almost entirely devoid of cross veins; the entire margin of the apical half of the wing is broken by nearly straight and equidistant cross veins over a large area, while the disc of the wing is irregularly reticulated. The costal margin is very broadly and gently convex, and the inner margin nearly straight, so that the wing is of nearly equal breadth throughout. Its length (with broken tip) is 35 mm.; probably it was about 38 mm. long; its breadth is 15.5 mm. The species seems to be somewhat nearly allied to *Blattina primæva* Gold. of the European carboniferous formation, but differs distinctly in the extreme weakness of the scapular vein, its nearly uniform distance from the margin throughout its course, and its continuation nearly to the tip of the wing.

A full description and figure of the species will be given in a future paper.

AN INSECT WING OF EXTREME SIMPLICITY FROM THE COAL-FORMATION.

At the last general meeting of the Society, the wing of a fossil cockroach from Pennsylvania was exhibited; in consequence of which Dr. Packard sent me a fragment of anthracite shale preserved in the Museum of the Peabody Academy of Science at Salem, bearing certain impressions. The specimen was taken from a coal hod in New York City by Mr. James Angus of West Farms, and is supposed to have originated from Pennsylvania.

Upon this piece of carbonaceous shale is the well defined wing of an insect of marked simplicity. It is small, and very broad in proportion to its length, with a costal margin very much arched apically, a pointed subfalcate tip and an anal region broadly lobed. The number of principal veins is six, arranged to a certain extent by pairs, since each pair approximates to a greater or less extent at the extreme base. I have long maintained that the normal number of veins in the wings of insects is six (as upheld by Heer and others), and that they were arranged by pairs; but that in many insects one or another, or indeed most of the veins, might become aborted, and that they become differentiated in the various groups in different ways, sometimes one and sometimes others playing the principal role and one or more, although not always the same, being quite simple, while others by branching support the principal part of the framework of the wing. In this ancient wing, however, scarcely the slightest differentiation has begun, each of the veins branching near the base, again with slight diversities before the middle of the wing, and again either (in the upper half) at, or (in the lower half) beyond the middle of the wing; there are also occasional additional branches; but each principal vein appears to branch to an almost exactly equal extent; the region covered by the uppermost pair of principal veins and their branches, however, exceed that covered by either of the other pairs; it is indeed about equal to the other two combined, which share equally between them the lower half of the wing. The general resemblance of the whole to the distribution of the tracheæ in the forming wing of a caterpillar is very striking; and if the theory of the wing that I have maintained be correct, this is precisely the number and mode of distribution of the veins which one would predicate for the primæval wing. Hitherto we have arrived at nothing of the sort; in all the wings we have yet seen from the Carbon-

iferous or Devonian formation, differentiation of the veins has already reached nearly or quite the same degree of perfection as in living insects; excepting, possibly, in some cases where, from the fragmentary nature of the remains, it is impossible really to say what degree of uniformity or simplicity the different veins possessed.

In the third volume of the Geology of Illinois, I described several species of obscure carboniferous remains of wings under the generic name *Euephemerites*. They were so fragmentary that little could be said concerning them, and unfortunately the engravings gave no sort of idea of the structure that could be seen. It is interesting now to find that this wing is so closely related to them that it should be placed in the same genus, though separable specifically from them in the delicate and equal striation of the entire surface parallel to the veins, in the more frequent and apparently more regular branching, and in the considerably smaller size. In none of the former species could the shape of the wing be determined, while this is quite perfect. The species may be called *Euephemerites primordialis*. The length of the wing is 11.5, its extreme breadth 6.75. It may be added that a fragment of an exceedingly slender, straight, perfectly simple, cylindrical and unarmed leg crosses a part of the wing, broken at intervals, but altogether about 7 mm. long. A figure of this species, as well as new figures of the other species of *Euephemerites* will be given in a future memoir on the Carboniferous Insects of America, for which I have long been gathering material.

Upon the same shale is a specimen of *Cyclopteris* which Professor Lesquereux has determined as *C. elegans* Lesq., or *C. hirsuta* Lesq., the specification being doubtful, as most of the borders of the leaflet are destroyed. Mr. Lesquereux thinks the shale is undoubtedly from the coal measures of Pennsylvania.

NOTE ON EUTERMES RIPPERTII.

The nests of the white-ants found at the Isle of Pines in 1864, as I recollect them, were about the size of a man's head, and dome-shaped. According to notes taken at the time, the first of them was found resting on the ground around the base of a small tree; and I believe that all the others were similarly situated, and that the trees were not more than an inch in diameter. The outside crust of the nest was made of a loosely compacted earth, while within it, at the depth of about an inch or two, was a much firmer material, a closely cemented hardened earth, two or three inches thick, which required a hatchet to break; within, it was softer again. The nest extended an inch or two below the level of the gravelly soil, and most of the milk-white larvæ were found in this part of the nest. The queen was found near the middle of the nest, beneath its very hardest part, upon the easterly side; and on the same side the black workers were much more abundant than elsewhere. Several nests were opened and a single queen taken from each (at least I find no notice of a second queen); the first nest that was despoiled was visited the next day (about eighteen hours after destruction), and the open parts were found entirely covered with fresh earth, and crowds of workers were running about with larvæ in their mouths. Several day's search failed to discover a deserted nest.

REMARKS ON CALLIPTENUS AND MELANOPLUS, WITH A NOTICE
OF THE SPECIES FOUND IN NEW ENGLAND.

The genus Calliptenus was founded by Serville in 1831 in his *Revue Méthodique* under the name Calliptenus,¹ with three species, *Acrydium sanguinipes*, *A. italicum* and *A. morio*, each being placed as a representative of a distinct subdivision. In 1838 Burmeister, and in 1839 Serville himself, retained *C. italicus* alone in the genus, and it therefore became its type.

Until within a few years, all authors who have treated of the American species placed by Burmeister in this genus, or of their congeners since described, have referred them to Calliptenus, if they have separated them at all from Acridium. In 1873 Dr. Stål in his admirable *Recessio Orthopterorum* first pointed the differences which exist between the European *Cal. italicus* and the North American species which had been referred to that genus, and the closer connection of the latter with Pezotettix. Our common *C. femur-rubrum* was placed by him in a subgenus of Pezotettix which he termed Melanoplus. Without considering the intimate relationship which undoubtedly exists between Melanoplus and the true Pezotettix, it will be enough at the moment to assume that the great variety of forms in this country in either group, will necessitate our separating them under distinct names even should they prove as closely allied as Stål's arrangement would indicate. For the assistance of American students the characteristic differences of structure between

¹ On orthographic grounds, Burmeister afterwards changed the name to Caloptenus; but Erichson more properly wrote it Calliptenus, in which he is followed by Stål.

Calliptenus and Melanoplus are pointed out, that the change of names which it will necessitate may not appear to those unacquainted with the scholarly work of Stål to be capricious. For better comparison the differences are presented in a tabular form.

Calliptenus.

Eyes proportionately larger in ♂ than in ♀; in the former broader than the length of the genæ.

Upper base of antennæ opposite the middle of the eye.

Deflected lobes of pronotum abruptly separated from the dorsal area by a distinctly elevated carina.

Meso- and metasternum together equally long and broad.

Metasternal lobes almost transverse, more widely separated than in Melanoplus, the posterior edge convex throughout.

Mediastinal vein of tegmina striking the costa at the middle of the outer two-thirds of the wing.

Discoidal cell of same terminating in the middle of the wing.

Vena intercalata of same wanting.

Branches of the principal veins much less numerous than in Melanoplus at the tip of the tegmina; they are also more oblique, and have a normal distribution.

Hind femora broad and stout, the upper margin serrate.

First joint of hind tarsi longer and very much stouter than the last joint; arolium small.

Penultimate segment of ♂ abdomen not noticeably larger than the preceding, leaving the abdomen horizontal.

Melanoplus.

subequal in ♂ and ♀; in both generally narrower, never broader, than the length of genæ.

slightly below the middle of the eye.

passing almost insensibly into the dorsal area, there being no distinct lateral carinæ.

together longer than broad.

oblique, directed backward as much as inward, the posterior edge more or less excavated next the hind coxæ.

striking the costa beyond the middle of the outer half of the wing.

terminating beyond the middle of the wing.

distinctly present.

running parallel with the principal veins, and remaining in close proximity to them throughout the tegmina, making the framework of the wing appear as if formed of an excessive number of principal veins, and adding greatly to its power in flight; they are but little oblique even at the tip of the wing.

slenderer than in Calliptenus, the upper margin smooth.

only a little stouter than, and of equal length with, the last joint; arolium large.

much swollen and expanded on the ventral surface, noticeably larger than the preceding segments, throwing the tip of the abdomen upward.

Anal cerci. of male of excessive length, very conspicuous, more than one third the length of the hind tibiae.

Segment preceding supra-anal plate of male entire, without marginal apophyses.

moderately large but not excessive, seldom one-fifth the length of the hind tibiae.

furnished with more or less conspicuous, paired, marginal apophyses, arising from the middle of the hinder edge, generally taking the form of pointed, more or less depressed, divergent lobes, lying in the lateral sulci of the supra-anal plate.

It has been generally supposed that we had only two species of *Melanoplus* in New England, the common species mentioned by Dr. Harris in his Report on Injurious Insects, under the names *Acridium flavovittatum* and *A. femur-rubrum*. Mr. Uhler indeed had given a MS. name to a single specimen of a distinct species from Maine, and I had described the same in 1862 under his name *Caloptenus punctulatus*; but as no other specimens were discovered, doubt was thrown upon its proper habitat; others, however, have now been found, and the species appears to be peculiar to the Northern States. More recently, Mr. Riley has described a fourth species (which has been separated from *M. femur-rubrum* in my cabinet for ten years) under the name of *Cal. atlantis*;¹ and in the present paper two additional species are made known which will be more fully described in a memoir now in preparation.

These six species may be separated by the following table.

1. Tegmina scarcely exceeding, often much shorter than, the abdomen. *Male* with the median marginal apophyses of the last dorsal segment no longer than the segment itself. *Female* with the basal tooth of the lower valves of the ovipositor small, obscure blunt, much broader than long. Two callosities on the under surface of the first hind tarsal joint. 2.

Tegmina much exceeding the abdomen. *Male* with the median marginal apophyses of the last dorsal segment more than twice as long as the segment itself, extending conspicuously along the lateral sulci of the basal half of the supra-anal plate. *Female* with the basal tooth of the lower valves of the ovipositor prominent, sharp, nearly or quite as long as broad. Three callosities on the under surface of the first hind tarsal joint. 5.

¹ This was first called *atlanis* by Riley; but in his later writings he has used the corrected form, *atlantis*.

2. Moderately large species. Fastigium with parallel walls directly continuous with those of the frontal carina. Median carina of pronotum more or less distinct on foremost division of anterior lobe. *Male* with the apex of the last abdominal segment sharply conical; anal cerci expanding apically to a broad plate. . . . 3.

Small species. Tip of fastigium expanding laterally next the upper ocelli. Median carina of pronotum very obscure or wanting on the foremost division of the anterior lobe. *Male* with the apex of last abdominal segment obscurely conical and docked; anal cerci equal or apically forked. 4.

3. Antennæ brightly colored; eyes not prominent; upper limit of deflected lobes marked by a yellow stripe which extends on to the head; median and anal fields of the tegmina, otherwise immaculate, separated by a similar stripe; posterior lobe of pronotum nearly smooth; hind tibiæ red. *Male* with the anal cerci expanded at the base. *Female* with the upper valves of the ovipositor tapering, finely pointed. *M. femoratus* (Burm.)

Antennæ dark colored; eyes prominent; no lateral stripe on the pronotum or tegmina, the latter of which are spotted irregularly with dusky blotches; posterior lobe of pronotum rather coarsely punctate; hind tibiæ particolored. *Male* with the basal half of anal cerci equal. *Female* with the upper valves of the ovipositor scarcely tapering, bluntly pointed. . . . *M. punctulatus* (Uhl.) Scudd.

4. Transverse sulci of anterior lobe of pronotum distinct; upper half of divergent lobes but little darker than the lower half; tegmina as long as the abdomen. *Male* with the anal cerci forked at the tip. *Female* stout. *M. collinus* n. sp.

Transverse sulci of anterior lobe of pronotum indistinct; upper half of divergent lobes strikingly darker than the pale lower half; tegmina much shorter than the abdomen. *Male* with the anal cerci equal or nearly equal throughout, long, slender, and nearly straight. *Female* rather slender. *M. rectus* n. sp.

5. *Male* with the marginal apophyses of the last dorsal segment stout, parallel, reaching half way over the supra-anal plate; anal cerci tapering, pointed at tip, not more than half so broad on apical as on basal half; apex of last abdominal segment entire. *Female* with the median carina of the pronotum generally distinct on the anterior lobe; prosternal spine nearly cylindrical, scarcely tapering excepting at the extreme tip, which is generally bluntly rounded. *M. femur-rubrum* (De Geer) Stål.

Male with the marginal apophyses of the last dorsal segment slender, divergent, reaching scarcely one-third way over the supra-anal plate; anal cerci broad, equal, broadly rounded at tip, scarcely twice as long as broad; apex of last abdominal segment notched. *Female* with the median carina of the pronotum generally indistinct or wholly wanting on the anterior lobe; prosternal spine tapering, generally bluntly pointed at tip. . . . *M. atlantis* (Ril.)

M. femoratus is the species generally called *Cal. bivittatus*. The latter, however, is an interior species, while this, as will be seen in the succeeding paper, extends across the continent. It is common everywhere in New England, and the female lays from seventy to ninety eggs. From the abdomen of one I once extracted a species of *Mermis* (?) at least six decimetres long. These insects are very fond of a species of *Inula* (*I. Helenium*) growing by road-sides, and sun themselves on its broad leaves.

M. punctulatus is a rarity, and most of the specimens I have seen have been without definite locality. I have taken it in Andover, Mass., in November. Mr. Uhler gave me a specimen from near Boston, Mr. Henshaw has taken it in Massachusetts, Dr. Packard in (Brunswick?) Maine, Baron Osten Sacken sent me a specimen from the Middle States, and the late Mr. Walsh another from Illinois. I formerly noted that I had taken it in Vermont, but I think this must be an error. The species is allied to *M. Helluo* (*Cal. Helluo* Scudd.) from the South.

M. collinus is not a rare species. It is allied to *M. luridus* (*Cal. luridus* Dodge). It occurs in abundance at Sudbury, Vt., where eleven years ago I first recognized it as distinct from other species, and occurs in the vicinity of groves in dry hilly pastures; comparatively few *M. femur-rubrum* are found with it, the latter affecting open sunny spots in hollows and the lowlands. The young of the two species may readily be separated. I found this species devouring perfectly dead and dry hickory leaves. I have also taken it in Andover, about Boston and on the island of Nantucket in this State, and Mr. Henshaw has sent it to me from Jamaica Plain.

M. rectus is again a rarer species. I have seen few specimens. Mr. Henshaw captured it at Jamaica Plain, Prof. S. I. Smith formerly took it in Norway, Maine, and I have a single specimen taken in the White Mt. valleys of New Hampshire. The species is nearly allied to *Mel. devastator* Scudd. from the western part of the country.

M. femur-rubrum is the commonest species of all. On account of

its abundance and its extensive range (see the succeeding paper) I have long considered this form of *Melanoplus* as in all probability the true *A. femur-rubrum* of De Geer; but Dr. Stål has fortunately for us described the anal cerci of the male from De Geer's type, leaving us quite certain of his species. Abbé Provancher has recently redescribed it under the name of *Cal. sanguinolentus*. Collecting this species in large numbers, in different stations at Sudbury, Vt., I noticed that specimens found in moist low ground were darker and had more vividly contrasted colors than those found in the hollows of dry upland pastures. I also thought the former to be longer winged but took no measurements to verify this point.

M. atlantis is everywhere common, being apparently about half as numerous as *M. femur-rubrum* in every locality I have collected, excepting at the highest elevations, as among the White Mts., where it appears to be about equally abundant. Both occur on the alpine summits. Taking New England as a whole *M. atlantis* is more abundant than *M. femoratus*, and is particularly so in the South where the latter begins to decrease in numbers. In Nantucket the species takes on a peculiar coloring and nearly all the specimens have pale glaucous hind tibiæ. Fuller details of these differences will be published hereafter.

Mel. junius (Pez. *junius* Dodge) has been taken about Quebec by Abbé Provancher, but has not been detected in New England. Abbé Provancher described it (only a few months later than Mr. Dodge) under the name *Cal. minor*.

BRIEF NOTICE OF THE AMERICAN SPECIES OF MELANOPLUS FOUND WEST OF THE ONE HUNDRED AND SEVENTEENTH MERIDIAN.

The collections of Orthoptera made during the last summer by Dr. A. S. Packard, together with a series sent me by Mr. Henry Edwards of San Francisco, and others collected by the late Mr. Crotch, or previously in my collection, enable me to give some idea of the distribution of *Melanopli* on the Pacific coast. In this enumeration I do not count some species from the extreme southern portion of California, west of the 117th meridian, obtained by Dr. Edward Palmer, but leave them for another occasion. In the district as I have limited it in the title of this paper, nine species of *Melanoplus* are found, only one of which appears to be confined to it. This is the one I have called *M. collaris*; it comes from the

extreme south, on the borders of Lake Tulare at the upper waters of the San Joachin, and is remarkable for its resemblance to *Pezotettix enigma* Seudd., a peculiar species also found in southern California, but only known west of the Coast Range. We cannot yet speak definitely of *M. spretus* (Uhl.), for although it has certainly been taken in this region, it may not be native to it. Perhaps the researches of Dr. Packard will establish this point. Probably all the others are found upon both sides of the Sierras and their northern extension, although one, a very small species, *M. Kennicottii* (which I once¹ wrongly referred to *Cal. bilituratus* Walk., from specimens taken by Mr. Dawson on the Souris River, a tributary of the Assiniboine) is probably confined to the eastern side, as the only other specimens I have (males) were taken by Mr. Kennicott on the Yukon River, south of which the mountains trend westward. Still another, *M. Packardii*, may also belong only to the east, for it is an abundant species as far eastward as Great Salt Lake, the South Park and southern Colorado, Nebraska and Texas, and was taken by Dr. Packard at Wallula on the Columbia, and by Mr. Crotch in British Columbia—at what point is unknown. The other species certainly occur on both sides, and most of them have a wide range. *M. femur-rubrum* (DeGeer), for example, which is abundant over its whole area of distribution, has been taken at Sissons, Cal. (Packard), Ft. Redding (Pac. R. R. Surv.), the same and other points in California (Edwards), Portland, Or. (Packard, Edwards), Great Bear Lake (Kennicott), and also occurs at Great Salt Lake, Pueblo, Col., central Texas (Belfrage), and even central Mexico (Sumichrast); from these points it extends eastward to the Atlantic, where it ranges from Canada to central Florida;—having, probably, as wide a range as any Acridian on the continent. *M. atlantis* (Ril.) proves by its scarcely less extended distribution, the impropriety of its name; it is a more northern species, extending, on the Atlantic coast from Canada to North Carolina, and westward through the northern United States, and all parts of Colorado to Salt Lake, where it is extremely abundant, to California, Wallula, Portland, Or., British Columbia, Victoria, Vancouver's Island, and the Yukon River, Alaska. *M. devastator*, a species which, probably, rather than *M. atlantis*, is the source of most of the damage to crops in California, besides being especially abundant in the Shasta Valley, and found also at Sissons (Packard) and Sauzalito, Cal. (Behrens),

¹ G. M. Dawson, Rep. Geol. and Resources Forty-ninth Parallel, p. 343.

occurs about Lake Tahoe, Reno and Glen Brook, Nev. (Packard); and was taken by myself sparingly at Beaver Brook and Morrison, Col. Another species, which in allusion to its ashen tints is here called *M. cinereus*, has been sent me from California and Nevada by Mr. Edwards, and was taken by Dr. Packard at Wallula, W. T., and at Reno, Nev., and by myself in great numbers at Great Salt Lake and in the American Fork Cañon, Utah. Possibly it is this species (I have only poor specimens to judge from), which Capt. Pope took in Texas, on the upper Pecos River. Finally the common *M. femoratus* (Burm.) of the east, where it ranges from Maine to N. Carolina, has been found at Wallula (Packard), British Columbia (Crotch), and the Shasta Valley (Edwards).

The following table, based on the structure of the abdomen, may serve to separate the males of these species.

1. Penultimate segment of abdomen conspicuously inflated beneath 2.
 Penultimate segment of abdomen not conspicuously inflated beneath *M. collaris*.
2. Apex of last abdominal segment distinctly notched . . . 3.
 " " " " entire or most obscurely notched 5.
3. Anal cerci broad, rarely more than three times as long as broad, the apical half bent on the basal 4.
 Anal cerci slender, equal, straight, nearly four times as long as broad *M. devastator*.
4. Anal cerci more than twice as long as broad . . . *M. atlantis*.
 " " less " " " " . . . *M. spretus*.
5. Anal cerci enlarged at the apex, the last segment of abdomen produced 6.
 Anal cerci tapering, or equal at the apex 8.
6. Anal cerci strongly depressed, and a little twisted on apical half *M. cinereus*.
 Anal cerci with apical half slightly bent, or in the same plane with the base 7.
7. Lower edge of anal cerci toothed *M. femoratus*.
 " " " " not toothed *M. Packardi*.

♂♂ Species of medium size; last segment short; anal cerci much narrower in distal than in basal half, several times longer than the mean width *M. femur-rubrum*.

Species minute; last segment of abdomen produced at the tip; anal cerci subequal, rounded at the tip, scarcely twice as long as the mean width *M. Kennicottii*.

Concerning the synonymy of these species, it may be remarked that the name under which I described *Cal. fasciatus*¹ being preoccupied, I have thought it most appropriate to apply to the species the name of one of the members of the national Entomological Commission, who has done the most to extend our knowledge of the Melanopli of the extreme west. Walker's species are, in nearly every instance, described from females only, and characters used which apply equally well to nearly every species, so that it will be long before we know what they are; it would appear probable, however, that his *Cal. bilituratus* is Riley's *Cal. atlantis*, and his *Cal. scriptus* DeGeer's *Acrid. femur-rubrum*. As to the former, the discovery of the wide extent of its range, combined with its other features, satisfy me that it must be separated from *M. spretus* (Uhl.) as Riley claims, although there are few differences between the two besides length of wing and of anal cerci; while both differ to so much greater a degree from *M. femur-rubrum* that it is not a little strange that Mr. Riley should have so persistently endeavored to show how *M. atlantis* should be distinguished from *M. femur-rubrum*, rather than from *M. spretus*.

Of the species here named for the first time, and of which we shall give full descriptions in a future paper, *M. collaris* is a species which cannot possibly be confounded with any other. It is brightly colored, with blue hind tibiæ, a body much brighter yellow than usual, the antennæ very light yellow, and the front edge of the pronotum with a narrow yellow rim. The sternal spine is pointed, and the front division of the pronotum slightly swollen. *M. devastator*, but for its anal cerci, would appear to be more closely allied to *M. spretus* than *M. atlantis* is. The wings vary greatly in length, sometimes nearly equalling those of *M. spretus*, at other times but slightly surpassing the abdomen. The hind tibiæ are usually red, although of not so deep a color as in *M. atlantis*; but Dr. Packard brought specimens from Shasta Valley and Sissons, Cal., in which they are

¹ Proc. Bost. Soc. Nat. Hist., XVII, 477.

deep blue, and one from Lake Tahoe in which they are very pale green; the markings also vary greatly, but the pronotum seldom appears to possess a very distinct black band on the upper portion of the deflected lobes; the tegmina may be almost devoid of spots, but generally possess a distinct discal series of quadrate spots. This species has been distributed by Mr. Edwards with the number 94 attached. *M. cinereus* is a peculiar species, very distinct from any yet described. The female wholly resembles the male, and the hind tibiae are always blue; the black stripe of the deflected lobes of the pronotum is followed beneath by livid tints in broken patches. It is a slender species, with wings longer than the body, the tegmina with a discal series of slender, alternating pale and dark lines and dots; the posterior lobe of the pronotum, and that only, has rather a prominent median carina. *M. Kennicottii* is a minute species, only fifteen millimetres long, of a dark brown color, with hind tibiae apparently of a reddish yellow color, hind femora barred above with black, and a lateral black stripe on the front half of the deflected lobes of the pronotum. The prosternal spine is very blunt, the median carina of the pronotum is distinct, and nearly equally so throughout; the tegmina are blotched along the middle line; the anal cerci are thick, less than twice as long as broad, nearly equal and rounded, resembling most those of *M. spretus*.

An examination of the species previously known brings to light one or two points which may be added. Specimens of *M. atlantis* from the vicinity of Puget Sound are darker, and the tegmina more heavily marked than elsewhere, especially in the female. No blue tibiae have occurred among them. This species was numbered 90 and 157 by Mr. Edwards. *M. femur-rubrum*, on the other hand, does not appear to differ in the least from average specimens on the Atlantic coast; but Dr. Packard brought home a very curious male from Portland, Or., in which the terminal segment of the abdomen is deeply cleft in the middle by an incision which extends nearly across the entire segment. This seems to be due simply to some accident, perhaps in moulting, but it bears an entirely normal appearance, and, occurring just where the segment is notched in *C. spretus* and its nearest allies, led me at first to place it aside as a distinct species; in every other part of its structure, however, it agrees with ordinary specimens of *M. femur-rubrum*. Mr. Edwards has distributed the Californian *M. femur-rubrum* under the numbers 95 and 156.

M. femoratus (Burm.) has been distributed by Mr. Edwards under the number 161.

RHACHURA, A NEW GENUS OF FOSSIL CRUSTACEA.

Mr. William Gurley has recently sent me from the black limestone of Danville, Ill., a curious crustacean, allied to *Dithyrocaris*, contained in a large kidney-shaped concretion. There are two separate fragments, one partially overlapping the other; one is more conspicuous than the other, consisting of the last three segments of an abdomen with a pair of lateral posterior appendages, all of a dull clay-color; while the other scarcely differs in color from the matrix, being only the impression of a portion of a carapace, the edge of which partially overlies one of the caudal appendages of the first mentioned fragment. Were it not for its caudal appendages the latter would resemble in a remarkable manner the thorax and abdomen of an insect, completely covered by its wings; for so closely do the lines of ornamentation upon the penultimate and antepenultimate segments resemble the veins of an insect's wings, that for a long time I was inclined to consider them such, notwithstanding the anomaly of the large exarticulate abdominal appendages. That it should be found in the same nodule with the carapace of a fluviatile or marine crustacean, seemed no more remarkable than the assem-

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blage of animals associated in the nodule-bearing beds of Mazon Co. in the same State.

The penultimate and antepenultimate segments are of nearly equal breadth, the former nearly as long as broad, and quadrate; the latter is more than half as long again as broad, and also quadrate; the last segment is not preserved, but by the relation of the surrounding parts appears to have been triangular and nearly equiangular; attached to the outer sides of this segment are the caudal appendages, which diverge at a small angle; these appendages are slightly longer than the three terminal segments of the abdomen, straight, depressed, lamellate, tapering regularly beyond the middle and longitudinally sulcate throughout, as well as finely and obscurely striate near the tip; the extremities of both are broken, but were apparently produced to a fine point. There is no median spine, nor, to judge from the relation of the lateral spines at their base, and by comparison with the same parts in the trebly spined genera *Ceratiocaris* and *Dithyrocaris*, did one ever exist; if really bicaudate, this genus differs distinctly from any we know.

The most striking and interesting feature in this crustacean, however, lies in the nature and distribution of the lines of ornamentation upon the dorsal surface of the abdominal joints. So far as I am aware, the striation of the abdominal joints of these low and ancient Branchiopoda has always hitherto been found to take the form of imbricated lamellæ, and the lines thus formed run parallel, or nearly parallel, to one another. In *Rhachura*,¹ as the fossil from Illinois may be called, this is not the case, the markings being ordinary raised ridges, or, if in reverse, they appear as impressed lines or furrows, which branch more or less from one another. Their distribution on the antepenultimate segment is most remarkable; with the exception of one or two short and feeble lines next the outer edge, which run obliquely forward and parallel to each other, they either converge by running in a curving course toward the anterior outer embossed angles of the segment, or they join others which do so. At this angle, the principal lines, or those either made up of the union of several branches, or running independently to this point, do not quite meet, but lie side by side, just as do the principal veins of an insect's wing; so that these principal lines, with or without their branches, spreading in all directions over the half of the segment belonging to them, imitate, to an extraordinary degree, the branching or simple veins of an insect's wing. Moreover, just as in

¹ Derived from ῥαχος, οὐρά.

such low insects as have hitherto been found in carboniferous formations, the anal or posterior vein (which lies on the inner side when the wing is at rest) is always multivenose, and often occupies with its veinlets a large share of the wing, so here the innermost principal line is most numerously branched, and with its branches covers nearly a third of the segment. At first glance, however, these branches, which run transversely across the segment, appear to be continuous with those springing from the innermost line of the opposite side, which would be quite inconceivable in the wings of an insect; a close examination, however, shows that there is but a single one of these branches which actually traverses the segment; the others nearly meet, but interdigitate, and the break in the one might be judged to be invisible through the imperfection of preservation; so that the resemblance to an insect's wing is even more striking, and this circumstance long led me to maintain the possible insectean nature of the fossil. All the other lines, moreover, could be referred, without violence, to one or another of the principal veins of a wing, with the exception of those next the margin, whose origin could be supposed to be lost on the side of the fossil. Another feature rendered this theory more tenable; a microscopic comparison of the surfaces of the antepenultimate and penultimate segments of the abdomen showed a difference in texture, the former being marked by a very obscure and minute reticulation, which could not be seen on the latter; this difference was improbable, or at least unexpected, in two contiguous segments of a crustacean abdomen, but on the theory that the lines represented the veins of an insect's wing, seemed to indicate that the hind wing was membranous, and the fore wing more or less coriaceous in texture, as in Orthoptera. On the wing-hypothesis, however, the insect must have been extraordinary in character, even apart from the gigantic appendages of the abdomen. For, judging by the direction of the supposed veins, the front wings would then have covered only the segment which bore them, and would not have protected the hind wings; while the latter would have reached the tip of the abdomen with no plication of the anal area. The abdomen, also, notwithstanding it bore so enormous a pair of appendages, would have been shorter than the thorax, which in a comparatively slender insect would be altogether anomalous.

All doubts, however, concerning the real nature of the fossil were put to rest on the reception of some Devonian specimens of *Dithyrocaris* kindly lent me by Professor James Hall, and which he will

describe under the name of *D. Neptuni*. These specimens, though gigantic beside *Rhachura*, show the same general features; the proportion of the different segments of the abdomen are almost identical; the lateral caudal appendages are essentially alike, although a median spine is added; the lines of ornamentation are of the same nature and have an equal distribution; they are in many cases branched; on the antepenultimate segment the anterior lines are transverse and with those of the opposite sides form curves, convex in front, while the posterior lines are longitudinal, just as in *Rhachura*; the general trend of all the lines on the penultimate segment is also the same, this segment differing in this respect from the antepenultimate to just the degree we find in the Illinois fossil. The much more numerous lines, however, do not, as in *Rhachura*, originate from the anterior outer angle of each segment, but from its whole outer margin, the greater part of them parallel to one another; but a curious resemblance to *Rhachura* again appears in the slight interdigitation of the lines of the opposite sides, which, as in *Rhachura*, appear at first glance to be continuous across the segment. These intimate resemblances show that the two animals were closely allied, but leave it no less surprising that mere marks of ornamentation should in so close a manner happen to resemble the neururation of an insect's wing. Owing to this resemblance it may bear the name of *Rhachura venosa*.

Having thus settled the affinities of this fragment, it seems probable that the impression of a dorsal shield in the same nodule belongs to the same individual. This would show that it possessed a carapace resembling that of *Dithyrocaris* in general form. It was, however, very broadly rounded in front, and its periphery had a broad, flat margin, which was covered, at least laterally, with very frequent, delicate but distinct, slightly incurved, uniform ridges, nearly parallel to the longitudinal axis of the body, and to one another. The specimen is too broken to show anything of the eyes or of any other feature excepting two low longitudinal ridges marked by a slight sharp carina, slightly curved, opening inward, one in the middle of either lateral half of the body.

Breadth of the carapace 50 mm.; breadth of its margin 5.5 mm.; greatest distance of lateral ridge from inner edge of margin — on one side, 10 mm.; on the other 8.5 mm. Length of abdominal fragment and appendages 48 mm.; of antepenultimate segment 7 mm.; breadth of same 9.5 mm.; length of penultimate segment 13 mm.;

breadth of same, posteriorly, 8.75 mm.; probable length of last segment 5 mm.; length of caudal appendages 26 mm.; breadth of same, at base, 3 mm.; in middle 2.5 mm.; at broken tip 1.2 mm.

The specimen, as I am informed by Mr. Gurley, comes from the bed marked as No. 14 in the section of the coal-measures of Vermilion County, given by Mr. Bradley in the *Geology of Illinois*, Vol. 4, pp. 244-47.

Plate 9, fig. 3, represents the abdominal fragment of the natural size; fig. 3, a, the same enlarged.

A CARBONIFEROUS *TERMES* FROM ILLINOIS.

An ironstone nodule from the coal measures of Vermilion Co., Ill., sent to me by Mr. Wm. Gurley, contains the remains of an insect, consisting of a pair of wings, apparently front wings, of opposite sides. The body between is crushed past all recognition, and fragments of the legs lying beneath the wings only show that they were slender. The wings, also, are only partially preserved, their bases being destroyed with the crushing of the body and their tips by extending beyond the edge of the nodule; more than half of each wing remains, however, comprising some of the more important parts, and showing that the insect belonged to the white ants. It is interesting from the fact that it is not only the first white ant found fossil in America, but is also the oldest known representative of that group of white ants whose wings are not reticulated, all the carboniferous white ants of Europe having net-veined wings. It seems to be more nearly allied to some of the tertiary *Termitina* described by Heer from Radoboj, and indeed to many living forms, than to other carboniferous *Termitina*, but it is much larger than its nearest allies. It may be called *Termes contusus*.

All the veins from the marginal to the interno-median inclusive, as far as they are traceable on the stone, are nearly straight and parallel; the upper three are also simple, and the scapular area is considerably and uniformly depressed; the externo-median vein is forked near the base of the wing, and the space included between the forks, as well as the externo-median area, is traversed by feeble inequidistant, straight or oblique, cross-veins. The interno-median vein traverses the middle of the wing, or runs scarcely above it, and emits from its lower border a large number of oblique veins, which run,

often with a slightly irregular course, to the margin of the wing; in the fragment there are eight such veins on one wing and six on the other and more imperfect wing, in both cases about equidistant, but more regular and straighter on the left than on the right wing; in both, also, one of the secondary veins, and one only, arising shortly before the middle of the wing, is forked; on the left side close to its origin, on the right side near the middle of its course. Both borders are perfectly preserved on the right wing, showing it to be 10 mm. broad; the length of the longer fragment is 20 mm., and the probable length of the wing is about 35 mm.

ON DIMORPHISM IN WESTERN ACRIDIANS.

The different forms had in many instances been described as distinct species, and, indeed, been referred to distinct genera; the short winged forms having usually been placed in *Pezotettix*, while the long winged types had been described as *Callipteni*. This peculiarity is found in ten or twelve species, mostly occurring in the Mississippi valley; usually there is a very decided difference in the length of the wings, although in the long-winged forms the tegmina seldom surpass or even reach the tip of the hind femora; and no intermediate forms occur. In one instance three varieties occur, which are with little doubt to be referred to one species; and in this case the variety with the longest wings has tegmina which extend past the hind femora. The dimorphic forms of any one species are found at the same stations, and can not be considered racial. Similar dimorphism has long been known in Orthoptera, and this should doubtless serve as a sufficient reason to group together several of the forms of *Xiphidium* which had been described as distinct species, and the two northern forms of *Gryllotalpa*, as well as some so-called species of *Gryllus* and *Nemobius*.

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v. 1 Entomological Notes, I-VI.