BIOLOGIA
CENTRALI-AMERICANA.

INSECTA.

RHYNCHOTA.

HEMIPTERA-HOMOPTERA.

Vol. I.

BY

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AND

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1881–1905.
INTRODUCTION.

This Volume is devoted to the enumeration of eight families of Homoptera—the Cicadidae, Fulgoridae, Flatidae, Derbidae, Cixiidae, Achilidae, Issidae, and Delphacidae; the first two have been dealt with by Mr. W. L. Distant and the remainder by Canon Fowler. Altogether 323 species are enumerated, of which 208 are treated as new, with twenty-five new genera. The other families of Homoptera are reserved for Vol. II. of this series, and considerable progress has already been made with them. The Index to the two volumes will be given at the end of Vol. II. Of the thirteen coloured Plates accompanying Vol. I., six have been drawn by Mr. Purkiss and the remainder by Mr. Wilson. In the Appendix, four species are illustrated in the text.

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BIOLOGIA CENTRALI-AMERICANA.

ZOLOGIA.

Class INSECTA.

Order RHYNCHOTA.

Suborder HEMIPTERA-HOMOPTERA.

Fam. CICADIDÆ.

Cicadidae, Westwood, Intr. Mod. Class. Iss. ii. p. 420 (1840); Arean. Entomol. i. p. 91 (1843).
Cicadariae, Packard (nec Latreille), Guide Stud. Ins. 5th edit. p. 533 (1876).

Of this large but at present imperfectly known family, twelve genera and forty-seven species are here enumerated as belonging to this fauna, being a considerable addition to our knowledge of these insects since Prof. Westwood, writing in 1840, alluded to the then best collection, contained in the Berlin Museum, which numbered 150 species only, seventy of which were from America; and Stål, in his ‘Hemiptera Mexicana’ (1864), referred to not more than thirteen species.

In the descriptive nomenclature here adopted for the venation of the tegmina I have followed Stål, but differ from that author in his use of the term “scutellum,” which, in my opinion, is the “mesonotum”—in which I am supported by Burmeister and Westwood. The "scutellum," as used by Germar, apparently equals the "metathoracic cross" of Prof. Uhler; it is considered here (in agreement with Burmeister, and as may be proved by easy dissection) as part of the mesonotum, and is alluded to by me as the basal cruciform elevation of the same. I have also followed Prof. Westwood in the numeration of the abdominal segments, of which six are plainly visible—the basal one being described as the first, and the apical one as the sixth.

The "song" of the male insect is clearly of a sexual and of a non-protective character. The enemies of these insects are numerous. As regards birds, Belt has described how in Nicaragua during "April, when the Cicadæ are piping their shrill cry from morning until

night, individuals are often seen whose bulky bodies have been bitten off from the thorax by some bird; and the large and graceful Swallow-tailed Kite at that time feeds on nothing else. I have seen these Kites sweeping round in circles over the tree-tops, and every now and then catching insects off the leaves, so that on shooting them I have found their crops filled with Cicadæ." They also suffer much from other insects. Réaumur (as quoted by Westwood) states that the eggs of one of the European species are attacked by the larvæ of an ichneumon. Büchner relates that a friend (Herr Schlüter) saw a hornet catch a Cicada, sting it, and try to fly off with the bulky prey. Swinton refers to a writer in the 'Journal of the Asiatic Society of Bengal,' who, describing large numbers of Cicadidae seen between Kandahar and Kabul, remarks that "the only enemies they appeared to have were some large dragon-flies, which pounced upon them and carried off what appeared to be double their own weight." They are also affected by fungoid growths.

Mr. Peck, in his Annual Report on the New-York Museum of Natural History for 1878, refers to a fungus developed on the abdomen of Tibicen septemdecim, Linn., which, though not immediately fatal to the insect, manifestly incapacitates it for propagation.

In the Proceedings of the Entomological Society of London for 1866 is a record of Mr. Wilson Saunders having exhibited two larvæ of a Cicada from Mexico, each of which had a large Clavaria growing from between its eyes. Some species, however, appear to have defence; for Bates when describing the habits of an Amazonian species* which was very common, "sometimes three or four tenating a single tree, clinging, as usual, to the branches," says:—"On approaching a tree thus peopled, a number of little jets of a clear liquid would be seen squirted from aloft. I have often received the well-directed discharge full on my face; but the liquid is harmless, having a sweetish taste, and is ejected by the insect from the anus, probably in self-defence or from fear." I have also elsewhere stated my opinion that this originally sexual peculiarity may tend to have a secondary protective character, as on capturing the large Malayan Pomponia imperatoria, Westw., I found the vibration caused by stridulation sent a thrill through the nerves of my arm, and so considered that birds or other enemies of this insect would probably reject so startling a capture, and in time might recognize it by its appearance, which would thus ensure it some amount of immunity.

ZAMMARA.


Zammara and the two following genera here enumerated, i.e. Odopea and Tettigades, have a common and distinctive character in the produced and ampliated lateral margins of the pronotum. In Zammara the ulnar veins are contiguous at and for some little distance from their bases; and, as described by Stål, it is "area ulnari interiore retrorsum angustata."

* This species is evidently Fidicina maculipennis, Lap.
This truly Neotropical genus has not been recorded north of Mexico; nor does it probably extend in the opposite direction beyond the South-Brazilian subregion; it appears to be also absent from the Antillean fauna. About seven species of this genus are known, two of which are found in Central America. Some of the species are subject to great variation in the size and number of fuscosc spots to the tegmina.

1. *Zammara smaragdina.* (Tab. I. figg. 1, 1 a, 1 b.)


*Hab. Mexico* ²; *Nicaragua*, Chontales (*coll. Dist.*); *Panama*, Volcan de Chiriquí (*Champion*).

A Nicaraguan specimen is figured. Walker¹ gave the origin of his type (*Z. smaragdina*) as “West coast of America,” which habitat appears, from what I have observed with others of Walker’s species thus localized, to be clearly referable to the Central-American region. Walker’s figure is without structural detail; and no reference is made to it either in the description in part I, or in the index appended to part 4 of his list. The specimens he has described as *Z. angulosa* are clearly faded female forms of *Z. smaragdina*. As in the following species, the macular markings of the tegmina are most inconstant, being either in agreement with typical forms, as the one here figured, or becoming confluent and forming an irregular transverse fascia. The three apical marginal spots are sometimes followed by two or three others. In one specimen examined these macular markings are asymmetrical on the right and left tegmina.

2. *Zammara calochroma.* (Tab. I. figg. 5, 5 a, 5 b.)


*Zammara calichroma*, Stål, Stett. ent. Zeit. xxv. p. 57 ².


The specimen figured is a typical *Z. calochroma*, Walk., from Mexico, in which the tegmina are ornamented with confluent fuscosc macular markings, and agrees generally with the form described by Stål, of which, by the courtesy of Dr. Anrivilius, I have been enabled to examine a specimen. These fuscosc markings become frequently less confluent and more diminished in area till the form *Z. smaragdula*, Walk., is reached, and again decrease in number and size, so that in a female specimen from Panama which is now before me they are only faintly indicated. The structural characters of the underside, however, are very distinct; and the pattern and markings of the pro- and mesonotum are always constant.

*1 2*
HEMIPTERA-HOMOPTERA.

ODOPEA.


This genus differs from the preceding in having the ulnar veins clearly separated at the base. Stål also adds, “marginibus lateralis areae ulnaris interioris parallellis.” Odopea, though confined to the Neotropical Region, has a wider area of dispersal than that of Zammarana. Though not recorded north of Mexico, it extends as far south as the Argentine Republic, and is well represented in the Antilles. About thirteen species are known, six of which have been found in Central America.

1. Odopea montezuma. (Tab. III. figg. 5, 5a, 5b.)

Zammarana montezuma, Walk. List Hom. i. p. 36. 6 1.


Hab. Mexico 1 2.

The figure is taken from a typical specimen in the collection of the British Museum. We have not yet received it in any of the collections sent to us from Central America.

2. Odopea imbells. (Tab. I. figg. 3, 3a, 3b.)


A Guatemalan specimen is figured.

3. Odopea azteca, n. sp. (Tab. I. figg. 4, 4a, 4b.)

Body pale green. Head with the anterior margin, outer margins of ocelli, and an oblique narrow fascia from outer margins of ocelli to frontal margin of eyes black; ocelli red, eyes ochraceous. Pronotum with a central transverse fascia near anterior margin, two central longitudinal narrow fasciae on disk, two oblique narrow fasciae on each side, commencing from behind eyes, and outer and inner borders of dilated lateral margins black. Mesonotum with two large central obconical and curved spots on anterior margin, followed by a central longitudinal fascia on disk, on each side of which is a rounded spot, and on outer side of these central markings four elongate spots, placed in pairs obliquely, black. Abdomen above with a small black central transverse spot on anterior margin of first segment, and four small rounded fuscous spots near lateral margins of third, fourth, fifth, and sixth segments. Lateral margins of apical half of face, apex of rostrum, bases and apices of tibiae (narrowly), anterior tarsi, excepting base of apical joint, and apices of posterior tarsi black. Tegmina pale hyaline, with the costa and radial veins greenish; basal half of tegmina with the veins greenish, outer half with the veins fuscous; claval margins testaceous, posterior edged with black near base. Wings pale hyaline, veins coloured as in tegmina, but claval margin darker.

Face somewhat depressed, lateral margins transversely striated and centrally and longitudinally sulcated. Lateral margins of pronotum much amplified and obtusely angulated, posterior margins transversely striated. Tympana prominent, subconical, and subacutely angulated anteriorly. Opercula truncate
exteriorly, rounded posteriorly, obtusely pointed and rounded, but not meeting interiorly. Rostrum not passing posterior coxae.

Long. 25 millim., exp. tegm. 83 millim.

_Hab._ MEXICO (Mus. Berol.).

Allied to _O. montezuma_, Walk., but differs by the much smaller size, different structure of the face and opercula, colour, markings, &c.

4. **Odotopa signoretii.** (Tab. I. figg. 10, 10 a, 10 b.)


_Hab._ MEXICO (coll. Dist.).

5. **Odotopa diriangani**, n. sp. (Tab. III. figg. 10, 10 a, 10 b.)

♀. Ochraceous and unicolorous, obscurely pilose. Tegmina and wings hyaline, veins ochraceous. Face strongly carinate, its width and distance to outer margin of eyes being subequal. Eyes black, ocelli red. Pronotum with the lateral margins considerably amplified and rounded, obtusely and obscurely angulated about middle. Mesonotum with two large but obscure oblongal spots commencing on apical margin. Anterior femora with a strong spine about one third from apex, between which and apex are two smaller and much more obscure spines.

Long. 22 millim., exp. tegm. 69 millim.

_Hab._ NICARAGUA, Chontales (Janson).

This species is allied to _O. signoretii_, Stål, and _O. azteca_, Dist., from both of which it differs by the neuration of the tegmina being unicolorous, by the basal margin of the eighth apical area being almost straight and oblique, the ulnar veins abruptly divergent at base, and also by the strongly carinate face.

It is more than probable that some specimens of this species are green, and not ochraceous like the form here described.

6. **Odotopa medea.** (Tab. I. figg. 2, 2 a, 2 b.)

『Odotopa medea』, Stål, Stett. ent. Zeit. xxv. p. 60. 386.

_Hab._ MEXICO, Oaxaca.

A typical female specimen in the Stockholm Museum is here figured; and Dr. Aurivillius informs me that in that collection this species has been placed under the genus Zanmara. The ulnar veins, however, are distinctly separate at their origin; and I see no reason to doubt Stål's correctness in originally placing it in the genus _Odotopa._

**TETTIGADES.**


_Tettigades_ differs from the two preceding genera by not having the basal area of the tegmina distinctly quadrangular; the lateral margins of the pronotum are also more obtusely rounded; and the venation, especially as regards the relative lengths of the ulnar and apical areas, is also very different.
HEMIPTERA-IOMOPTERA.

Confined to the Neotropical Region, *Tettigades* possesses an extended area, from Chili to Mexico. This area is not known, however, to be continuous, but seems more than probably to be restricted altogether to the western portion of the southern continent. Five species are at present recorded, one of which, here described, has been received from Mexico.

1. *Tettigades mexicana*, n. sp. (Tab. II. figg. 9, 9 a, 9 b.)

♀. Head above black, front with an arcuated fascia at each side of base of face on anterior margin, an indistinct, narrow, broken, central longitudinal fascia on vertex, and a broad streak behind inner margin of eyes, luteous. Pronotum with the disk ochraceous, having a large reversed triangular spot on anterior margin, a large oblique patch on each side behind eyes, and a small central transverse line near posterior margin fuscous; anterior border narrowly, lateral and posterior borders broadly luteous. Mesonotum black, with two central pale lines commencing on anterior margin and terminating about one third the length of mesonotum; basal elevation with large horn-like and branching angles extending therefrom to about centre of disk, and frenum, luteous. Abdomen black, strongly pilose, with the posterior segmental borders narrowly ochraceous. Underside of body and legs luteous; base and central fascia to face, inner margin of eyes, some irregular marks on sternum and near coxae, a linear streak on each side of femora, a spot on trochanters, a marginal segmental row of spots to abdomen, and a large quadrate spot on apical segment fuscous. Tegmina pale hyaline; radial and postcostal veins, and venation of apical third of tegmina fuscous; postcostal ulnar ramus and remaining venation luteous. Wings pale hyaline; basal half of venation luteous, apical half fuscous.

The face is moderately convex and gibbous, distinctly transversely striated, with a broad central longitudinal suture, the edges of which are slightly raised. The rostrum in the typical specimen has the apical joint mutilated, but apparently about reaches the posterior coxa. The anterior femora are armed with two strong spines. Body very strongly pilose.

Long. 22 millim., exp. tegm. 68 millim.

_Hab._ Mexico (*Mus. Berol._).

This species is allied to *T. compacta*, Walk., a species erroneously placed as a synonym of *T. chilensis*, A. & S., by Berg (Hem. Argent. p. 204). The habitat given by Walker is “West coast of America,” which, as before observed, is likely to have referred to Central America. There is, however, no other or more detailed habitat to be found in the records of the British Museum; and it is therefore unadvisable to insert Walker’s species in this fauna on such uncertain information.

CICADA.


This genus is at once separated from the three preceding by the non-produced and non-ampliated lateral margins of the pronotum. The basal area of the tegmina is not twice longer than broad; the transverse vein at the base of the second apical area is oblique; and the space between the postcostal vein and ulnar ramus is linear, and not distinctly broader at the apex.

The genus *Cicada* is a very comprehensive one, and includes a large number of species, some of which superficially surveyed scarcely appear to be congeneric. Stål
has founded several subgenera, two of which, *Cicada* and *Diceroprocta*, are found in this fauna, the last appearing to apply to all the species with the exception of the first, which is stated by Stål to belong to his subgenus *Cicada*. In our present imperfect knowledge of the family it is impossible to give a correct or even fairly approximate estimate of the total number of species even described (for these are frequently wrongly ascribed to the genus) or existing unnamed in collections. It is well represented in Central America, fourteen species being here included.

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*Opercula long, broad and rounded, covering two thirds of the abdomen.*

1. **Cicada opercularis.**

*Cicada tibicen*, Linn. Syst. Nat. i. p. 707, var.?  
45; Stål, Stett. ent. Zeit. xxv. p. 62. 390\(^1\).  
Stoll. Cig. fig. 13.  
*Hab.* Mexico\(^1\).

This species is here included on the authority of Stål, who considered it a variety only of *C. tibicen*, Linn.; and if this view is correct, the species has a wide Nearctic range. Its habits have been studied in Bermuda by Mr. J. H. Jones; and some interesting details are given in that author's 'The Naturalist in Bermuda,' p. 122.

\[ \sigma \]

*Opercula long, triangular, reaching the base of the fourth abdominal segment.*  
*Apices of the opercula obtuse; tegmina spotted with fuscous near the apex.*

2. **Cicada transversa.** (Tab. II. figg. 1, 1a, 1b.)  
*Cicada transversa*, Walk. Ins. Saund. Hom. p. 15\(^1\).  
*Cicada alacris*, Stål, Stett. ent. Zeit. xxv. p. 62. 391\(^2\).  
*Hab.* Mexico\(^2\), Vera Cruz\(^1\).

I am indebted to Dr. Signoret for the opportunity of comparing types of this species with those of Walker in the British Museum.

*Apices of opercula acute; tegmina unspotted.*

3. **Cicada ornea.** (Tab. III. figg. 3, 3a, 3b.)  
*Cicada ornea*, Walk. List Hom. i. p. 137. 75\(^1\).  
*Hab.* Mexico\(^1\).

The type in the collection of the British Museum is here figured.

\[ \sigma \] unknown.

4. **Cicada bicosta.** (Tab. III. figg. 1, 1a, 1b.)  
A female Mexican specimen, belonging to the collection of the Vienna Museum, is here figured. The localities of Walker's types are unrecorded.

I have not seen a male specimen of this species, so cannot describe the opercula. Judging from the female, *C. bicosta* is allied to *C. rudis*, but differs by the more timid face and the much less interspace between that and the eyes.

5. **Cicada rudis.** (Tab. II. figg. 20, 20 a, 20 b.)


The specimen figured is in the Vienna Museum. Walker described this species as nearly allied to *C. tibicen*; on the contrary, however, it much resembles the well-known European species *C. fraxini*.

6. **Cicada montezuma.** (C. rudis, var., Tab. II. figg. 2, 2 a, 2 b.)

Allied to *C. rudis*, but smaller, the transverse veins at base of second and third apical areas insaeated; opercula only reaching to base of first abdominal segment, with the interior margins parallel and contiguous, but not overlapping. Face much narrower.

Long. 26 millim., exp. tegm. 75 millim.

*Hab. Mexico (Mus. Berol.)*.

7. **Cicada pallida**, n. sp. (Tab. II. figg. 7, 7 a, 7 b.)

Head pale greenish, with two small transverse spots on centre of front, two larger ones near inner margins of eyes, and two large lunate spots, partly surrounding the two posterior ocelli, black. Pronotum pale greenish and unicolorous. Mesonotum ochraceous, with two large obconical spots commencing on anterior margin, on each side of these a smaller and more oblique spot of the same description, a broken submarginal longitudinal fascia, and two small rounded spots on posterior portion of disk fuscous. Abdomen above ochraceous. Head beneath pale greenish. Sternum, legs, opercula, and underside of abdomen ochraceous. Tegmina pale hyaline; venation of about basal two thirds ochraceous, that of apical third fuscous. Wings pale hyaline; basal half of venation ochraceous, apical half fuscous.

The face is large, robust, and convex, faintly transversely striate, and with a faint central raised longitudinal line. Opercula rounded, divergent, meeting only at anterior angles, posteriorly reaching apex of first abdominal segment. Tympana somewhat large and prominent. The body alone is sparingly pileose, the frenum most densely so.

Long. 21 millim., exp. tegm. 61 millim.

*Hab. Mexico (Mus. Berol.)*.
CICADA.

3. Opercula small, transverse, reaching base of first abdominal segment.
   Face broad, transverse, depressed.

8. **Cicada nigriventris.** (Tab. II. figg. 6, 6 a, 6 b.)
   **Hab.** MEXICO¹ (*Bilimeck, Mus. Vind. Cas.*); COSTA RICA (*coll. Dist.*).
   The specimen figured is in the Vienna Museum.

   *Face compressed and gibbous.*

9. **Cicada crucifera.** (Tab. III. figg. 6, 6 a, 6 b.)
   *Cicada crucifera*, Walk. List Hom. i. p. 196. 147¹.
   **Hab.** MEXICO¹ (*Mus. Berol.*).
   A Mexican specimen in the collection of the Berlin Museum is here figured.

   *Body small, tympana large, opercula small and transverse.*

10. **Cicada psophis.** (Tab. II. figg. 11, 11 a, 11 b.)
    **Hab.** MEXICO¹ (*Mus. Berol.*).
    A specimen in the Berlin Museum is here figured.

   *Head, including eyes, narrower than base of pronotum.*

11. **Cicada hilaris**, n. sp. (*Cicada alacris*, Tab. II. figg. 10, 10 a, 10 b.)
    3. Body above black; head with a yellow spot at base and apex of front, one on each lateral and two on posterior margin; eyes dull ochraceous. Pronotum with the disk almost covered with large subconfluent dull testaceous spots; lateral and posterior margins black, with the outer edge yellow. Mesonotum with two faintly indicated large basal obconical spots, base of lateral margins, and cruciform elevation at base yellow. Anterior margins of tympana, lateral margins of first, second, and fifth, and basal margin of sixth abdominal segment creamy white. Underside of body much paler, and covered with whitish pubescence. Legs ochraceous and thickly pilose. Tegmina and wings pale hyaline. Tegmina with the basal half of the venation ochraceous, apical half fuscous, transverse veins at base of second and third apical arcs broadly fuscous; costa pitchy, basal area dull ochraceous and opaque, inner claval margin pitchy.
    The opercula are pale, not passing the base of the first abdominal segment; their apices are broad and rounded; and their inner margins considerably overlap. The face is moderately convex, thickly pilose, and with the sides strongly and transversely striated. The anterior femora are armed with two long acute spines.

    **Long.** 20 millim., **exp. tegm.** 62 millim.
    **Hab.** MEXICO (*Mus. Berol.*).

    I originally considered this species the *C. alacris*, Stål; but since then, from an examination of Stål's type, I have found his species to be a synonym of *C. transversa*, Walk.; and I have therefore been compelled to provide this insect with a fresh name.

    **Biol. Centr.-Amer., Rhynch. Homop., December 1881.**

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12. Cicada intermedia, n. sp.
Allied to the preceding species, but abdomen much wider, the anterior margins of tympana and sides of base of first abdominal segment creamy white only. Underside of body pale, but less covered with whitish pubescence than in C. alacris, and transverse vein at base of second apical area placed much nearer the base of the first, the second apical area being thus longer, and the first apical area shorter than in the corresponding tegmental areas of the other species.
Long. 22 millim., exp. tegm. 57 millim.

_Hab._ Mexico (coll. Dist.).

13. Cicada robusta, n. sp. (C. alacris, var., Tab. II., figg. 3, 3 a, 3 b.)
Body above black; head, pronotum, and mesonotum marked as in two preceding species; abdomen with a large pale yellowish spot on lateral margins of first abdominal segment. Underside of body and legs pale castaneous. Tegmina and wings pale hyaline; tegmina with the costa, costal membrane, and basal half of venation ochraceous, radial vein and apical venation fuscous, basal area and base of clavus pitchy, transverse veins at base of second and third apical areas broadly fuscous. Wings pitchy at base.
The body is very broad and robust, as in _C. intermedia_; but the position and relative lengths of the first and second tegmental apical areas are as in _C. alacris_. The face, however, is broader and much more tumid than in that species; and the opercula are a little longer, reaching the apex of the first abdominal segment. This species is also much larger than the two others with which it is here compared, and the pale abdominal markings are different.
Long. 3 27 to 32 millim., exp. tegm. 74 to 80 millim.; 2 24 to 27 millim., exp. tegm. 70 to 76 millim.

_Hab._ Mexico (Mus. Holm.), Cuernavaca (Bilimek, Mus. Vind. Cac.).
The specimen figured is in the Vienna Museum. I had concluded that this species was but an extreme variety of _C. alacris_; but a long series which has passed through my hands since lettering the Plate has compelled me to believe in its distinct character.

14. Cicada dissimilis, n. sp.
Allied to the preceding species; but the opercula are longer, reaching the second abdominal segment; the head is much narrower and considerably less in width than the pronotum at base, the first apical area of tegmina very little longer than second, the upper transverse veins scarcely infuscated, the "limbus emervis" very broad, and basal area only slightly ochraceous and opaque.
Long. 24 to 26 millim., exp. tegm. 72 to 82 millim.

_Hab._ Mexico (coll. Dist. Mus. Berol.).
The last four species here described may also be thus separated:—
Abdomen elongate, not wider than the base of pronotum . . . . . . . . _C. hiliaris._
Abdomen broad, wider than base of pronotum.
Tegmina with first apical area not much longer than second.
Opercula reaching first abdominal segment . . . . . . . . _C. intermedia._
Opercula reaching second abdominal segment . . . . . . . . _C. dissimilis._
Tegmina with first apical area considerably longer than second . . . . _C. robusta._

_TETTIGIA._
_Tettigia_ differs at once from _Cicada_ in having the basal area of the tegmina twice