

A Revision of the Genera and Species of the
Group Mogoplistii (Orthoptera: Gryllidæ)
found in North America north of
the Isthmus of Panama.

BY

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A REVISION OF THE GENERA AND SPECIES OF THE GROUP *MOGOPLISTII*
(ORTHOPTERA; GRYLLIDÆ) FOUND IN NORTH AMERICA
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The group *Mogoplistii* forms a division of the subfamily *Myrmecophilinæ* and comprises eleven genera and over fifty species described from localities well distributed over the warmer regions of the earth. All of the species are of small size, very delicate and covered with minute, easily abraded scales, for which reasons they appear to have been but little collected, and in consequence most of the species were described from but little and often badly damaged material.

In studying an extensive series of North American specimens of this group, we found it necessary to go so deeply into the relationship of the various genera and species that it became incumbent on us to analyze all of the genera described to this date, to construct a new key for all of the genera, and also erect four new genera. In addition to this we were confronted with a great amount of confusion in regard to the characters and extent of certain genera and also some complicated specific synonymy. As these facts are best discussed in a chronological sequence, we have summarized the history of the names here treated.

HISTORY.

In 1839, Serville erected the genus *Mogoplistes*¹ on the species *M. brunneus* from southern Europe [Sardinia]. Guérin, in 1844, described the genus *Ornebius*,² basing it on two new species, *O. xanthopterus*, from Mauritius, and *O. nigripalpis*, from Pondicherry, the former of which has been selected as the genotype by Kirby. The same author, in 1849, erected the genus *Ectatoderus*,³ on a new species *E. nigriventris*, from Abyssinia. In 1855, Costa based a new genus *Arachnocephalus*⁴ on a species from Naples, this author being

¹ *Hist. Nat. Ins. Orth.*, p. 357.

² *Iconogr. Regne Anim.*, III, p. 331.

³ In Lefebvre, *Voy. en Abyss.*, VI, p. 336, Ins. pl. VI, fig. 3.

⁴ *Fauna Nap.*, Grill., p. 41, pl. IX, fig. 5. We are unable to quote this reference from the original work as, unfortunately, our copy is incomplete, lacking among others the requisite page.

fully acquainted with *Mogoplistes*, with which he compared his new genus. Philippi, in 1863, described the genus *Microgryllus*⁵ as a subgenus of *Gryllus*, placing in it the two new species *Gryllus pallipes* and *griseus* from Chili, to the former of which the name has since been limited. Scudder, in the year 1869, based a new genus *Cycloptilum*,⁶ on a single new species, *C. squamosum*, from Texas, while at the same time he described another new species from Lower California as *Mogoplistes occidentalis*. Brunner, in 1873, proposed the name *Physoblemma*⁷ for several unnamed species, which name is clearly shown by the text to be an exact equivalent of the older *Arachnocephalus* Costa, a genus apparently unknown to him at that time. Saussure, in 1874, described a new species from Cuba⁸ which he referred to Scudder's genus *Cycloptilum* as *C. americanum*, later emending the spelling to *Cycloptilus*.⁹ The same author, in 1877, erected the genus *Liphoplus*¹⁰ for two new species, *L. novarae* from Tahiti and *L. guerinianus* from an unknown locality, the former of which has been selected as type of the genus by Kirby. Bruner, in 1891, described a species as *Cycloptilum* (using Saussure's emended spelling, *Cycloptilus*) *borealis*, from Nebraska,¹¹ while the next year Redtenbacher described a species from St. Vincent, West Indies, which he called *Ectatoderus antillarum*.¹² Saussure, in 1897, in the *Biologia*¹³ described two new species from Mexico as *Ectatoderus aztecus* and *Liphoplus mexicanus*, while in the same year Scudder described a species from southern Florida, based on a single female, as *Mogosiplotus* [emended *Mogoplistes*] *slossoni*.¹⁴ In 1905, the present authors described a new species from a single male from southern Florida as *Liphoplus zebra*,¹⁵ while Morse, in the same year, based a new species, *Mogisoplistus*¹⁶ [emended *Mogoplistes*] *barbouri* on a single female from the Bahamas.

CLASSIFICATION.

The three facts which strike one most forcibly after a careful study of all the generic descriptions and the type species of the same are

⁵ *Zeitschr. für Geo. Natur.*, XXI, p. 231.

⁶ *Proc. Bost. Soc. Nat. Hist.*, XII, p. 142.

⁷ *Schw. Entom. Gesell.*, IV, pp. 167, 169.

⁸ *Miss. Sci. Mex., Rech. Zool.*, VI, p. 426, pl. 8, figs. 41, 42.

⁹ *Mélang. Orth.*, II, p. 476, 1877.

¹⁰ *Ibid.*, pp. 456, 483.

¹¹ *Canad. Ent.*, XXIII, p. 37.

¹² *Proc. Zool. Soc. London*, 1892, p. 218, pl. XVII, figs. 16a, 16b.

¹³ *Biol. Centr. Amer., Orth.*, I, pp. 230-231.

¹⁴ *Psyche*, VIII, p. 55.

¹⁵ These PROCEEDINGS, 1905, p. 49, pl. I, fig. 12.

¹⁶ *Psyche*, XII, p. 21.

first, that *Ectatoderus* is quite distinct from any North American form which has been referred to it. The greatly elongate pronotum of the male, covering by far the greater portion of the abdomen, is a character found in none of our species, while the form of the caudal metatarsus is quite distinctive. The second fact is that *Mogoplistes* is equally unrepresented in our fauna, the reference of forms from North America to this genus being due to the fact that no males were examined by the authors of those species. In all such cases we have examined the types and unquestionably identical males, these examinations proving that the species are not at all related to *Mogoplistes brunneus*, the type of that genus. The third fact is that "*Cycloptilus*" as understood by Saussure is not *Cycloptilum* Scudder, the characters of the pronotum, palpi and limbs being very different. This misinterpretation was doubtless due to a certain amount of vagueness in Scudder's original description, but much uncertainty as to what characters were really diagnostic of *Cycloptilum* resulted from Saussure's error. The latter's key to the genera of the group¹⁷ contained two groups of very misleading characters; first, the division or non-division of the interantennal protuberance, and second, the elongate caudal metatarsus with its non-sulcate and non-serrate dorsum in "*Cycloptilus*." The former feature is of considerable value as a major section in a generic key, but as that vertical division is represented more or less clearly in a few genera by a sulcus, or in several by a decided deep incision, it is necessary to qualify the word "division." Saussure is completely in error in the characters which he gives for *Cycloptilum*, the typical material of the type of the genus being very different in these features.¹⁸ The emphasis placed on these two sets of characters was responsible for the present authors describing *Liphoplus zebra* as a member of that genus, when it is really a *Cycloptilum*. The presence of a weak but apparent sulcus on the face, and the sulcate and serrate metatarsus easily ran the species into the genus *Liphoplus* as placed in Saussure's key.

Material Examined.—In the preparation of the present work the types of the following species have been before us:

Cryptoptilum hesperum n. sp.

(*Mogosiplistus slossoni* Scudder, synonym of *Cryptoptilum antillarum* Redtenbacher.)

¹⁷ *Mélang. Orth.*, II, p. 456.

¹⁸ Davis (*Jour. N. Y. Ent. Soc.*, XVII, p. 187, 1909) correctly analyzed the mistakes of previous authors and properly presented the evidence of the type of *Cycloptilum squamosum*.

(*Mogisoplistus barboursi* Morse, synonym of *Cryptoptilum antillarum* Redtenbacher.)

Cryptoptilum conctectum n. sp.

Cryptoptilum tubulatum n. sp.

Cryptoptilum trigonipalpum n. sp.

Cycloptilum squamosum Scudder.

Cycloptilum zebra (Rehn and Hebard).

Oligacanthopus prograptus n. sp.

Hoplosphyrum occidentale (Scudder).

Hoplosphyrum boreale (Scudder).

The series examined numbers 763 specimens, generically distributed as follows: *Glaphyropus* 2, *Cryptoptilum* 475, *Cycloptilum* 236, *Oligacanthopus* 1, *Hoplosphyrum* 49. The great majority of these specimens were taken by the authors on recent trips and are located in the Hebard Collection and that of The Academy of Natural Sciences of Philadelphia, a considerable series, moreover, is in the Hebard Collection ex Bruner, while important specimens were kindly loaned to us by Dr. Samuel Henshaw, of the Museum of Comparative Zoology at Cambridge, and through Mr. A. N. Caudell we have been able to have before us the entire series of specimens belonging to the United States National Museum. To these gentlemen, for their many kindnesses, we wish to extend our hearty thanks. We would also express our gratitude to Professor Albert P. Morse, Mr. William T. Davis and Messrs. Sherman and Brimley for specimens of this group which they have sent us for examination.

Group MOGOPLISTII.

Group Characters.—Size of all forms small; body covered with translucent scales; apterous or having in the male sex abbreviate membranous tegmina. Head discoidal, depressed, having an interantennal protuberance which is separated from the vertex by a transverse sulcus; ocelli very small or absent; palpi variable in length. Pronotum in males often produced, vaulted or depressed; lateral lobes of pronotum very narrow. Tegmina when present containing all essential parts of tambourine. Caudal femora moderately or considerably inflated; caudal tibiæ serrulate on dorsal margins, without true spines, armed distad with six spurs; caudal metatarsi armed distad with two arcuate spurs; all of the internal spurs being longer than their external equivalents.

Key to the Genera of the Group.

- A. Dorsum of metatarsus almost unarmed,¹⁹..... *GLAPHYROPUS* n. gen.
(Genotype *G. americanus*.)

¹⁹ In this division chætiform spines are apparent on the margins of the metatarsus when the latter is examined under a Zeiss binocular.

- AA. Dorsum of metatarsus serrate or serrulate on margins.
 B. Facial protuberance not markedly divided.
 (OLIGACANTHOPUS²⁰ n. gen.)
 (Genotype *O. prograptus*.)
- C. Tegmina of male absent or only represented by rudiments.
 D. Internal tibial spurs elongate, slenderer,
 MICROGRYLLUS Philippi.
 (Genotype *M. pallipes*.)
- DD. Internal tibial spurs less elongate, more robust,
 MOGOPLISTES Serville.
 (Genotype *M. brunneus*.)
- CC. Tegmina of male present, although frequently hidden under pronotum.
 D. Pronotum of male very elongate, equal to two-thirds of body length. (Tegmina present, but completely covered by pronotum.)
 ECTATODERUS Guérin.
 (Genotype *E. nigriventris*.)
- DD. Pronotum of male less elongate. (Tegmina partly visible or [*Cycloptilum*] completely hidden under pronotum.)
 E. Pronotum strongly narrowing cephalad in male, in length equal to about one-half that of body.
 F. Tegmina of male not visible beyond pronotum.
 General size small,.....CRYPTOPTILUM n. gen.
 (Genotype *C. antillarum*.)
- FF. Tegmina of male with periphery visible beyond pronotum. General size very small,
 CYCLOPTILUM Scudder.
 (Genotype *C. squamosum*.)
 (OLIGACANTHOPUS n. gen., *vide supra*.)
- EE. Pronotum not strongly narrowing cephalad in male, in general more or less subquadrate.
 F. Tibial spurs very long. Ovipositor not at all enlarged at apex,.....HOPLOSPHYRUM n. gen.
 (Genotype *H. occidentale*.)
- FF. Tibial spurs very short. Ovipositor somewhat enlarged at apex,.....ORNEBIUS Guérin.
 (Genotype *O. xanthopterus*.)
- BB. Facial protuberance markedly divided.
 C. Tegmina absent in both sexes. (No perforation of cephalic tibiae.).....ARACHNOCEPHALUS Costa.
 (Genotype *A. vestitus*.)

²⁰ This new genus belongs in this division, nearest *Cycloptilum*, but as it is known only from the female we are unable to place it more exactly in this key.

CC. Tegmina present in male, partly projecting beyond pronotum. (Cephalic face of cephalic tibiæ perforate.)

LIPHOPLUS Saussure.
(Genotype *L. novaræ*.)

GLAPHYROPUS²¹ new genus.

1874. *Cycloptilum* Saussure (not of Scudder, 1868), Miss. Sci. Mex., Rech. Zool., VI, p. 425.

1877. *Cycloptilus* Saussure (not *Cycloptilum* Scudder, 1868), Mélang. Orth., II, p. 476.

1897. *Cycloptylum* Giglio-Tos (not *Cycloptilum* Scudder, 1868), Boll. Mus. Zool. Anat. Comp. Univ. Torino, XII, No. 301, p. 6.

The very elongate caudal metatarsus which is very sparsely and very delicately armed dorsad, will immediately separate this genus from the other genera of the group. Under an ordinary hand lens the metatarsus appears unarmed dorsad, and this is doubtless the reason Saussure accentuated this character, thus differentiating it from the allied genera, but under a moderate-power microscope the margins are seen to be supplied with delicate chætiform spines. However, this spination is most subtle and is entirely different in character from that found in any of the allied genera, which all have these spines more decidedly dentiform, often contrastingly colored and always truly serrate in their arrangement. The extremely slender metatarsus is so striking a character that it will at once serve to distinguish members of this genus.

Genus monotypic. GENOTYPE—*Glaphyropus americanus* [*Cycloptilum americanum*] (Saussure).

Generic Description.—Head small, subelongate, smooth; inter-antennal protuberance weak, broadly rounded, no vertical dividing sulcus present; eyes pyriform, not inflated; maxillary palpi very long and slender, the distal joint very obliquely truncate, labial palpi short. Pronotum of male strongly produced caudad covering the base of the abdomen, caudal margin strongly arcuate; of female subquadrate in form, cephalic margin truncate, caudal margin weakly arcuate and covering mesonotum and base of metanotum. Tegmina in male concealed by the pronotum, absent in female. Ovipositor straight, slender, moderately long; distal valves lanceolate, but not differentiated from the shaft. Supra-anal plate of male strongly plicate, bicarinate, bimammilate at the base; of female rotundato-trigonal, sulcate cephalo-caudad and folded between the cerci. Subgenital plate trapeziform in male; rotundato-trigonal

²¹ From *γλαφυρός*, smooth, and *πούς*, foot; in allusion to the practically unarmed dorsal margins of the caudal metatarsus.

in female. Cerci very long and slender, very smooth, tapering. Caudal femora dilated; caudal tibiae slender, sub-compressed, very finely serrulate on dorsal margins, with three pair of distal spurs, the dorso- and ventro-internal subequal, the medio-internal nearly twice their length and equal to about two-fifths the length of the metatarsus; caudal metatarsus very elongate, slender, equal to over half the length of the caudal tibia, dorsal margins supplied with very delicate chaetiform spines, second joint minute, third joint very small.

Distribution in North America.—Cuba, Vera Cruz, Lower California and Mexico.

Glaphyropus americanus (Saussure).

1874. *Cycloptilum americanum* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 426, pl. 8, figs. 41, 42. [Cuba.]

1874. *Cycloptilum poeyi* Saussure, *ibid.*, explanat. pl. 8, figs. 41, 42. (Plate name only.)

1888. *Cycloptilum americanum* Bolivar, Mem. Soc. Zool. France, I, p. 157. [Cuba.]

1891. *Cycloptilus americanus* Gundlach, Entom. Cuban. II, p. 370. [Cuba.]

1909. *Cycloptilum americanum* Rehn, Second Rept. Cent. Exp. Sta., Cuba, p. 221. [Cuba.]

TYPES: ♂ and ♀; Cuba. (Poey and Gundlach.) [Saussure Collection.]

The following description is based upon a female from San Rafael, Vera Cruz, Mexico. (Townsend.) [Hebard Collection.]

Size small; form subdepressed; surface very smooth.²² Head ovoid, subdepressed, but convex dorsad; interantennal protuberance separated from the vertex by a well-marked transverse interantennal

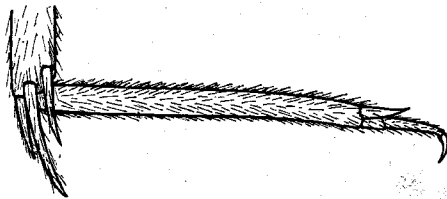


Fig. 1.—*Glaphyropus americanus*. Internal face of caudal metatarsus and internal tibial spurs. (Greatly magnified.)

sulcus. Maxillary palpi greatly elongate, distal joint elongate tubiform, distal margin very obliquely truncate. Pronotum transversely strongly arcuate, caudal width subequal to the length, lateral outlines of disk gently arcuate, expanding little caudad;

²² Scales completely abraded from the only specimen seen by us.

holosericeo-tomentose, head and thorax fulvous, abdomen more grayish." The specimen before us from Lower California has been dried from alcohol, and in consequence its coloration is greatly altered from that of nature.



Fig. 3.—*Glaphyropus americanus*. Apex of ovipositor. (Greatly magnified.)

In general it is cream-buff, darkening to ochraceous on the head, antennæ, thorax and base of the abdomen, eyes dark slate-gray, ovipositor pale ochraceous with the apex tawny. The specimen in our possession from the state of Vera Cruz is cinnamon, darkening to vandyke-brown on the sides of the head, pronotum and dorsal surface of the abdomen, eyes vandyke-brown, underparts of body, palpi, cephalic and median limbs and caudal tarsi clay color, ovipositor russet.

Distribution.—Only known from Cuba, the state of Vera Cruz, Mexico, the extremity of Lower California (San José del Cabo) and northern Venezuela.²⁴ It is possible that the Venezuelan material may not be identical.

Synonymy.—Saussure's erroneous association of this very distinct generic group with *Cycloptilum* Scudder beclouded the characters of true *Cycloptilum*, preventing some authors from recognizing the latter, as Scudder failed to mention the character of the dorsal margins of the caudal metatarsus.

Remarks.—We have before us two females of this species from Mexican territory, which show no character of difference from the original description—in fact, agreeing in every particular. It is interesting to find material from such widely separated and different localities agreeing so thoroughly.

Specimens Examined.—2 females.

San Rafael, Vera Cruz, Mexico; 1 ♀. [Hebard Collection.]

San José del Cabo, Lower California; 1 ♀. [Hebard Collection.]

CRYPTOPTILUM²⁵ new genus.

1892. *Ectatoderus* Redtenbacher (not of Guérin, 1849), Proc. Zool. Soc. London, 1892, p. 218.

1897. *Liphoplus* Saussure, Biol. Cent. Amer., Orth., I, p. 232 (in part).

1897. *Mogosiplistus* Scudder (not *Mogoplistes* Serville, 1839), Psyche, VIII, p. 55.

1897. *Mogosiplistus* Scudder (not *Mogoplistes* Serville, 1839), Guide to Gen. Class. N. Amer. Orth., p. 63.

1905. *Mogosiplistus* Morse (not *Mogoplistes* Serville, 1839), Psyche, XII, p. 21.

²⁴ Giglio-Tos, *Boll. Mus. Zool. Anat. Comp. Univ. Torino*, XII, No. 301, p. 6. 1897.

²⁵ From κρυπτόν, hidden, and πτερόν, wing; in allusion to the hidden tegmina.

1905. *Cycloptilus* Morse (not *Cycloptilum* Scudder, 1868), Psyche, XII, p. 21.
 1905. *Liphoplus* Rehn and Hebard (not of Saussure, 1877), Proc. Acad. Nat. Sci. Phila., 1905, p. 49.
 1906. *Liphoplus* Rehn (not of Saussure, 1877), Bull. Amer. Mus. Nat. Hist., XXII, p. 117.
 1907. *Liphoplus* Rehn and Hebard (not of Saussure, 1877), Proc. Acad. Nat. Sci. Phila., 1907, p. 316.
 1909. *Liphoplus* Rehn (not of Saussure, 1877), Second Rept., Cent. Exp. Sta. Cuba, p. 220.
 1910. *Liphoplus* Rehn (not of Saussure, 1877), Proc. Acad. Nat. Sci. Phila., 1910, p. 10.
 1911. *Cycloptilus* Sherman and Brimley, Ent. News, XXII, p. 391 (in part).

Genus includes five species. GENOTYPE.—*Cryptoptilum antillarum* [*Ectatoderus antillarum*] (Redtenbacher).

Generic Description.—Form depressed, compact, surface clothed with scales; pronotum produced caudad in male; tegmina absent in female, concealed by pronotum in male.

Head small, rounded, produced cephalad; interantennal protuberance with trace of vertical division. Pronotum of male narrow cephalad, produced caudad, in length equal to about half of the entire length of the body; of female sub-quadrate. Tegmina of male concealed by disk of pronotum, tympanum perfectly developed, caudal margin of dorsal field of tegmina strongly arcuate; lateral field of tegmina well developed. Ovipositor nearly straight, narrowly sub-lanceolate at apex, the latter with margins unarmed. Subgenital plate of female with distal margin complete or angulate-emarginate mesad. Cerci of both sexes elongate, tapering. Cephalic tibiae with the cephalic face bearing a distinct tympanum. Caudal femora much dilated; armament of limbs as in *Cycloptilum*.

Distribution in North America.—Extending from central North Carolina southward to extreme southern Florida and westward to Brazos County, Texas. The genus is also found in Lower California and has a wide insular distribution, having been recorded from Bermuda, the Bahamas, Cuba and St. Vincent.

Key to Cryptoptilum, New Genus.

- A. Terminal joint of maxillary palpi moderately elongate, expanding gently distad, gently obliquely truncate.
 B. Pronotum of male widening gradually but distinctly caudad.
 C. Pronotum of male with cephalic width contained about two and three-quarters times in the greatest length of the same, much produced caudad; subgenital plate of female broadly truncate distad with no emargination.....*hesperum* n. sp.

- CC. Pronotum of male with cephalic width contained hardly twice in the greatest length of the same, not as much produced caudad; subgenital plate of female arcuato-convergent, narrowly acute-angulate emarginate distad.....*antillarum* (Redtenbacher).
- BB. Pronotum of male subequal in width.....*tubulatum* n. sp.
- AA. Terminal joint of maxillary palpi not so elongate, expanding widely distad, very obliquely truncate.
- B. Form compact, pronotum of male widening gradually, but broadly caudad, not constricted in either sex; subgenital plate of female arcuato-convergent, carinate meso-caudad, very narrowly acute-angulate emarginate distad,
contectum n. sp.
- BB. Form rather slender, pronotum of male narrow, expanding gently caudad, noticeably constricted in both sexes; subgenital plate of female arcuato-convergent, broadly obtuse-angulate emarginate distad.....*trigonipalpum* n. sp.

Cryptoptilum hesperum n. sp.

This species is closely related to *C. antillarum*, but differs from it in having the interantennal protuberance more produced and bulbous, the joints of the maxillary palpi more elongate with the terminal joint more roundly and less obliquely truncate. The pronotum is heavier in both sexes, and considerably longer proportionately in the male. The caudal tibiae and metatarsi are very slightly longer in proportion to the length of the caudal femora, the caudal metatarsi having normally on each dorsal margin ten or more serrations. In the male the subgenital plate is much as in *antillarum*, but in the female it is gently arcuato-convergent laterad, broadly arcuato-truncate distad with no trace of emargination.

TYPE: ♀; San Lazaro, Lower California, September, 1894. [Hebard Collection.]

Description of Type.—Size medium for group. Head small, interantennal protuberance much produced and bulbous, much longer in proportion to the general size of the head than in *antillarum*, divided vertically by a very minute sulcus. Maxillary palpi with penultimate joint about two-thirds as long as terminal joint, the latter expanding very gently

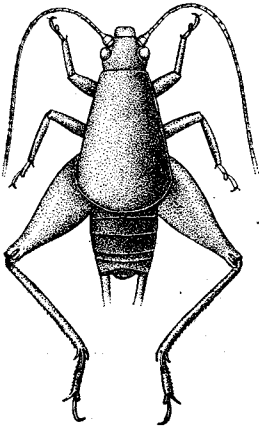


Fig. 4.—*Cryptoptilum hesperum*. Dorsal view of allotype. ($\times 4$.)

thirds as long as terminal

distad, very mildly obliquely truncate. All of the joints of the maxillary palpi are considerably longer and more attenuate than in *antillarum*. Eyes much as in *antillarum*, pronotum likewise, but heavier. Tegmina absent. Subgenital plate somewhat arcuato-convergent laterad, broadly truncate distad with no emargination whatever. Ovipositor as in *antillarum*. Cerci missing. Cephalic tibiae with cephalic face bearing a distinct tympanum. Armament of limbs much as in *antillarum* except that the serrations on the dorsal margins of the caudal metatarsi are heavier and less widely spaced, and number seven on inner, ten on outer margin. Caudal tibiae and metatarsi very slightly longer proportionally than in *antillarum*.

Allotypic ♂: Lower California. [Hebard Collection.]

Description of Allotype.—Slightly smaller than female. Pronotum larger and proportions considerably longer than in *antillarum*, the caudal margin transverse, broadly arcuate. Tegmina much as in *antillarum*.

In addition to the type and allotype, the entire series of specimens here examined and listed below may be considered paratype.

Measurements (in millimeters).

	ALLOTYPE. Lower California.	TYPE. San Lazaro, L. Cal.	San José del Cabo, L. Cal.
	♂	♀	♀
Length of body.....	8	8.9	10
Length of pronotum.....	5.1	2.7	2.9
Caudal width of pronotum.....	3.1	2.7	3
Length of caudal femur.....	5.4	5.4	.....
Greatest width of caudal femur.....	2	2	.....
Length of caudal tibia.....	3.9	4	.....
Length of caudal metatarsus.....	1.6	1.7	.....
Length of ovipositor.....	.....	5	6.6

Color Notes.—As all but the two adult females are dried alcoholic specimens, our color notes refer to these two specimens only. In ground coloration they are much like *antillarum*, but the dorsum of the abdomen is wholly black. The scaly covering of the type is in perfect condition, and shows the insect to be thickly covered with scales as in *antillarum*, but in this case the scales are metallic-bronze in color. In this specimen there is a cephalic bar of dark brown which crosses the eye, but is not continued on the pronotum; in the two other adult specimens, both of which have almost entirely lost

their scaly covering, no trace of such a bar exists. The maxillary palpi are dark brown and are covered with light hairs.

Distribution.—The known range of this species is confined to Lower California.

Remarks.—As noted under *antillarum*, the female, in the later stages of the nymphal condition, has dentiform spines on each side of the ovipositor sheath; these are situated distad along the ventral margin of the upper section of the valves, and in the specimen before us are five in number on each side. The adults all have a distinct tympanum on the cephalic face of the cephalic tibiæ, but this tympanum is not present in any of the nymphs.

Specimens Examined.²⁶—10; 1 male, 2 females and 7 nymphs.

Lower California; 1♂, 1♀ n.

Sierra el Toste, L. Cal.; September 23, 1894; (Eisen); 1♂n, 1♀ n.

San Lazaro, L. Cal.; September, 1894; 1♀, 2♂n, 2♀ n. (♀ TYPE.)

San José del Cabo, L. Cal.; 1♀.

Cryptoptilum antillarum (Redtenbacher).

1892. *E[ctatoderus] antillarum* Redtenbacher, Proc. Zoöl. Soc. London, 1892, p. 218, pl. XVII, figs., 16a, 16b. [St. Vincent, West Indies.]

1897. *Liphoplus krugii* Saussure, Biol. Cent. Amer., Orth., I, p. 232. [Cuba.] (March, 1897.)

1897. *M[ogisoplistus] slossoni* Scudder, Psyche, VIII, p. 55. [Biscayne Bay, Florida.] (April, 1897.)

1905. *Liphoplus krugii* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1905, p. 49. [Key West, Florida.]

1905. *Mogisoplistus barbouri* Morse, Psyche, XII, p. 21. [Nassau, New Providence Island, Bahamas.]

1906. *Liphoplus krugii* Rehn, Bull. Amer. Mus. Nat. Hist., XXII, p. 117. [Mangrove Key, Andros, and Pot Key, Bahamas.]

1907. *Liphoplus krugii* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1907, p. 316 (in part). [Pablo Beach and Gainesville, Florida.]

1909. *Liphoplus krugii* Rehn, Second Rept., Cent. Exp. Sta. Cuba, p. 220. [Cabañas Fortress, Cuba.]

1910. *Liphoplus krugii* Rehn, Proc. Acad. Nat. Sci. Phila., 1910, p. 10. [Paget West, Bermuda.]

1911. *Cycloptilus squamosus* Sherman and Brimley (not of Scudder, 1868), Ent. News, XXII, p. 391 (in part). [Beaufort, North Carolina.]

TYPE: ♂, and allotype, ♀; St. Vincent, West Indies, windward side. (H. H. Smith.) [British Museum.]

The following description is based upon a male from Wrightsville, North Carolina, September 7, 1911. (Rehn and Hebard.) [Hebard Collection.]

Size medium for the group, head small, interantennal space roundly

²⁶ The entire series is in the Hebard Collection.

produced and divided by a very minute subobsolete longitudinal sulcus. Maxillary palpi with penultimate joint about two-thirds as long as terminal joint, the latter expanding gently distad, gently obliquely truncate. All of the palpal joints proportionately more attenuate than in the two known species of the genus *Cycloptilum*. Eyes pyriform, subvertical. Pronotum narrowing regularly cephalad, considerably produced caudad, the entire dorsal surface transversely gently arcuate; the caudal margin transverse, broadly arcuate. Tegmina wholly concealed from above by the pronotum, from the side the lateral field may be seen to embrace the abdomen. Cerci as long as the abdomen. Cephalic tibiae with cephalic face bearing a large, oval and distinct tympanum. Caudal femora dilated. Caudal tibiae with three pair of well-developed distal spurs, the dorso-internal noticeably shorter than the ventro-internal spur, the medio-internal spur considerably longer than the others with its length contained about twice in the metatarsus. Caudal metatarsus rather long, straight, rather broad, sulcate dorsad, both dorsal margins armed with four and five on inner and six and seven well-developed serrations²⁷ on outer margins, the distal extremity armed on both sides with a long spur, the longer inner spur reaching to the end of the first third of the terminal tarsal joint.

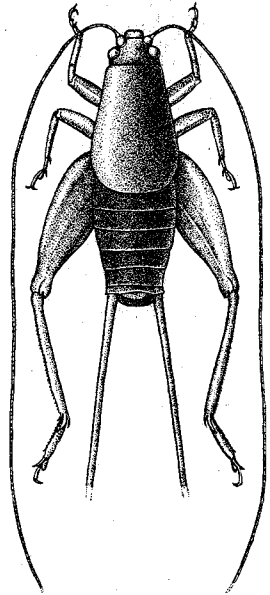


Fig. 5.—*Cryptoptilum antillarum*. Dorsal view of male specimen here described. ($\times 4$.)

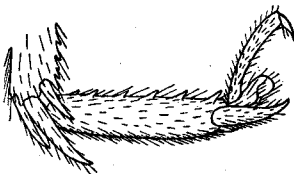


Fig. 6.—*Cryptoptilum antillarum*. Internal face of caudal metatarsus and tibial spurs. (Greatly magnified.)

longer than the others with its length contained about twice in the metatarsus. Caudal metatarsus rather long, straight, rather broad, sulcate dorsad, both dorsal margins armed with four and five on inner and six and seven well-developed serrations²⁷ on outer margins, the distal extremity armed on both sides with a long spur, the longer inner spur reaching to the end of the first third of the terminal tarsal joint.

A female, taken with the male here described, differs from it in the following respects:

Larger; the pronotum subquadrate, narrowing very little cephalad; tegmina absent. The subgenital

²⁷ The number of these serrations is found to vary considerably in the species of this group, but the inner margins always bear fewer serrations than the outer margins in the same individual.

plate is arcuto-convergent laterad, semi-ovate, narrowly acute-angulate emarginate at the apex. The ovipositor is long, straight, lateral division of valves exactly at middle of the sides, sub-lanceolate at apex, the latter with margins unarmed.

Measurements (in millimeters).

Wrightsville, N. C.

	Described. ²⁸		Average of series.	
	♂	♀	♂♂	♀♀
Length of body.....	9.	9.3	8.2(7.2-9.)	8.8(8. -9.8)
Length of pronotum.....	4.	2.5	4. (3.8-4.2)	2.3(2.2-2.5)
Caudal width of pronotum.....	3.	2.8	3. (2.8-3.1)	2.5(2.3-2.9)
Length of caudal femur.....	5.5	6.	5.1(4.5-5.5)	5.7(5.1-6.)
Width of caudal femur.....	2.	1.9	1.9(1.5-2.1)	1.9(1.8-2.)
Length of ovipositor.....	.....	5.5	.....	5.2(4.9-5.5)

Isle of Hope, Ga.

Average of series.

	♂♂	♀♀
Length of body.....	7.8(7.6-8.1)	8.4(7. -9.)
Length of pronotum.....	4. (3.9-4.2)	2.2(2. -2.4)
Caudal width of pronotum.....	2.7(2.5-2.9)	2.4(2.1-2.7)
Length of caudal femur.....	4.9(4.5-5.)	5.6(5. -6.)
Width of caudal femur.....	1.7(1.6-1.9)	1.9(1.7-2.)
Length of ovipositor.....	.....	5.1(4.8-5.6)

Atlantic Beach, Fla.

Average of series.

	♂♂	♀♀
Length of body.....	7.6(7.4-8.)	8. (7.5-8.5)
Length of pronotum.....	4. (3.8-4.1)	2.2(2. -2.7)
Caudal width of pronotum.....	2.8(2.7-3.)	2.5(2.3-2.8)
Length of caudal femur.....	4.9(4.3-5.2)	5.5(5. -6.2)
Width of caudal femur.....	1.8(1.7-2.)	1.9(1.8-2.2)
Length of ovipositor.....	.....	5.1(4.6-5.4)

Key West, Fla.

Average of series.

	♂♂	♀♀
Length of body.....	6.9 (6.7-7.3)	7.1(6.5-8.)
Length of pronotum.....	4. (3.8-4.2)	2.1(2. -2.2)
Caudal width of pronotum.....	2.85(2.8-3.)	2.2(2.1-2.4)
Length of caudal femur.....	4.3 (4.1-4.5)	5. (4.9-5.2)
Width of caudal femur.....	1.6 (1.5-1.7)	1.9(1.8-2.)
Length of ovipositor.....	.....	4.2(4. -4.3)

²⁸ These measurements are almost exactly the same as those given by Redtenbacher in his original description. The large size of St. Vincent specimens may prove to be the result of tropical influence.

These measurements plainly show that, in the United States, the species reaches its greatest size at the northern limit of its range, and that it gradually and constantly decreases in size southward, although in all of the large series from a single locality there exists a great amount of size variation. Specimens from Cabañas, Cuba, are very much like those from Key West.

Color Notes.—Ground color of dorsal surface of pronotum, head, mesonotum, metanotum, and sometimes first abdominal segments, russet, in some individuals varying to mars-brown. In the majority of specimens, sides and under portions of head, lateral lobes of pronotum, all of the limbs and under portions of body excepting abdomen are of a much lighter shade, the outer and dorsal faces of



Fig. 7.—*Cryptoptilum antillarum*. Apex of ovipositor. (Greatly magnified.)



Fig. 8.—*Cryptoptilum antillarum*. Maxillary palpus. (Greatly magnified.)

caudal femora often dark. Abdomen black, frequently marked above on edges of segments with brown, this usually more pronounced in female sex, and females are occasionally found with whole dorsum of abdomen suffused with that color. Maxillary palpi usually color of under portions of body, sometimes darkly suffused toward distal extremity of last segment.

Specimens covered with scales usually appear wholly silvery-drab or silvery-white, as all portions of the insect excepting the eyes, face and feet are heavily scaled. Specimens frequently have these scales rubbed off in such a way that the insect would at first glance appear to belong to a distinct species. An inconspicuous dark post-ocular bar is often to be found on the head in the present species, but is never continued on the pronotum.

Distribution.—In the United States this species is found within the boundaries of the Lower Austral Zone; the most northern locality at which it has been taken is Beaufort, on the central portion of the coast of North Carolina, and the vicinity of Wilmington on the southern coast of that State. A specimen before us from Brazos County, Texas, constitutes the most western record at the present date. The species is found on the Bermudas, and is probably widely

distributed through the greater and lesser Antilles, having been taken in the Bahamas, Cuba, and St. Vincent.

Biological Notes.—The present species is bush-loving, and over the greater portion of its range is rather plentiful in bayberry and other heavy bushes. On the Florida Keys, specimens could almost invariably be found in *Ilex cassine* during the proper season. At Wrightsville, North Carolina, not only was it found in great numbers in the bayberry bushes, but also on the ground among leaves and low plants under live oaks in countless numbers. Hardly ever before had the species been found on the ground. In this respect the present species differs from both known species of *Cycloptilum* which are almost wholly terrestrial, and it may be said to be truly thamnophilous.

Synonymy.—The description and figures of *antillarum* perfectly match the series of specimens before us, and we unhesitatingly refer our specimens to Redtenbacher's species.

Saussure's *Liphoplus krugii* from Cuba also agrees perfectly, and specimens before us from Cuba which we have previously determined as *krugii* are inseparable from others in the present series. The name consequently falls into the synonymy under *antillarum*.

Scudder has described *Mogosiplistus slossoni* from Biscayne Bay, Florida, apparently without reference to the literature bearing on the *Mogoplistii* of the Antilles, and after examination of his type we unhesitatingly place it also in the synonymy under *antillarum*.

We have examined the unique female type of *Mogosiplistus barbouri* Morse, in the Museum of Comparative Zoology at Cambridge, and find it to be a very large specimen of the present species, ten millimeters in length. The tympanum on the cephalic face of the cephalic femora in *antillarum* is found to vary in a large series from elliptical to nearly circular, and the fact that the species in southern Florida is particularly small, doubtless caused the large Bahaman specimen to appear different from the small individuals of the type series of Scudder's synonymic *Mogosiplistus slossoni* when it was compared with those specimens and described as new.

Remarks.—The female of this species in the later stages of the nymphal condition has six heavy dentiform spines on each side of the heavy ovipositor sheath, these are situated distad along the ventral margin of the upper sections of the valves.

Specimens Examined.—438; 175 males, 216 females and 47 nymphs.

Beaufort, N. C.; early July, 1909; (Sherman); 2 n.: middle Sept., 1911; 1♂, 1♀. [Coll. N. C. Dept. Agr.]

Wrightsville, N. C.; Sept. 7, 1911; (R. and H.)²⁹; 91 ♂, 125 ♀, 6 ♀ n.

Winter Park, N. C.; Sept. 7, 1911; (R. and H.); 3 ♂, 9 ♀, 1 ♀ n.

Lake Waccamaw, N. C.; Sept. 8, 1911; (R. and H.); 2 ♂.

Florence, S. C.; Sept. 6, 1911; (R. and H.); 1 ♂, 1 ♀ n.

Sullivan Id., Charleston Co., N. C.; Sept. 5, 1911; (R. and H.); 1 ♂.

Tybee Id., Ga.; Sept. 2, 1911; (H.); 1 ♀.

Isle of Hope, Ga.; Sept. 3, 1911; (R. and H.); 27 ♂, 36 ♀, 5 ♀ n.

St. Simon's Id., Ga.; Aug. 30, 1911; (R.); 2 ♂, 2 ♀.

Cumberland Id., Ga.; Aug. 31, 1911; (R. and H.); 1 ♂, 2 ♀, 4 ♀ n.

Jacksonville, Fla.; (Priddy); 1 ♀, 1 ♀ n. [Hebard Collection.]

St. George, Fla.; Aug. 27, 1882; 1 ♂. [Hebard Collection.]

Atlantic Beach, Fla.; Aug. 24, 25, 1911; (R. and H.); 13 ♂, 11 ♀, 3 ♀ n.

Pablo Beach, Fla.; Aug. 12, 13, 1905; (R. and H.); 2 ♂, 1 ♀ n.

Gainesville, Fla.; Aug. 16, 1905; (R. and H.); 1 ♀.

Lake Worth, Fla.; (Slosson); 1 n. [Scudder Collection.]

Biscayne Bay (Miami), Fla.; Feb. 9, 1904; (H.); 1 ♂: (Slosson); 1 ♂, 1 ♀, ³⁰ 1 n. [Scudder Collection.]; Nov. 18, 1911; (Engelhardt), 1 ♂. [W. T. Davis Collection.]

Key Largo, Fla.; March 18, 1910; (H.); 1 ♀ n.

Long Key, Fla.; March 13, 1910; (H.); 7 ♂, 5 ♀, 2 ♂ n, 2 ♀ n.

Key Vaca, Fla.; March 14, 1910; (H.); 3 ♂, 3 ♂ n, 1 ♀ n.

Boot Key, Fla.; March 14, 1910; (H.); 1 ♂.

Key West, Fla.; Jan. 19, 1904; (H.); 1 ♂, 2 ♀, 4 ♀ n: March 15, 16, 1910; (H.); 9 ♂, 13 ♀, 3 ♂ n, 4 ♀ n.

Wellborn, Brazos Co., Tex.; Aug. 27, 1904; 1 ♀. [U. S. N. M.]

Paget West, Bermuda; Jan. 6, 18, 1909; (F. M. Jones); 4 ♀. [A. N. S. P.]

Nassau, New Providence Island, Bahamas; July, 1904; (T. Barbour); 1 ♀. (TYPE of *Mogisoplastus barbouri* Morse) [Mus. Comp. Zool.]

Cabañas (Fortress), Cuba; Jan. 29, 1904; (H.); 5 ♂, 1 ♀, 1 ♀ n.

*Cryptoptilum tubulatum*³¹ n. sp.

This species is quite different from *C. antillarum*, to which of the known species of this genus it is most nearly related. Its form is quite distinctive owing to its somewhat tubular appearance, caused by the fact that in this species alone, of the six known to belong to the genus *Cryptoptilum*, the head, pronotum and abdomen are of very

²⁹ Throughout the present paper it is understood that specimens taken by the authors are in the Hebard Collection and The Academy of Natural Sciences of Philadelphia.

³⁰ This female is the type, here selected, of *Mogisoplastus slossoni* Scudder; the other specimens, male and nymph, are paratypes.

³¹ In allusion to the tubular appearance of the insect.

nearly the same width throughout. The insect is very much the same size as *antillarum*, but the dorsal surface of the head is more flattened, while the interantennal protuberance is more sharply rectangular. As in *C. trigonipalpus*, the tympanum on the cephalic face of the cephalic tibia is circular, not oval as is usual in *C. antillarum*. The last three segments of the maxillary palpi are much as in *antillarum*, but are more robust in proportion to their length. The pronotum is proportionally longer and its sides are subparallel. The caudal femora are much the same as in *antillarum*, and the armament of the limbs is similar.

TYPE: ♂; Salina Cruz, Oaxaca, Mexico; December 22, 1898. [Hebard Collection.]

Description of Type.—Size medium for the group. Head small, interantennal space produced and sharply rounded, divided by a very minute subobsolete longitudinal sulcus. Maxillary palpi with fourth joint from distal extremity nearly twice as long as broad, considerably longer than in *C. antillarum*. Eyes pyriform, subvertical, somewhat larger and slightly more prominent than in *antillarum*. Pronotum when seen from above subequal in width, considerably produced caudad, the entire dorsal surface transversely gently arcuate, more decidedly so than in *antillarum*, the caudal margin subtruncate. Tegmina wholly concealed dorsad by the pronotum, a portion of the lateral field may be seen to embrace the abdomen, though in this species the peculiar shape of the pronotum causes the lateral lobes to embrace the

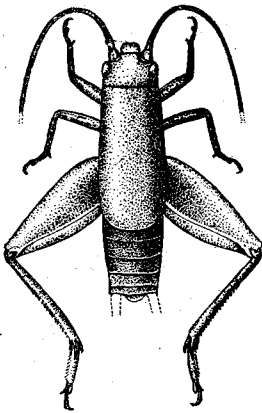


Fig. 9.—*Cryptoptilum tubulatum*. Dorsal view of type. (× 4.)

sides of the body to nearly the caudal margin of the pronotum. Cephalic tibiae with cephalic face bearing a large, circular and distinct tympanum. Limbs, and armament of the same, much as in *antillarum*.

Measurements (in millimeters).—♂: Length of body, 8.2; length of pronotum, 5.2; cephalic width of pronotum, 2; caudal width of pronotum, 2.1; length of caudal femur, 5.3; width of caudal femur, 1.8.

Color Notes.—Ground color of dorsal surface of pronotum russet. Dorsal surface of head and all of abdomen blackish-brown. Other

portions of head including palpi and also limbs very dark bistre. Antennæ tawny-olive. The body is heavily scaled, above the great majority of these scales are translucent wood-brown, the remainder are translucent. Beneath the heavy scale covering is hoary-white.

Distribution.—As the species is known from but one specimen, we are only able to give one locality in the state of Oaxaca, Mexico, at which it is found, and nothing is known of the habits of the insect.

Specimens Examined.—1 ♂.

Salina Cruz, Oaxaca, Mexico; December 22, 1898; 1 ♂. (TYPE.) [Hebard Collection.]

*Cryptoptilum conlectum*³² n. sp.

This insect shows the closest relationship to *C. trigonipalpum* (*vide infra*), from which species it differs in the somewhat heavier build, which, however, is not as heavy as in *C. antillarum*. The pronotum is proportionately more expansive both in length and width in the male, and in fact considerably exceeds the broader species *antillarum*. The caudal femora are more strongly inflated, and in this respect closely resemble *antillarum*. In the female the pronotum is wider, being in proportionate width intermediate between *trigonipalpum* and *antillarum*, the subgenital plate differs from all other species of the genus in being apically keeled, and the ovipositor is also very much shorter than in any of the other forms.

TYPE: ♂; Hayti. (P. R. Uhler.) [Scudder Collection.]

Description of Type.—Size small; form not as slender as *C. trigonipalpum*. Head small, the interantennal space roundly produced, divided vertically by a distinct though minute sulcus. Maxillary palpi as in *trigonipalpum*. Pronotum narrowing regularly cephalad, very wide and considerably produced caudad. Cerci of type missing. Cephalic face of cephalic tibiae bearing a large, distinct, broadly ovoid tympanum. Hind femora and armament of limbs as in *C. antillarum*.

Allotypic ♀. Data the same as the type.

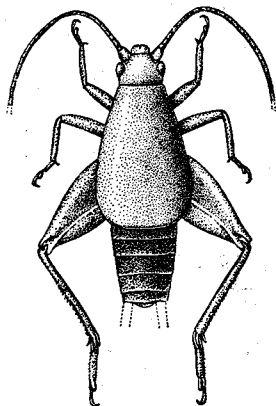


Fig. 10.—*Cryptoptilum conlectum*. Dorsal view of type. (× 4.)

³² In allusion to the expansive pronotum of the male of this species.

Description of Allotype.—Much the same size as the male. Pronotum proportionately wider than in *C. trigonipalpum*, narrower than in *C. antillarum*. Tegmina absent. Subgenital plate arcuato-convergent laterad, semi-ovate, carinate meso-caudad, very narrowly acute-angulate emarginate at the apex. Ovipositor much shorter than in the other species of the genus.

Measurements (in millimeters.)

	♂ TYPE. Hayti.	♀ ALLOTYPE. Hayti.
Length of body.....	7.2	7.1
Length of pronotum.....	4.7	2.1
Caudal width of pronotum.....	3.	2.
Length of caudal femur.....	4.5	4.9
Greatest width of caudal femur.....	1.9	2.
Length of ovipositor.....	.....	3.6

Color Notes.—Head, antennæ, pronotum and limbs cinnamon. The pronotum of the female and first abdominal segments with dorsal surface somewhat darker, approaching mars-brown. Abdomen of male black, all but the dorsal surface of the proximal segments the same color in the female. Ovipositor russet. Scales on dorsal surface translucent wood-brown, appearing silvery to the naked eye; on the ventral surfaces of head and edges of the abdominal segments the scales are hoary-white; the heavy covering of scales on the limbs is of the same color. On all but the edges of the abdominal segments on the ventral surface of the abdomen, the scales are translucent wood-brown.

Distribution.—The species is known from but two specimens from the island of Hayti, and we have no information concerning the habits of the insect.

Specimens Examined.—1 ♂, 1 ♀.

Hayti; (P. R. Uhler); 1 ♂, 1 ♀. (♂ TYPE.) [Scudder Collection.]

Cryptoptilum trigonipalpum n. sp.

1905. *Cycloptilus americanus* Morse (not of Saussure, 1874), Psyche, XII, p. 21. [Nassau, New Providence Island, Bahamas.]

1907. *Liphoplus krugii* Rehn and Hebard (not of Saussure, 1897), Proc. Acad. Nat. Sci. Phila., 1907, p. 316 (in part). [Pablo Beach and San Pablo, Florida.]

1911. *Cycloptilus squamosus* Sherman and Brimley (not of Scudder, 1868), Ent. News, XXII, p. 391 (in part). [Raleigh, North Carolina.]

This species differs from *C. antillarum* in the average smaller size over the major portion of its range, the more graceful build, the more

pronounced interantennal sulcus and very different terminal joint of the maxillary palpi, the edges of which when viewed from the side form an isosceles triangle, owing to the fact that this joint expands widely distad and is very obliquely truncate. The pronotum is proportionally narrower and smaller in both sexes, the caudal femora are less strongly inflated, while in the male the subgenital plate is very slightly less produced obtuse-angulate and in the female it is semi-ovate, broadly obtuse-angulate emarginate at the apex.

TYPE: ♂; Isle of Hope, Chatham County, Georgia, in heavy undergrowth of green plants and vines, September 3, 1911. (Rehn and Hebard.) [Hebard Collection.]

Description of Type.—Size smaller and more slender than *C. antillarum*.

Head very small, the interantennal space roundly produced, divided vertically by a distinct though minute sulcus. Maxillary palpi with greatest length of terminal joint a very little more than greatest length of penultimate joint. Terminal joint conical, sharply expanding distad, very obliquely truncate, so much so that when viewed from the side the edges form an isosceles triangle, the equal sides

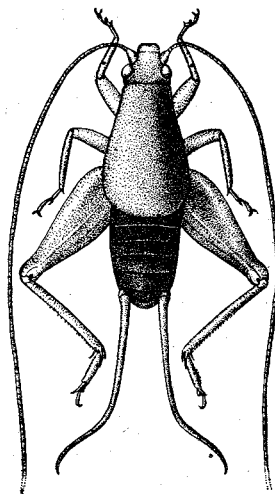


Fig. 11.—*Cryptoptilum trigonipalpus*. Dorsal view of type. ($\times 4$.)



Fig. 12.—*Cryptoptilum trigonipalpus*. Maxillary palpus. (Greatly magnified.)



Figs. 13-16.—Oblique views and relative terminal circumference of distal joint of maxillary palpus of *Cryptoptilum antillarum* (figs. 13, 14) and *C. trigonipalpus* (figs. 15, 16). (Greatly magnified.)

formed by the diameter of the apex and the shortest lateral dimension. Pronotum narrower than in *antillarum*, general form of pronotum and tegmina as in that species. Cerci nearly as long as the length of the entire body. Cephalic face of cephalic tibiae with tympanum as in *antillarum*. Hind femora considerably less dilated than in *antillarum*, armament of limbs similar.

Allotypic ♀. Data the same as the type.

Description of Allotype.—Slightly larger than male. Pronotum, mesonotum and metanotum noticeably narrower than in *antillarum*, bringing into prominence the depressed ovate abdomen. Tegmina absent. Subgenital plate semi-ovate, broadly obtuse-angulate emarginate at apex. Ovipositor as in *antillarum*.

In addition to the type and allotype, the following specimens may be considered paratype: Isle of Hope, Ga.; Sept. 3, 1911; (R. and H.); 1 ♂ n. Sandfly, Ga.; Sept. 3, 1911; (R. and H.); 1 ♀.

Measurements (in millimeters).

	TYPE.	ALLOTYPE.	Charlotte Harbor, Fla.	Key Largo, Fla.
	♂	♀	♂	♀
Length of body.....	7.1	8.	6.8	7.8
Length of pronotum.....	4.	2.1	3.7	2.
Caudal width of pronotum.....	2.5	2.	2.4	2.
Length of caudal femur.....	5.	5.	4.2	5.1
Greatest width of caudal femur.....	1.7	1.8	1.3	1.9
Length of ovipositor.....	.....	5.2	.....	4.
	Florence, S. C.		Average of entire adult series.	
	♂	♀	♂♂	♀♀
Length of body.....	7.	8.5	7.	7.9
Length of pronotum.....	4.1	2.1	3.9	2.
Caudal width of pronotum.....	2.5	2.1	2.4	2.
Length of caudal femur.....	5.	5.5	4.4	5.
Greatest width of caudal femur.....	1.6	1.8	1.6	1.7
Length of ovipositor.....	.....	6.2	.....	4.8

The measurements would indicate that this species is smaller than specimens of *antillarum* from the same place over the greater portion of its range, but as it decreases in size southward much less rapidly than that species, the two species are very nearly of the same size in southern Florida, though their proportions markedly differ.

Color Notes.—There is scarcely any difference in ground coloration between *antillarum* and the present species, except that, in the series of the latter species before us, the maxillary palpi are never darkly suffused, though of a richer brown than the surrounding facial parts, and all have the dorsal surface of the abdomen wholly black. The insects are thickly covered with nearly transparent scales, so that in the field they frequently appear to have the black abdomen ringed above at the intersection of the segments with whitish scales, due

to the fact that at the juncture of the segments the scales are somewhat raised, and the refraction of light gives them a whitish appearance where such refraction occurs.

Distribution.—This species is now known to occur in the Bahama Islands and the southeastern United States. The series shows the range of the species to extend from east-central North Carolina to the northern Florida Keys and New Providence Island, Bahamas.

Biological Notes.—This species was not always recognized in the field as different from *antillarum*, although on one or two occasions the notes refer to it as a different species. From our notes we are therefore only able to state that the species occurs often in the same general region with *antillarum*, but it is probable that it seeks rather heavier growth than that species, as the following field note would suggest. "The Jungle *Liphoplus*³³ has scales only on under side and around segments of abdomen giving it a ringed appearance and a strikingly red and black color when compared with *Liphoplus krugii*, which species is covered with sparse silvery scales, pronotum and all."

Specimens Examined.—24; 8 males, 8 females and 8 nymphs.

Raleigh, N. C.; Sept., 1908; (Sherman); 1 ♂. [Coll. N. C. Dept. Agr.]

Lake Waccamaw, N. C.; Sept. 8, 1911; (R. and H.); 1 ♀.

Florence, S. C.; Sept. 6, 1911; (R. and H.); 1 ♂, 1 ♀.

Sullivan Id., Charleston Co., N. C.; Sept. 5, 1911; (R. and H.); 1 ♀.

Isle of Hope, Ga.; Sept. 3, 1911; (R. and H.); 1 ♂, 1 ♀, 1 ♂ n. (♂ TYPE; Hebard Collection).

Sandfly, Ga.; Sept. 3, 1911; (R. and H.); 1 ♀.

Jacksonville, Fla.; (Priddy); 1 ♀. [Hebard Collection]: Aug. 25, 1911; (R. and H.); 2 ♂.

Atlantic Beach, Fla.; Aug. 24, 1911; (R. and H.); 1 ♀ n.

Pablo Beach, Fla.;³⁴ Aug. 13, 1905; (R. and H.); 1 ♂ n.

San Pablo, Fla.;³⁴ Aug. 13, 1905; (R. and H.); 1 ♂, 1 ♀ n.

Charlotte Harbor, Fla.; 1 ♂. [Scudder Collection.]

Punta Gorda, Fla.; Nov. 13, 1911; (W. T. Davis); 1 ♀. [W. T. Davis Collection.]

Key Largo, Fla.; March 18, 1910; (H.); 1 ♀, 3 ♂ n.

³³ To distinguish it from *C. antillarum* which was then called *Liphoplus krugii*.

³⁴ These specimens were recorded as *Liphoplus krugii* by the authors, these PROCEEDINGS, 1907, p. 316. At that time so few specimens of the group from North America had been taken, and genera were so confused, that it was almost impossible to determine with accuracy any of the species. The authors' notes in that paper on *Liphoplus*, *Cycloptilum* and *Ectatoderus* are wholly erroneous.

Nassau, New Providence Island, Bahamas; Jan. 31, 1905; (A. E. Wright); 1 ♂, 1 ♂ n.³⁵ [Morse Collection.]

Genus **CYCLOPTILUM** Scudder.

1868. *Cycloptilum* Scudder, Proc. Bost. Soc. Nat. Hist., XII, p. 142.
 1874. *Cycloptilum* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 425 [in part].
 1877. *Cycloptilus* Saussure, Mélang. Orth., II, p. 477 [in part].
 1897. *Cycloptilus* Saussure, Biol. Cent. Amer., Orth., I, p. 231 [in part].
 1897. *Cycloptilum* Scudder, Guide to Gen. Class, N. Amer. Orth., p. 64.
 1905. *Liphoplus* Rehn and Hebard (not of Saussure, 1877), Proc. Acad. Nat. Sci. Phila., 1905, p. 49.
 1909. *Ectatoderus* Rehn and Hebard (not of Guérin, 1849), *ibid.*, 1909, p. 482.
 1909. *Cycloptilum* Davis, Jour. N. Y. Ent. Soc., XVII, p. 187.

Genus monotypic. GENOTYPE—*Cycloptilum squamosum* Scudder.

Generic Description.—Form depressed, compact; surface clothed with scales; pronotum produced caudad in male; tegmina absent in female, projecting beyond pronotum in male.

Head small, rounded, produced cephalad; interantennal protuberance with trace of vertical division. Pronotum of male narrow cephalad, broadened and produced caudad, in length equal to about half of the entire length of the body; of female subquadrate. Tegmina of male extending caudad of caudal margin of pronotum a distance subequal to one-third the greatest pronotal length, tympanum perfectly developed, caudal margin of dorsal field of tegmina strongly arcuate; lateral field of tegmina well developed. Ovipositor nearly straight, sub-lanceolate at apex, the latter with margins unarmed. Subgenital plate of female with distal margin complete or distinctly but transversely emarginate mesad. Cerci of both sexes elongate, tapering. Cephalic tibiae with the cephalic face bearing a distinct tympanum. Caudal femora greatly dilated; caudal tibiae with three pair of well-developed distal spurs, the dorso-internal shorter than the ventro-internal spur; caudal metatarsus sulcate dorsad, serrate on both dorsal margins, the distal extremity armed on both sides with a spur which extends well beyond the base of the distal tarsal joint.

Distribution in North America.—Extending from central New Jersey southward to extreme southern Florida, westward in the South through Texas to southern Arizona and the Mojave Desert in

³⁵ The specimens from this locality recorded as *Cycloptilus americanus* by Morse, *Psyche*, XII, p. 21, 1905, cannot be found. The present specimens from the collection of Professor Morse were determined by him as that same species, but the records have not been published. We feel, therefore, confident that those specimens recorded as *Cycloptilus americanus* are the authors' new species, *Cryptoptilum trigonipalpus*, to which the present specimens unquestionably belong.

California, and northward to northern Nebraska and extreme north-eastern Colorado.

Key to Cycloptilum Scudder.

- A. Size small; pronotum of male with cephalic portion of dorsum well rounded, caudal portion broadened and distinctly flattened; the lateral outline of the pronotum when seen from above expanding more sharply caudad; pronotum of female small; ovipositor 3 mm. or over.....*squamosum* Scudder.
- AA. Size very small; pronotum of male with entire dorsum transversely well rounded, caudal portion not so much broadened; the lateral outline of the pronotum when seen from above expanding regularly but very slightly; pronotum of female very small; ovipositor less than 3 mm.,
zebra (Rehn and Hebard.)

Cycloptilum squamosum Scudder.

1868. *Cycloptilum squamosum* Scudder, Proc. Bost. Soc. Nat. Hist., XII, p. 142. [Texas.]
1874. *Cycloptilum squamosum* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 427. [Texas.]
1877. *Cycloptilus squamosus* Saussure, Mélang. Orth., II, p. 477. [Texas.]
1891. *Cycloptilus borealis* Bruner, Can. Ent., XXIII, p. 37. [Near Niobrara River at Valentine and Lincoln, Nebraska.]
1893. *Cycloptilum boreale* Bruner, Publ. Nebr. Acad. Sci., III, p. 33. [Central and Northern Nebraska.]
1897. *Cycloptilus squamosus* Saussure, Biol. Cent. Amer., Orth., I, p. 231. [Dallas, Texas.]
1903. *Cycloptilus squamosus* Caudell, Proc. U. S. Nat. Mus., XXVI, p. 808. [Victoria, Texas.]
1905. *Cycloptilum squamosum?* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1904, p. 799. [Thomasville, Georgia.]
1907. *Liphoplus krugii* Rehn and Hebard, *ibid.*, 1907, p. 361 (in part). [San Pablo and Gainesville, Fla.]
1909. *Ectatoderus occidentalis?* Rehn and Hebard, *ibid.*, 1909, p. 482. [Cottonwood, California.]
1909. *Cycloptilum squamosum* Davis, Jour. N. Y. Ent. Soc., XVII, p. 187. [Lakehurst, New Jersey.]
1910. *Cycloptilus squamosus* Allard, Proc. Ent. Soc. Wash., XII, p. 42. [Thompson's Mills, Georgia.]
1910. *Cycloptilus squamosus* Rehn in Smith, Ann. Rept. New Jersey State Mus., 1909, p. 191. [Lakehurst, New Jersey.]
1911. *Cycloptilus americanus* Sherman and Brimley (not *Cycloptilum americanum* Saussure, 1874), Ent. News, XXII, p. 391. [Raleigh and "Alamance County," North Carolina.]

TYPE: ♂; Texas. (Belgrave.) [Scudder Collection.]

Description of Type.—Size small for the group, head very small, interantennal protuberance well produced, rounded, with trace of vertical division. Maxillary palpi with penultimate joint not more than two-thirds as long as terminal joint, the latter gently expanding distad, gently obliquely truncate. Eyes reniform in outline, subvertical. Pronotum strongly narrowed cephalad, considerably

broadened and produced caudad, its caudal margin forming nearly a semicircle, the cephalic portion of the dorsum well rounded, the broadened caudal portion of the dorsum distinctly flattened. Tegmina with dorsal field as broad as pronotum at its widest part, tympanum perfectly developed, caudal margin of tegmina subequal in arcuation to the caudal margin of the pronotum; lateral field of tegmina well developed, embracing abdomen; the cephalic two-thirds of the tegmina concealed by the pronotum, the visible portion extending caudad of the caudal margin of the pronotum a distance subequal to one-third the greatest pronotal length.

Cerci more than one-half as long as abdomen. Cephalic tibiae with cephalic face bearing a distinct tympanum. Caudal femora greatly dilated. Caudal tibiae with three pair of well-developed distal spurs, the dorso-internal very slightly shorter than the ventro-internal spur, the medio-internal spur is the longest and has its length

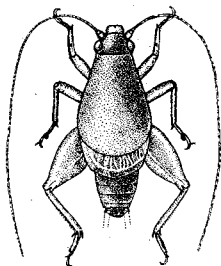


Fig. 17.—*Cycloptilum squamosum*.
Dorsal view of type. ($\times 4$.)

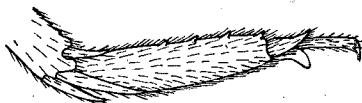


Fig. 18.—*Cycloptilum squamosum*. In-
ternal face of caudal metatarsus and
internal tibial spurs. (Greatly mag-
nified.)

contained two and one-quarter times in the metatarsus. Caudal metatarsus rather long, straight, rather broad, sulcate dorsad, both dorsal margins armed with short, well-separated serrations five on inner and eight on outer margin,³⁶ the distal extremity armed on both sides with a spur, the somewhat longer inner spur reaching to nearly the end of the first quarter of the terminal tarsal joint.

Allotypic ♀: Dallas, Texas. [United States National Museum Collection.]

Description of Allotype here Selected.—The specimen differs from the male type in that it is somewhat larger, the pronotum is subquadrate, narrowing very slightly cephalad, and the tegmina are absent. The subgenital plate is arcuato-convergent laterad, with

³⁶ See note under *Cycloptilum antillarum* concerning variability as to number of these serrations.

distal section of margin complete.³⁷ The ovipositor is fairly long and nearly straight, somewhat elongate sublanceolate at apex, the base alone showing a slight upward curvature, lateral division of valves exactly at middle of sides, the apex with margins unarmed. Length of ovipositor contained in length of cerci nearly one and one-quarter times.

Measurements (in millimeters).

	<i>C. borealis</i> Br.			
	TYPE. Texas.	ALLOTYPE. Dallas, Tex.	ALLOTYPE. Lincoln, Neb.	TYPE.
	♂	♀	♂	♀
Length of body.....	6.3	7.2	6.6 ³⁸	6.2
Length of pronotum.....	3.4	2.2	3.	2.1
Caudal width of pronotum.....	2.9	2.1	2.6	2.
Length of caudal femur.....	3.5	4.2	3.9	4.1
Greatest width of caudal femur.....	1.5	1.8	1.8	1.9
Length of ovipositor.....	.....	3.6	.....	3.

	Cumberland Island, Georgia.		Wrightsville, North Carolina.	
	♂	♀	♂	♀
Length of body.....	6.1	6.3	6.1	6.
Length of pronotum.....	3.3	2.	3.4	2.
Caudal width of pronotum.....	2.7	1.9	2.6	1.9
Length of caudal femur.....	4.	4.4	4.1	3.7
Greatest width of caudal femur.....	1.7	1.8	1.5	1.5
Length of ovipositor.....	.....	3.	.....	3.

Measurements taken of a large series from St. Simon's Island, Georgia, show that there is an equal or greater amount of variation among individuals from that locality than is found in the specimens whose measurements are given above. Length of body; ♂, 5.4–6.9 mm.; ♀, 5.6–6.9; length of pronotum; ♂, 3.1–3.9; ♀, 2–2.1; caudal width of pronotum; ♂, 2.5–2.7; ♀, 1.9–2; length of caudal femur; ♂, 3.8–4.2; ♀, 3.5–4.2; greatest width of caudal femur; ♂, 1.3–1.8; ♀, 1.6–1.9; length of ovipositor; 3.6–2.9.

Color Notes.—Over the more arid portions of the range of this species (which includes the type locality) the general color of the insects is rather pale brown, the entire body more or less covered



Fig. 19.—*Cycloptilum squamosum*. Apex of ovipositor. (Greatly magnified.)

³⁷ For variability of this character see note in "Remarks."

³⁸ Appears to have been somewhat squeezed out.

with silvery or yellowish scales, while a post-ocular bar of darker scales frequently extends as a narrow line of dark scales along the dorsal edge of the lateral lobes of the pronotum to its caudal margin. In specimens which have lost their scaly covering no trace of such a line exists, the ground color of head, pronotum, limbs and first two or three segments of the abdomen is found to be russet, while the remainder of the abdomen is black. The maxillary palpi are much suffused with blackish, this is most pronounced in the darkest specimens. The ovipositor is vandyke-brown.

Specimens from Nebraska show, in individuals which have lost their scaly covering, the same coloration, but when fully clothed with scales their appearance is rather more yellowish, owing to the fact that in these individuals a greater proportion of their scales are more yellowish than in specimens from the arid West.

Individuals from the Atlantic coast are similar to western specimens in body coloration, but their scale covering is usually composed chiefly of blackish or slate-colored scales, which gives the specimens a dark and somewhat mottled appearance quite different from that of western representatives of the species. This difference in coloration is augmented by the fact that while in western individuals the caudal margin of the tegmina is marked with a few faintly darker veins, the Atlantic coast representatives of the species have this margin heavily and strikingly velvety black.

Distribution.—This species is now known to range from central New Jersey southward on the Atlantic coast to north-central Florida, westward across Texas and southern Arizona as far as the Mojave Desert in California, in the middle west north to the northern boundary of Colorado, and over the entire central and north-eastern portions of Nebraska.

This distribution is rather surprising owing to the fact that the species is to be found both in the humid regions of the East and the areas of extreme aridity of the Southwest. The vertical range of the species is known to extend from sea level to an elevation of 3,550 feet on the Great Plains, 2,274 feet in the Mojave Desert, and 2,500 feet in Pima County, Arizona.

Biological Notes.—At Cottonwood, California,³⁹ this species was common under creosote bush (*Covillea*), where, among the collected refuse at the base of the bushes, the insects were heard shrilly stridulating at dusk and later. The sound produced was an incessant and

³⁹ *Proc. Acad. Nat. Sci. Phila.*, 1909, p. 482.

high-pitched zeee-zeee-zeee. Along the Atlantic coast the authors have found the species under boards and various other debris on the ground, usually along the edge of, or in forest growth, and almost always in very small numbers. Once, however, a locality was examined where the little insects were present in countless numbers; this was on St. Simon's Island, Georgia, where myriads were found jumping about among the dead leaves and very few low plants and grasses growing on the sandy soil under live oaks. Professor Bruner has stated that the synonymous *C. borealis* is common in Nebraska among dry grass and under boards on sandy soil.

Synonymy.—As we have before us one male and fifteen females of the typical series of *Cycloptilus borealis* Bruner, we are enabled to refer it unhesitatingly to the present species. There are no differences between these specimens and the type and allotype of *squamosum*, except in the coloration of the scaly covering which in the present species is exceedingly variable. We find Scudder's measurements to be accurate, while those given by Bruner in the original description of *borealis* are quite different from what we find to be the case in the typical series, which in size and proportions can in no way be separated from *squamosum*.

Remarks.—In the series of females before us, the distal section of the margin of the subgenital plate varies from a type which is arcuato-convergent laterad with the distal section of the margin complete, to one which has the distal section of the margin broadly emarginate, this emargination flanked laterad by acute spiniform angles. The majority of specimens from the Atlantic coast have this emargination present, while it is absent in the majority of western specimens, but an examination of the series shows that it is not constant and that in this species the entire form of the subgenital plate is exceedingly variable in the female sex, while in the male it is simple and broadly arcuate.

Specimens Examined.—215; 83 males, 115 females, and 17 nymphs.

Piney Point, Md.; Sept. 14, 1902; (Pergande); 1 ♀. [U. S. N. M.]
 Raleigh, N. C.; Oct. 2, 1903; 1 ♀: Aug. 16, 1906; 1 ♂: Oct. 30, 1907; 1 ♂, 1 ♀: Sept. 30, 1898; 2 ♀. (All Brimley.) [Brimley Collection.]

Wilmington, N. C.; Sept. 8, 1911; (R. and H.); 1 ♂.

Winter Park, N. C.; Sept. 7, 1911; (R. and H.); 1 ♀.

Wrightsville, N. C.; Sept. 7, 1911; (R. and H.); 2 ♂, 1 ♀.

Florence, S. C.; Sept. 6, 1911; (R. and H.); 1 ♂.

Yemassee, S. C.; Sept. 4, 1911; (R. and H.); 1 ♂, 1 ♀.

Thompson's Mills, Ga.; Oct. 1909; (Allard); 1 ♂, 1 ♀. [U. S. N. M.]

- Isle of Hope, Ga.; Sept. 3, 1911; (R. and H.); 4 ♂, 2 ♀.
 St. Simon's Id., Ga.; Aug. 30, 1911; (R. and H.); 48 ♂, 56 ♀,
 3 ♀ n.
 Cumberland Id., Ga.; Aug. 31, 1911; (H.); 6 ♂, 13 ♀, 5 ♀ n.
 Brunswick, Ga.; Aug. 30, 1911; (H.); 1 ♂, 3 ♀.
 Thomasville, Ga.; Aug. 3, 1903; (for H.); 1 ♂ n.
 Atlantic Beach, Fla.; Aug. 25, 1911; (R. and H.); 1 ♂, 3 ♀.
 San Pablo, Fla.;⁴⁰ Aug. 13, 1905; (R. and H.); 1 ♀, 1 ♀ n.
 Live Oak, Fla.; Aug. 26, 1911; (R. and H.); 1 ♂ n.
 Gainesville, Fla.;⁴⁰ Aug. 16, 1905; (R. and H.); 1 ♀.
 Texas; (Belfrage); 2 ♂.⁴¹ [Scudder Collection.]
 Dallas, Tex.; 2 ♀, 1 ♂ n. [U. S. N. M.]
 Columbus, Tex.; May 31; 1 ♂. [U. S. N. M.]
 New Braunfels, Tex.; Sept. 8; (Schwarz); 1 ♂, 1 ♂ n. [U. S.
 N. M.]
 Victoria, Tex.; June; (Caudell); 1 ♂ n. [U. S. N. M.]
 Calhoun County, Tex.; (J. W. Mitchell); 1 ♀. [U. S. N. M.]
 Carrizo Springs, Tex.; (A. Wadgymar); 3 ♂, 3 ♀. [Hebard
 Collection.]
 Brownsville, Tex.; May 13-24, 1904, June 6, 1904; (Barber);
 6 ♂, 1 ♀, 1 ♂ n. 1 ♀ n. [U. S. N. M., A. N. S. P., Hebard Collec-
 tion.]
 Tumamoc Hill, Tucson Mts., Ariz.; Oct. 3-4, 1910; (R. and H.);
 2 ♀.
 Snyder's Hill, Pima Co., Ariz.; Oct. 11, 1910; (R. and H.); 1 ♀.
 Tinajas Altas, Yuma County, Ariz.; 1905; (W. J. McGee); 1 ♀.
 [U. S. N. M.]
 Cottonwood, San Bernardino County, Cal.; Sept. 9, 1907; (H.);
 1 ♂.
 Julesburg, Colo.; July 29, 1910; (H.); 1 ♂ n.
 Lincoln, Nebr.; Sept. 1888; 1 ♂, 15 ♀.⁴²
 Sidney, Nebr.; 1 ♀. [Hebard Collection.]

Cycloptilum zebra (Rehn & Hebard).

1905. *Liphoplus zebra* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1905,
 p. 49, pl. I, fig. 12. [Miami, Florida.]

At the time of the original description the authors were not acquainted with the Scudderian genus *Cycloptilum*, and Saussure's misconception led us to suppose that the present species did not belong to that genus. We are now able to state definitely the following facts:

⁴⁰ These specimens were unfortunately recorded as *Liphoplus krugii* by the authors. These PROCEEDINGS, 1907, p. 316.

⁴¹ One of these two specimens is the unique type of *Cycloptilum squamosum* Scudder.

⁴² These are from the paratypic series of *Cycloptilum berealis* Bruner, which are divided as follows: 1 ♂, 10 ♀ (including the single type and allotype), Hebard Collection; 2 ♀, Acad. Nat. Sci. Phila.; 1 ♀, U. S. N. M.; 2 ♀, Scudder Collection.

The present species is distinguished from *Cycloptilum squamosum* by its smaller size, relatively more regularly convex dorsal surface of the pronotum in the male, which is less expanded caudad and is much shorter. In the female the pronotum is very small and narrows somewhat more cephalad. Proportionately, the limbs are shorter and the caudal femora more flea-like. Differences in coloration are also apparent and are given in the color description below.

TYPE: ♂; Miami, Dade County, Florida, on wire-grass in low undergrowth of pine woods, February 6, 1904. (Hebard.) [Hebard Collection.]

Description of Type.—Size very small for the group. Head with interantennal protuberance much as in *squamosus*, but the perpendicular division is somewhat more apparent, very narrow but distinct. Maxillary palpi with penultimate joint not more than two-thirds as long as terminal joint, the latter gently expanding distad and gently obliquely truncate. Eyes reniform in outline, subvertical. Pronotum with cephalic width of dorsal surface approaching caudal width of the same more nearly than in *squamosum*, considerably produced caudad, its caudal margin forming nearly a semicircle, the whole of the dorsum well rounded. Tegmina with dorsal field slightly broader than pronotum at its widest point, tympanum perfectly developed, caudal margin of tegmina subequal in arcuation to the caudal margin of the pronotum. Cerci missing in type (in other males of this species the cerci are more than one-half as long as the abdomen). Cephalic tibiae with cephalic face bearing a minute but distinct tympanum. Caudal femora more dilated than in *squamosum*. Caudal tibiae with three pair of well-developed distal spurs, the dorso-internal very slightly shorter than the ventro-internal spur; the medio-internal spur is the longest and has its length contained two and one-quarter times in the metatarsus. Caudal metatarsus fairly long, straight, rather broad, sulcate dorsad, both dorsal margins armed with short, well separated serrations, much as in *C. squamosum*, the distal extremity armed on both sides with a spur which extends to nearly the end of the first third of the terminal tarsal joint.

Allotypic ♀: Key West, Monroe County, Florida, on underside

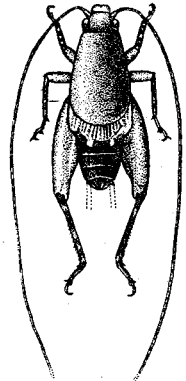


Fig. 20.—*Cycloptilum zebra*. Dorsal view of type. (× 4.)

of coquina boulder on sandy strand, March 16, 1910. (Hebard.)
[Hebard Collection.]

Description of Allotype here Selected.—Very slightly larger than type. Pronotum subquadrate, narrowing perceptibly cephalad; tegmina absent. Ovipositor rather short, straight, somewhat elongate sublanceolate at apex, lateral division of valves exactly at middle of sides, the apex with margins unarmed. Subgenital plate arcuato-convergent laterad, distal section of margin flattened but with no emargination. Cerci reaching but very little beyond the tip of the ovipositor.

Measurements (in millimeters).

	TYPE. Miami, Fla.	ALLOTYPE. Key West, Fla.	Lake Worth, Fla.	Long Key, Fla.
	♂	♀	♂	♀
Length of body.....	5.	5.	6. ⁴³	5.1
Length of pronotum.....	2.9	1.7	2.6	1.6
Greatest width of pronotum.....	1.9	1.8	1.7	1.6
Length of caudal femur.....	3.1	3.4	3.4	3.2
Greatest width of caudal femur.....	1.1	1.4	1.4	1.2
Length of ovipositor.....	.....	2.8	.....	2.7

Average in Key West, Fla., series.

	♂	♀
Length of body.....	5.2 (5. -5.5)	5.2 (4.9-5.5)
Length of pronotum.....	2.4 (2.3-2.6)	1.5 (1.3-1.7)
Greatest width of pronotum.....	2. (1.9-2.1)	1.7 (1.5-1.8)
Length of caudal femur.....	3.1 (3. -3.2)	3.5 (3.4-3.7)
Greatest width of caudal femur.....	1.2 (1.1-1.4)	1.3 (1.3-1.4)
Length of ovipositor.....	.....	2.8 (2.7-2.9)

Color Notes.—The entire territory over which this species is known has much of its surface composed of rough coquina rock which rock is very white. The species is wholly terrestrial, and we find that its scaly covering is silvery, usually with limbs barred and body spotted and mottled with dark brown scales; this coloration so matches the surface of the coquina rock that the little insects are practically invisible when at rest. The insect is very much whiter in appearance than its larger relative *C. squamosum*, even where specimens of that species from the arid West are found covered with pale yellowish scales. The postocular bar is very dark in this species and in the entire series before us extends along the upper edge of the lateral

⁴³ Specimen much squeezed out, normal length probably about 5 mm.

lobes of the pronotum to the caudal margin. Rubbed specimens show that the ground color of the species on head, pronotum, mesonotum, metanotum and all of the limbs is very pale yellowish, while the abdomen is black and the ovipositor dark brown. Unlike in *squamosum*, the post-ocular bar mentioned above is present not only in scale coloration but ground coloration as well, while the lateral lobes of the pronotum are somewhat lighter in coloration than its dorsal surface. The maxillary palpi are usually light, the apical joint suffused with blackish distad, this darker suffusion in a few cases overspreading the last three joints. The tegmina are bone white, the caudal border lightly blotched with black.

Distribution.—Lake Worth, southward to Key West, Florida.

Biological Notes.—Nearly all of the specimens of this terrestrial species have been captured hiding on the under surface of coquina boulders near or on the strand; the type, however, was captured in the low undergrowth growing on rough coquina rock in the scattering pine woods back of Miami. The little insects have never been found more than two or three at a time, and usually a considerable area has to be carefully searched before any specimens are discovered. When first exposed they usually remain motionless and closely pressed to the surface of the rock under which they had been hiding; when disturbed, however, they spring about wildly and are so hard to follow with the eye that unless captured before they are thoroughly aroused, individuals have excellent chances of escaping.

Remarks.—This species is unquestionably closely related to *Cycloptilum squamosum*, and it is possible that it may prove to be a geographic race of that species limited to southern Florida. Without material from the region between Palm Beach and Jacksonville, however, we are unable to find the slightest suggestion of intergradation. The facts that the characters which separate *zebra* from *squamosum* are constant, and that the former species is invariably much the smaller, rather suggest that *zebra* is not a race at all, since over the tremendous range of *squamosum*, no such differences are to be found in that species.

In the entire series of females the subgenital plate is, without exception, arcuato-convergent laterad with the distal section of the margin flattened, but with no trace of the emargination and acute spiniform angles found in so many females of *squamosum* from the Atlantic coast.

Specimens Examined.—21; 6 males, 9 females and 6 nymphs.

Lake Worth, Fla.; (Slosson); 1 ♀, 2 n. [Scudder Collection.]; 1 ♂. [Hebard Collection.]

Miami, Fla.; February 6, 1904; (H.); 1 ♂ (TYPE). [Hebard Collection.]; (Slosson); 1 n. [Scudder Collection.]

Long Key, Fla.; March 13, 1910; (H.); 1 ♀. [Hebard Collection.]

Key West, Fla.; March 15, 16, 1910; (H.); 4 ♂, 7 ♀, 3 ♂ n.⁴⁴

OLIGACANTHOPUS⁴⁵ new genus.

1905. *Mogoplistes* Rehn and Hebard (not of Serville, 1839), Proc. Acad. Nat. Sci. Phila., 1905, p. 4.

Genus monotypic. GENOTYPE—*Oligacanthopus prographus* n. sp.

This genus, known from a single female, is widely separated from all others of the group. In some respects a relationship, or development along similar lines to *Glaphyropus*, is apparent; this is shown in the compact build, rounded head, small eyes, broadly rounded and but little produced interantennal space, which is not divided by a vertical sulcus, and similar caudal femora.

With these characters, however, similarity to *Glaphyropus* ceases and we find, instead, a close relationship to *Cycloptilum* in the following respects: maxillary palpi very much like those found in *Cycloptilum*, cephalic and median limbs also similar, very different from the elongate type found in *Glaphyropus*; ovipositor of the type of *Cycloptilum*, but somewhat arcuato-convex and differing from all other known North American members of the group in having the ventral margins of the apex armed distad with a row of minute but true serrulations; cerci of the type found in *Cycloptilum*, caudal tarsi even shorter and proportionally heavier; armament of limbs of the same type as found in *Cycloptilum* but reduced in size to an extreme degree; the metatarsi are proportionally very long, nearly intermediate between *Glaphyropus* and *Cycloptilum*, but more closely approaching the former, the dorsal margins armed with serrulations similar to those of *Cycloptilum*, but so fine that they are apparent only in a good light under a microscope. Consequently we see that the caudal limbs are most peculiar in having proportions and armament differing strikingly from any other known species; the caudal femora are elongate and not at all flea-like, the tarsi are very short, quite heavy and armed with minute distal spurs, while the metatarsi are proportionally very long and slender, their dorsal margins so finely serrate that these could almost be termed unarmed and their terminal spurs minute.

⁴⁴ These specimens are distributed as follows: 1 ♂, 3 ♀, 3 ♀ n., Hebard Collection; 1 ♂, 2 ♀, A. N. S. P.; 1 ♂, 1 ♀, U. S. N. M.; 1 ♂, 1 ♀; Mus. Comp. Zool.

⁴⁵ From *ὀλίγος*, small, *ἀκανθα*, thorn, and *πόδις*, feet; in allusion to the very small tarsal spurs.

When compared with *Mogoplistes* the following differences are found. Head very different, ovoid, interantennal protuberance not as produced and with no vertical sulcus, eyes not so protuberant; pronotum with dorsal surface more flattened; caudal femora shorter, caudal tarsi very much shorter, proportionally very much longer caudal metatarsi; armament of limbs different, as in *Cycloptilum*, but all of the spurs and serrulations much smaller. The ovipositor in *Mogoplistes* is straight, rather long, with lateral division of valves exactly at middle proximad, but rising sharply and much nearer the dorsal margin over the greater length of the ovipositor, the apex is not widened and is armed on the ventral edge of the dorsal valves with blunt, knob-like serrations, while the surface of the dorsal valves is finely punctate. In *Oligacanthopus* the ovipositor is very different from this as may be seen by reference to the description.

Generic Description.—Head small, transverse, subelongate, smooth, interantennal protuberance weak, broadly rounded, flattened distad, no vertical dividing sulcus present; eyes pyriform, very slightly inflated; maxillary palpi not very long, gently expanding distad, the distal joint mildly obliquely truncate. Pronotum of female subquadrate in form, cephalic margin subtruncate, weakly arcuato-emarginate, caudal margin weakly arcuate, leaving the entire metanotum exposed. Tegmina absent in female. Ovipositor very gently arcuato-convex, very short, somewhat elongate sublanceolate at apex, lateral division of valves exactly at middle of sides, the surface of apex smooth, the ventral margins of the ventral valves armed distad with a row of minute serrulations. Subgenital plate of female rotundato-trigonal. Cerci elongate, subcrassate, tapering. Caudal femora dilated; caudal tibiae proportionately heavy and short, minutely serrulate on dorsal margins, with three pair of distal spurs, the dorso-internal shorter than the ventro-internal; caudal metatarsus elongate, proportionately slender, equal to over one-half the caudal tibia in length, dorsal margins supplied with minute serrulations, second joint not quite as long as third joint.

Distribution in North America.—Extreme southern Florida.

*Oligacanthopus prograptus*⁴⁶ n. sp.

1905. *Mogoplistes slossoni* Rehn and Hebard (not *Mogosiplistus slossoni* Scudder, 1897), Proc. Acad. Nat. Sci. Phila., 1905, p. 48. [Miami, Florida.]

TYPE: ♀; Miami, Dade County, Florida, under sign on oak in "hammock," February 6, 1904. (Hebard.) [Hebard Collection.]

⁴⁶ From *πρό*, in front, and *γραπτός*, that which is written upon; in allusion to the striking dark bars on the facial protuberance.

Description of Type.—Size small; form depressed, compact; surface covered heavily with scales. Head ovoid, occipital outline depressed,

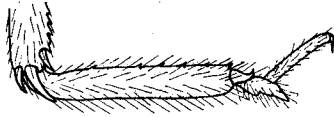


Fig. 21.—*Oligacanthopus prograptus*. Internal face of caudal metatarsus and internal tibial spurs. (Greatly magnified.)

weakly arcuate dorsad; interantennal protuberance separated from vertex by a well-marked transverse interantennal sulcus. Maxillary palpi with penultimate joint not more than two-thirds as long as terminal joint, the latter gently expanding distad, gently obliquely truncate. Pronotum with dorsum transversely very gently arcuate, curving sharply laterad, caudal width subequal to length, lateral outlines of disk straight, subparallel; lateral lobes passing into disk with an angulation but slightly indicated, depth of lobes over one-quarter their greatest length, ventral margin sinuato-truncate. Subgenital plate arcuato-trigonal, subcompressed. Ovipositor shorter than caudal femur, gradually thickened proximad, very gently arcuato-convex, somewhat elongate sublanceolate at apex, the surface of apex smooth, the ventral margins of the ventral valves armed distad with a row of minute serrulations. No tympanum present on the cephalic tibiae. Caudal tibiae straight; armament of same similar to that found in *Cycloptilum*, but greatly reduced in size, much smaller than in any other known North American species of the Mogoplistii, the medio-external spur nearly twice the length of the dorso- and ventro-external spurs. Caudal metatarsus straight, subcompressed; distal spurs reduced to very small heavy teeth which are sharply upcurved distad and scarcely reach the base of the



Fig. 22.—*Oligacanthopus prograptus*. Apex of ovipositor. (Greatly magnified.)

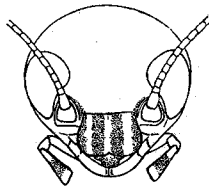


Fig. 23.—*Oligacanthopus prograptus*. Cephalic aspect of head. (Much enlarged.)

second tarsal joint, which is twice the length of one of these external spurs; these, as is true also in the tarsal spurs, are longer than the homologous internal spurs:

Measurements (in millimeters).—♀: Length of body, 5.8; length of pronotum, 1.5; caudal width of pronotum, 1.4; length of caudal femur, 3.7; greatest width of caudal femur, 1.2; length of caudal tarsus, 2; length of caudal metatarsus, 1.2; length of ovipositor, 2.5.

Color Notes.—So heavily covered with scales is the only specimen known that it is difficult to state the ground coloration of the insect. This coloration appears to be very pale wood-brown over the entire surface of the body; the interantennal protuberance never has the distal portion scaled, and in the present species this is strikingly marked with four parallel vertical bars of bistre separated by bars of the ground color of the same width, these somewhat more tinged with yellowish. The terminal joints of the maxillary palpi have also a broad band of bistre encircling their median portion, while the tip is more yellowish than the basal portion of the palpi which is of the prevailing very pale wood-brown. The antennæ are colored as the tips of the maxillary palpi, but have the third, sixth, tenth and sixteenth joints on each side bistre. The scaly covering is composed of silvery scales among which darker ones are found in confused masses, the tarsi all are distinctly twice banded with these scales, and in addition the base of the caudal tarsis is so darkened. The general effect is that of an irregularly mottled silvery hair-brown insect with banded limbs.

Biological Notes.—Although but a single specimen of this species has been captured, others were seen. All of these were observed at Miami, Florida, in the heavy semi-tropical "hammock" on the south bank of the Miami River, and were found by prying up loose pieces of bark and tearing off signs on the low oak trees. When exposed the insects sprang wildly about, to which habit is due the fact that but a single specimen was taken.

Distribution.—Miami, Dade County, Florida.

Synonymy.—When the specimen, on which this species is based, was first recorded, the authors confused it with Scudder's *Mogosiplistus slossoni* [*Cryptoptilum antillarum*] partially owing to the fact that Saussure had stated that the interantennal protuberance of *Mogoplistes* (*Mogisoplastus* Saussure, 1877; not *Mogosiplistus* Scudder, 1897) was not divided by a median vertical sulcus. Specimens from Saussure before us of the type of that genus, *Mogoplistes brunneus*, prove that though the interantennal protuberance is not absolutely divided by a sulcus, still it shows a distinct though minute sulcation quite as strongly as *Cryptoptilum antillarum*. This sulcation appears to be found in nearly all the species of the present group, and although

in *Glaphyropus* and *Oligacanthopus* this may be said to be absent, under a powerful microscope traces of such a suture may be found. *Liphoplus* and *Arachnocephalus* are said to have the protuberance so distinctly sulcate that, when viewed from above, the interantennal protuberance can be seen to be divided by a sulcus which separates this part into two distinct lobes. In all of the other known genera a distinct but more or less subobsolete sulcus exists. The variation in individual opinion in considering this type sulcate or non-sulcate has led to much confusion.

Specimens Examined.—1 ♀.

Miami, Fla.; Feb. 6, 1904; (H.); 1 ♀. (TYPE) [Hebard Collection.]

HOPLOSPHYRUM⁴⁷ new genus.

1868. *Mogoplistes* Scudder (not of Serville, 1839), Proc. Bost. Soc. Nat. Hist., XII, p. 142.

1874. *Mogoplistes* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 423 (in part).

1877. *Mogisoplistus* Saussure, Mélang. Orth., II, p. 463 (in part).

1897. *Ectatoderus* Saussure (not of Guérin, 1849), Biol. Cent.-Amer., Orth., I, p. 230.

1902. *Ectatoderus* Scudder (not of Guérin, 1849), Proc. Davenp. Acad. Sci., IX, p. 58.

Genus includes three species. GENOTYPE—*Hoplosphyrum occidentale* [*Mogoplistes occidentalis*] (Scudder).

The genus *Hoplosphyrum* is erected to include forms which are closer to *Ornebius* Guérin than to any other genus, but from which individuals of this genus can be readily separated by the elongate median spur of the caudal tibiæ and the very peculiar non-dilated apex of the ovipositor. The form of the pronotum and the apparent tegmina of the males show that they are not at all related to true *Ectatoderus*, while the presence of well-developed tegmina in the male, the ovipositor structure in the female, and the spur proportions are readily appreciable characters to differentiate the new genus from *Mogoplistes*.

Generic Description.—Form hardly depressed, compact, surface clothed with scales; pronotum little produced caudad in male, in general subquadrate dorsad; tegmina absent in female, well-developed and projecting caudad of pronotum in male.

Head little produced cephalad; interantennal protuberance with slightest trace of vertical division. Pronotum of male subdepressed,

⁴⁷ From ὄπλον, arm or weapon, and σφυρόν, ankle; in allusion to the long spurs on the distal extremities of the caudal tibiæ.

subquadrate or slightly longer than wide, narrowing but little cephalad, cephalic margin arcuato-emarginate, caudal margin arcuato-truncate; of female transversely arcuate, subquadrate in form, cephalic margin arcuato-emarginate, caudal margin emarginato-truncate; disk in both sexes cephalad with paired pyriform impressed outlines flanked cephalad and caudad by single subcallous points. Tegmina of male extending caudad of pronotum a distance equal or subequal to the pronotal length, broad, distal margin arcuate, tympanum fully developed, lateral field deep. Ovipositor cylindrical, straight or but little arcuate, apex simple, not differentiated from the shaft, unarmed, immediate apex acute. Subgenital plate of both sexes with the distal margin not excised, this plate in females compressed. Cerci of both sexes elongate, tapering. Cephalic tibiae with the cephalic face with a distinct tympanum. Caudal femora dilated; caudal tibiae straight, robust, deplanate dorsad, serrate dorso-laterad, with three pair of distal spurs, the dorso-internal shorter than the ventro-internal, the medio-internal elongate, reaching to the middle of the metatarsus; caudal metatarsus compressed, sulcate dorsad, strongly serrate on both dorsal margins, armed disto-laterad with spurs which cover the proximal portion of the terminal joint of the tarsus.

Distribution in North America.—Extending from southern New Mexico to the southern slopes of the Sierra Madre in California, southward to the Cape Region of Lower California, and also in the state of Guerrero, Mexico.

Key to Hoplosphyrum, New Genus.

- A. Terminal palpal joint elongate, subtubiform, the distal margin very obliquely subtruncate.
- B. Pronotum of male with cephalic width contained one and one-half times in the greatest length of the same, somewhat produced caudad; lateral lobes of male pronotum obliquely arcuato-emarginate caudad; ovipositor slender, subequal to the caudal femora in length.....*occidentale* (Scudder).
- BB. Pronotum of male with cephalic width contained very slightly more than once in the greatest length of the same, subquadrate; lateral lobes of male pronotum obliquely subtruncate caudad, not at all arcuato-emarginate; ovipositor more robust, shorter than the caudal femora,
boreale (Scudder).
- AA. Terminal joint of palpi broader, ovate.....*aztecum* (Saussure).

Hoplosphyrum occidentale (Scudder).

1868. *Mogoplistes occidentalis* Scudder, Proc. Bost. Soc. Nat. Hist., XII, p. 142. [Cape St. Lucas, Lower California.]
1874. *Mogoplistes occidentalis* Saussure, Miss. Sci. Mex., Rech. Zool., VI, p. 424. [Lower California.]
1877. *M[ogisoplistus]? occidentalis* Saussure, Mélang. Orth., II, p. 469. [Lower California.]
1896. *Mogoplistes occidentalis* Scudder, Proc. Bost. Soc. Nat. Hist., XXVII, p. 215.
1902. *E[ctatoderus] occidentalis* Scudder, Proc. Davenp. Acad. Sci., IX, p. 59.

TYPES:⁴⁸ 2 ♀; Cape St. Lucas, Lower California. [Scudder Collection.]

Description of Lectotype here Selected.—Size large for the genus; form elongate fusiform. Head rather small, depth subequal to greatest width, depressed dorsad, moderately protuberant between the antennal bases, without an appreciable vertical sulcus; eyes subpyriform, somewhat prominent laterad when viewed from the cephalic aspect. Maxillary palpi with the distal joint very elongate, slightly longer than the preceding joint, trumpet shaped, the distal margin very obliquely truncate, the length of the truncation contained over twice in the next shortest side. Pronotum subdeplanate dorsad, in proportions subquadrate, the lateral lines of the disk weakly subconvergent cephalad; cephalic margin strongly arcuato-emarginate, the head well seated in the same; caudal margin subtruncate, very faintly and very broadly subemarginate mesad; dorsum passing into the lateral lobes without lateral carinæ, but with appreciable angles caudad; lateral lobes with the greatest depth contained about three times in the greatest (dorsal) length of the same, ventral margin of lobes straight, becoming obliquely subarcuato-emarginate in the caudal half. Tegmina absent. Abdomen slightly deplanate dorsad, elliptical in outline. Subgenital plate small, subrostrate, very slightly arcuato-emarginate mesad. Ovipositor equal in length to the abdomen, subequal in length to the caudal femur, of moderate depth, slightly arcuate dorsad in the proximal third, thence straight, apex with very small impressed puncta. Cerci elongate, tapering. Cephalic tibiæ with a distinct but small elliptical tympanum on the cephalic face. Median limbs similar in proportions to the cephalic. Caudal femora moderately

⁴⁸ Both of the types have lost all of their limbs, and the characters of these parts are supplied from practically topotypic material.

inflated, the greatest depth contained slightly more than two and one-half times in the length of the same. Caudal tibiae compressed, V-shaped in section, the dorsum deplanate, nonsulcate, the margins elevated and closely serrate, dorso- and ventro-external distal spurs subequal in length, medio-external nearly twice the length of those dorsad and ventrad of it, internal spurs all longer than the external spurs and as in the generic diagnosis; caudal metatarsus armed on the dorso-internal margin with eight to nine spines, on the dorso-external margin with nine to ten spines.

Allotypic ♂ here selected; San José del Cabo, Lower California. [Hebard Collection.]

Description of Allotype.— Agreeing with the female lecto-

type except in characters here mentioned. Pronotum of male more produced caudad and more ampliate in the same direction, the cephalic width contained one and one-half times in its greatest length, the greatest caudal width subequal to its length; cephalic margin as in female, caudal margin strongly arcuate laterad, arcuato-truncate mesad; lateral lobes as in the female. Tegmina well developed for this group, projecting caudad of the pronotum a distance which at its greatest is subequal to the greatest length of the pronotum, broad, the width of the dorsal field of a single tegmen subequal to the greatest width of the pronotum; lateral field deep, slightly less than half the width of the dorsal field; distal extremity of dorsal field well arcuate; speculum of tegmina subequal in width to the cephalic margin of the pronotum. Subgenital plate with the distal margin complete.

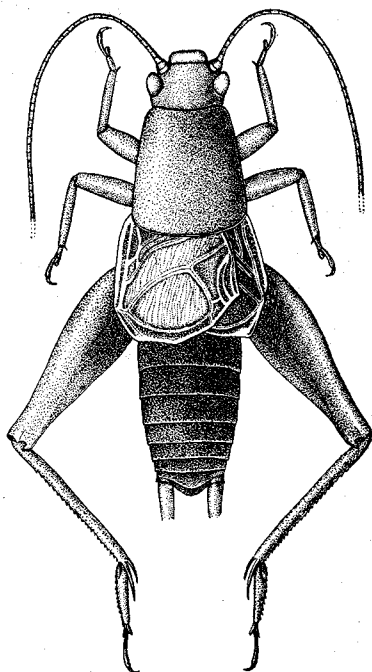


Fig. 24.—*Hoplosphyrum occidentale*.
Dorsal view of allotype. (× 4.)

Measurements (in millimeters).

	ALLOTYPE.	TYPE.
	San José del Cabo, L. Cal.	Cape St. Lucas, L. Cal.
	♂	♀
Length of body.....	14.3	13.2
Length of pronotum ⁴⁹	4.5	4.
Caudal width of pronotum.....	4.2	4.
Length of caudal femur.....	7.5	.....
Greatest width of caudal femur.....	2.9	.....
Length of ovipositor.....	.....	7.8

Average of series.

	♂♂	♀♀
Length of body.....	12.7 (12. - 14.5)	12.8 (11.5-14.)
Length of pronotum ⁴⁹	4.1 (4. - 4.5)	3.8 (3.5- 4.)
Caudal width of pronotum.....	4.1 (4. - 4.5)	3.9 (3.5- 4.2)
Length of caudal femur.....	7.3 (7.2- 7.5)	7.6 (6.7- 8.2)
Greatest width of caudal femur.....	2.9 (2.9- 3.)	3.1 (2.9- 3.3)
Length of ovipositor.....	.....	7.6 (7. - 8.)

Color Notes.—General shade of females varying from tawny ochraceous to vandyke-brown, the abdominal segments frequently darker proximad than is the general coloration. General color of head and

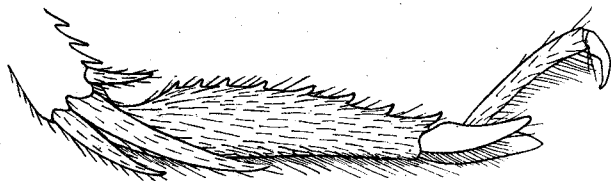


Fig. 25.—*Hoplosphyrum occidentale*. Internal face of caudal metatarsus and internal tibial spurs. (Greatly magnified.)

pronotum of male varying from cinnamon-rufous to hazel, the pyriform pronotal impressions umber, some incomplete concentric markings on the occiput of the same color. Abdomen of male deep chocolate, the margins of the segments very narrowly lined with whitish; the overlying scales of the abdomen bistre with points of ecru-drab, the latter color predominating in the marginal scales. Eyes very pale drab; palpi seal-brown; antennæ raw umber. Pronotum with the lateral lobes seal-brown. Tegmina of male broccoli-brown clouded with seal-brown, particularly toward the distal margin, veins more or less prominently lined with grayish-white; lateral field of tegmina

⁴⁹ Along lateral angle, as in the female the median length is less than the lateral.

with the base color seal-brown. Cephalic and median limbs seal-brown; caudal limbs burnt umber becoming seal-brown on the tarsi. Ovipositor raw umber.

All of the specimens before us appear to have been immersed in alcohol at some time, and in consequence the color description is not

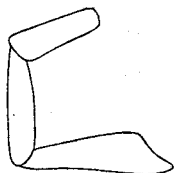


Fig. 26.—*Hoplosphyrum occidentale*. Maxillary palpus. (Greatly magnified.)



Fig. 27.—*Hoplosphyrum occidentale*. Apex of ovipositor. (Greatly magnified.)

as satisfactory as could be desired. In nearly all of the specimens the scales have been almost completely abraded and in but one specimen is there enough left to give an idea of the mass coloration of the scales.

Distribution.—With all the known material of this species before us, we can only give its distribution as the Cape Region of Lower California. San José del Cabo and Cape St. Lucas are the localities.

Synonymy.—Originally described and for years known only from two typical females, the acquisition of males of the allied *boreale* enabled Scudder to remove the species from *Mogophistes*, in which he had erroneously placed it at the time of the original description. Unfortunately, he placed it in *Ectatoderus* Guérin, a genus which has no apparent tegmina in the male and an immensely long pronotum in the same sex. In consequence we have been compelled to erect the genus *Hoplosphyrum* to receive the three forms here placed in it.

Specimens Examined.—9; 3 males and 6 females.

Cape St. Lucas, Lower California; 2 ♀. (TYPES) [Scudder Collection.]

San José del Cabo, Lower California; 3 ♂, 4 ♀. [Hebard Collection.]

Hoplosphyrum boreale (Scudder).

1902. *Ectatoderus borealis* Scudder, Proc. Davenp. Acad. Sci., IX, p. 58, pl. IV, fig. 4.⁵⁰ [La Cueva and Dripping Springs, Organ Mts., New Mexico; Julian, San Diego County, California.]

1905. *Ectatoderus borealis* Baker, Invertebr. Pacif., I, p. 79. [Claremont, California.]

1909. *Ectatoderus borealis* Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1909, p. 172. [Between Alamogordo and Dry Cañon, Otero County, New Mexico; Florida Mts., New Mexico.]

This species differs from *H. occidentale* in having the cephalic

width of the male pronotum contained only slightly more than once in the greatest length of the same, and in consequence the pronotal disk is more quadrate; the lateral lobes of the male pronotum are obliquely subtruncate, but not at all emarginate, and the ovipositor is more robust and is shorter than the caudal femora.

TYPES: 1 ♂, 1 ♀; La Cueva, N. M.: 1 ♂; Julian, Cal. [All Scudder Collection.]

Lectotype here selected: ♂; La Cueva, Organ Mountains, New Mexico, September 4. (C. H. T. Townsend.) [Scudder Collection.]⁵⁰

Description of Lectotype.—This specimen differs from the allotypic male of *occidentale* in the characters here given. Size smaller, head subcompressed, the depth considerably greater than the greatest width (across eyes); eyes less protuberant, hardly

projecting beyond the general line of the head. Pronotum with the cephalic width contained slightly more than once in the length of the dorsum, lateral margins moderately expanding caudad, caudal margin of the disk less rounded laterad than in *occidentale* and in consequence the caudal margin is straighter; lateral lobes of the pronotum deeper than in *occidentale*, ventro-caudal margin without any arcuate-emargination, more decidedly oblique truncate. Tegmina, on account of the reduced pronotum, appearing to be longer and more ample than in *occidentale*, in general form and proportions, however, being very similar; the greatest width of a single tegmen is slightly less than the caudal width of the pronotum; speculum of tegmina distinctly wider than the cephalic width of the pronotum and subequal to the median length of the same. Caudal femora less inflated than in *occidentale*; caudal metatarsus armed dorsad with eight internal and ten external spines.

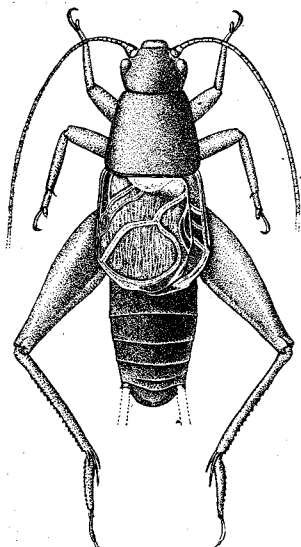


Fig. 28.—*Hoplosphyrum boreale*.
Dorsal view of lectotype.
(× 4.)

⁵⁰ The originally figured specimen is the female from Dripping Springs (*vide infra*), the condition of the individual fully agreeing with the figure. As this specimen was subsequently received by Scudder and is not one of the listed type series, it cannot be regarded as the lectotype.

Allotypic ♀ here selected. Data the same as the type, except date which is September 5.

Description of Allotype.—Closely resembling the same sex of *occidentale*, differing only in the characters here indicated. Size smaller. Head with the proportions of the same and prominence of eyes as in male sex. Pronotum subquadrate, the greatest caudal width slightly greater than the length of the same; margins as in *occidentale*; lateral lobes as in the male. Ovipositor more robust and shorter than caudal femur. Caudal limbs somewhat less robust.

Measurements (in millimeters).

	TYPE. ALLOTYPE.		Julian, Cal.	San José del Cabo, L. Cal.	La Chee- parosa, L. Cal.
	La Cueva, N. M.				
	♂	♀	♂	♂	♂
Length of body.....	12.7	13.	10.5	8.6	12.3
Length of pronotum.....	3.	3.	2.9	2.4	3.3
Caudal width of pronotum..	3.2	3.4	3.1	2.7	3.4
Length of tegmen.....	4.5	.....	4.1	3.2	4.
Length of caudal femur.....	7.	7.1	6.	.....	6.
Greatest width of caudal femur.....	2.5	2.4	.....	.....	2.2
Length of ovipositor.....	.....	6.5	.....	.....	.....

	Los Angeles Co., Cal.		Florida Mts., N. M.	
	♀	♀	♀	♀
Length of body.....	9.5	12.		
Length of pronotum.....	2.4	2.9		
Caudal width of pronotum.....	2.8	3.2		
Length of tegmen.....	.....	.....
Length of caudal femur.....	5.1	7.		
Greatest width of caudal femur.....	2.	2.4		
Length of ovipositor.....	4.8	6.2		

Los Angeles and Los Angeles Co., Cal.
Average of series.

	♂ ♂	♀ ♀
Length of body.....	9.3 (8.5-10.)	10.2 (9.5-11.)
Length of pronotum.....	2.4 (2.3- 2.6)	2.5 (2.3- 2.8)
Caudal width of pronotum.....	2.8 (2.6- 3.)	2.9 (2.8- 3.1)
Length of tegmen.....	3.2 (2.9- 3.8)	.....
Length of caudal femur.....	5.3 (5.2- 5.5)	5.6 (5.1- 6.3)
Greatest width of caudal femur.....	2. (2.)	2. (1.9- 2.2)
Length of ovipositor.....	.....	5.1 (4.6- 5.5)

Color Notes.—General tone of more or less abraded specimens varying from cinnamon to ochraceous, the abdomen generally seal-brown, but in a few specimens⁵¹ the abdominal coloration is no darker than the general tone. Eyes varying from broccoli to clove-brown, palpi varying in similar fashion. Lateral lobes of the pronotum wholly seal-brown, the dorsal line of the color mass more sharply defined in some than in other specimens. Abdominal segments in the majority of specimens narrowly margined with whitish; ovipositor ferruginous; cerci buffy, darkening distad. Limbs buffy,⁵² but as the overlying scales are more generally present on the limbs than on the rest of the body and in color are raw umber, the general shade is dark, with, however, a more or less distinct paler pregenicular annulus; caudal tibiae with the scales colored in such a fashion that there is a broad median pale annulus and another extremely narrow one immediately distad of the genicular extremity, the remainder of the tibial scales being seal-brown. In the specimens sufficiently abraded on the dorsum to enable one to ascertain the color of the scales, it is seen that pale buff-gray is the covering color, while in some specimens regularly placed patches of umber scales are found on the margins of the abdominal segments.

Distribution.—From Southern New Mexico (Alamogordo and Organ Mountains) west to Southern California, north as far as the southern slopes of the Sierra Madre (Claremont), thence south to the Cape region of Lower California. Nothing whatever is known of the distribution of the species in northern Mexico, and we have no record of its occurrence in Arizona. The highest elevation (of which we have record) at which the species has been taken is Dripping Springs, N. M., at an altitude of 5,800 feet above sea level.

Biological Notes.—The only knowledge concerning the habits of this species is the fact that the Alamogordo specimen was taken by the authors from a dead yucca.

Remarks.—The present species is one which varies much in size, New Mexican individuals surpassing all others in this respect except Sierra Laguna, Lower California, specimens. Such variation is not

⁵¹ These specimens have not had their coloration lightened by alcoholic immersion. A number of other individuals which have at some time been immersed in alcohol are equally pale on the abdomen, but we have not considered such specimens in drawing up the above notes.

⁵² In specimens which have been in alcohol the cephalic and median limbs are much darker, seal-brown in fact, but this does not seem to be the natural coloration.

correlated with definite regions, as San José del Cabo representatives are as small as any seen, while the Los Angeles County, California, specimens are all of very small size. The Lower California individuals vary considerably from the typical New Mexican phase, approaching *occidentale* in the shape of the head; some specimens having the proportions of the latter as in *occidentale*, but in such cases the proportion of the pronotum in the male, the rather slenderer caudal femora in both sexes, and the distinctly shorter and more robust ovipositor in the female will serve to associate properly the individuals. The number of spines on the dorsal margins of the caudal metatarsi varies considerably, the external margin having from six to nine and the internal seven to twelve distinctly indicated. The number of these spines is in no way correlated with the locality. The tympanum is clearly indicated on the cephalic face of the caudal tibiae in all the adults examined, although varying considerably in size and exact shape, but it is not present in nymphal specimens. The cerci vary in length in this species much as in *Cryptoptilum antillarum*. The subgenital plate in the male is weakly subtruncate in several individuals, but its normal form is similar to that of *occidentale*.

Specimens Examined.—40; 13 males, 23 females and 4 nymphs.

- Dripping Springs, Organ Mts., N. M.; Sept., 1899; (Cockerell);
 1 —. [U. S. N. M.]: (Cockerell); 1 ♂, 1 ♀. [Scudder Collection.]
 La Cueva, Organ Mts., N. M.; Sept. 4, 5; (C. H. T. Townsend);
 1 ♂, 1 ♀. (TYPES) [Scudder Collection.]
 Alamogordo to Dry Cañon, N. M.; July 13, 1907; (R. and H.);
 1 ♀ n. [Hebard Collection.]
 Florida Mts., N. M.; (Pilsbry); 2 ♀. [A. N. S. P.]
 California; 1 ♀. [U. S. N. M.]
 Los Angeles County, Cal.; (Coquillett); 2 ♂, 4 ♀. [U. S. N. M.]
 Los Angeles, Cal.; (Coquillett); 1 ♂, 2 ♀. [U. S. N. M.]: 1 ♂.
 [Hebard Collection.]
 Claremont, Cal.; (C. F. Baker); 1 ♂. [A. N. S. P.]
 Julian, San Diego Co., Cal.; July; 1 ♂. (TYPE) [Scudder Collec-
 tion.]
 Lower California; 1 ♂, 3 ♀. [Hebard Collection.]
 Sierra Laguna, L. Cal.; (Eisen); 1 ♂, 3 ♀. [*ibid.*]
 La Joya, Sierra Laguna, L. Cal.; (Eisen); 1 ♀ n. [*ibid.*]
 La Cheeparosa, L. Cal.; 1 ♂, 1 ♀ n. [*ibid.*]
 San Lazaro, L. Cal.; Sept., 1894; 1 ♀. [*ibid.*]
 Sierra el Toste, L. Cal.; Sept. 23; (Eisen); 1 ♂. [*ibid.*]
 San José del Cabo, L. Cal.; 1 ♂, 5 ♀, 1 ♀ n. [*ibid.*]

Hoplosphyrum aztecum (Saussure).

1897. *Ectatoderus aztecus* Saussure, Biol. Cent. Amer., Orth., I, p. 230, pl. XI, figs. 35, 36. [Chilpancingo, Guerrero, Mexico, 4,600 feet.]

1905. *Ectatoderus aztecus* Baker, Invertebr. Pacif., I, p. 79. [Acapulco, Guerrero, Mexico.]

As far as can be determined from the description, this species can be readily separated from the other species of this genus, to which it undoubtedly belongs, by the ovate terminal palpal joint.

TYPE: ♂; Chilpancingo, Guerrero, Mexico, elevation 4,600 feet. (H. H. Smith.) [*Biologia* Collection in British Museum.]

Description of Type.—"Somewhat thickened, fuscous. Head suborbicular, lightly convex, a fulvous obsolete transverse facial line and an irregular fulvous line on each side above the eyes. Antennæ fuscous, bases paler. Eyes broadly elliptical or subovoid, hardly attenuate above, internal margin above very subtly incised. Terminal palpal joint a little broader, ovate. Pronotum as long as wide, deplanate, anteriorly not strongly coarctate; anterior margin sinuate, posterior transverse, scarcely arcuate; upper part seen from above castaneous, broadly flavo-fulvous on the margins of both sides, lateral lobes black. Disk marked above on both sides with two crassate black puncta and on each side between these an intercalate pyriform depression, showing exteriorly acute elevated margins. Elytra parallel on dorsum, leaving the apex of the abdomen exposed, shaded with dull testaceous and fuscous lines, posterior margin arcuate; regularly vittate with fuscous at the margin. Speculum much broader than long, with elevated lines, the anterior angle right- or obtuse-angulate; anal rami three. Lateral field very wide, luteous, with two to three longitudinal fuscous lines, the second the widest; inferior margin angulate before the middle. Feet compressed; anterior and intermediate fuscous, coxæ, knees and tarsal articulations testaceous; metatarsi moderately long. Posterior femora heavy, fusco-testaceous, apically fuscous. Posterior tibiæ moderately broad, fusco-rufescent, apically more fuscous, above broadly canaliculate, the margins heavily denticulate. Internal intermediate spur fairly elongate; upper minute. Tarsi fuscous; posterior metatarsus elongate, above armed with many teeth. Abdomen brownish-black, beneath fusco-testaceous. Cerci rather long, rufous, bases thickened. Last dorsal segment narrow, testaceous. Supra-anal plate elongate-trigonal, apex rounded. Subgenital plate transverse, margin subarcuate, black.

"♂. Length of body 6.8; pronotum 2.2, width 3; elytra beyond pronotum 2.7, width 3.2; posterior femur 4.8 millimeters."

Remarks.—No specimens of this species are available for study. We have included the species to make our study of the genus complete for the forms found north of Panama.

Genus **LIPHOPLUS** Saussure.

1877. *Liphoplus* Saussure, Mélang. Orth., II, pp. 456, 483.

GENOTYPE (selected by Kirby): *Liphoplus novaræ* Saussure.

We do not feel positive that the following species is really a member of the genus *Liphoplus*, which elsewhere is found only in the Polynesian, Indian and Malagasian regions. However, as the original description specifically agrees with most of the generic characters which Saussure gave as diagnostic of his genus, we have no alternative, in the absence of material, but to retain it in *Liphoplus*. No mention is made of the absence of a tympanum on the cephalic face of the cephalic tibiæ, which absence is considered an important generic character in the original description of the genus, but this omission is rather discounted by the figure which shows no tympanum, thus agreeing with true *Liphoplus*. The interantennal protuberance is described and figured as distinctly divided.

Generic Description.—"Body pubescent, the females apterous, the males supplied with tegmina. Head as in *Arachnocephalus*, showing a protuberance divided by a sulcus.

"Pronotum in the males produced posteriorly over the metanotum, as in *Ectatoderus*, the caudal margin arcuate; less produced in the females. Anterior tibiæ having the internal faces supplied with a small tambourine. Tegmina of males short, membranous, supplied with a complete tambourine, but sometimes more or less obsolete.

"This genus is to us but imperfectly known. The body is very pubescent, but we presume that it should be likewise more or less scaled in fresh and well-preserved individuals. The elytra of the males show in their tambourines certain analogies to those of the *Phalangopsini*, the first vein being angulate.

"*Liphoplus* differs from *Arachnocephalus* in the anterior tibiæ being furnished with a tambourine, and in their winged males; from *Ectatoderus* in their facial protuberance being distinctly divided."

Distribution in North America.—State of Guerrero, Mexico.

Liphoplus mexicanus Saussure.

1897. *Liphoplus mexicanus* Saussure, Biol. Cent. Amer., Orth., I, p. 231, pl. XI, fig. 37. [Amula, Guerrero, Mexico.]

TYPE: ♂; Amula, Guerrero, Mexico, elevation 6,000 feet. (H. H. Smith.) [*Biologia* Collection in British Museum.]

Description of Type.—"Rufo-testaceous, depressed. Antennæ of

the same color. Head and pronotum covered with grayish scales. Facial scutellum much swollen, divided by a sulcus. Pronotum large, depressed, much narrowed anteriorly, much dilated posteriorly, posterior margin transversely arcuate. Elytra surpassing the pronotum very much, leaving the last two abdominal segments exposed, broader than pronotum, testaceous, flat; lateral field deflexed, narrow, reflexed inferiorly, divided by a thick, luteous longitudinal vein, marginal half (base and extremity excepted) blackish; dorsal field very broad, posterior margin broadly rounded, margins reddish; speculum very large, subtrigonal, posterior margin arcuate, anterior angle hidden under pronotum, entire disk irregularly folded like a fan and divided by a rectangular vein. Feet reddish, covered with whitish scales; femora heavy. Posterior tibiæ mildly arcuate, above flat, acutely rounded, thickly armed with minute teeth. Internal spurs: intermediate equal to one-third of the metatarsus; upper short, shorter than lower, equalling or exceeding half the length of the intermediate. External spurs very small: upper little longer than lower, removed from the intermediate spur. Metatarsus posteriorly compressed, having two series of denticulations above. All of the tarsi black at apex. Apical portion of abdomen attenuate, black. Supra-anal plate minute, transverse, deflexed, divided by a sulcus. Subgenital plate elongate, covered with hairs, the apex forming two denticulations. Cerci long, reddish.

“♂. Length of body 9; pronotum 3.7, width 3; tegmina beyond pronotum 2.9, width 3.8; caudal femora 5 millimeters.”

Remarks.—No specimens of this species are available for study. We have included the genus and species to make our study of the group complete for the forms found north of Panama.