OCCASIONAL PAPERS
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No. 150 May 4, 2001

EMBIA

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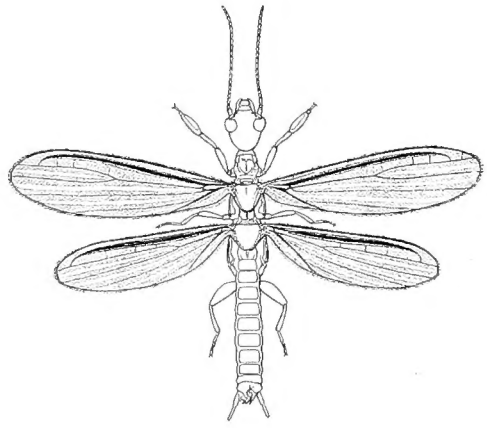
Part 3
The Embiidae of the Americas (Order Embiidina)

By
Edward S. Ross



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Brachypterembia moreliensis Ross (Embiidae), male paratype on microscope slide. Shows short wings, one of the characteristics of the species. Some paratypes have, even shorter wings, scarcely the length of the bearing somite.
Type locality: near Morelia, Michoacán, Mexico.

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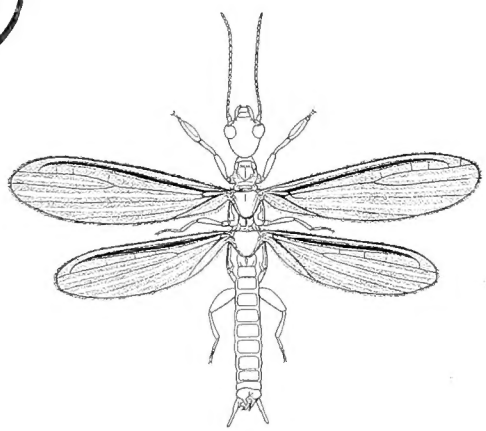

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Part 3. The Embiidae of the Americas (Order Embiidina)

Part 3

The Embiidae of the Americas (Order Embiidina)

Abstract

All 65 recognized American species of the family Embiidae (30 new in this paper) are treated, assigned to twenty-one genera (9 new in this paper) and placed in four new subfamilies. In many cases the treatment of species is limited to those serving as the type species of a genus. Additional species in my collection (CAS), many undescribed, will be treated in future works. Included will be several collected in northeastern Brazil, males of which did not mature in cultures in time for incorporation in this treatment. The arrangement of genera in this checklist do not always reflect degrees of relationship.

Introduction

Embiidae, one of the order's major families, is well represented in the Americas, but most species belong to one subfamily, Scelembiinae, which is more richly represented in equatorial Africa, often by genera closely related to those in the Americas. Several other embiid subfamilies are present in Africa and India but the family appears to stop in eastern Burma. Most southeastern Asian and Australian families are very distinct.

My background for this paper includes a study of the primary types of almost all New World species of Embiidae, as well as those of other taxa. I have also visited almost all Latin American countries and have cultured field-encountered specimens.

Except for obvious close relationships within the newly-named subfamily Archembiinae, and its affinity to the plesiomorphic family Clothodidae, the development of a cladogram for other genera would be premature. Many anatomical characters cannot be well expressed in words. Also, I have lately become impressed by the importance of coloration, especially that of females, in distinguishing species. Very often species are almost indistinguishable on the basis of terminalia characters.

The distinct embiid genera of Mesoamerica, especially of Mexico's Sierra Madre Occidental, appear to have evolved during the long separation of Mesoamerica from South America. One Mexican genus, *Pachylembia* Ross, is so distinct, including copulation methods, that I propose a new subfamily, Pachylembiinae, for it.

Explanation of terminalia symbols: 9 = ninth abdominal tergite; 10 L and 10 R = hemitergites of tenth somite; 10 LP and 10 RP = processes of these hemitergites; MS = medial sclerite of 10; EP = epiproct (somite 11); H = hypandrium (sternite 9); HP = process of H; LPPT and RPPT = left and right paraprocts; LCB and RCB = left and right cercus-basipodites; LC_1 = basal segment of left cercus.

Institutional symbols: AMNH – American Museum of Natural History, New York; BMNH – British Museum, Natural History, London; CAS – California Academy of Sciences, San Francisco; IHNB – Instituto de Historia Naturales, Bogota; IFML – Instituto Miguel Lillo, Tucumán; MHNP – Museo Historia Naturales Lima Peru; MNRJ – Museu National Rio de Janeiro; MZUSP – Museu do Zoologia de Universidad de São Paulo; UNAM – Instituto Biologia, UNAM, Mexico, DF; NMQ – Museo de Ciencias Naturales, Quito; USNM – United States National Museum, Washington.

Nomenclature of types: For a holotype, I choose the best quality adult male specimen from the largest series with the most precise locality and biological data. In the case of the few parthenogenetic species, the holotype is an adult female.

In accordance with my personal opinion (Ross, 1956) that paratypes should as near as possible represent characters of the holotype and not necessarily the general nature of the species (e.g., variation, distribution, etc.), my paratypes are topotypic and of the same sex as the holotype. My designations allotype and parallotype are similarly restricted but, because they are not paratypes, they have no formal status under the International Code of Zoological Nomenclature (4th edition, 2000).

In most cases, my type series are from a single culture. Specimens apparently conspecific but from other localities are treated as "other specimens examined."

CHECKLIST OF AMERICAN EMBIIDAE

Subfamily Archembiinae, new
Genus *Archembia* Ross
batesi (McLachlan), Amazon Basin
peruviana n. sp., Peruvian montaña
lacombea Ross, eastern Brazil
kotzbaueri (Navás), eastern Brazil
bahia n. sp., Bahia, Brazil
dilata n. sp., southern Brazil
paranae n. sp., southern Brazil
boliviana n. sp., SE Bolivia
arida n. sp., S-coastal Ecuador
Genus *Calamoclostes* Enderlein
albistriolatus Enderlein, Baños, Ecuador
gurneyi Ross, southern Colombia
auriceps n. sp., central Ecuador
micropterus n. sp., central Ecuador
silvestris n. sp., El Oro, Ecuador
oculeus n. sp., W of Cali, Colombia
Subfamily Microembiinae, new
Genus *Microembia* Ross
rugosifrons Ross, Iquitos, Peru
Subfamily Scelembiinae, new
Genus *Lithembia* Ross
florissantensis (Cockerell), Oligocene
Genus *Embolyntha* Davis
brasiliensis (Gray), Rio region, Brazil
Genus *Xiphosembia*, new
amapae n. sp., Amazonia, Brazil
Genus *Dolonembia*, new
tapirape n. sp., Mato Grosso, Brazil
Genus *Ischnosembia*, new
amazonica n. sp., Lower Amazon, Brazil
surinamensis (Ross), Surinam
Genus *Gibocercus* Szumik
chaco Szumik, Argentina
urucumi Szumik, Mato Grosso, Brazil
beni Szumik, Bolivian yungas
peruvianus n. sp., Peruvian montaña
magnus n. sp., Bolivian yungas
Subgenus *Amazonembia*, new
sandrae n. sp., Napo region, Ecuador
napoa n. sp., Napo region, Ecuador
nanai Szumik, Iquitos region, Peru
flavipes n. sp., Iquitos region, Peru
Genus *Pararhagadochir* Davis
trinitatis (Saussure) Trinidad, Venezuela
= *flavicollis* Krauss, Rio Orinoco
flavicollis (Enderlein), Bolivia, Paraguay
= *schadei* Ross, n. syn.
pallida n. sp., Argentina
picchua n. sp., Machu Picchu, Peru
trachelia (Navás), Argentina
bicingillata (Enderlein), Amazonia
= *davisi* Ross, n. syn.
christae Ross, lower Amazon, Brazil
balteata Ross, São Paulo, Brazil
tenuis (Enderlein), Bolivian yungas
birabeni (Navás), Argentina
confusa Ross, Argentina
minuta n. sp., northeastern Brazil
Genus *Litosembia*, new
oligembioides n. sp., Belém, Brazil
Genus *Biguembia* Szumik
multivenosa n. sp., northeastern Brazil
copo Szumik, Argentina
cocum Szumik, Mato Grosso, Brazil
Genus *Argocercembia*, new
guyana n. sp., Guyana
Genus *Aphanembia* new
obscura n. sp., Amazon Basin
Genus *Ambonembia*, new
incae, n. sp., Cuzco, Peru
adspersa (Enderlein), Bolivia
Genus *Malacosembia*, new
tucumana n. sp., Argentina
yungae n. sp., Bolivia
Genus *Ochrembia*, new
wagneri (Navás), Argentina
Genus *Neorhagadochir* Ross
inflata Ross, Guatemala
Subgenus *Drepanembia* Ross
salvini (McLachlan), Guatemala
Genus *Brachypterembia* Ross
moreliensis Ross, Michoacán, Mexico
Genus *Conicercembia* Ross
tepicensis Ross, Tepic, Mexico
septentrionalis (Mariño-Márquez), Michoacan, Jalisco, Colima, Mexico
Insertae sedis
Embia mulleri Hagen, southeastern Brazil
Subfamily Pachylembiinae, new
Genus *Pachylembia* Ross
chapalae, Ross, Michoacán, Mexico
autlanae n. sp., Jalisco, Mexico
colimae n. sp., Colima, Mexico
unicincta Ross, Jalisco, Mexico
taxcoensis Ross, Taxco, Gro, Mexico

KEY TO SUBFAMILIES OF AMERICAN EMBIIDAE

(Males)

1. Basal segment of left cercus (LC_1) without an inner lobe. Left tergal process (10 LP) minute, needle-like. Sierra Madre Occidental, Mexico ..... Pachylembiinae
— LC_1 with inner, usually echinulate, lobe. 10 LP conspicuous 2
2. Anterior margin of clypeus rugose, its outer angles projected. Small, upper Amazonian species ..... Microembiinae
— Margin of clypeus smooth, not projected 3
3. Medial flap (MF) usually elevated, if not, a large sclerite is present in caudal membrane of tergite 9 ..... Archembiinae
— Medial flap never elevated, no sclerite in caudal membrane of tergite 9 ..... Scelembiinae

Archembiinae Ross
new subfamily

Type genus.—*Archembia* Ross, by present designation.

Distribution.—South America.

Diagnosis.—Males: Size medium to large (body length 11–18 mm), usually winged but apterous or subapterous in at least two high Andean species. Mandibles usually short, thin, apical teeth on a single plane; mentum prominent; submentum quadrate, weakly sclerotized, anterior and lateral margins not inflexed. Wings at times basally broad; venation embioid but with MA unforked as a variation in *Archembia arida* n. sp., and *Calamoclostes oculeus* n. sp.; veins well sclerotized except for Cu_{1a} which is weak, never forked. Hind basitarsus with a usually small, medial papilla. Terminalia in *Archembia* small; cerci, especially the apical segment, often greatly elongated; terminalia of *Calamoclostes* more robust; cerci shorter. Tenth tergite broadly cleft to base; medial flap (MF) elevated, ridge-like in *Archembia*; epiproct sclerite (EP) broadly attached to MF, narrowed caudad and slanted downward instead of horizontal. Left hemitergite (10 L) weakly margined on inner side; its process (10 LP) slanted mesad; narrow, simple in *Archembia*, but slightly barbed distally and dorsally in *Calamoclostes*; right process (10 RP) at most a short, triangular lobe, membranous on inner side, not terminated as a sclerotic talon. Hypandrium (H) uniformly but weakly sclerotized; its lobe (HP) short, its caudal and left margin membranous. Left paraproct (LPPT) composed of a membranous, setose lobe and a sclerotic outer portion toward base of left cercus (in *A. arida*, LPPT is completely sclerotized, the setose portion obscure). Right paraproct (RPPT) reduced to an inconspicuous, setose lobe partially obscured beneath apex of HP. Right cercus-basipodite (RCB) a peculiar, sclerotic ring around base of right cercus, never fused to adjacent structures. Basal segment of left cercus (LC_1) always bearing a prominent medial or distal echinulate lobe.

Females.—Subfamily characters not investigated.

Discussion.—This exclusively South American subfamily contributes much to an understanding of the evolution of the abdominal terminalia of males of the order. The medial flap (MF) is particularly interesting because it is undoubtedly homologous to the upturned apex of the tenth tergite of *Clothoda* Enderlein, the most plesiomorphic genus of the order. In this structure, which includes a vestige of somite eleven, archembiines are more closely related to *Clothoda* than that genus is to its congeners (*Cryptoclothoda* Ross, *Antipaluria* Enderlein, and especially *Chromatoclothoda* Ross) in which MF isn't upturned, having leveled off to become the inner portion of the right hemitergite (10 R) and its process (10 RP).

Archembiines also indicate that the epiproct sclerite (EP) throughout the order is derived from the ventral (or mesocaudal) surface of MF (= vestige of tergite 11). This sclerite hinges and usually levels off on a supra-anal pad (EP). This pad and its sclerite (when present) apparently is attachment for intertergal muscles which pull the right process (10 RP) downward during copulation, especially in oligotomoid and teratembioid genera. It should be noted that 10 RP has no muscles. Therefore, the epiproct is of great copulatory importance throughout the order. However, as in some genera of Scelembiinae, the epiproct, as well as the medial flap, is scarcely discernable.

It is noteworthy that *Clothoda* and *Archembia* have in common the largest number of chromosomes as yet observed in the order (Ross, unpublished data).

The subfamily's two genera are distinguished by overall dissimilarity of male characters some of

which aren't exclusive, e.g., generally more slender body form of *Archembia* with longer cerci and antennae; smaller, narrower head of *Archembia* with thinner mandibles and finer apical dentation; a usually broader vannal hind wing area of *Archembia*; universal absence in *Archembia* of a large sclerite in the dorso-caudal membrane of the ninth abdominal somite; universal simplicity of left tergal process (10 LP); and the usually medial position of the left cercus lobe of *Archembia*. The left cercus lobe often is very large in *Calamoclostes*. The geographic ranges of the two genera are almost allopatric and colony formation and habitats usually are generically distinct. Colonies of *Archembia* usually are conspicuous on road bank, and bark surfaces, those of *Calamoclostes* are obscurely concealed in rock and bark crevices.

Distribution.—*Archembia* is a prominent genus in Amazon and Paraná river basins, and especially in Atlantic forest zones of eastern Brazil. *Calamoclostes* is almost entirely confined to high Andean habitats in Ecuador and Colombia. However, *Archembia arida* n. sp., is isolated along the arid southern coast of Ecuador. It is very unlikely that it was introduced into the region in human commerce.

KEY TO GENERA OF ARCHEMBIINAE

(Males)

1. Adult males with a large sclerite in posterior intersegmental, dorsal membrane of abdominal somite nine. Left tergal process (10 LP) with an acute apical hook and, at times, a blunt subapical dorsal spur. Andean altiplano and coastal Ecuadorian distribution ..... *Calamoclostes*

— Adult males lacking an intersegmental sclerite on somite nine. Left tergal process (10 LP) simple, apex rounded. Absent in Andean altiplano. Widespread in Amazon and Paraná basins as well as in eastern Brazil. One species in arid coastal Ecuador ..... *Archembia*

Genus *Archembia* Ross

Archembia Ross, 1971:30. Szumik, 1996:51; 1998:141 (in cladogram).

Type species.—*Archembia lacombea* Ross, by original designation.

Distribution.—South America: Entire Amazon and Paraná basins, eastern Brazil, southward at least into southern Santa Catarina, and westward to the lower east Andean slopes of Bolivia, Peru, Ecuador and Colombia. One exceptional species occurs in arid, coastal Ecuador.

Diagnosis.—Males: Size medium to large (body length 12–18 mm) body usually slender, somewhat dorso-ventrally flattened, always winged. Head usually disproportionately small and narrow. Apical antennal segments usually brown but abruptly pure white in two species (always in *A. batesi*, usually in *A. bahia*). Mandibles small, flat, outer margins evenly arcuate; apical dentation often minute, finely acute; middle tooth of left mandible at times smaller than others. Submentum never heavily sclerotized but with sides well defined, anterior margin never inflexed. Wings occasionally broad in basal, subcostal and vannal areas; RBS rather narrow, other veins reduced toward apices; Cu_{1a} reduced to a row of setae; MA usually branched; cross-veins few in number; hyaline stripes very narrow their margins irregular. Hind basitarsus with a medial, often small, ventral papilla. Terminalia small, weakly sclerotized; ninth and tenth tergites short, transverse; ninth tergite membranous except along basal margin and sides, lacking a sclerotized area in caudal intersomital membrane. Tenth tergite largely membranous medially, almost to basal margin. Left hemitergite (10 L) small, inner margin weakly sclerotized, its process (10 LP) simple, narrow, slanted meso-caudad, at times flared or twisted distad. Right hemitergite (10 R) usually produced caudad as a short acute point (10 RP) which is membranous on inner side. Medial flap (MF) well developed, elevated, slightly recurved and microspiculate on anterior end; ventral surface sclerotic, wrinkled, tapered caudad, extended on surface of epiproct (EP). Ninth sternite, or hypandrium (H) broadly lobed (HP). Left and right paraprocts (LPPT and RPPT) each represented by a fleshy, inner, setose, membranous lobe (the left of which is larger) on either side of HP and by a dark, sclerotic fragment, lacking a process, at base of left paraproct. Right cercus-basipodite (RCB) a narrow, dark, sclerotic ring around cercus base. Cerci very elongate, slender, distal segments longer than the basals. Inner side of basal segment of left cercus with an abrupt, medial, or distal echinulate lobe. Both cerci completely, but not always heavily sclerotized (i.e., outer surfaces not membranous).

Females: Rather large; strongly, dorso-ventrally flattened; legs stout. Cranium circular; pale to dark-

ly pigmented; if dark, a large, transverse, dorsal, pale spot usually present between eyes. Antennae 22 to 24-segmented, apical segment dark; five subapical segments contrastingly white; all other segments dark brown. Pronotum rather large, at times paler than other thoracic scuta, or as dark. All other thoracic and abdominal scuta darkly pigmented and evenly sclerotized; thoracic and abdominal pleurites and sternites weakly sclerotized, usually pale. Legs entirely pale or partially pigmented; hind basitarsus short with a small to large, medial, ventral papilla. Paragenital sternites without prominent structures, ninth sternite emarginated medially; pigmentation variable. Cerci normal, usually evenly pigmented, but distals may be paler in some species.

Discussion.—The submentum of males is particularly interesting. Its broad shape in combination with a short, weak ventral bridge appears to be plesiomorphic. Some species of the genus have many of the long setae of the submentum clumped in parallel, lateral lines. A white secretion coagulates in the midst of these when a specimen is killed in alcohol. Close examination reveals indistinct, circular pores between the setal sockets. These must be the source of the secretion. This fluid perhaps is associated with mating for I have observed males rubbing the venter of their head on the dorsum of the female's head just prior to copulation. Conceivably this activity might make the much stronger female receptive to copulation. It might be physiologically significant that the pale cranial spot is directly over the brain.

In some populations of *Archembia* the wings are exceptionally broad at the subcosta's base and in the vannal area. The latter tends to be broadest in the hind wing and must be a vestige of an extensive vannus found in many orthopteroid insects and their fossilized ancestors.

Component species.—*Archembia* potentially is a large genus with species difficult to recognize on the basis of male terminalia characters which are so useful in other genera. Also, unlike most other genera, more than one species of the genus may occur in the same locality and habitat. Fortunately, coloration characters, especially of adult females, are very useful and consistent. For example, the antennae of male *A. batesi* (McLachlan), the only widespread species in the Amazon Basin, invariably has white distal segments. All other *Archembia* have distally brown antennal apices except for a minority of specimens of *A. bahia* n. sp. The pigmentation of the head, acrotergites, and cerci are among the many characters useful for identification of adult females.

I have collected additional new species in northeastern Brazil, one in forests on mountains inland from Recife. Males of one species is jet black with a brilliant orange head. Females are entirely black. At least two other new species occur under stones and in adjacent leaf litter in arid thornbush-cactus habitats of northeastern Brazil, as well as in similar zones of coastal Ecuador. Therefore, species of the genus have a wide ecological range from semi-desert to wet rainforest.

All species are highly gregarious, often with broods of several females apparently sharing a large labyrinth of galleries. Colonies may extensively cover bark and road bank surfaces. The silk is conspicuously white, not being covered with pulverized debris.

KEY TO SPECIES OF *ARCHEMBIA*

(Adult males and females)

1. Occurring in semi-arid, coastal habitats of southwestern Ecuador. Left paraproct (LPPT) of males almost entirely sclerotized. Subapical inner margin of left mandible with an arcuate flange ..... *arida*
— Occurring east of the Andes. Left paraproct almost entirely membranous, sclerotic portion small confined to extreme left (next to left cercus base). Inner margin of left mandible without a flange 2
2. Occurring in Amazon Basin 3
— Occurring elsewhere in South America 4
3. Males with distal antennal segments always white. Prothorax usually tan. Widespread in Amazon Basin at lower altitudes ..... *batesi*
— Males with all antennal segments and prothorax dark brown. Occurring in central upper Amazon tributary zone ("montaña") of Peruvian Andes ..... *peruviana*
4. Cranium of males uniformly pale yellow. Yungas zone, Bolivia ..... *boliviana*
— Cranium of males dark brown, or patterned (except in one new species from NE Brazil which has an orange head). Eastern Brazilian localities 5
5. Females with all dorsal body sclerites, includ-

ing a very dark chestnut brown pronotum, very glossy dark brown with a faint bluish luster. Without pale intersomital thoracic bands. All ventral sclerites and membranous areas pale tan. Cranium glossy blackish brown with two sharply defined interocular golden spots. Submentum pale yellow. Brazil: Rio to São Paulo ..... *lacombea*

— Females with head and body variably pigmented dorsally and ventrally, not glossy or with ventral sclerites contrastingly pale. Intersomital thoracic bands pale 6

6. Males with left tergal process (10 LP) dilated apically. Right process (10 RP) short, blunt, concealed beneath caudal margin of 10 R. Eastern Brazil, NE Argentina, southcentral Venezuela 7

— 10 LP tapered to a usually-sharp point. 10 RP acute, visible from above. Eastern Brazil 8

7. Males with distal antennal segments usually white. Submentum as broad as long. Cranium narrow, sides caudally convergent. Brazil: Minas Gerais and Bahia ..... *bahia*

— Distal antennal segments always brown. Submentum broader than long. Cranium circular, broadly rounded, sides not caudally convergent. Type locality: Iguaçu Falls region. Related new species or subspecies in other regions ..... *dilata*

8. Males and females very darkly melanized. Head of females jet black with a small interocular orange "cloud." Mouthparts very dark brown. Medial area of pronotum piceous, anterior margin and caudal angles orange. Cervical membranes and thoracic pleura dark lavender. Acrotergite 1 largely translucent white due to internal fat; clouded tan caudo-medially; adjacent dorsal membranes cream. Mesonotum black, caudal margin yellowish, membranes lavender. Acrotergite 2 transparent tan, intersomital membranes broadly cream. Forelegs golden brown, other legs darker. Metanotum and abdominal terga black, hind legs jet black. Brazil: Atlantic forests E of Curitiba .. *paranae*

— Head of females chestnut brown, its golden "cloud" large. Mouthparts pale amber. Pronotum medium brown bordered with tan. Acrotergite 1 uniformly medium brown. Mesonotum dark brown; margins irregularly tan. Pale band between meso- and metathorax narrower than in *A. paranae*. All legs tan clouded with brown. Abdominal terga dark brown, pleura cream. Brazil: Rio region .... *kotzbaueri*

Archembia batesi (McLachlan)

Embia batesi McLachlan, 1877:380.
Embia (*Olyntha*) *batesi* McLachlan, 1885:195.
Olyntha batesi (McLachlan), Krauss, 1911:29.
Rhagadochir batesi (McLachlan), Enderlein, 1912:56.
Embolyntha batesi (McLachlan), Davis, 1940b:347.— Ross, 1944:413.— Barth, 1954:172.— Barth and Lacombe, 1955:67.—Lacombe, 1958a:177; 1958b:655; 1960, p.1; 1963:393; 1965:503.— Ross, 1970:166.
Archembia batesi (McLachlan), Ross, 1971, p.32.

Type.—Male, on slide, McLachlan Collection, BMNH. Type labels: "Embia batesi, M'L.," "Type"(red), "Brazil Bates" (circle). It should be noted that although McLachlan published, "collected by Bates on the Amazons," "Amazons," doesn't appear on the specimen labels. It is likely, however, that the type was collected at Ega (Tefé), one of Bates' favorite collecting localities on the upper Amazon. In the British Museum I have seen a damaged specimen of *A. batesi* labeled "Ega" (in a blue circle), probably McLachlan Collection, which was undoubtedly collected by Bates but not used as the type due to its damaged condition.

Discussion.—Nothing was added to the knowledge of this common species until Davis (1940b) redescribed its type. I have since cultured series from many localities in the Amazon Basin. It appears that *A. batesi* is a "weed species" spread in commerce. *Batesi* isn't congeneric with "*Embia" brasiliensis* Gray (or Griffith and Pidgeon) which, to date, has been collected only in Atlantic forests near Rio de Janeiro. Anatomical research of Barth, and Lacombe, cited in the above synonymy, involved specimens of *Archembia lacombea*, not *Embolyntha batesi*, as stated by them.

Adult males of *A. batesi* exhibit most of the integumental characters illustrated (Fig. 1) for the following new species except for narrower wing bases. These two species appear to be the only archembias in the Amazon Basin. *Archembia batesi* is the embiid most likely to be collected in Amazonia by the non-specialist. It is the only *Archembia* in the region with males having white-tipped antennae. The distal five antennal segments are white, the 21st (the most distal) is apically tan. The prothorax usually is tan in contrast to other dark

brown body sclerites. The mid- and hind coxae are cream white. The cercus segments are exceptionally long, the lobe of the basal segment of the left cercus is abruptly projected and well centered.

Records.—Brazil: Serra do Návio, Amapá, colony on small branch in rainforest (E. S. Ross) CAS; Esprito Santo (McLachlan Collection) BMNH; Vaupés (Igarapes), Rio Negro (D. Lacombe) CAS; Médio Javari, Amazonas (D. Lacombe) CAS; Porto Planton (D. Lacombe), CAS; Rancho Grande, 62 km S Ariquemes, Rondônia, 187 m, bark in primary forest (E. S. Ross) CAS; Manaus, bark in forest near Hotel Tropical (E. S. Ross) CAS. Colombia: Macoa, Nariño, colonies on tree bark (E. S. Ross) CAS; Sta. Rosa Sucumbios, Rio San Miguel, int. Putomayo, 400 m, at light, 2 males (B. Malkin) CAS. Ecuador: 5 km N Puyo, Napo-Pastaza, 953 m, colony on fence post (E. S. Ross) CAS; Aliñahui, 25 km E Puerto Napo, 475 m, (E. S. Ross) CAS; 15 km. N Limon, Marona–Santiago, 1010 m (E. S. Ross) CAS. Peru: E end Boqueron de Padre Abad, (E. S. Ross) CAS; Pucallpa, limbs of shade trees along street (E. S. Ross) CAS; Iquitos, colonies on bark of river front trees (E. S. Ross) CAS; Amazon Camp, Rio Momón, 97.5 m (near Iquitos) (E. S. Ross) CAS.

Archembia peruviana Ross
new species
(FIGURE 1)

Holotype.—Male, on slide, CAS. Data.—Peru: Cueva de la Pava, Tingo Mariá, Huanuco, matured XI-54 (E. S. Ross and E. I. Schlinger).

Description.—Appearance: Moderately large (body length 13 mm); uniformly brown throughout. Color details (in alcohol): Cranium chestnut brown, lighter at vertex, clypeal area and caudal margins blending darker. Eyes lavender black. Mouthparts concolorous with cranium; antennae brown to apex (without white apical segments). Thoracic sclerites varied shades of medium brown, except cervical and prosternum which are yellow tan; pleurites of pterothorax with faint bluish luster; all intersclerotal membranes cream white (the color of internal tissue). All legs medium brown to tan, including mid and hind coxae. Wings very dark brown with very narrow hyaline, intervenal stripes; cross-veins highly variable in number and position, none behind MP; white when crossing hyaline stripes (extensively white in many specimens). Abdomen, except for darker terminalia, varied shades of medium brown. Dimensions (on slide).—Body length 13.0 mm.; forewing length 7.6 mm, breadth 2.1 mm.

Important integumental characters.—As figured, almost identical to *A. batesi*. However, readily distinguished by larger size and uniformly dark brown color, especially the dark prothorax and entirely brown antennae (lacking white distal segments).

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Moderately large (body length 10.0 mm), generally dark chestnut brown with contrasting cream prothorax and legs and transverse spot between eyes; antennal apices white. Color details: Cranium dark chestnut brown except for a large, transverse, somewhat chevron-shaped cream area between eyes. Eyes black. Antennal segments 1–15 dark brown, 16–20 pure white, 21 light brown (number complete). Mouthparts uniformly brown. Cervical sclerites clear, pale amber. Pronotum cream with faint light brown clouding; prosternum medium brown; intersclerotal membranes cream; acrotergites and meso- and metathoracic sclerites dark brown, sterna lighter; pleural membranes dark lavender. Legs cream except for tan tibiae and clouding on hind femoral bases. Abdominal tergites dark brown, sternites medially tan; pleural membranes whitish; cerci dark brown with dark lavender joint membranes.

Paratypes.—Numerous adult males reared from cultures I collected on the grounds of the experiment station at Tingo Mariá, Huanuco, Peru; on bark of lemon trees on bank of Rio Huallaga; on tree trunks 4 mi. SW Las Palmas, Huanuco; and Cueva de la Pava, near Tingo Mariá. Deposited in CAS, USNM, MNRJ, MHNP, and BMNH.

Discussion.—Extensive series of adult males from the Tingo Mariá region have the above described, uniformly dark brown coloration, including the coxae and all antennal segments. *Archembia batesi*, a very close relative, represented in my collection by hundreds of specimens from throughout the Amazon Basin, invariably have the prothorax of the male contrastingly tan and invariably white antennal apices. The eastward distribution of *A. peruviana* seems to stop on the east side of the last mountain range between Tingo Mariá and the Amazonian plain. Future studies may reveal that *A.*

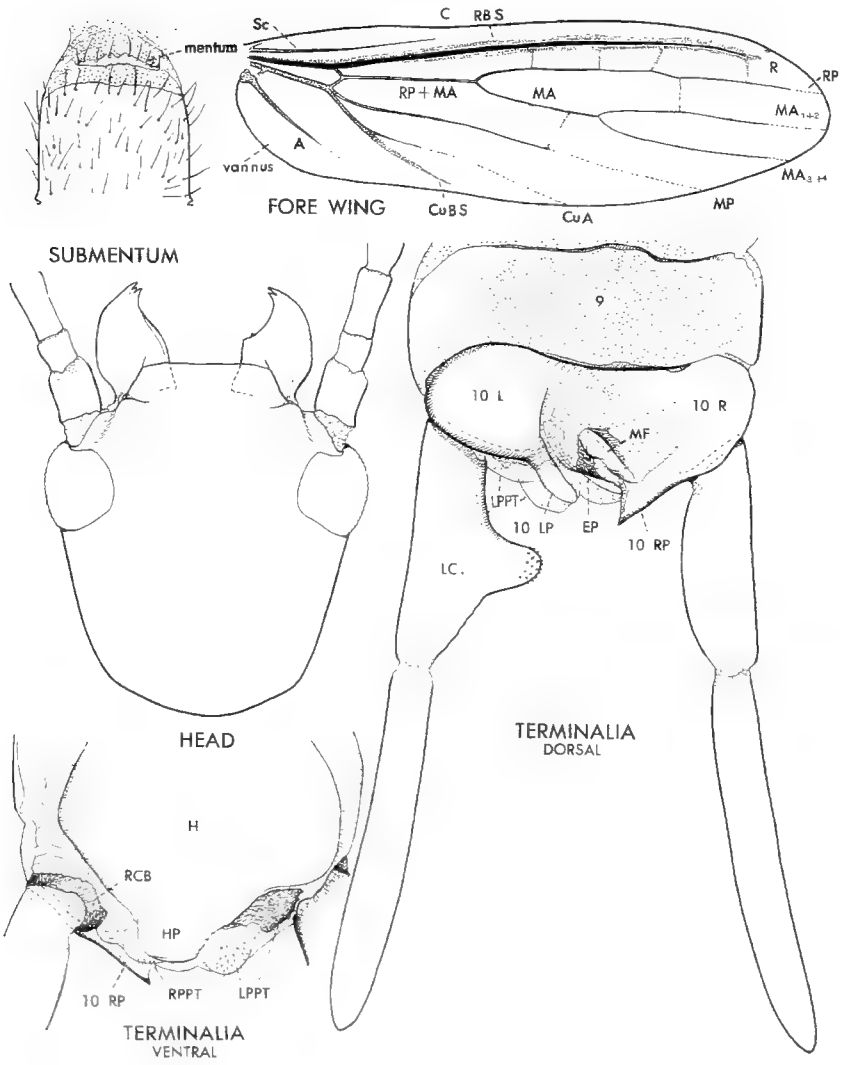

FIGURE 1. *Archembia peruviana* Ross, n. sp., holotype. Type locality: Tingo Mariá, Peru. Structures are very similar in *A. batesi* (McL.). Coloration is the most convenient means of distinguishing the two species.

peruviana is a dark subspecies of *A. batesi* limited to higher altitudes of the eastern Andean foothills at an average altitude of 1,000 m.

Biological notes.—*Archembia peruviana*, like *A. batesi*, forms extensive, fully exposed galleries on the trunks, limbs and ledges in primary forest, especially if semi-cleared for agriculture. Colonies also occur on foundations of building and even on steel bridges, especially around bolts.

Archembia lacombea Ross

(FIGURE 2)

Archembia lacombea Ross, 1971:33, fig. 1.

Holotype.—Male, on slide, CAS. Data.—Brazil: Ponte Maromba, Parque Nacional do Itatiaia, 1200 m, matured in culture 29-VIII-1964 (E. S. Ross).

Name basis.—Named after Dyrce Lacombe, Fundação Oswaldo Cruz, Rio, a personal friend who conducted research in the internal anatomy of embiids.

Redescription.—Appearance: Moderately large, slender, alate; very dark brown with head dull yellowish. Color details (in alcohol): Cranium pale orange but dulled by a uniform, faint mottling of rust brown which increases anteriorly and be-

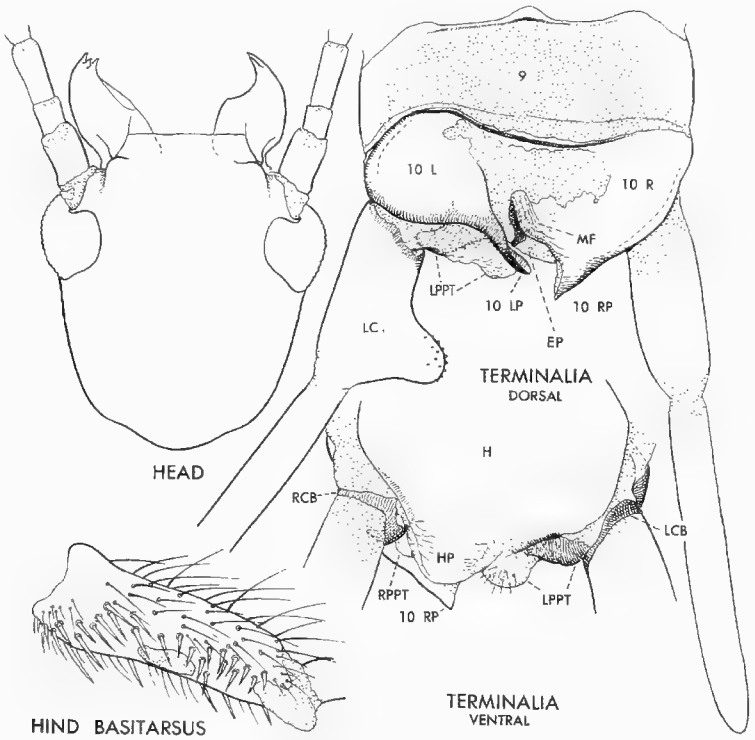

FIGURE 2. *Archembia lacombea* Ross, holotype (re-published from Ross, 1971). Type locality: Parque Nac. do Itatiaia, Brazil.

comes a solid dark band around eyes and anterolaterally between eyes and the anterior tentorial pits; ventral surface paler; cranial setae blackish. Eyes blackish lavender, narrowly pale at edges. All antennal segments blackish brown except for gradually tan apical segments; total 22 segments. Submentum golden with a whitish coagulant amidst bases of parallel, lateral setal clumps. Sclerites of thorax and legs chocolate brown with darker sutural lines; membranes whitish, strongly tinged with lavender. Wings uniformly dark brown with very narrow hyaline stripes; costal and radial sinus (RBS) margins bright salmon pink. Sclerotic portions of abdomen dark tan, membranes cream white, palest around the two basal sternites; terminalia, including cerci, blackish brown; membranes gray lavender. Dimensions: Body length 11.5 mm; forewing length 8.1 mm, breadth 2.2 mm. Important integumental structures as figured.

Allotype.—Female, in alcohol, with holotype data and disposition.

Redescription.—Appearance: Rather large (body length 13.5 mm), flattened, dark chocolate brown dorsally, very glossy, sheen faintly metallic; prothorax somewhat paler; venter and legs very pale; apical antennal segments white. Color details: Cranium almost black with a large, transverse, golden band between eyes, its margins diffused; ventral surface becoming medium brown mesad. Antennal segments 1–15 concolorous with cranium, segment 16 tan, 17–18 pure white, 19 basally white, apically tan, 20 dark brown. Mouthparts other than mandibles cream white, including submentum; palpi blending to light brown. Cervical sclerites cream white. Pronotum chestnut brown, glossy; prosternum cream white, tinged with brown; pleurites transparent amber, surrounding membrane whitish. Acrotergite 1 dark brown. Mesonotum, acrotergite 2 and metanotum glossy, dark chocolate brown; meso- and metathoracic pleura cream white, sterna and legs similar but lightly tinged with brown. Abdominal terga glossy chocolate brown; sterna 1–7 cream white; 8 dark brown, paler laterally; 9 basically dark amber, heavily tinged with dark brown. Abdominal pleura cream white. Paraprocts pale amber. Basal segments of cerci very dark brown, the distals ma-

hogany, joint membranes dark lavender brown. Body length 13.5 mm.

Paratypes and parallotypes.—Reared topotypic adults deposited in CAS, USNM, MNRJ, MZUSP and BMNH.

Additional records.—A large series of adults reared from stock I collected on road banks and bark in Parque Nac. do Tijuca (Paineiras) above Rio de Janeiro (CAS) agree closely with the type lots from Parque Nac. do Itatiaia (1000–1800 m). The species occurs also within Rio in the botanical garden and on grounds of Catholic University. Southwest of Rio a male was collected at Mangaratiba (at light) 20-I-93; also in Reserva Ruschi, near Santa Teresa, Espirito Santo and, unexpectedly, 10 km SE Ipiaú, Bahia, 100 m. I also cultured a large series from the botanical garden in São Paulo (CAS). It is possible that this apparently vigorous species has been moved about in human commerce.

A series from Campos, Est. Rio de Janeiro (CAS) collected by Dyrce Lacombe, has very distinct females with large, entirely golden heads slightly clouded with brown; legs, pleura and venter very pale; cerci as in *A. lacombea*, entirely dark, including membranes. I cultured a similar series from 20 km N of Linhares, Espirito Santo. Its males have apical cercus segments unusually long. Females reared from Minas Gerais: Cacaca (monastery), and 20 km S Manuaco, 650 m (both CAS) also have head golden blending to brown toward the clypeus.

It is possible that specimens with gold-headed females represent a new species. However, a detailed study of this possibility and other systematic questions ideally should be undertaken by a qualified Brazilian researcher with an opportunity to rear series from many localities.

Dyrce Lacombe contributed extensively to knowledge of the anatomy and histology of *lacombea* using the name *Embolyntha batesi* (McLachlan). Most of her study specimens were collected near Sepetiba.

Archembia lacombea differs from *A. batesi* in numerous coloration and anatomical characters; for example, *A. lacombea* males never have white-tipped antennae (*A. batesi* does), it has parallel setal clumps on the submentum (setae evenly distributed in *A. batesi*), and the left cercus lobe is apical or subapical in *A. lacombea* (submedial in *A. batesi*); also, *A. batesi* appears to be restricted to the Amazon Basin.

Of the closely related species or races in the Rio region, I am somewhat arbitrarily applying the name, *Embia Kotzbaueri* Navás to one of these, as treated below. At Paineiras, in the national park above Rio, colonies of *A. lacombea* and *A. kotzbaueri* occur on the same road banks. Strangely, few differences in the male terminalia separate these species but, fortunately, they are readily distinguished by striking coloration differences, especially in adult females.

Archembia kotzbaueri (Navás)

Embia Kotzbaueri Navás, 1925:67; Ross, 1944:498 (as unrecognizable).

Archembia kotzbaueri (Navás), Ross, 1971. P. 32 (new combination).

Type.—Male, originally in Navás Collection, but now apparently lost. Data.—"Heim at Brazilian: Nistheroy, 25-XI-1924. In meiner Sammlung."

The type locality undoubtedly is Niterói, a district within Rio de Janeiro. Perhaps in 1924 the area was less congested and one or more species of *Archembia* could have existed there. Navás' type appears to be lost. I couldn't find it in his collection when it was lodged in Zaragoza (the collection has since been moved to Museo Zoologia, Barcelona). The original description is inadequate; however, Navás' described coloration, and head and wing illustrations, indicate that the species is an *Archembia*. Furthermore, all other native embiids in the Rio area, except for *A. lacombea* and very distinctive *Embolyntha brasiliensis*, are very small anisembiids and teratembiids. I decided, therefore, to assign the name *A. kotzbaueri* to the genus *Archembia* as the second species of that genus occurring in Rio, the first being *A. lacombea*. The species is herewith redescribed from a neotype selected from extensive cultured series of both sexes.

Neotype.—Male, on slide, MNRJ. Data.—Brazil: Parque Nac. do Tijuca (at Paineiras) above Rio de Janeiro, matured 25-VI-64 in culture 695A (E. S. Ross).

Description.—Appearance: Moderately large (body length 11.0 mm), slender, alate, light brown throughout except for a cream pro-pterothoracic band and cream abdominal pleura. Color details: Cranium basically tan, becoming darker laterally,

toward clypeus and around dark lavender eyes. Antennae uniformly medium brown grading to tan, but not white distad; 28-segmented. Submentum and venter of cranium very pale amber, setae of submentum sparse, only slightly clumped in lateral lines, these are clogged anteriorly with a thick, white, coagulated secretion. Sclerites of body and legs varied shades of light brown and tan with dark brown sutural lines. Membranes white, those between pro-and pterothorax especially conspicuous, forming a pale band both dorsally and ventrally; a whitening of the caudal margin of the pronotum contributes to this. Hyaline stripes of wings very narrow; all veins, except towards apices, sclerotized, except for Cu; 4 cross-veins between RBS and RP, between RP and MA_{1+2} and 1 between MA and MP. Abdominal terga basically whitish but mottled with dark brown, especially toward sides and abdominal base; pleural membranes white; terminalia sclerites chestnut brown, membranes whitish; cerci dark brown. Dimensions (on slide): Body length (excluding cerci) 11.0 mm; forewing length 7.5 mm, breadth 2.0 mm. Important anatomical structures similar to those of *A. lacombea* (Fig. 2).

Neallotype.—Female, in alcohol, MNRJ. Data: A "sister" of the neotype.

Description.—Cranium golden mahogany brown dorsally with very faint vertex pattern, but including a transverse golden "cloud" between eyes. Antennae brown except for white distal third of segment 18; 19 pure white; 20 basally white, distal half tan; 21 entirely tan. Mouthparts, including submentum, pale amber, palpi light brown. Cervical sclerites golden brown, adjacent membranes dark lavender. Pronotum basally amber, tinged medially with dark lavender; prosternum pale amber, anterior margins very dark lavender; pleura dark to pale amber, membranes whitish. Acrotergite 1 golden amber. Mesonotum largely medium brown, medially tinged with dark purple, anterior angles blending to white, posterior angles becoming pale amber. Acrotergite 2, pale amber. Metanotum similar to mesonotum but with smaller pale angles. Meso- and metathoracic pleural sclerites translucent dark amber, membranes very dark lavender; sternites translucent pale amber. Coxae, trochanters, and femora of all legs varied shade of amber; hind femora, tibiae and foretarsi tinged with lavender. Abdominal terga golden brown, tinged with lavender, partially bordered with dark lavender; sterna 1–7 clear amber medially, blending to dark lavender in lateral thirds; genital sternite 8 dark lavender, 9 basically amber but heavily tinged with dark brown laterally and around genital opening; pleurites very pale amber; membranes cream white; paraprocts grading from pale amber to cream caudad. Basal segments of cerci dark lavender brown, distal segments golden tan, joint membranes dark cream. Body length 16.0 mm.

Paraneotypes.— Numerous topotypic adults deposited in CAS, USNM, MNRJ, MZUSP and BMNH.

Discussion.—Although there are anatomical differences between males of *A. lacombea* and *A. kotzbaueri*, these are difficult to define except for the more circular head of the latter. Fortunately, the two species are readily distinguished by very distinct coloration, especially that of females. *Archembia lacombea* is overall darker in both sexes. Females and nymphs of *A. kotzbaueri* have a "checkered" appearance, a pale cranium, acrotergites and body sclerites light brown, and paler cerci. In *A. lacombea* adults all these structures are much darker with a pronounced iridescent luster.

Archembia bahia Ross
new species

Holotype.—Male, on slide, MNRJ. Data.—Brazil: On hill 20 km SW Jequié, Bahia, 600 m, colony in road bank just below microwave tower, matured in culture June 1992 (E. S. Ross).

Description.—Appearance: Large, slender, dark chocolate brown except for golden head and prothorax, a whitish band between pro- and mesothorax, and usually white-tipped antennae. Color details (in alcohol): Cranium golden with faint smokey pattern and black setae; eyes black; mouthparts golden except for dark brown palpi (a white coagulant is deposited amidst laterally-clumped, black setae on submentum). Antennae almost as long as body; segments 1–19 dark brown, 20–23 white, 24 tan. Cervical sclerites and prothorax brilliant gold, setae black, membranes basically white but lavender-tinged on crests of folds. Membranes between pro- and mesothorax pure white (forming a band). Coxae, trochanters and femora of forelegs tan, tinged with brown; tibiae and tarsi dark brown. All other sclerotized portions of body dark chocolate brown, especially the terminalia with its very

dark membranes; body sclerites very glossy; mid and hind legs lighter brown. Wing bands medium brown, hyaline stripes very narrow; two white cross-veins between RP and MA_{1+2}, three between MA and MP. Dimensions (on slide): Body length 13.75 mm; forewing length 8.0 mm, breadth 2.4 mm.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Appearance: Large, robust. Head, prothorax and acrotergite chestnut brown, otherwise chocolate brown except for white-tipped antennae. Color details: Cranium basically golden, tinged with chestnut brown; surface between eyes paler; eyes black; mouthparts light brown. Antennal segments 1–18 brown, 19–22 white; 23 white basally, tan distally. Prothorax varied shades of chestnut brown, forelegs concolorous, cervical sclerites and pronotum amber; membranes heavily tinged lavender. Remainder of thorax varied shades of chocolate brown, sternites paler, all membranes dark lavender; coxae, trochanter, and tarsi of mid-legs pale amber, femora and tibiae medium brown; hind legs rather uniformly brown. Abdomen glossy chocolate brown dorsally, paler ventrally; membranes white, tinged with lavender; genital sternite and cerci (including joint membranes) dark brown. Body length 18 mm.

Paratypes and parallotypes.—14 topotypic males and females reared in holotype's culture. Deposited in CAS, MZUSP and MNRJ.

Additional record.—One male with white-tipped antennae from 20 km N of Linhares, Espirito Santo, 40 m, matured VII-92 (E. S. Ross) CAS.

Discussion.—Usually males of this colorful species can be distinguished from all other *Archembia* in the Atlantic regions of Brazil by their white-tipped antennae. However, in my cultured series ten males have white-tipped antennae and four have them grading distad to light brown. Such a variation is unusual.

A more consistent recognition character is the narrow, brilliant gold head, including all non-mandibular mouthparts except brown palpi, in combination with golden cervical sclerites, and largely golden prothorax, forecoxae, trochanters, and femora. All other sclerotized portions are dark chocolate brown with purple-tinged membranes.

Archembia dilata Ross
new species
(FIGURE 3)

Holotype.—Male, on slide, deposited in MZUSP. Data.—Brazil: Foz do Iguaçú, Paraná, matured in culture 24-VII-1964 (E. S. Ross).

Description.—Appearance: Large, robust, alate; dark brown except for bright golden head and prothorax. Color details (in alcohol): Cranium golden, lacking pattern, darker around antennal bases; setae contrastingly dark. Eyes dark lavender. Basal antennal segment dark chestnut brown, other segments to apex (segment 24) very dark brown. Mouthparts, including labrum, amber yellow except for dark brown palpi. Pronotum, pro-pleurites, and cervical sclerites yellow, slightly paler than cranium. Prosternum pale tan mottled with brown. Pterothoracic sclerites dark chocolate brown with darker sutural lines, membranes purple; legs concolorous with pterothorax except fore- and mid-coxae, trochanters, and hind trochanters which are yellow tan. Wings dark brown with bright pink costal and radial blood sinus (RBS) margins; hyaline stripes very narrow and weak basad; numerous cross-veins behind RP are white when crossing a hyaline stripe. Abdominal tergites brown laterally, otherwise extensively membranous; membranes dorsally and laterally pale purple; sternites more strongly sclerotized and basically dark chestnut but dark laterally and thus forming two longitudinal, ventral, dark stripes. Sclerotic portions of terminalia, including processes and cerci, very dark chocolate brown, cercus membranes as dark as segments. Dimensions (on slide): Body length 15.0 mm; forewing length 7.6 mm, breadth 2.1 mm.

Important integumental characters.—The large, robust body form. Broad head with an exceptionally large, but not heavily sclerotized submentum which has evenly distributed setae. Left tergal process narrow, parallel-sided then slightly flared and rounded at apex. Right process not produced, its apex obsolete. Hypandrium lobe scarcely produced. Basal segment of left cercus stout, its width through the lobe equal to the segment length. These and other features are figured.

Allotype.—Female, in alcohol, (MZUSP) with holotype data.

Description.—Appearance: Large, mostly dark mahogany brown with prothorax and basal half of

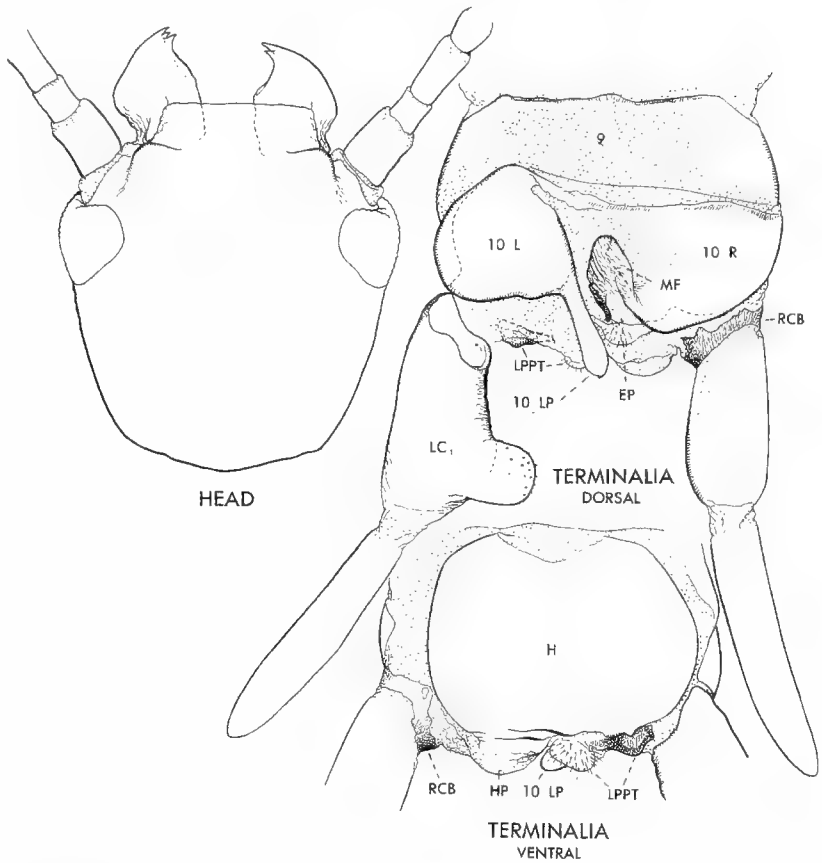

FIGURE 3. *Archembia dilata* Ross, n. sp., holotype. Type locality: Foz do Iguaçú, Paraná, Brazil.

fore- and mid-legs largely golden tan; apices of antennae gray white. Color details: Cranium chestnut brown with a narrow, suffused, golden area arcing caudad between antennal bases; stem of ecdysial suture also golden, as well as cranium's ventral surface; dorso-basal pattern not developed. Eyes dark lavender. Antennae dark brown except for four apical segments which are gray white, each tipped with rust red; 21 segments in complete antenna. Mouthparts golden except for palpi which become brownish distad. Prothoracic sclerites, including first acrotergite, golden with narrow brown margins and medial clouding on pronotum. Other thoracic tergites and pleurites dark mahogany brown; nota clouded with gold tan and having a distinct, pale, medial, longitudinal line; all sternites transparent pale amber, bordered with light brown; all thoracic membranes whitish, lightly tinged with lavender. Fore- and mid-legs largely golden tan basally, tibiae and tarsi medium brown, those of mid-legs paler; hind legs various shades of medium chestnut brown. All abdominal tergites dark mahogany brown, pleurites medium brown; sternites clear pale amber except sternite 8 purple white; lateral sclerites very dark brown; sternite 9 medium brown, paler caudad; paraprocts pale tan; cerci dark brown with joints dark lavender. Body length 17 mm.

Paratypes and parallotypes.—Numerous reared topotypic adults deposited in CAS, USNM, MZUSP, MNRJ and BMNH.

Other specimens examined.—Several adult males from "Rondon 24°38′S, 54°07′W" eastern Paraná, Brazil, XI to XII (Fritz Plaumann) CAS. I have collected related species or races, with a dilated left tergal process, in other regions of Brazil and Bolivia but study of these should be deferred until ample research time and specimens are available. One of these, a series from Camacá, Bahia is very closely related to *A. dilata,* but has a much narrower submentum and other small distinctions. This also applies to a large series I reared from stock collected in Santa Elena, a Venezuela-Brazil border town north of Boa Vista, Roraima. Males of this

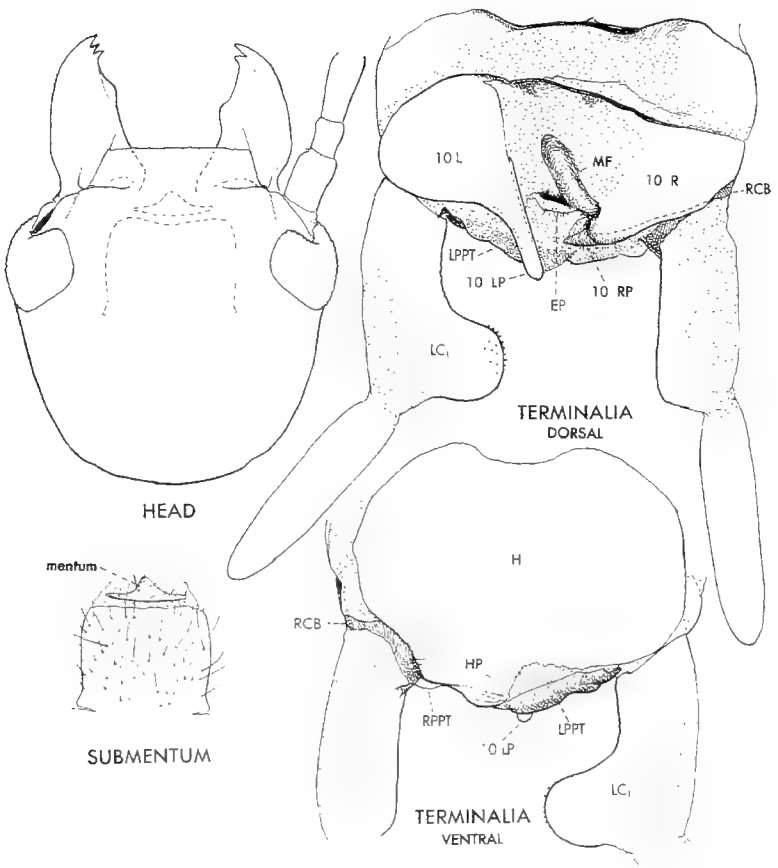

FIGURE 4. *Archembia arida* Ross, n.sp., holotype. Type locality: Near Santa Elena, Guayas, Ecuador.

group of species, or races, are distinguished by the dilated apex of the left tergal process (10 LP); the small, almost obsolete right process (10 RP) obscured beneath the caudal margin of 10 R (thus not visible from above), the golden color of the head, and many minor characters.

Biology.—The type colonies were scattered on the bark of trees growing along trails provided for tourists visiting Foz do Iguaçú. The species is highly gregarious, as are all other species of *Archembia*. The silk galleries are fully exposed, lacking a cover of pulverized feces or debris. At the time of encounter, late April 1964, most colonies consisted of an adult female and her brood of half-grown nymphs developing in unison. One colony was more advanced, however, with the brood about one instar short of maturity. In cultures, field-collected nymphs matured during late July, especially during August, and declined during September. In the following year adults began maturing during June. Eggs are laid on their "back" in flat clusters and imbedded in a matrix of pulverized material.

Archembia paranae Ross
new species

Holotype.—Male, on slide, MZUSP. Data.—Brazil: Paraná Recanto Bela Vista, picnic ground above Jõao São da Graciosa (between Moretes and PR410), 800 m, matured X-99 (E. S. Ross).

Description.—Appearance: Slender, generally blackish except for the largely mottled tan cranium. Color details (in alcohol): Anterior two-thirds of cranium basically yellow tan but tinged with dark brown, especially on clypeus; caudal third and sides dark brown. Eyes jet black. Antennae entirely black, 22 segments (complete). Venter of cranium and mouthparts amber except for dark brown palpi. Prothoracic sclerites and fore-legs blackish brown, membranes very dark lavender except narrowly white behind cranium. Pterothoracic scuta blackish

brown apically, blending to lighter brown caudad; acrotergite 1 and prescutum 1 blackish brown; acrotergite 2 mottled tan; ventral thoracic sclerites dark chocolate brown, sutures black. Wing bands dark brown; hyaline stripes narrow, margins indefinite with macrotrichia arising from dark brown wing spots; all cross-veins narrowly white. Abdominal sclerites dark brown except for mottled tan medial areas on somites 8 and 9; pleural membranes white; 10 L, 10 R and basal segments of cerci jet black, 10 LP dark amber, MF medium brown, terminalia membranes cream, distal cercus segments grading from dark brown basally to golden brown apically. Dimensions (on slide): body length 14.0 mm; forewing length 10.0 mm, breadth 2.7 mm.

Anatomical features.—Submentum as in *A. boliviana* very weakly sclerotized; setae very long, equal in length, denser in lateral areas. Terminalia similar to *A. boliviana* but 10 RP is larger and projected meso-caudad. Lobe of left cercus narrow; submedial, slightly more basad.

Allotype.—Female in alcohol, MZUSP. Data.—From holotype's culture.

Description.—Appearance: Large, multicolored, antennal apices white. Color details: Cranium dull black dorsally with a conspicuous gold tan transverse band between antennal bases, gular area golden brown. Antennal segments 1–15 dark brown, 16 apically tan, 17–22 pure white, distal segment pale tan (23 segments, complete), mouthparts amber, palpi black. Pronotum golden brown bordered with amber, prosternum and cervical sclerites mahogany brown, bordered with amber; membranous areas dark lavender. Acrotergite 1 amber brown, adjacent membranes cream white. Mesoscutum glossy black, caudal membranes cream; pleurites black, associated membranes dark lavender; posternum and mesosternum amber, extensively dark brown. Metathorax similar to mesothorax. Fore- and mid-legs with coxae mahogany brown, femora amber blending distad to chestnut brown, tibiae dark brown, foretarsi dark brown, midtarsi tan; hind legs blackish except for tan trochanters, tibial bases and tarsi. Abdominal terga black, pleural membranes cream; sterna dark brown, medial area of sternite 8 and 9 dark lavender. Paraprocts and adjacent membranes pale cream. Cerci, including joints, jet black. Body length 17.0 mm.

Paratypes and parallotypes.—A large series from holotype's culture distributed CAS, MZUSP, MNRJ, USNM, and BMNH. Also a series from the same locality cultured in 1993.

Other specimens studied.—A large cultured series from Hacienda Belo Vista, E of Curitiba, Paraná, 300 m, C-721 A + B, 1964 (E. S. Ross). One pair, C-715, N of Itajai, near sea level (E. S. Ross).

Biology.—Stock for the type cultures was collected in a colony on a mossy stump, another on the mossy damp surface of a concrete building, both in a clearing in dense cloud forest, 800 m elev. At 300 m, east of Curitiba, colonies were on mossy stumps in semi-cleared pasture with scattered *Auricaria* trees. Paratypes matured in cultures during July and, mostly, during August and September. Those at 300 m mostly matured during August or October, one as early as March.

Discussion.—Topotypic males are exceptionally large and very black. Females are multicolored with conspicuous pale thoracic bands. The species is probably widespread in cloud forests at higher elevations in Atlantic forests in Paraná. One would expect that the pair from near sea level, just north of Itajai would be *Embia mulleri* Navás, but females differ in having the thorax broadly cream-banded and the fore and midlegs are uniformly pale yellow. Therefore, the population is more closely related, perhaps racially, to *A. paranae*.The type of *E. mulleri*, a female, is larger, almost entirely dull black with very narrow, pale thoracic band and probably entirely dark antennae.

Archembia boliviana Ross
new species

Holotype.—Male, on slide, CAS. Data.—Bolivia: Angostura, 70 km SW of Santa Cruz matured 20-VIII-64 (E. S. Ross).

Description.—Appearance: Rather large, alate. Cranium straw yellow. Pronotum light tan with narrow brown margins, pleura and prosternum light brown. Remainder of body and legs uniformly mahogany brown with piceous sternal sutures; area between pro- and mesothorax mahogany brown with dark membranes; pterothoracic scuta uniformly mahogany brown. Abdomen, sclerotic portions of terminalia and cerci also uniformly mahogany brown except for yellow apical half of 10 LP. Dimensions: Body length 12.0 mm; forewing length 8.5 mm. breadth 2.1 mm.

Anatomical features.—Not very distinctive. Cranium and mouthparts weakly sclerotized; setae on submentum rather evenly distributed, two especially long setae submedially in anterior third. Cranium rather broad; eyes not inflated, separated by two eye-widths. Left tergal process (10 LP) minutely spiculate on outer surface; right tergal process (10 RP) minute, sharp, projected beneath caudal edge of 10 R. Sclerotic portion of left paraproct (LPPT) confined to extreme left, membranous portion extensive, clear with few setae. Lobe of left cercus large, apical.

Allotype.—Female in alcohol, CAS. Data.—From holotype's culture, matured 20-VIII-64 (E. S. Ross).

Description.—Appearance: Uniformly mahogany brown with yellowish cranium, pale intersomital thoracic bands, and white antennal apices. Color details: Cranium basically pale yellow with light brown tint, no vertex pattern. Eyes black. Antennal segments 1–17 mahogany brown, 18 apically white, 19–23 white (complete). Body and legs uniformly mahogany brown with pronotum slightly darker and glossy; dorsal membranes before and caudad of acrotergite 1 pale, forming a faint band; comparable membranes between meso- and metathorax pale, anterior margin of metanotum broadly white, thus forming a conspicuous pale band. all other body membranes light brown only slightly paler than sclerotic areas. Body length 16. mm.

Paratypes and parallotype. —Two topotypic males, one female (CAS).

Discussion.—Because of the remote, far western occurrence, and contrasting coloration of the head and prothorax, it is concluded that this is a distinct species but one, as is usual within the genus *Archembia*, having only slight male terminalia distinctions.

Archembia arida Ross
new species
(FIGURE 4)

Holotype.—Male on slide, CAS. Data.—Ecuador: 21 mi NE Santa Elena, Guayas, 50 m elev (est.) 29-I-55 (E. S. Ross).

Description.—Appearance: Moderately large, alate; dark brown except for bright golden head and white band between prothorax and pterothorax and whitish abdominal pleura. Color details (in alcohol): Cranium almost uniformly golden, pattern faint. Antennae dark brown basally, becoming medium brown to apex, apical segments therefore not whitish, 19-segmented (complete). Eyes black. Mandibles amber yellow except for piceous inner margins and dentation; other mouthparts pale amber except for brown palpi. Body sclerites, legs, and cerci uniformly brown; pleural membranous areas whitish, terminalia membranes mottled with purple. Dimensions (on slide): Body length 12.0 mm; forewing length 7.0 mm, breadth 2.0 mm.

Important anatomical features.—Mandibles elongated due to lengthening of molar area, medial flange of left mandible much larger than in congeners; submentum weak, wider than long, setae variable in size, evenly spaced (not clumped in lateral rows). Wings with MA forked beyond basal half (unforked in some specimens). Terminalia similar to congeners, lacking a sclerite in caudal membrane of tergite 9. As in *A. dilata*, cercus segments are stouter and shorter with the left cercus lobe terminal, broadly rounded and finely echinulated. Outer half of this segment desclerotized, that of the right cercus sclerotized only on its inner face. Left paraproct well sclerotized throughout; its setose, membranous lobe small, obscure.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Cranium amber yellow with rust brown pattern; eyes black; antennae pale tan throughout, 20-segmented (complete). Body sclerites and legs light brown, membranous areas cream white. Paragenital sclerites dark brown, cerci tan. Body length 15 mm, somewhat distended in alcohol.

Paratypes parallotypes.—Topotypic males and females deposited in Museo Nacional and Catholic University, both in Quito, Ecuador; CAS, USNM and BMNH.

Discussion.—The occurrence of an *Archembia* on the coast of Ecuador is surprising—more so because of its occurrence in arid habitats. At first I thought that it might be a species of *Calamoclostes*, a genus almost entirely confined to moist, often high Andean habitats; however, the absence of a sclerite in the caudal membrane of the ninth tergite, the simple left tergal process and other characters, rules against this. The type series is from localities

close to Santa Elena, Guayas. Here colonies were very conspicuous on trunks and branches of small trees, and amidst thorns of cacti. Most adults matured in cultures during January. A large series was also cultured from stock collected by David Cavagnaro 2 mi S of Manglaralto, Guayas with most adults maturing during September. He collected another culture 5 mi N of San Pablo, Guayas. Adults matured during July and August. Recently, I cultured the species from stock collected just south of Bahia, Manabi, 15 m elev., males matured during July. Here the habitat was seasonally-arid jungle with scattered silk cotton trees. It is apparent that *A. arida* has a wide occurrence in xeric habitats of coastal Ecuador. At higher elevations in this zone there are evergreen tropical forests but these haven't been investigated for embiids.

In addition to their geographically separate occurrence, *A. arida* males are distinct in their more elongate mandibles, almost completely sclerotized left paraproct, and relatively bright coloration. The unicolorous brown antennae of both sexes (lacking white apical segments) is also distinctive.

Genus *Calamoclostes* Enderlein

Calamoclostes Enderlein, 1909:188.—Krauss, 1911: 73.—Enderlein, 1912:27.—Navás, 1918:94.—Davis, 1940a:189.—Ross, 1944:414.

Type species.—*Calamoclostes albistriolatus* Enderlein, by original designation.

Distribution.—Ecuador and Colombia, chiefly in Andean altiplano.

Diagnosis.—Males: Generally large and robust; alate, micropterus, or apterous; usually darkly pigmented throughout, including antennae and cerci. Wing venation embioid, but MA isn't forked in some specimens of *C. oculeus*, n. sp. All characters similar to those of *Archembia* except for consistent differences in terminalia, as follows: Ninth somite with a large, sclerotized area, lacking setae, in medio-caudal, dorsal membrane which is slanted caudad. Left tergal process (10 LP) stouter, more sclerotic, with a distinct apical hook and often an obtusely-angulate, dorso-medial projection on outer side. Medial flap (MF) not greatly elevated; more transverse, microspiculate on inner-basal crest. Epiproct sclerite (EP) very broadly attached to MF, then caudally narrowed on a flatter plane than in *Archembia* (in which it is directed ventrad). Lobe of hypandrium (HP) membranous apically, often acutely tapered. Left paraproct sclerotic next to base of left cercus; mesal two-thirds membranous, setose, greatly enlarged, often extensively projected caudad; some species have a small, setose sclerite isolated between the mesal membranous lobe and sclerite at cercus base. Basal segment of left cercus with lobe always apical, large, the segment almost as broad across lobe as long; apex of lobe rounded, densely micro-echinulate. Right cercus-basipodite (RCB) not a complete ring (dorsally obsolete). Basal segment of right cercus with outer side often membranous; distal segments of cerci shorter than basals.

Females: Not studied for generic level characters.

Discussion.—In most of its range, and entirely so in the high Andes, *Calamoclostes* species are the only large-sized embiids and the only representatives of the family Embiidae. Also, they are the only embiids in these regions having two hind basitarsal papillae. At lower altitudes east of the Andes, and in northern Colombia, it is possible that the range of *Calamoclostes* may overlap that of *Antipaluria* of Clothodidae and *Pararhagadochir* and *Gibocercus* of Scelembiinae, both of which also have two hind basitarsal papillae.

Species of *Calamoclostes* perhaps are apomorphic derivatives of the more plesiomorphic genus *Archembia*. In addition to consistent anatomical differences between the two genera, there are distinctions in biology. *Calamoclostes* species, unlike those of *Archembia*, do not form extensive, sheet-like colonies often occupied by scores of individuals. Instead, each *Calamoclostes* "nest" is occupied by a single female and her brood. Colonies are scattered, never interconnected. Some species are found in inconspicuous colonies obscured by bark flakes of trees and fence posts, others occur on road or trail banks at high altitude with refuge galleries extended into soil or rock crevices.

Component species.—I have collected and cultured about five species. Included are the two known species: *C. albistriolatus* Enderlein from Baños, Ecuador, and *C. gurneyi* Ross from southern Colombia. I also encountered an apparently new species far to the south in Ecuador, near Loja, but was unable to develop a culture. At this time I will describe only the most distinct new species. The genus appears to be most diversified in Ecuador's

altiplano where males of some species are apterous, or micropterus, the one from near Paute, Azuay possesses miniature wings (not antipenultimate pads), length not exceeding the bearing thoracic somite. An intensive study of the genus by a qualified resident specialist should prove to be very interesting.

KEY TO SPECIES OF *CALAMOCLOSTES*

(Males)

1. Males apterous or short-winged. Highlands of Ecuador 5
— Males with normal wings. Ecuador and Colombia 2
2. Costal and distal wing margins narrowly white. Lowland rainforests of western Ecuador ..... *silvestris*
— All wing margins brown. Highlands of Ecuador and Colombia 3
3. Eyes very large, cranial interspace only slightly more than an eye-width. Highlands W of Cali, Colombia ..... *oculeus*
— Eyes relatively small, cranial interspace more than eye-widths. Highlands of Colombia and Ecuador 4
4. Right tergal process (10 RP) conspicuous, acutely triangulate. Membranous portion of left paraproct (LPPT) large, transverse. Baños region, Ecuador ..... *albistriolatus*
— Right process (10 RP, inconspicuous, vestigial. Membranous portion of LPPT small, globose, projected caudad. Upper Putumayo, Colombia ..... *gurneyi*
5. Apterous, neotenic. Cranium largely golden. Ecuadorian altiplano, near Alausi ..... *auriceps*
— Brachypterous, wings very small, not much longer bearing somites. Cranium uniformly dark brown. Ecuadorian altiplano, near Paute ..... *micropterus*

Calamoclostes albistriolatus Enderlein

(FIGURE 5)

Calamoclostes albistriolatus Enderlein, 1909:188.—Krauss, 1911:73.—Enderlein, 1912:28.—Navás, 1918: 94.—Davis, 1940a:189.—Ross, 1944:415.

Type.—Male, pinned; terminalia and set of wings on slide; deposited in Polska Academia Nauk, Warsaw. Labels.—"Ecuador, Baños, 1800 m, 21-3-1899, E. Schmidt S." "Type" "Calamoclostes albistriolatus Endl. Type det Dr. Enderlein."

Discussion.—To date all references to this very distinct species were based on Enderlein's type. During my first visit to Baños (1955) I encountered numerous, but very obscure, colonies of this species in rough bark of indigenous trees (Lauraceae) along the town's southern street. Most collections were made near the Palace Hotel but such occurrence has probably now ceased. Recently, in the 1990s, I found numerous colonies on fence posts and bases of small trees, about 1000 m in altitude above Baños, on the NE slope of Volcan Tungurahua. The embiids occupied silk-lined retreats under loose bark and feed on lichens and decomposing bark. The silk is gray in color and inconspicuous. Each colony consisted of a single female with eggs or brood. Evasive movement is sluggish.

This species is readily recognized by the conspicuous broad white "slashes" across all crossveins. These aren't as conspicuous in other species of the genus. This peculiarity must have suggested the name, *albistriolatus*. Nymphs and adult females are characterized by variegated head, body and leg maculation peculiar to the species.

Calamoclostes gurneyi Ross

(FIGURE 6)

Calamoclostes gurneyi Ross, 1944:415, figs. 17–19.

Holotype.—Male, on slide, USNM. Data.—Colombia: upper Putumayo River (B. Guevara).

Locality interpretation.—The type locality isn't precise. Perhaps this can be determined by research on the travels of the collector. Like that of most of its congeners, the locality may be assumed to be well above 1000 m.

Name basis.—Named after the late Dr. A.B. Gurney formerly of the U.S. National Museum's entomological staff who assisted my early embiid research.

Discussion.—My revised illustration of the holotype shows that *C. gurneyi* is distinct in the reduced sclerotization of the epiproct (EP), fairly distinct microspiculation of the crest of the medial flap (MF); the small, blunt, right tergal process (10 RP) tucked under the caudal margin of 10 R; the longer, triangular, membranous apex of the hypandrium process (HP), the large, quadrate, caudal extension of the setose lobe of the left paraproct (LPPT); the absence of an isolated, small sclerite between this lobe and the paraproct's sclerite at the left cercus base; the relatively short left cercus lobe, and only

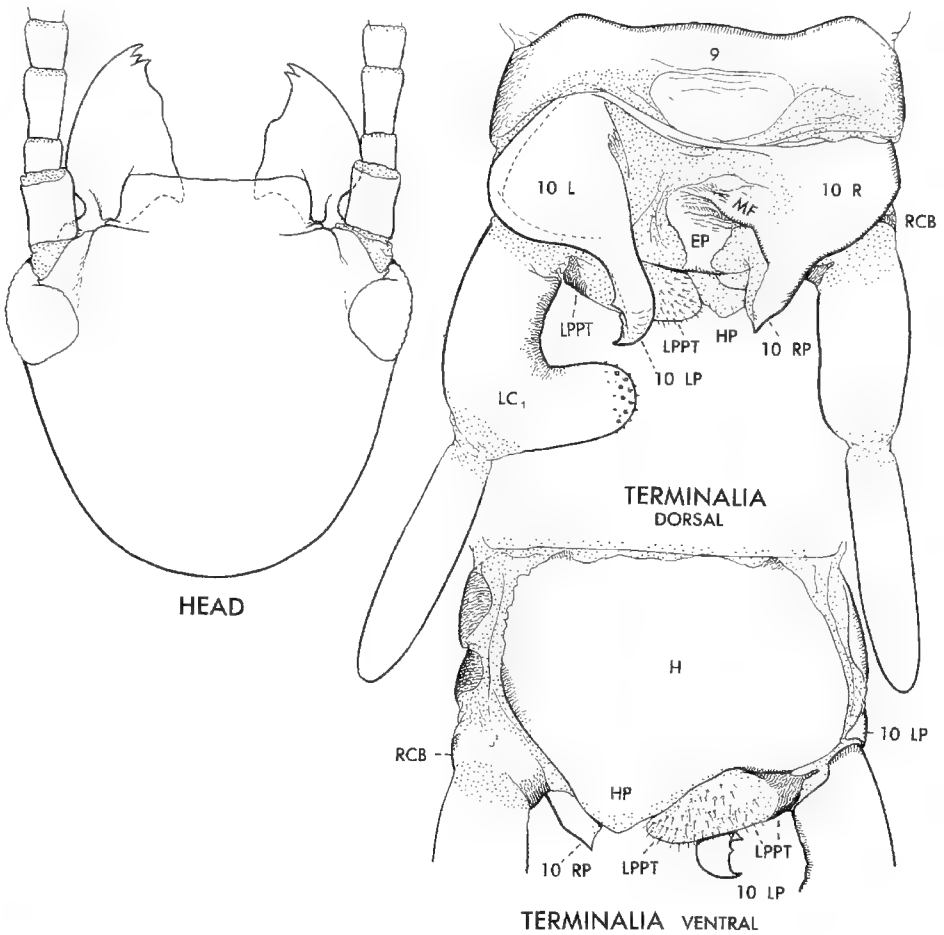

FIGURE 5. *Calamoclostes albistriolatus* Enderlein, topotype. Type locality: Baños, Ecuador.

short whiteness on the few cross-veins. My only specimens with most of these characters are from 14 mi SE Caqueza, Meta Prov., Colombia, 1300 m, but this place is far to the north of the upper Putumayo type locality.

During 1955 I also reared a large series related to *C. gurneyi*, 2 mi W of Alban, Cundin Amarca Prov, Colombia, 2020 m, under bark flakes of trees in a pasture. Males have larger wings with fewer and less white cross-veins; EP is well sclerotized; MF crest is strongly microspiculate; 10 RP is triangular, projected caudad; HP process is more rounded, and the membranous portion of LPPT is rounded, not quadrate. The series probably represents a new species worthy of a name when a comprehensive study of *Calamoclostes* of the Bogota region is made.

Calamoclostes auriceps Ross
new species

Holotype.—Male, on slide, CAS. Data.—Ecuador: Pistishi, 8 mi S. Alausi, Chimborazo, 2400 m, colony in crack in vertical, silty, road bank, matured in culture 11-III-55 (E. S. Ross and E. I. Schlinger).

Name basis.—*Auriceps* in reference to golden head.

Description.—Appearance: Apterous, very large (body length 14.0 mm); body sclerites and legs mottled chestnut brown, membranes cream white; pale sclerites and adjacent membranes forming a pale band between each thoracic somite; head extensively golden. Color details (in alcohol): Cranium golden except for a transverse, chestnut brown diamond-shaped area between antennae and

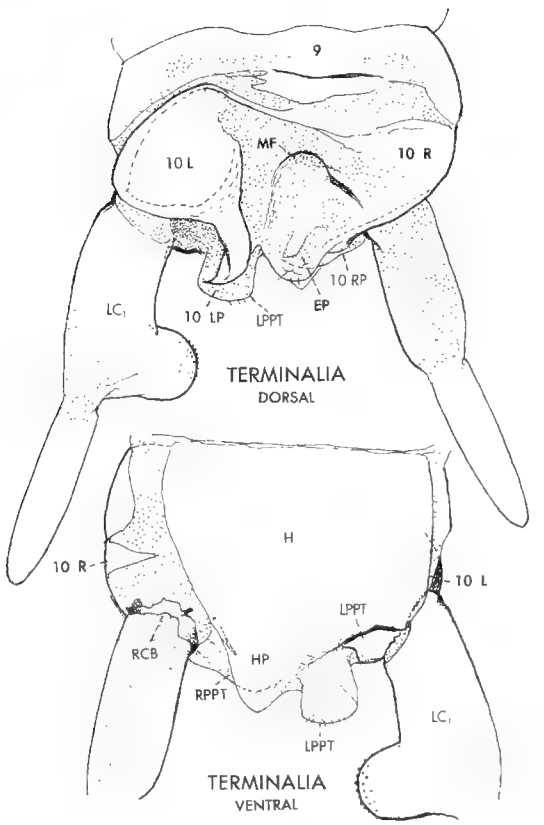

FIGURE 6. *Calamoclostes gurneyi* Ross, holotype. Type locality: Upper Putumayo R., Colombia.

a cloud on vertex, thus delimiting a transverse gold band between very small, black eyes. Venter of head and mouthparts lemon yellow; antennae light tan. Dorsal and pleural sclerites of thorax mottled chestnut brown; prosternum and cervical sclerites chestnut brown, meso- and metathoracic sterna yellow brown, irregularly margined with cream white, adjacent membranes cream white; acrotergites translucent amber, adjacent dorsal membranes cream white, thus forming two intersomital pale bands. Legs basically concolorous with thoracic terga except for cream white femora-tibial joints on hind legs. Abdominal terga 1–5 concolorous with thoracic terga, 6–8 increasingly pale caudad due to medial, cream white clouding; sterna 1–8 and pleurites golden, sternite 9 chestnut brown; pleural membranes cream white. Tenth tergite's hemitergites dark chestnut brown, left process piceous; membranes cream white. Cerci tan with joint membranes cream white; left cercus largely golden brown, apical half of lobe dull yellow.

Anatomical distinctions: Cranium nymphaform, eyes very small. Antennae very slender, segments small, 24 (complete); body and legs essentially similar to a female. Medial papilla of hind basitarsus inflated, conspicuous. Left tergal process (10 LP) piceous, short, curved down, broad, surface rugose (the contact point with left cercus lobe) apex a sharp spine, not visible from above; right tergal process (10 RP) triangular, weakly sclerotized. Medial flap (MF) carinate, not microspiculate at apex. Epiproct sclerite (EP) broadly attached to MF, thence tapered caudad. Basal segment of left cercus very stout, its lobe very large, curved basad, dorso-ventrally flattened (pinched); basal segment of right cercus stout on inner side, greatly expanded distad, apical segments tapered distad, mahogany brown with extreme apex cream white; joint membranes gray.

Allotype.—Female, in alcohol (CAS). Data: From holotype's culture.

Description.—Basically similar to male but not as dark. Cranium with dorsal pattern outlined in brown. Thoracic bands paler, more conspicuous. Body length: 18.0 mm.

Paratypes.—Males from type culture deposited in CAS, USNM, and Ecuador's Museo de Ciencias Naturales, Quito.

Calamoclostes micropterus Ross
new species

(FIGURE 7)

Holotype.—Male, on slide, CAS. Data.—Ecuador: 11 mi E. Paute, Azuay, 2800 m (est.), 17-II-55 (E. S. Ross).

Description.—Appearance: Rather large (body length 13.5 mm). Body and legs varied shades of light chestnut brown except prothorax and its legs, which are dark chestnut brown, and a pale band between pro- and mesothorax. Color details (in alcohol): Cranium very dark chestnut brown, lacking a golden band between eyes; area around anterior tentorial pits faintly golden. Basal antennal segments medium brown, others grading to tan at apex, 22 segmented (complete). Acrotergite 1, pale tan, adjacent membranes gray white, thus forming a pale thoracic band. Sclerotic portions of terminalia varied shades of very dark chestnut brown to piceous, especially on medial sclerite (MS), the left tergal process (10 LP), and margins of basal segment of left cercus; basal segment of right cercus sclerotized

only on convex inner side; distal segments medium brown, tips and intersegmental joints pale tan; cleft membrane of tenth tergite gray white.

Anatomical distinctions: The very small wings (not nymphal pads), barely extended beyond caudal end of each bearing somite. Left process (10 LP) of terminalia has an elevated dorsal projection and a small, left-turned apical hook. Hypandrium process (HP) triangulate, weakly sclerotized. Left paraproct (LPPT) globose, membranous except for an isolated medial sclerite; otherwise its sclerotic portion appresses the inner base of the left cercus. Basal segment of left cercus exceptionally stout.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Appearance: Large; generally amber with cream membranes, prothorax darker; head bright chestnut brown. Color details: Cranium uniformly chestnut brown, without pattern except for a narrow, caudally-arcing, yellow area extending from eye to eye; clypeo-frons area dark chestnut brown. Basal antennal segment amber, others to apex gradually blending from tan to cream (in two subapical segments), distal segment tan. Pronotum dark amber. Acrotergite 1 amber, adjacent membranes cream. Mesonotum dark amber, anterior fifth whitish, thus enhancing the conspicuous pale band between prothorax and mesonotum. Metanotum and all abdominal tergites pale amber with cream membranes. Legs varied shades of amber. Ventral body sclerites (except for darker prosternum), largely transparent cream white. Paragenital sclerites amber, medial areas cream. Cerci very pale tan, joints white. Body length: 17.5 mm.

Paratypes.—A few topotypic adult males, CAS and NMQ and a few adult female parallotypes.

Discussion.—From *C. auriceps*, the only other *Calamoclostes* in the same high Andean altiplano zone, *C. micropterus* is, of course, readily distinguished by its miniature wings, *C. auriceps* has none. However, one shouldn't be surprised if fully winged, or completely apterous males of this species occur in the same general region. *Calamoclostes auriceps* males also differ in having a completely golden head, that of *C. micropterus* is evenly brown. There are numerous terminalia differences, such as the more stubby 10 LP of *C. auriceps* and the lack of an isolated sclerite on the left paraproct's membranous lobe.

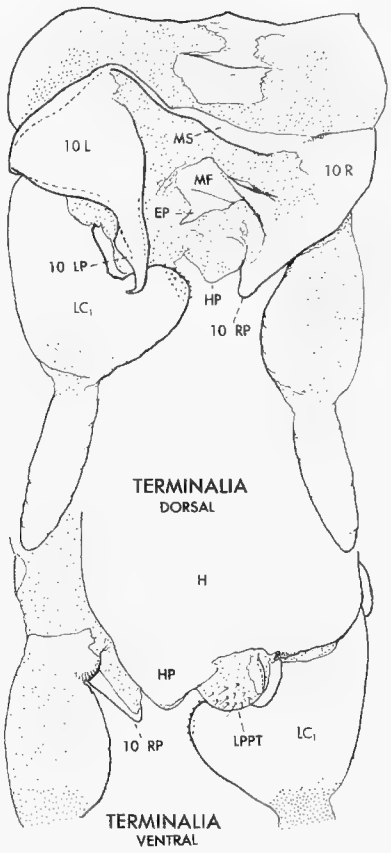

FIGURE 7. *Calamoclostes micropterus,* n. sp. holotype. Type locality: Near Paute, Azuay, Ecuador.

Calamoclostes silvestris Ross
new species

Holotype.—Male, on slide, CAS. Data.—Ecuador: 15 mi SE Santa Rosa, El Oro, matured in culture II-55 from bark flakes in dark primary rainforest (E. S. Ross and E. I. Schlinger).

Name basis.—Refers to occurrence in lowland rainforest (unusual for the genus).

Description.—Appearance: Alate, very dark brown throughout, head darker. Color details (in alcohol): Cranium very dark chocolate brown with two very faint, transverse, diffused, oval, golden spots between eyes. Antennae concolorous with cranium, 24-segmented (complete). Palpi, mentum and anterior third of submentum dark brown, becoming chestnut brown caudally. Pronotum medium brown, becoming pale laterally, adjacent membranes cream white. Pterothorax and legs varied shades of dark brown, hind basitarsus and its setae especially dark. Wings small for the genus with nar-

row, white, costal and apical margins; veins weakly pigmented; one cross-vein between RP and MA, one between RP and MA_{1+2}, two between MA and MP, all white when crossing exceptionally narrow hyaline stripes. Abdomen, including terminalia, varied shades of brown; pleurae, especially toward base, cream white.

Anatomical distinctions.—Mandibles short, broad; the left one with a large incisor flange. Eyes rather small, three eye-width interspace. Hind basitarsal mid-papilla large. Left tergal process (10 LP) short, down-curved, caudal surface rugose, terminated ventrally as a narrow, sharp point turned leftward. Forward end of medial flap (MF) densely microspiculate. Apex of hypandrium lobe (HP) membranous, triangular. Left paraproct with a second non-setose sclerite in membrane. Dimensions (on slide): Body length 11.0 mm; forewing length 6.7 mm., breadth 1.6 mm.

Allotype:—Female (in alcohol) CAS. Data: From holotype's culture.

Description.—Appearance: Varied shades of brown, legs and antennae golden tan. Color details: Cranium uniformly dark chestnut brown with a faint golden chevron between black eyes. Antennae golden tan, all but seven segments lost. Mouthparts and ventral area golden brown. Pronotum light chestnut brown. Meso- and metathoracic scuta golden brown medially, blending to dark lavender brown on sides and across apices; abdominal terga similar. Ventral sclerites, including paraprocts and all legs, golden tan; pleurae cream white; cerci tan, mottled with brown. Body length: 10.0 mm., actually much longer because the specimen died and the body segments telescoped.

Paratype.—One male (CAS) from holotype culture.

Discussion.—The occurrence of a *Calamoclostes* in dark, virgin forest at low altitude on the west side of the Andes, is exceptional. Males are distinct in having almost the entire costal and apical margins of the wings narrowly white, all congeners have brown margins. The terminalia are much like those of *C. albistriolatus* except for the stubby, expanded, rugose, abruptly downwardly-hooked apex of 10 LP (apex scarcely visible from above); the more acute apex of HP; the presence of a detached, non-setose sclerite just mesad of the sclerotic portion of LPPT, and the more expanded, pale apex of the left cercus lobe.

Calamoclostes oculeus Ross
new species

Holotype.—Male, on slide, CAS. Data.— Colombia: Salado, 27 mi. W. of Cali, 1350 m, 21-III-55 (E. S. Ross, E. I. Schlinger). Under bark flakes of shade trees in plaza.

Name basis.—Latin *oculeus*, full of eyes, in reference to the relatively large eyes of the species.

Description.—Appearance: Alate, rather small for the genus, uniformly brown; head darker, lacking maculation. Color details: Antennae concolorous with cranium, as are the mouthparts. Prothorax slightly paler than pterothorax. Pterothorax and legs varied shades of medium brown, hind basitarsus not especially dark. Wing bands light brown, hyaline stripes rather broad, MA forked beyond apical half (not forked in some specimens), cross-veins absent behind RP. Abdomen, including terminalia, concolorous with pterothorax.

Anatomical distinctions.—Cranium somewhat quadrate. Eyes especially large, inflated; half of head length long, separated by slightly more than an eye width. Mid-papilla of hind basitarsus perhaps absent, at least not inflated or readily discernable. Terminalia basically as in *C. albistriolatus* but less sclerotic, but its 10 LP has a shorter sub-basal spur on its left side and a tiny one opposite on the right base; HP margin broadly rounded, membranous; inner setose portion of LPPT large, globular. Dimensions (on slide): Body length 9.5 mm; forewing length 8.0 mm, breadth 2.0 mm.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Appearance: Smallest species of the genus (body length 10.0 mm); body and legs uniformly tan except for a slightly darker prothorax and legs; all body membranes pale tan, almost same tone as sclerites, no pale thoracic intersomital bands. Cranium uniformly chestnut brown except for two, suffused golden areas between eyes. Antennal segments 1–15 uniformly light brown, 16 and 17 golden tan, 18 light brown (segmentation complete). Paragenital sternites medium brown. Paraprocts translucent pale tan. Basal segments of cerci pale golden tan, distal segments light golden brown.

Paratypes and parallotypes.—Numerous topotypic males and females deposited in CAS, USNM, BMNH, and Instituto de Historia Naturales, Bogota, Colombia.

Microembiinae Ross
new subfamily

Type genus.—*Microembia* Ross, 1944, by present designation.

Distribution.—South America: Upper Amazon (one record).

Diagnosis.—Male (Fig. 8): Very small (body length about 5 mm), alate, pale tan throughout. Head circular, dorsoventrally thick. Eyes large, wide-spaced, extending caudad half of the cranium's length, facets very large; clypeus and frons heavily sclerotized, rugose, anterior angles strongly lobed forward and dorsad. Mandibles thin, relatively large due to great expansion of outer basal angles; distal teeth small. Submentum well sclerotized; anterior margin transverse, weak; lateral margins strongly inflexed, convergent caudad. Antennal segments exceptionally long, segments beyond the fifth broken off. Wings narrowly tapered basad, very pale due to reduced venal bands and broad hyaline intervenal stripes; venation embioid with all veins unsclerotized except for blood sinuses, RP and RP + MA; cross-veins absent except for one between apex of RBS and RP. Legs very long and slender; hind basitarsus lacking a medial papilla. Terminalia small, weakly sclerotized. Ninth tergite (9) membranous except for basal margin and outer caudal angles. Basal margin of tergite 10 narrowly sclerotized, slightly arcuated basad; the tergite broadly cleft to base; left hemitergite (10 L) well sclerotized except at its weak inner base, caudal margin arcuately projected caudad; inner margin straight, continuous with that of its process (10 LP) which is narrow, parallel-sided and simple; inner margin of right hemitergite (10 R) weak, blending with membrane of tergal cleft, outer margin strong, evenly acuated from outer base to caudal apex; right process (10 RP) a short, blunt, fleshy lobe folded beneath caudo-mesal margin of 10 R. An obscure sclerite on the inner margin of 10 R may be the homolog of a median flap (MF?); beneath it a caudally-rounded lobe may be the epiproct (EP?). Ninth sternite (H) broad basally, evenly tapered caudad, becoming an angular process (HP). Left paraproct (LPPT) very large, closely contacting H and HP on inner side; right paraproct (RPPT) obsolete, with only weakly sclerotized fragments. Cerci short, left cercus two-segmented, apical segment broadly attached to the basal segment (LC_1) which is well sclerotized, distally enlarged, but not abruptly lobed, inner margin of this expansion coarsely echinulated; right cercus normally articulated; both cerci, especially ventrally, bearing numerous trichobothria with large sockets.

Females.—Unknown.

Discussion.—This category is proposed with hesitation because of the limited series and rather indecisive characters. The subfamily seems to be most closely related to Archembiinae but the component species differs in its minute size, reduced wing vein sclerotization, lack of a second basitarsal papilla, the terminalia's lack of a well-developed medial flap, and reduced lobing of the left cercus. Judging from its large eyes and pale coloration, males of the type species must disperse nocturnally. This is unusual for an embiid inhabiting tropical forests.

The subfamily contains the one genus, *Microembia* Ross (1944:416) and species, *M. rugosifrons* Ross, l.c. (holotype male, on slide USNM; one additional male in my collection, CAS) (Fig. 8).

These, the only specimens collected to date, were secured at Iquitos, Peru, March-April 1931 by R. C. Shannon. They were probably attracted to light. During a visit to Iquitos I attempted without success to locate colonies of the species. These must be very obscure in bark crevices, but may no longer occur within the limits of the now much-disturbed city. On remnant trees along the river front I found only numerous colonies of the "weed species," *Archembia batesi.*

Szumik's suggestion (1996) that *Microembia* has a relationship with *Ptilocerembia* of SE Asia, based in part on the highly unreliable group character—the absence of a middle basitarsal papilla, is weak. Her discussion of the relationship to other embiids is inconclusive. I am inclined to relate the genus to the Archembiinae. Until more fieldwork in the Amazon Basin yields related species or genera, *Microembia* will "hang in taxonomic space."

Although not used in the present systematic studies, I have accurately included chaetotaxy in my revised illustration of the terminalia which is based

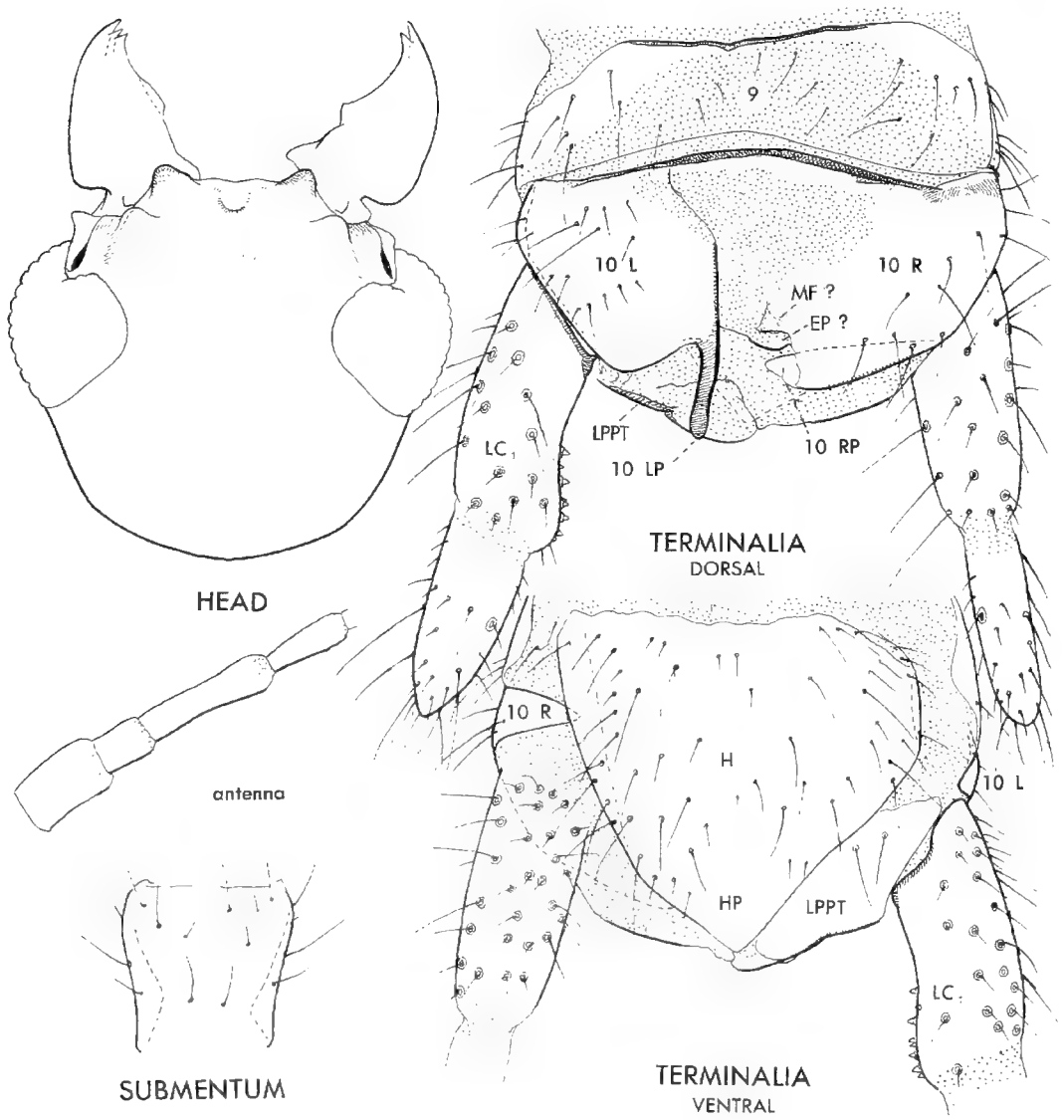

FIGURE 8. *Microembia rugosifrons* Ross, paratype. Type locality: Iquitos, Peru.

on the CAS paratype. *Microembia* has an unusually large number of large-socketed trichobothria on the cerci of males.

Scelembiinae Ross

new subfamily

Type genus. *Scelembia* Ross, 1960, by present designation.

Distribution.—Afrotropical and Neotropical regions.

Diagnosis.—Males small to moderately large (body length 6–18 mm), usually alate; pale tan to black, often with orange or reddish prothorax and/or pterothorax. Cranium usually elongate-oval; eyes small to moderately large; clypeus and frons not especially sclerotic or rugose, anterior angles not produced; mandibles dorso-ventrally thin, apical teeth well spaced, on a horizontal plane (not curved ventrad), mandibles not dentate in some African genera; submentum usually weakly sclerotized with apical and lateral margins not inflexed (except in three Neotropical genera, *Ischnembia, Pararhagadochir* and *Litosembia*, as well as in several African genera). Wings highly variable in size and pigmentation, absent in many species (all species of some African genera); MA usually forked. Ninth

abdominal tergite extensively membranous; tergite 10 broadly cleft to base. Medial sclerite (MS) forming the narrow, transverse basal margin of tergite 10 (in some African genera an often detached, isolated sclerite, present in the cleft membrane, may be MS). Medial flap (MF) usually a diagonal sclerotized arm projected forward in cleft (never a flap, as in Archembinae); in some American genera MF is obsolete, represented only by membranous wrinkles. Left paraproct (LPPT) well developed, at times bearing a micro-echinulate nodule, or an acute point on inner caudal angle, but never a distinct process. Basal segment of left cercus usually lobed medially or distally, these lobes always echinulate; however, in Mesoamerican and some Mexican genera (except for introduced *Pararhagadochir*) the lobe is at extreme base of the segment and may not be echinulate. *Conocercembia* of Mexico has a prominent distal lobe, but this isn't echinulate. Apical cercus segments always present, well articulated.

Females.—Not studied for subfamily characters.

Discussion.—As evident in the above description, this large, widespread subfamily is highly diversified and difficult to define. However, especially in the New World, an experienced specialist can readily recognize its genera. The subfamily's greatest diversity occurs in Africa, the locale of its type genus, *Scelembia* Ross. Except for the teratembiid genus *Diradius* Friederichs, it is the only embiid group with strong transatlantic relationships.

KEY TO NEW WORLD GENERA OF SCELEMBIINAE

(Adult males)

1. Tertiary shale fossil, Florissant Colorado ..... *Lithembia*
— Extant species 2
2. Left cercus lobe located medially or distally, always echinulate. Endemic to South America 3
— Left cercus lobe confined to extreme base, at times not echinulate. If a distal lobe is present, it is not echinulate (except for introduced *Pararhagadochir* in which it is echinulate). Endemic to Mexico and Central America 14
3. Membrane at forward end of MF not microspiculate in a depression 4
— Membranes at forward end of MF depressed and microspiculate 12
4. Medial flap of tenth abdominal tergite (MF) vestigial, represented only by membranous wrinkles 5
— Medial flap conspicuous, an at least partly sclerotic arm projected forward in cleft membrane 7
5. Left tergal process (10 LP) simple – a large, sclerotic talon arcing leftward ..... *Ochrembia*
— Left tergal process bifid, consisting of a small inner talon and an outer, often submembranous flange 6
6. Surface of left hemitergite (10 L) diagonally ridged, continued meso-caudad as the base of the inner talon of its process (10 LP); outer flange broad extended partly beneath the talon ..... *Ambonembia*
— Surface of 10 L almost flat; talon and flange of left tergal process, small, widely separated ..... *Malacosembia*
7. Process of left hemitergite simple, consisting only of an acutely tapered talon 8
— Process of left hemitergite bifid 11
8. Base of left tergal process (10 LP) arced forward almost contacting base of tenth tergite. Caudal margin of left hemitergite (10 L) obtusely angulate ..... *Dolonembia*
— Base of 10 LP not arced forward. Caudal margin of 10 L straight or tapered caudad 9
9. Cerci almost entirely white (not melanized), right cercus entirely white. Small species .....*Argocercembia*
— All segments of cerci brown (melanized). Small to large species 10
10. Very large bicolorous species. Caudal margin of left hemitergite (10 L) membranous; medial flap (MF) elongate, narrow; talon of right process (10 RP) small, twisted toward right. Atlantic forests of east-central Brazil .... *Embolyntha*
— Small unicolorous species. Caudal margin of 10 L not membranous. Medial flap broad, short; talon of right process large, angled mesad. Amazon Basin ..... *Xiphosembia*
11. Process of left hemitergite with talon and flange almost equal in length,and well spaced ..... *Biguembia*
— Talon of left process much larger than flange, the latter at times partly hidden beneath base of talon ..... *Gibocercus*
12. Very small, pale, desclerotized males. Medial flap (MF) terminating at forward end as a small, but distinct, microspiculate nodule. Tal-

on of left tergal process minute, not separated from the broad, faintly-visible flange.Belém, Brazil ..... *Litosembia*

— Small to very large, usually well sclerotized. Medial flap's forward end with a concave, microspiculate area in cleft membrane. Talon and flange of left process well developed and well separated 13

13. Small, pale males. Concave microspiculate area in cleft membrane very small. Inner basal side of left cercus deeply depressed .... *Ischnosembia*

— Medium to large males. Concave, microspiculate area in cleft membrane large, conspicuous. Inner basal side of left cercus not depressed ..... *Pararhagadochir*

14. Lobe at inner base of left cercus echinulate ..... *Neorhagadochir*

— Base of left cercus not distinctly lobed or echinulate 15

15. Left cercus with a distal, acute, non-echinulate inner lobe ..... *Conocercembia*

— Left cercus without a distal inner lobe .....*Brachypterembia*

Genus *Lithembia* Ross

Lithembia Ross, 1984:83.— Carpenter, 1992:190.

Type species.—*Embia florissantensis* Cockerell.

Distribution.—Oligocene fossil in volcanic ash shale, Florissant, Colorado (one specimen).

Discussion.—The type is a large male with fairly clear wings but only a dark blotch in the position of the male terminalia. The wings resemble those of the family Embiidae, vein MA being clearly forked. No details of the terminalia can be ascertained. In view of the fossil's large size, it is not likely to be a teratembiid and the forked MA rules out assignment to Anisembiidae. Its slender body and northerly occurrence indicates that it isn't a clothodid, a family which appears to have always been restricted to South America with an extension into Panama. Therefore, like all other North and Central American embiids with MA forked, it must be placed in Embiidae, more precisely in Scelembiinae.

Lithembia florissantensis (Cockerell)

Embia florissantensis Cockerell, 1908:230, fig. 4.—Handlirsch, 1906–08:1357.—Enderlein, 1912:53.

Oligotoma florissantensis (Cockerell), Krauss, 1911:48.

Clothoda florissantensis (Cockerell), Davis, 1939:379.—Ross, 1944:406.

Lithembia florissantensis (Cockerell), Ross, 1984:83.—Carpenter, 1992:190.

Holotype.—Alate male on rock slab in Riker Mount, Univ. of Colorado Museum, Denver. Data.—Florissant Colorado Station 14, 1907[?] (W. P. Cockerell). Miocene.

Discussion.—All references are based on Cockerell's original publication. No additional specimens have been found. The writer has studied the type and cannot add new details to the description, or improve on the original published photograph, except to note that it is reversed, perhaps due to an inverted negative.

Even if additional specimens are collected, it is doubtful if they would reveal sufficient terminalia details to add significant information concerning the relationships of the species.

The occurrence of an embiid in the ancient Florissant Basin, about thirty-five million years ago, indicates that the climate at that time lacked a prolonged cold winter. At the time of fossilization the area is reported to have had an estimated elevation of only 900 meters. Therefore, the estimate of about 2000 meters by K.M. Gregory would appear to have been too high for embiid survival at Florissant's latitude. Of course, one must consider increase in altitude and changed geographic position as a result of orogeny and tectonic movement.

Genus *Embolyntha* Davis

Embolyntha Davis, 1940b:344 (new name for *Olyntha* Gray, 1832). Ross, 1944:412.

Olyntha Gray, 1832:347.—Burmeister, 1839:70.—Davis, l.c. (as a name preoccupied by *Olynthus* Hübner, 1819).

Embius Gray,1832:786:72, fig. 2 (as a name preoccupied by *Embia* Latreille, 1829).—Davis, l.c.

Type species.—*Olyntha brasiliensis* Gray, 1832, by original designation.

Distribution.—Southeastern Brazil.

Diagnosis.—Males: Very large (body length more than 18 mm), robust; strongly pigmented,

blackish brown with prothorax, coxae, trochanters and femora of fore- and midlegs bright orange, antennal apices and numerous cross-veins of wings white. Cranium elongate-oval with pronounced longitudinal sulci paralleling lateral margins. Eyes small. Antennae very long (30-segmented, complete), segments short, setae fine, segments 1–24 uniformly dark, apical six pure white. Mandibles delicate, short, outer margins evenly arcuate; apical teeth small, even in spacing and size. Mentum conspicuous; submentum quadrate, evenly but not strongly sclerotized. Wings very large; vannal area reduced, narrowly tapered; all veins strong with considerable variation in branching and in the number and position of cross-veins (even in a single specimen); at times MA branches and MP are secondarily branched. Hind basitarsus densely setose, medial papilla small. Abdominal terminalia highly asymmetrical due to great size of left hemitergite (10 L). Ninth tergite very narrow on left side due to basal projection of 10 L. Left hemitergite (10 L) broader than long, basal and mesal margins forming a continuous sclerotic arc; caudal margin straight, transverse, sclerotic but with its edge membranous and setose. Left process (10 LP) continuous with inner arc of 10 L, long, tapering to an acute point on outer side with a subterminal truncate flange interrupting inner side. Medial cleft very narrow, paralleling basal and medial arc of 10 L and its process. Right hemitergite (10 R) terminated as a narrow, ventrally projected, sinuous, spine-like process (10 RP). Medial flap (MF) narrow, sclerotized ventrally only. Epiproct (EP) a very narrow fleshy lobe as long as 10 LP, bearing a very slender diagonal sclerite which extends beneath 10 LP to inner base of left cercus. Ninth sternite (H) very broad; its process (HP), which is not projected much beyond caudal margin of H, is simply a sclerotic fold. Left paraproct (LPPT) small, inner-caudal angle bearing a small nodule terminated by a narrow, microspiculate appendix. Basal segment of left cercus very short, sclerotic; inner lobe medial, its basal surface extensively depressed, almost causing bilobing of its coarsely echinulate apex (the greatly produced epiproct, stiffened by its long sclerite, together with 10 LP, apparently fits into this socket).

Females: Very large (body length averaging 25 mm), unicolorous blackish brown including membranous areas; legs and venter of thorax mostly golden. Antennal segments 31–33, brown, distal segments contrastingly white. Cerci uniformly dark brown. Hind basitarsi with two large ventral papillae. Eighth sternite strongly lobed medio-caudally, sides darkly pigmented; first valvifer lobes prominent; second valvifer represented by clear amber, lateral plates. Ninth sternite uniformly sclerotized, dark brown.

Discussion.—At this time *Embolyntha* is limited to its very distinct type species which is readily identified by generic-level characters. Davis (1940b:345) redescribed the holotype, an adult male in the British Museum (N.H.) with only "Brasil" as locality data. Recent collecting suggests that this type must have been collected in, or near, Rio de Janeiro.

Although it is one of the first named species of the order, one having exceptionally large body size, and occurs in the vicinity of one of the world's great cities, specimens of *E. brasiliensis* are very rare in collections. Perhaps less than six adult males have been collected to date and females and the habitat have remained unknown. However, after much search, I finally discovered that the species inconspicuously inhabits mossy rock ledges and road banks in rainforest near Paineiras in the heights above Rio de Janeiro. Each young nymph was developing alone in a separate gallery obscured in moss and other growth. The galleries extended from a crevice retreat into surface moss. After much effort, I collected and cultured ten nymphs but, unfortunately, all matured as females. It must not be assumed that the species is at times parthenogenetic, for the unmated females laid infertile eggs. In addition to these females, my collection (CAS) contains an adult male from Brazil's Parque National do Itatiaia, 26-X-58 (D. Lacombe) caught in diurnal flight near a mossy road bank.

It is probable that the brood of each female soon disperses into scattered crevices and thus the species may never produce the conspicuous, sheet-like colonies characteristic of the most common Rio de Janeiro embiids (*Archembia* spp.) found in the same habitat.

Embolyntha brasiliensis (Gray)

(FIGURE 9)

Embius (?) *brasiliensis* Gray, 1832:786, pl. 72, fig. 2.

Olyntha brasiliensis (Gray), Gray, 1832:347.—Westwood, 1837:373, pl. 2, fig. 3.—Burmeister,

1839:770.—Walker, 1853:532. —Krauss, 1911:28, pl. 1, fig. 1.

Embia (*Olyntha*) *brasiliensis* (Gray), Hagen, 1885:195.

Embia brasiliensis (Gray), Enderlein, 1912:48, fig. 24.—Navás, 1918:98.—Costa Lima, 1938:109, figs. 52–54.

Embolyntha brasiliensis (Gray), Davis, 1940b:345, figs. 1–7 (redesc. Type).—Ross, 1944:413.

Embia brasiliensis var. *flavicercatus* Enderlein, 1912:49 (prob. a distinct sp.).

Type.—Male, Children Collection, BMNH. Type labels.—"Brasiliensis G.R. Gray Brasil," "40 3.30 704," "Type" (red-circled card).

Condition.—Pinned dry with wings spread, mouthparts dissected on card, genitalia preserved in small vial attached to pin. General condition excellent.

Remarks.—My examination of the type confirms the accuracy of current identifications. Because most specimens were collected in or near Rio de Janeiro, the type locality is here formally established as Paineiras, 450 m, Parque Nac. do Tijuca, a well protected environment. The present generic treatment and figure, are based on a male (CAS) from Parque Nacional do Itatiaia, Est. do Rio de Janeiro.

The varietal name, *flavicercata* Enderlein, probably pertains to a distinct species—perhaps of the genus *Archembia*. Enderlein apparently had only a literature knowledge of a Burmeister specimen. Because no locality is specified and the specimen may not be preserved, the varietal name need not be recognized, if indeed it ever had nomenclatural status.

I attribute the name *E. brasiliensis* to Gray, rather than Griffith and Pidgeon, as was done by Davis (1940b), because Gray authored the portion of "Animal Kingdom" dealing with Embiidina.

Specimens examined.—1 male (Copenhagen Museum) Brazil: "Rio Reinh." (I assume that "Rio" is the locality and "Reinh.," an abbreviation of the collector's name. 1 male (USNM) Rio de Janeiro, Yellow Fever Survey (R.C. Shannon); 1 male (CAS) Itatiaia, Est. do Rio 26.X.58 (D. Lacombe); 8 adult females (CAS), Paineiras, Parque Nac. do Tijuca, each died infertile during VIII and IX-64 and III-65 (E. S. Ross).

Perhaps because of rarity, *E. brasiliensis* has no synonyms. Costa Lima's treatment (1938:109–114), as evidenced by his figures 53 and 54, was based on correctly identified specimens of *E. brasiliensis*. All of the anatomical work of Lacombe and Barth, using the name *brasiliensis*, was based on specimens of *Archembia lacombea* Ross.

Genus *Xiphosembia* Ross

new genus

Type species.—*Xiphosembia amapae* Ross, new species by present designation.

Distribution.—South America: Amazon Basin.

Name basis.—Greek *xiphos* (sword or saber) in reference to the saber-like left tergal process of the terminalia.

Diagnosis.—Males: Medium sized (body length 8–12 mm), alate; pale to darkly pigmented. Cranium variable in form; eyes small to large; antennae without pale distal segments, 22 to 28-segmented; submentum transversely rectangulate, anterior margin weak; mandibles flat, thin, short, apical teeth well spaced and acute. Hind basitarsus with two ventral papillae. Tenth tergite very broadly cleft to basal margin. Left tergal process (10 LP) very large, arising on inner side of the hemitergite; arcuate, narrow, evenly-tapered to a fine point; lacking an outer, basal appendix or flange except for a tiny, obscure one in a new species from Rondonia. Right hemitergite deeply excised on inner-basal side; process (10 RP) an abruptly-narrowed meso-ventrally-directed, large talon. Medial flap (MF) a wrinkled, sclerotized area directed meso-caudad, without microspiculations at forward end. Epiproct (EP) large; its sclerite narrow, inconspicuous. Hypandrium process (HP) truncate, not attaining caudal margin of left paraproct. Left paraproct (LPPT) with caudal margin simple, microspiculate in type species, but sclerotic and bilobed in another species. Basal segment of left cercus with a single, large, echinulate, inner-apical lobe; outer side well sclerotized.

Females: Without noteworthy integumental characters. Coloration very distinctive: antennae white-tipped; prothorax and mesothorax and legs yellow in all species; abdomen dark brown in one species, yellow in two species; head dark brown in all species.

Discussion.—The simple, scimitar-like left tergal process in combination with a prominent medial flap are distinct features of the male terminalia. Three species of *Xiphosembia* are represented in my collection. One from south of Belém is very closely

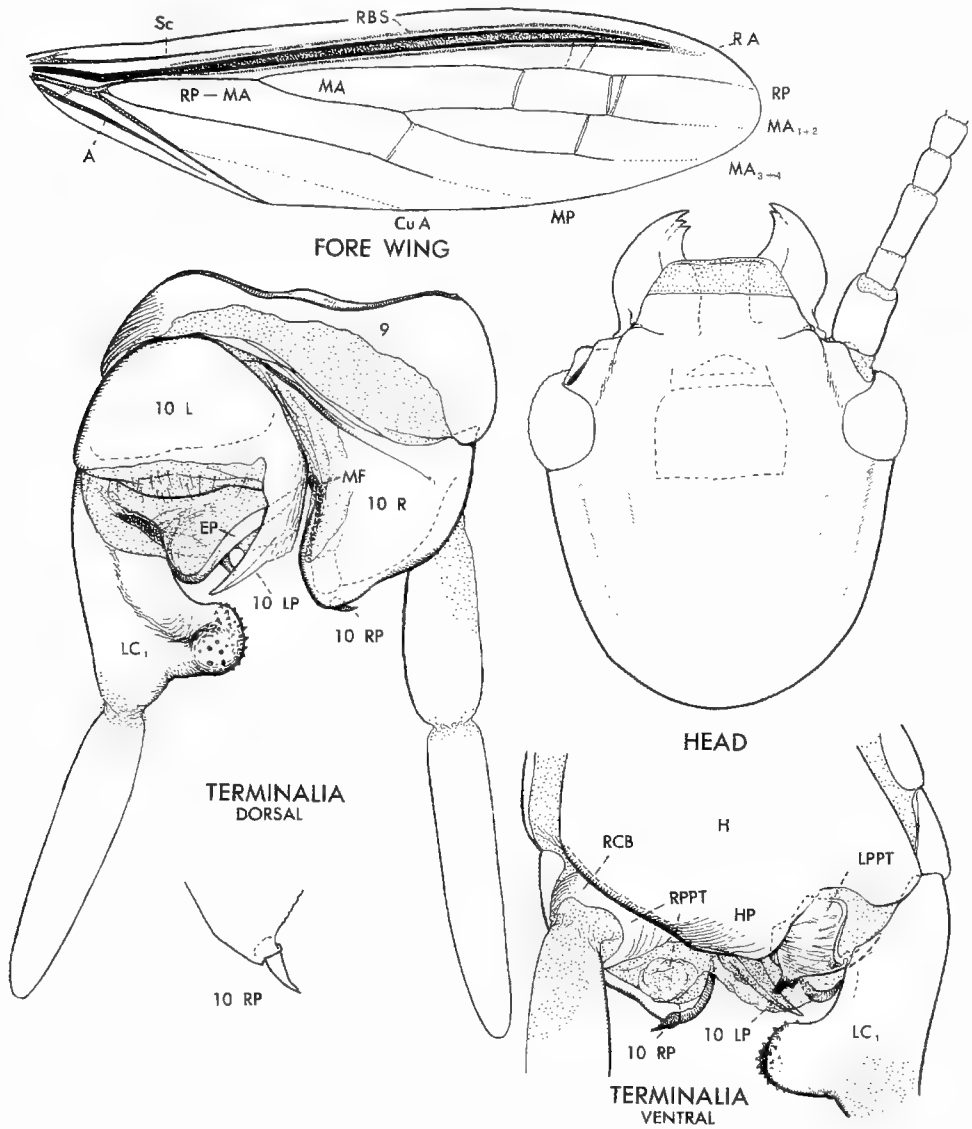

FIGURE 9. *Embolyntha brasiliensis* (Gray). Type locality: Assumed to be Rio de Janeiro, Brazil.

related to *X. amapae*, differing primarily in its more elongate head with small eyes. Both have distinctly pigmented females—these being entirely yellow except for a brown head and a largely dark brown metanotum.

Xiphosembia amapae Ross
new species
(FIGURE 10)

Holotype.—Male, one slide, MNRJ. Data.—Brazil: Vila Amazonas, port of Icomi Mine, near Macapá, Amapá. Matured in culture 28-VII-1964 (E. S. Ross).

Description.—Appearance: Medium sized, alate; pale tan with dark brown head, light brown terminalia and wings; antennae almost unicolorous. Color details (in alcohol): Cranium mottled mahogany brown with distinct vertex pattern. Eyes gray-black with pale outline. Antennae uniformly medium brown, segments 2–3 slightly paler; 22-segmented. Mouthparts medium brown. Pronotum light brown, other thoracic sclerites pale yellow with darker sutures; all thoracic membranes cream white. Fore and mid coxae, trochanter and femora cream white; tibiae and tarsi light brown. Hind coxae light brown, trochanters and femora bases

cream white; femora grading to light brown distad, tibiae and tarsi light brown. Wings with all veins sclerotized except apices of MA, MP and entire Cu_{1a}; cross-veins present between all veins except within MA fork, and behind MP; hyaline stripes rather broad, venal stripes light brown. Abdominal sclerites light brown except for darker terminalia, all membranes pale cream. Dimensions (on slide): Body length 8.5 mm; forewing length 6.0 mm, breadth 1.5 mm.

Important integumental characters.—The short cranium with strongly caudally-convergent sides which are shorter than an eye-length; the very large, inflated eyes which are separated by less than an eye-width; and the relatively short antennae with only 22 segments. The terminalia are distinctive in the mesal origin of the left tergal process (10 LP), which has a simple, tapered, arcuate form; the triangulate shape and striation of the medial flap (MF); the simple, submembranous, microspiculate caudal margin of the left paraproct (LPPT) and the peculiar form of the basal segment of the left cercus, the lobe being extremely long and narrow, almost as long as the segment, and its caudal side is submembranous.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Rather small; entirely yellow except for white-tipped antennae, dark brown head and portions of metanotum. Color details: Cranium dark mahogany brown, paler anteriorly and ventrally. Eyes black. Basal third of antennae pale yellow blending to dark mahogany brown in medial area; distal four segments pure white (24-segmented). Mandibles and submentum dark amber, other sclerotized portions of mouthparts pale yellow. Dorsal body sclerites pale yellow except for metanotum which is clouded with dark mahogany brown in lateral third and yellow medially; metapleurae also dark mahogany; ventral sclerites and all membranes cream white. All legs entirely pale yellow except for largely medium brown, hind legs. Paragenital sternites translucent pale yellow. Body length 9.0 mm.

Paratypes and parallotypes.—Numerous adults from type culture deposited in major entomological collections, including CAS, USNM, BMNH, MNRJ and MZUSP.

Biology.—This species was discovered in a remnant patch of original forest in a region subject to a long dry season. Situated but a few feet above river level, it was ground-water dependent and thus trunks and branches had few of the epiphytes characterizing a rainforest. Colonies are conspicuous chalk white patches fully exposed on the bark of large trees. Largest, abandoned colonies averaged 6 $\leftrightarrow$ 12 inches in dimension and were distributed high up on the trunks. During mid-March each newly formed colony consisted of a single parent female and a first or second instar brood. Adults of these broods began maturing late in July and their numbers peaked during August and September. A closely related new species, discovered south of Belém, has similar habits. Another new species from the Arequemes region of Rondonia has an extremely small, subventral, outer appendix at the base of the left tergal process. These will be named and described in a future publication.

Genus *Dolonembia* Ross

new genus

Type species – *Dolonembia tapirape* Ross, new species by present designation.

Distribution.—Brazil: Rio Tapirapé region, Mato Grosso (one record).

Name basis.—Greek *dolon* (dagger, stiletto, pike) in reference to dagger-like left tergal process of terminalia.

Diagnosis.—Males distinguished from distantly related genus, *Xiphosembia*, by larger size, darker coloration; broader mandibles; and very distinct terminalia, as follows: caudal margin of 10 L obtusely angulate; 10 LP originates at extreme inner-base of 10 L and is straight instead of arcuate; MF larger and more extensively projected basomesad; sclerotic, bilobed caudal margin of LPPT, and more elongate and sclerotic basal segment of left cercus with larger and flattened lobe. Females, instead of being almost entirely yellow, as in *Xiphosembia*, are brown with only the pro- and metathorax yellow.

Dolonembia tapirape Ross

new species

(FIGURE 11)

Holotype.—Male, on slide, CAS. Data.—Brazil: Barra do Tapirapé, Mato Grosso, 7-XI-64 (Borys Malkin).

Name basis.—Named for the Indian village Tapirapé. Tapirapé is an Indian village at the confluence of the Tapirapé and Arquais Rivers.

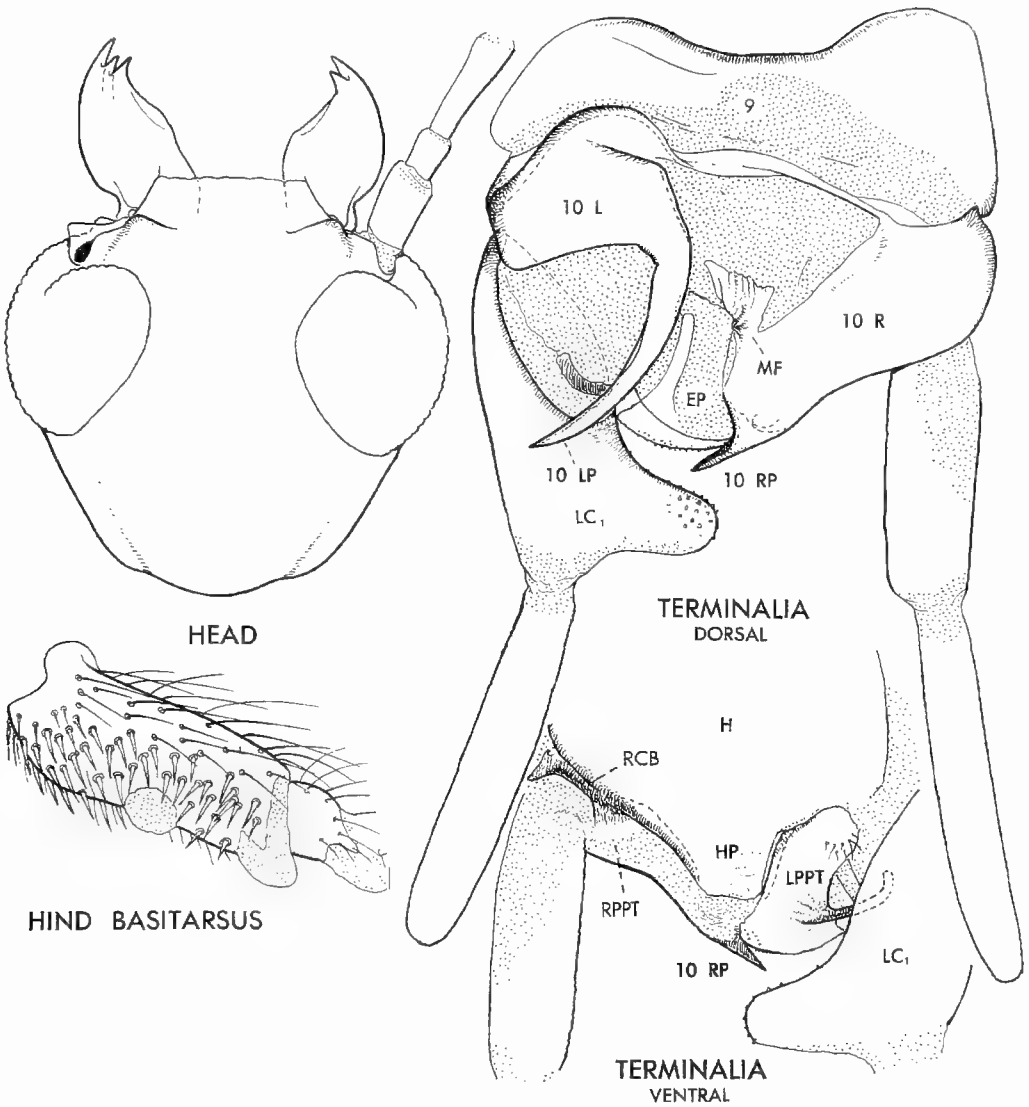

FIGURE 10. *Xiphosembia amapae* Ross, n. sp., holotype. Type locality: near Macapá, Brazil.

Description.—Appearance: Rather large, alate; dark mahogany brown except for golden prothorax and hind femora. Color details (in alcohol): Cranium uniformly dark mahogany brown, lacking paler clouding or pattern. Eyes black. Antennae entirely mahogany brown, 28-segmented. Submentum translucent dark amber, other mouthparts mahogany brown. Cervical sclerites and those of prothorax, including acrotergite 1 transparent gold; membranes cream white. Pterothoracic sclerites light mahogany brown, membranes cream. Forelegs almost entirely light mahogany brown; mid- and hind legs similar except for yellow femora. Abdomen rust mahogany brown except for dark mahogany brown terminalia, including processes and cerci. Dimensions (on slide): Body length 11.5 mm; forewing length 7.0 mm, breadth 1.6 mm.

Important integumental characters.—The broad, oval cranium with sides equal to three eye-lengths; eyes small, separated by almost four eye-widths; the long 28-segmented antennae, and the broad, short mandibles. The terminalia are unique in the basal origin of the simple, dagger-like, left tergal process (10 LP) which abruptly curves caudally thence becomes long, straight and finely-tapered. Medial flap (MF) exceptionally large and long, extending al-

most to basal margin of cleft which lacks a microspiculated depression. Right process (10 RP) simple, abruptly narrowed, angled mesad, apically blunt. Left paraproct (LPPT) narrow with caudal margin sclerotic, non-spiculate and bilobed on inner-caudal angle. Basal segment of left cercus broadly lobed, the lobe sclerotic on all surfaces and dorsally depressed.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Rather large; anterior half of body and legs bright yellow except for dark cranium, posterior half of body very dark brown. Color details: Cranium piceous brown faintly clouded with mahogany brown medially, but without definite pattern; ventro-medially golden brown. Eyes black. Basal two-thirds of antennae uniformly dark brown, apical third (segments 20-28) white. Submentum and entire labium amber yellow, mouthparts otherwise shades of brown. Cervical, prothoracic and mesothoracic sclerites translucent yellow; all membranes cream white. Metathoracic sclerites dark mahogany brown, sternites lighter brown; all membranes cream white. All coxae, trochanters, and femora golden yellow; tibiae and tarsi largely light mahogany brown; hind basitarsi with two prominent ventral papillae. Dorsum of abdomen basally and distally dark mahogany, becoming golden brown medially; sternites 1–7 transparent light brown, lateral thirds of 8 and most of 9 dark mahogany. Cerci dark brown except at extreme bases. Body length 13.5 mm.

Paratypes and parallotypes.—Small series of topotypic adults deposited in CAS, MNRJ, MZUSP.

Biology: The type series was collected in colonies on bark of trees growing on a forest-covered rocky hill. Adult males were present during January, February and November.

Genus *Ischnosembia* Ross
new genus

Type species.—*Ischnosembia amazonica* Ross, new species, by original designation.

Name basis.—Greek *ischnos* (withered, thin, weak) in reference to the frail, thin body form.

Distribution.—South America.—Widespread in forested regions.

Diagnosis.—Males: Small (body length averaging 9 mm) slender, alate; unicolorous tan, antennal apices and cerci white. Cranium small, eyes moderately large; antennae 19-segmented, segments especially elongate with rather long and erect setae, 3 apical segments white; mandibles small, delicate, oligotomoid; submentum sclerotic, shield-like, anterior and lateral margins inflexed. Wings with all veins behind RP reduced to rows of setae, cross-veins usually absent behind RP. Hind basitarsus elongate, with only one ventral papilla. Terminalia with tenth tergite broadly cleft to base. Left hemitergite (10 L) with weak inner and caudal margins; dorsal surface pinched by two transverse, incurved depressions. Process (10 LP) short, broad; inner talon very slender, sharply accuminated, its even arcuation forming a semicircle which extends leftward across apex of a broad, desclerotized outer flange. Inner-basal and outer-basal margins of right hemitergite (10 R) weak; process-base short. Right process (10 RP) composed of a short, sclerotic, meso-ventrally-directed talon and a soft, ventral lobe. Medial flap (MF) a thin, elevated ridge with a small, micro-dimpled area in the cleft membrane at its forward end. Epiproct (EP) large, well developed but weakly sclerotized. Left paraproct (LPPT) large, caudal margin straight, membranous, finely microspiculated especially on its rounded, outer corner. Basal segment of left cercus short, desclerotized except at base; lobe globose, coarsely-echinulated, angled caudo-mesad; other cercus segments not sclerotized, white.

Females: Slender, head exceptionally small, antennae with three apical segments white; body and legs uniformly glossy, red mahogany except for a conspicuous, white zone between each thoracic somite; cerci pale, partially white. Hind basitarsus with two ventral papillae.

Discussion:—Although this genus has many characters similar to those of *Pararhagadochir*, there are enough distinctions to warrant separate generic status. This conclusion is strengthened by the fact that there are three known, widespread species having very similar characters. The absence of a second hind basitarsal papilla in males, and the presence of two in females is unusual—almost unique in the order.

From those of *Pararhagadochir, Ischnosembia* males can be distinguished by their white cerci and white-tipped antennae; the reduced sclerotization of most wing-veins, usually absent cross-veins be-

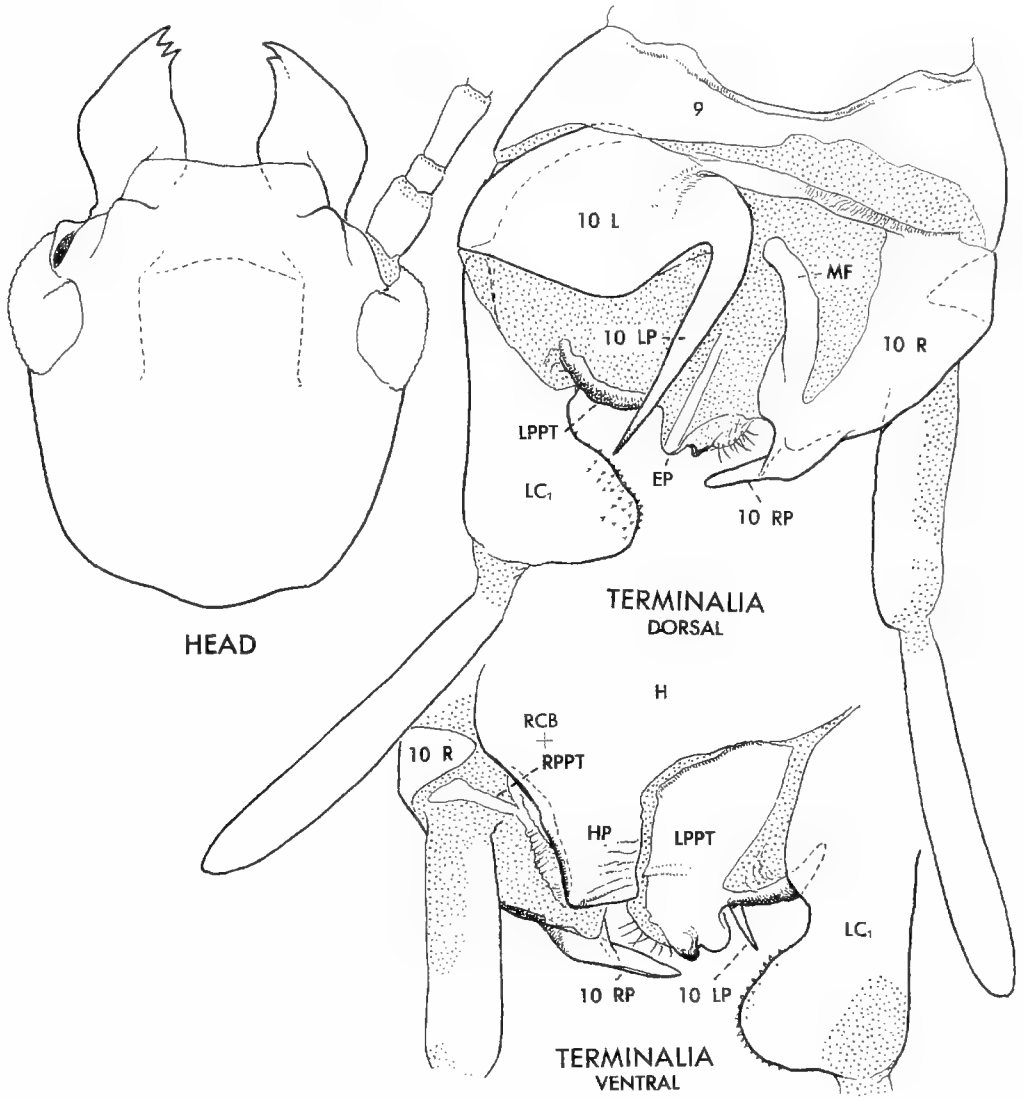

FIGURE 11. *Dolonembia tapirape* Ross, n. sp., holotype. Type locality: Barra do Tapirapé, Mato Grosso, Brazil.

hind RP, the transversely elevated (pinched) left hemitergite, the peculiar left process, the greatly reduced microspiculation of the cleft membrane opposite the anterior end of MF, the simple caudal margin of LPPT, and the peculiar form of the basal segment of the left cercus.

In addition to *I. amazonica*, my collection (CAS) contains a new species from SE Brazil and the holotype of the older species:*surinamensis* (Ross), new combination (*Pararhagadochir surinamensis* Ross, 1944:433, figs. 57–60). Holotype male, on slide, now deposited by exchange in CAS. Surinam: Kwakoegron, Saramacca River, 8-VI-27 (Cornell U. Lat 760, sub. 89).

Ischnosembia amazonica Ross
new species

(FIGURE 12)

Holotype.—Male, on slide, MNRJ. Data.—Brazil: Vila Amazonas near Macapá, Amapá. Matured in culture 17-VII-64 (E. S. Ross).

Description.—Appearance: Small, slender, alate; tan with darker head and abdomen; antennae white-tipped, cerci entirely white. Color details (in alcohol): Cranium basically golden brown with darker pattern outlining positions of brain and mandibular muscles; eyes lavender black; antennal scape dark tan, segments 2–15 pale amber, 16

lighter, distal three pure white; mouthparts varied shades of yellow tan. Thoracic sclerites basically pale yellow tan; sutures and surrounding membranes ringed with dark purple—especially on prothorax; tone of prothorax slightly darker than pterothorax. Legs concolorous with thorax. Wings pale tan with broad hyaline stripes. Abdomen basically pale tan but appearing rust brown due to extensive, subcutaneous mottling; terminalia more yellowish, cerci entirely white. Dimensions (on slide): Body length 6.5 mm; forewing length 4.6 mm, breadth 1.1 mm.

Important integumental characters.—As described in the generic diagnosis. Of specific importance are the size and form of the eyes, the form of the tergal processes, and the caudal spiculation of the left paraproct.

Allotype.—Female, in alcohol with holotype data and disposition.

Description:—Appearance: Small, slender; largely mahogany brown except for a white band between each thoracic somite, white-tipped antennae, and white cerci. Color details: Cranium basically golden brown but heavily tinged with rust brown in vertex pattern. Eyes dark lavender. Antennal segments 1–15 medium brown, segment 16 apically white, 17–18 white. Labrum amber yellow toward margins; other mouthparts varied shades of medium brown. All sclerotic portions of body and legs mottled mahogany brown except for transparent acrotergites and prescutae; all membranous surfaces darkly tinged with purple brown except dorsal membranes between thoracic somites which are white due to pale internal tissue. Basal segments of cerci whitish, tinged with dark purple toward bases; distal segments yellow white. Body length 9.2 mm.

Paratypes and parallotypes.—Numerous adults reared from type culture, deposited in CAS, USNM, MCZ, MZUSP, MNRJ, and others.

Discussion.—*Ischnosembia amazonica* is most closely related to an undescribed species from southern Brazil. *Ischnosembia surinamensis* is less closely related and distinguished by its more circular head, very large eyes (eye-length greater than that of cranial sides) and minor differences in the terminalia, notably the obtusely-angulate outer flap of the left tergal process. I have cultured a new species, yet to be named, from 62 km S Ariquemes, Rondonia, Brazil.

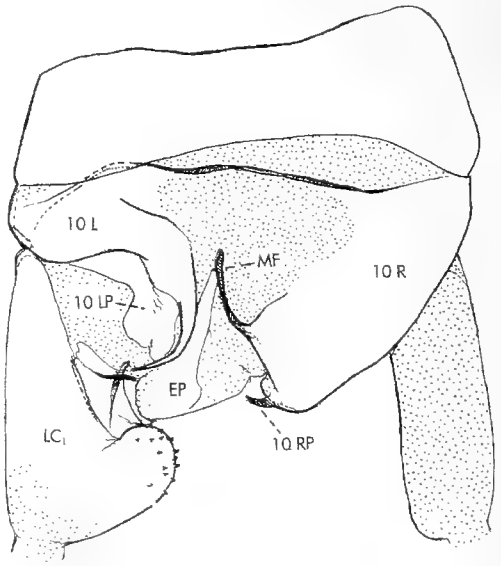

FIGURE 12. *Ischnosembia amazonica* Ross, n. sp., holotype. Type locality: near Macapá, Brazil.

Biology.—Stock for the type culture was collected in galleries spun on the undersurfaces of six-foot-long log sections (recently cut for charcoal burning). These were lying along a road cut through native forest near Amazon River level. The leaf litter under the logs was very damp due to recent, heavy rainfall. Several other embiid species, including an anisembiid, were collected under the same logs. Adult males matured in the culture during almost every month of the year.

Genus *Gibocercus* Szumik

Gibocercus Szumik, 1998:141. [should have been spelled *Gibbocercus*].

Type species.—*Gibocercus chaco* Szumik, by original designation.

Distribution.—South America: Western Amazon Basin; Bolivia east of Andes, and Argentina.

Szumik based this genus on a very limited number of specimens. Three of her four included species were represented only by unique male holotypes and no associated females. I had long had this genus in manuscript based on more than a thousand specimens representing many species, all having males associated with females.

I am dividing the genus into two subgenera, males of which are principally distinguished by differences in the basal segment of the left cercus and

the structure of the left tergal process (10 LP).Typical *Gibocercus* has a small, echinulate nodule on the inner base of the left cercus (*Amazonembia* new subgenus, does not) and a large, thin, blade-like inner portion of the left tergal process (in *Amazonembia* the inner portion of this process is narrow and thicker).

A more detailed diagnosis of *Gibocercus* sensu stricto follows:

Diagnosis:—Males: Large, alate, often dark mahogany brown, at times with prothorax and/or entire thorax yellow. Cranium often with a transverse, gold band between eyes (above brain); antennae and cerci uniformly brown. Cranium usually oval but at times caudally convergent; eyes small to large and inflated; antennae unicolorous, usually 30-segmented; submentum quadrate, weakly sclerotized, anterior margin weak, not inflexed; mandibles flat, thin, short with sharp, well-spaced apical teeth. Hind basitarsus with two ventral papillae. Tenth tergite broadly cleft to basal margin. Left hemitergite (10 L) large, its process (10 LP) bifid; inner portion long, broad, thin, blade-like, the outer portion shorter, narrow, acutely tapered, submembranous, in some species almost obsolete. Right process (10 RP) an abruptly narrowed, sclerotic, ventrally curved talon subtended by a tiny membranous lobe. Medial flap (MF) a sclerotic "arm" projecting forward in cleft membrane, membrane adjacent to its apex not microspiculate. Epiproct (EP) and its sclerite well developed. Left paraproct (LPPT) large, well sclerotized, not fused to hypandrium lobe (HP), bearing a prominent microspiculate, conical lobe on its inner angle. Basal segment of left cercus with a very large, forward-angled, echinulate inner-apical lobe and a small echinulate nodule on its inner base.

Females.—Not studied for generic or subgeneric characters. Most are large in size and colorful, all have a prominent medial hind basitarsal papilla.

Discussion.—This promises to be a very large, "difficult" subgenus. To date the following species are named: *G. chaco, G. beni* and *G. unicomi* by Szumik (1998), and *G. peruvianus* n. sp. and *G. magnus* n.sp. by me in this work. Coloration, especially that of mature females, is very useful in species identification. It is regrettable that Szumik didn't delay publication of *G. chaco* until she secured a culture and reared adequate series, including adult females, which could easily have been secured at the type locality, near Santiago del Estero, only a short distance from Tucumán, her home base.

Unfortunately, her species descriptions are too brief, and emphasize highly variable wing venational characters (as would be evident in a large series), and questionable hind basitarsal characters.

Biology.—The many colonies I have encountered are conspicuous, fully exposed on surfaces of bark, fence posts and road banks in tropical forest; one, *G. magnus,* colonized the undersurface of a fallen tree trunk. Occupants of colonies are highly gregarious. The silk is white, not obscured by coverings of pulverized debris.

KEY TO SPECIES OF *GIBOCERCUS* SUBGENUS *GIBOCERCUS*

(Males)

1. Body, including prothorax and abdomen, varied shades of brown. Pleura of abdomen almost concolorous with its tergites, thus not having conspicuous, longitudinal borders in both sexes (such a lack in *G. chaco* is assumed) 2
— Prothorax, at times pterothorax as well, yellow or golden, strongly contrasting with the dark brown of other body sclerites. Both sexes have conspicuous cream white abdominal pleura ... 3
2. As described by Szumik (1998), "Head brown with a dorso-posterior more less circular brownish area, the rest orangish [*sic*] brown." Santiago del Estero, Argentina ..... *chaco*
— Head basically golden, longitudinally streaked with chestnut brown, clypeus and frons darker brown. Santa Cruz, Bolivia ..... *magnus*
3. Inner blade, or talon, of left tergal process (10 LP) twice as long as broad; constricted at base. Mato Grosso, Brasil ..... *urucumi*
— Inner blade three times longer than broad; not constricted at base. East Andean montaña and yungas 4
4. Prothorax and pterothorax bright yellow gold, especially dorsally. Other body sclerites brown, Peruvian montaña ..... *peruvianus*
— Prothorax yellow-gold, pterothorax and other body sclerites brown. Bolivian yungas ..... *beni*

The following three species recently described by Szumik (1998), apparently having very similar terminalia, were based on only unique holotypes. Some of the characters used in the above key to distinguish them may be unreliable.

It is regrettable that her Bolivian species, *G. beni,* could not have been described by me at this time on the basis of my very large culture-reared series of both sexes from the Santa Cruz region. As discussed below, under *G. peruvianus* n.sp., this series can only be tentatively identified as *G. beni*. Future studies may indicate that most *Gibocercus* species compose a geographically extensive racial complex with coloration distinctions blending from locality to locality.

Gibocercus (*G.*) *chaco* Szumik

Gibocercus chaco Szumik, 1998:143

Holotype.—Male, IML. Data.—Argentina: Santiago del Estero, Reserva Copo, 7–24-X-1990 (J. Lopez de Cazenave)

Coloration.—"Thorax brownish, head brown with a dorso-posterior more or less circular brownish area, the rest orangish [*sic*] brown."

Gibocercus (*G.*) *urucumi* Szumik

Gibocercus urucumi Szumik, 1998 p. 143.

Holotype.—Male, MZSP. Data.—Brazil: Mato Grosso, Serra do Urucum-Corumba, 30-XI-1960, K. Lenko.

Coloration.—"Head, 1º to 18º antennal segment, tibiae and tarsi, and terminalia brown, the rest orangish [*sic*] brown."

Gibocercus (*G.*) *beni* Szumik

Gibocercus beni Szumik, 1998:146.

Holotype.—Male, MCZ. Data.—Bolivia: Beni Rurrenabaque, X-XI-1956 L. Peña.

Coloration.—"Antennae, prothorax, meso, meta-thoracic sternites yellowish; legs and terminalia (except cerci) brownish, the rest dark brown; head with two elliptical areas; anterior one darker, posterior one (between eyes) lighter. The abdominal pleurites and sternites have a longitudinal yellowish band."

Gibocercus (*G.*) *peruvianus* Ross
new species
(FIGURE 13)

Holotype.—Male, on slide, CAS. Data.—Peru: Yurac Plantation, 67 mi. E. of Tingo Mariá (on road to Pucallpa) 4-X-1954 (E. S. Ross).

Description.—Appearance: Large, alate; generally dark mahogany brown with entire thorax golden yellow; appendages uniformly brown. Color details (in alcohol): Cranium mahogany brown dorsally with a broad transverse, yellow band between eyes; ventrally yellow. Eyes lavender black. Mouthparts and antennae various shades of brown. Prothoracic and cervical sclerites clear yellow, all adjacent membranes cream white. Pterothorax dorsally concolorous with prothorax; sternites largely yellow but grading to light brown caudad. All legs uniformly dark brown. Wings dark brown with exceptionally narrow hyaline stripes; cross-veins behind RP partially white. Abdomen various shades of tan except terminalia which are largely dark mahogany brown with whitish membranes; left tergal process translucent amber. Dimensions (on slide): Body length 14.5 mm; forewing length 9.0 mm; breadth 2.2 mm.

Important anatomical features.—As figured. Of specific importance is the oval cranial outline and rather small eyes; the exceptionally large, blade-like, left tergal process (10 LP) with a vestigial outer appendix; the extremely long, sinuous sclerotic, right tergal process; the smooth, sclerotic, caudally-projected ventral lobe of the left paraproct; and the small, echinulate nodule on the inner base of the left cercus in addition to the large distal lobe.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Large, robust; dark mahogany brown except for a transverse, gold "chevron" between eyes, whitish antennal apices and pale abdominal pleurae (forming a stripe on each side of abdomen). Color details: Cranium basically dark reddish mahogany brown, basal pattern obscure; two golden areas paralleling anterior branches of ecdysial lines form a distinct chevron-like pattern between eyes. Antennal segments 1–22 mahogany brown, 23 half white, 24–30 whitish (antennae complete). Mouthparts essentially concolorous with cranium. All dorsal sclerotic portions of body, and legs, uniformly dark mahogany brown; anterior margins of thoracic scuta tan, not forming distinct bands; all membranous areas gray white; ventral sclerites paler; dorsal pleurites of abdominal somites 1–8 clear amber; surrounding membranous areas whitish, forming a pale stripe on each side of abdomen; terminal somites slightly darker, cerci uniformly brown. Body length 14.5 mm.

Paratypes and parallotypes.—Topotypic adults deposited in CAS, USNM and MHNP.

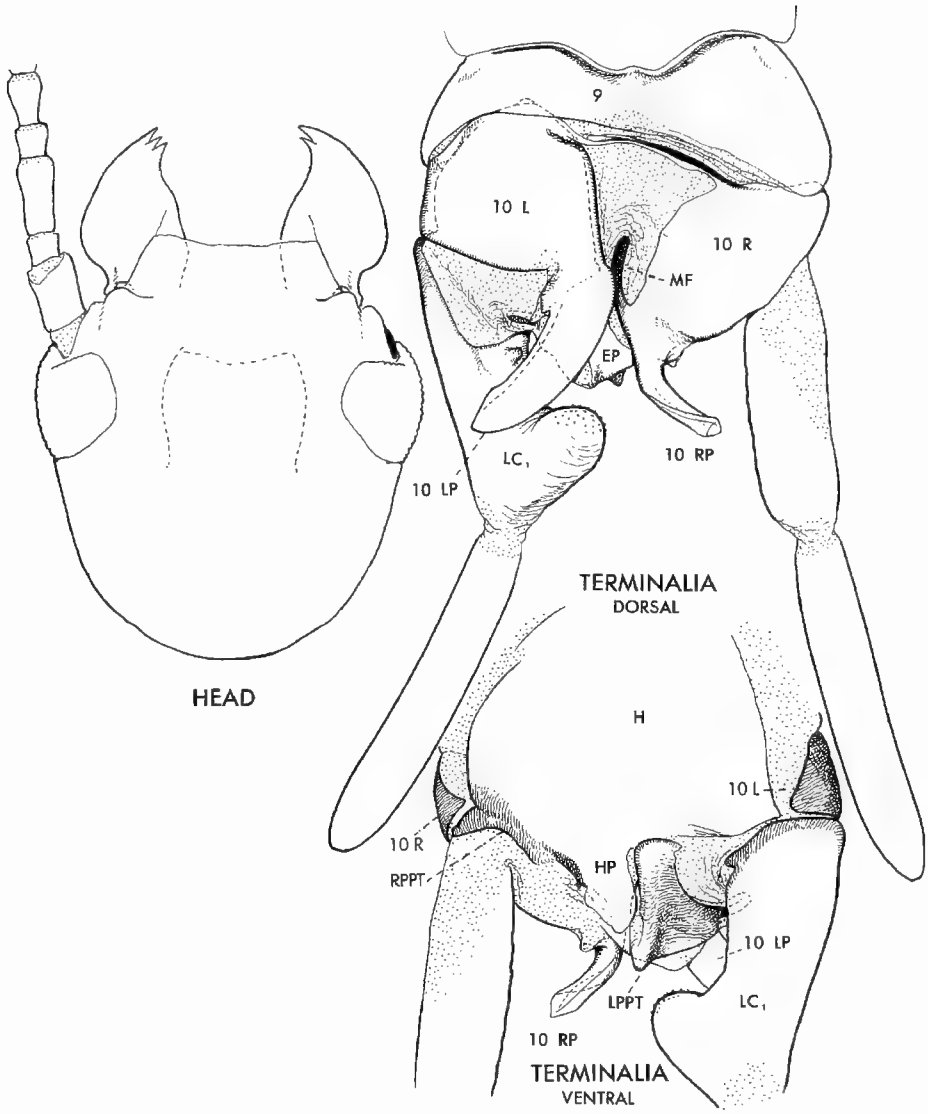

FIGURE 13. *Gibocercus (Gibocercus) peruvianus* Ross, n. sp., holotype. Type locality: 67 mi E of Tingo Mariá, Peru.

Discussion.—*Gibocercus peruvianus* appears to be most closely related to *G. beni* Szumik, perhaps also to *G. uricumi* Szumik, but, at least in the latter case, this cannot be determined from her short description. However, the more distant type locality of *G. uricumi* in Mato Grosso would appear to indicate a distinct status. Assuming that my large series of specimens from Bolivia's Santa Cruz region represents *G. beni, G. peruvianus* is distinct in the bright yellow-orange of its pterothorax, that of *G. beni* is very dark brown, almost blackish. Females of the two species are readily distinguished by the overall darkness of *G. peruvianus*, the narrower, pale tan, anterior margins of the thoracic scuta (brighter and broader in *G. beni*) and a comparable difference in the tone of the pleural abdominal stripes.

Additional records.—Peru: Colonia Perené, 18 mi NE La Merced, Junin, 750 m estimated, (E. S. Ross) CAS. Peru: Explorer's Inn, service area, Rio Tambopata, 30 km SW Puerto Maldonado, 290 m (E. S. Ross), CAS, large cultured series.

The Perené specimens are identical to the type series. The more southern Tambopata series differs in having the pterothoracic pleurites and sternites medium brown instead of yellow.

Biology.—Habitat is tropical rainforest along the eastern foothills of the Andes. The conspicuous colonies are most readily encountered in semi-cleared areas, such as coffee plantations, on surfaces of logs, stumps and rotting fence posts. In cultures adults matured almost every month of the year.

Gibocercus (*G.*) *magnus* Ross
new species

Holotype.—Male, on slide, CAS. Data.—Bolivia: 8 km N Santa Cruz. Matured in culture C-774, X-64 (E. S. Ross).

Description:—Appearance: Very large (largest species of the genus); varied shades of golden brown throughout, prothorax concolorous with pterothorax. Color details (in alcohol): Cranium basically golden, longitudinally streaked with chestnut brown, a pale spot present between eyes, clypeus and frons dark chestnut brown. Eyes lavender black. Antennae exceptionally long; basal segment dark chestnut brown, flagellar segments grading from medium brown to almost white at segment 33 (complete number). Prothorax golden tan, associated membranes dark cream. Pterothorax concolorous with prothorax, no pale band between the somites; associated membranes pinkish cream, tinged with rust on crests of folds. Legs varied shades of chestnut brown; forelegs, especially tarsi, dark chestnut. Wings very large, medium brown with narrow, but not sharply-margined hyaline stripes; forewing's cross-veins: 5 RBS–RP, 4 RP–MA_{1+2}, 2 MA_{1+2} – MA_{3+4}, and 1 MA_{3+4} – MP (near fork of MA); all cross-veins behind RP conspicuously white when crossing a hyaline stripe. Abdominal somites 1–8 soft, basically cream white, heavily tinged with rust brown. Dimensions (on slide): Body length 17.5 mm; forewing length 12 mm, breadth 3.0 mm.

Important anatomical features: Cranium strongly caudally convergent; eyes large, strongly inflated, separated by one eye-width. Terminalia similar to *G. peruvianus* but with outer flange of 10 LP well exposed, broad-based, symmetrically and narrowly tapered, basal three-fourths sclerotic, apical fourth pale, its length one third that of the blade-like inner portion. Medial flap (MF) bulbous, sclerotic. Right process (10 RP) exceptionally long, sinous; subtended by a slender, transparent subprocess. Basal nodule of left cercus large.

Allotype:—Female, in alcohol, CAS. Data.—A "sister" of the holotype.

Description.—Very large (one of largest of all embiids), body length 26.0 mm. Generally chestnut brown throughout with pale tan intersclerotal membranes; antennae becoming pale in apical third. Color details: Cranium mottled chestnut brown except for paler muscular pattern, a pale, transverse zig-zag between eyes and a dark brown "cloud" in clypeal region. Eyes jet black. Antennal segments 1–22 chestnut brown, 23 to 34 (complete number) gradually becoming pale, thence cream white to apex. Mandibles piceus, other mouthparts and venter of cranium chestnut brown, submentum darker. Cervical and other body sclerites varied shades of chestnut brown; first acrotergite, meso- and metathoracic and abdominal sclerites somewhat darker; crests of all intersclerotal membranous folds tinged with purple; abdominal pleurites chestnut brown, intervening membranes gray-pink, thus not forming pale, pleural, longitudinal lines as in some congeners. Paraprocts tan. Cerci dark purple-brown except for golden tips of distal segments; intersegmental membranes whitish.

Paratypes and parallotypes.—Seven topotypic males and two adult females reared from culture 774, 1964. Retained in CAS, except for the male deposited in IML.

Discussion.—Females of this spectacular, large species are readily distinguished from *G. beni*, the other *Gibocercus* occurring in the Santa Cruz region, by their larger size, uniformly brown coloration, as compared to the almost black-brown females of *beni* which also has contrasting tan-to-gold thoracic bands and pale yellow abdominal pleurae forming a longitudinal stripe down each side of the abdomen. The paraprocts are translucent pale cream. Cerci are very dark lavender brown without pale tips; the segmental joints are dark gray. Males are very distinct in appearance with an orange prothorax and a cream band between prothorax and mesothorax. The wings of *G. magnus* are especially large, light brown, with broader, irregularly-margined hyaline stripes. The wings of *G. beni* have very narrow, sharply-margined hyaline stripes with only three RP – MA cross-veins, (*G. magnus* has six). In the forewing *G. magnus* has two MA_{1+2} – MA_{3+4} cross-veins, (*G. beni* has none). The outer 10 LP flange of *G. beni* is very small, almost obsolete; that of *G. magnus* is almost

one-third the length of the inner talon, broad-based, acutely tapered and desclerotized at its tip.

Habitat.—Culture stock (C-774) was collected 8-V-64 in second growth forest bordering an ox cart road in an agricultural area eight km north of Santa Cruz. Extensive galleries were present on the underside of a fallen tree amidst weeds. Also present were colonies of *Pararhagadochir flavicollis* (Enderlein) and one or more species of Teratembiidae. Unfortunately, Culture 774 didn't thrive and produced only eight adult males and three huge adult females.

Gibocercus (*Amazonembia*) *Ross*
new subgenus

Type species.—*Gibocercus* (*Amazonembia*) *sandrae* Ross, new species

Distribution.—South America: Upper Amazon drainage of Ecuador, Colombia and Peru.

Diagnosis.—Unlike those of *Gibocercus* sensu stricto, males of this subgenus have a narrower, stouter, inner talon of the left tergal process (10 LP) and lack an echinulate nodule on the inner base of the basal segment of the left cercus.

Discussion.—Like *Gibocercus* s. str., this promises to be a large group with difficult-to-define anatomical characters, especially in the male terminalia. For this reason, such characters are figured for only the type species, *G. sandrae* n. sp. Fortunately, species, or at least races, can be distinguished by apparently consistent coloration of both sexes even when two or more species occur in the same habitats in the same locality. Besides the species treated below, I have also collected and reared short series of other species from Colombia and Ecuador which will not be named at this time. Because of the brevity of her description of *G.* (*A.*) *nanai*, I am not certain that one of my series from the Iquitos region represents that species. Another series from this region is very distinct and is given the name *G. flavipes*. If my identification of *G. nanai* is incorrect, this would indicate that a third species of this subgenus occurs in the region.

KEY TO SPECIES OF *GIBOCERCUS* SUBGENUS *AMAZONEMBIA*
(Males)

1. Distal antennal segments abruptly pure white 3
— Antennal segments grading from brown basally to tan distally, i.e., not abruptly white 2
2. Cranium dark chocolate brown with a distinct golden, eye-to-eye spot. Body dark brown except for a brilliant gold pterothorax. Upper Amazon of Ecuador ..... *sandrae*
— Cranium chestnut brown, eye-to-eye spot indistinct, pale cream. Body rather uniformly golden brown; pterothorax distinctly pigmented. Mid-Amazon region near Iquitos, Peru ..... *nanai*
3. Legs entirely pale yellow. Iquitos region (same habitat as *G. nanai*) ..... *flavipes*
— Coxae, trochanters and femora pale yellow, tibiae and tarsi medium to dark brown. Upper Amazon of Ecuador (may occur in same habitat as *G. sandrae*) ..... *napoa*

Gibocercus (*A.*) *sandrae* Ross
new species
(FIGURE 14)

Holotype.—Male, on slide CAS. Data.—Ecuador: Aliñahui (grounds of tourist lodge), 25 km E Puerto Napo, Napo Prov. 475 m. Matured in culture 30-I-95 (E. S. Ross)

Distribution:—Central Ecuadorian montaña, centered in Rio Napo tributaries.

Name basis.—Named after my wife, Sandra, whose conservation efforts through land purchase, have insured perpetual preservation of the type locality and its adjacent virgin forest.

Description.—Appearance: Moderately large, varied shades of brown except for brilliant gold pterothorax. Color details (in alcohol): Cranium dark chocolate brown except for a broad, transverse, suffused golden band between eyes above brain. Eyes lavender black. Antennae basally chocolate brown, blending to medium brown distad, 22-segmented (complete). Mouthparts chocolate brown. Cervical sclerites lemon yellow. Pronotum chocolate brown, faintly clouded with gold medially; prosternum transparent light tan. Acrotergite 1, translucent cream white. Prothoracic and cervical membranes whitish. Pterothoracic scuta clear gold with contrasting brown setae; sterna pale yellow. All legs chocolate brown. Wings brown with lavender luster, hyaline stripes very narrow; cross-veins: 2 RBS – RP, 2 RP – MA_{1+2}, no MA_{1+2} – MA_{3+4}, 1 MA – MP; cross-veins behind

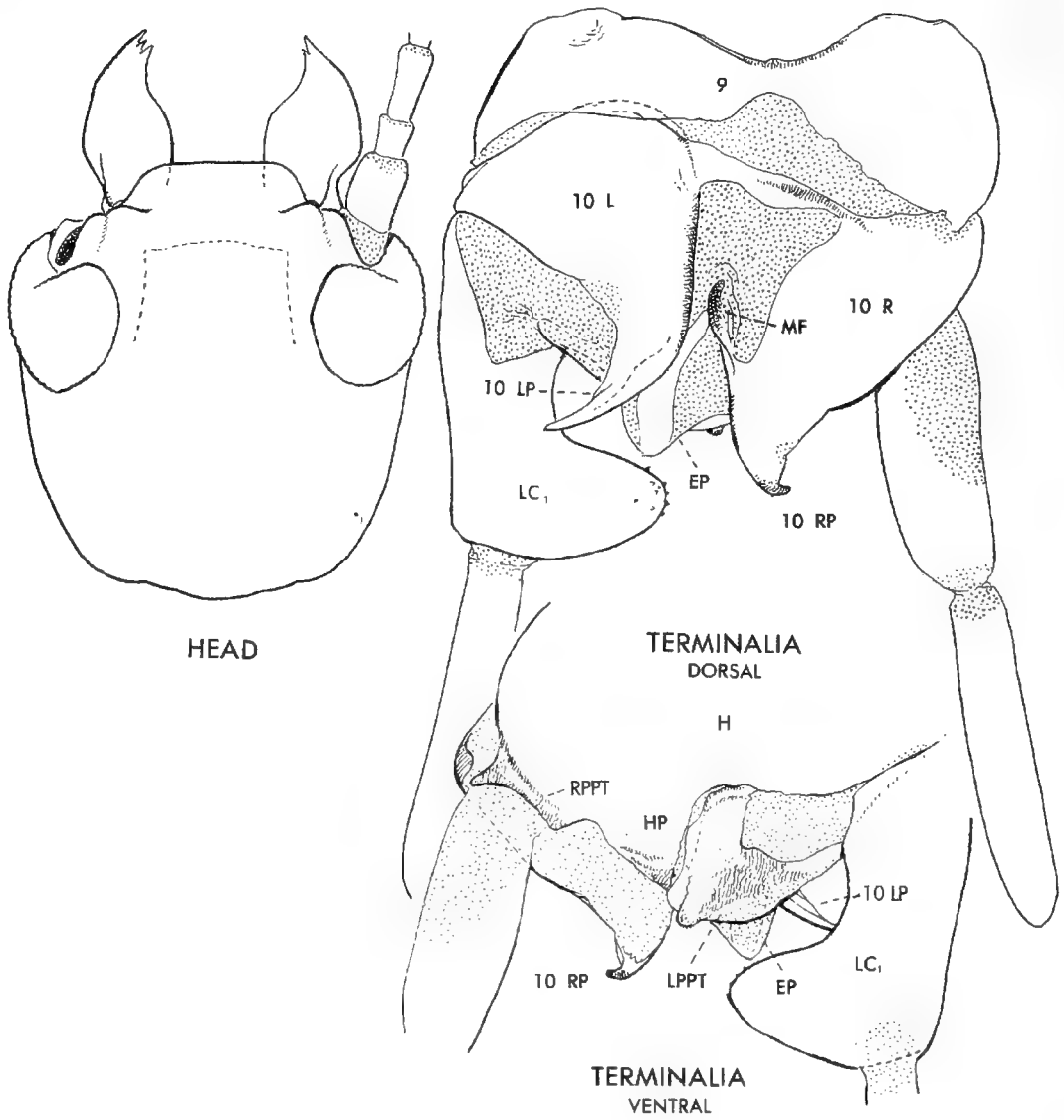

FIGURE 14. *Gibocercus* (*Amazonembia*) *sandrae* Ross, n. sp., holotype. Type locality: 25 km E of Puerto Napo, Ecuador.

RP bordered with white when crossing a hyaline stripe. Abdomen, except terminalia, whitish but strongly tinged with blackish brown, anterior margins of tergites narrowly dark brown; ninth tergite dark chestnut brown medially, becoming piceous laterally; tenth tergite, its processes, epiproct and sclerotized portions of cerci glossy dark brown, piceous at margins; membranous areas cream white. Dimensions (on slide): Body length 15.0 mm; forewing length 8.5 mm, breadth 1.6 mm.

Important integumental features.—As figured.

Allotype.—Female, in alcohol (CAS). Data.—From holotype's culture.

Description.—Large, body length 17.0 mm. Black except for white bands between thoracic somites, and a longitudinal pleural stripe on each side of abdomen, and a golden area across cranium. Color details (in alcohol): Cranium blackish brown except for large, marginally suffused, orange band across head between eyes (above brain) and antennal bases. Antennal segments 1–18 dark brown, 19 becoming white apically, 20–24 pure white (complete). Dorsal body sclerites jet black except for

narrow white anterior margins of meso- and metascuta of thorax; combined with white membranous areas, two conspicuous white thoracic bands are formed. Legs largely dark chocolate brown, or black; femur tibial joints golden. Abdominal tergites glossy black, margins of tergites 1–7 golden; pleural membranes white, thus forming a longitudinal white line on each side of abdomen; sternites smokey light brown, paragenitals darker. Paraprocts pale, clouded with light brown. Basal segments of cerci lavender black, distals medium brown; joint membranes lavender.

Paratypes and parallotypes.—Hundreds of cultured topotypic males and females. Deposited in CAS, USNM, MCZ, NMQ, MZUSP and MNHP.

Biology.—Large colonies are very abundant on most trees on the grounds of Cabañas Aliñahui and less so in the adjacent primary forest. They are very conspicuous because the silk isn't obscured by pulverized habitat material. The congener, *G.* (*A.*) *napoa* n. sp., distinguished by its white-tipped antennae and other features, occurs in virgin forest, along the road between Puerto Napo and Puyo, and elsewhere in the region.

Gibocercus (*A.*) *napoa* Ross
new species

Holotype.—Male, on slide, CAS. Data.—Ecuador: 3 mi N Puyo, Napo–Pastaza, 950 m, III-55 (E. S. Ross).

Name basis.—Relates to type region.

Description.—Appearance: Rather slender, alate, medium sized (body length 12.0 mm); entire thorax and legs largely pale yellow, head, wings and abdomen dark brown. Color details (in alcohol): Cranium dark chocolate brown with a small, faint, pale maculation between eyes; narrow pale rim around black eyes; ventrally becoming medium brown. Antennal segments 1–15 blending from dark brown to tan, 17 to 26 abruptly pure white (complete number). Thorax entirely pale yellow with dark brown setae, prothorax slightly darker (more golden); membranes and axillary area of wings cream white, almost concolorous with sclerites. Wing bands brown; hyaline stripes very narrow, sharply margined; in forewing 4 RP – MA_{1+2}, no MA_{1+2} – MA_{3+4}, 1 MA – MP cross-veins, all conspicuously white. Coxae, trochanters and femora of all legs concolorous with thorax; all tibiae and tarsi medium to dark brown. Abdomen mottled dark brown; tenth tergite, its processes, and left cercus much darker; other cercus segments medium-brown, including joints. Dimensions (on slide): Body length 12.0 mm; forewing length 7.5 mm, breadth 2.0 mm.

Important anatomical features: Cranium and mandibles similar to *G.* (*A.*) *sandrae*, outer margins of mandibles evenly arcuated. Terminalia similar to *G.* (*A.*) *sandrae* but with base of 10 LP broader.

Allotype.—Female, in alcohol, CAS. Data.—From holotype culture.

Description.—Appearance: Very dark brown with pale intersegmental membranes, an orange area between eyes, antennae white-tipped. Color details (in alcohol): Cranium black blending to dark orange in a large, transverse "cloud" between eyes (above brain). Mouthparts and antennal, segments 1–21 brown, others (22–27) pure white. All thoracic sclerites almost black; all membranes gray white, forming a narrow pale band between each somite. All leg segments dark chocolate brown. Abdominal sclerites likewise almost black, including the caudal tergites; pleural membranes grayish, forming a pale longitudinal band on each side. Basal segments of cerci medium brown, apicals tan. Body length 14.5 mm.

Paratypes.—18 topotypic males, CAS and NMQ.

Additional records (CAS): 1 male, Ecuador: Sacha Pacha, Rio Aguarico, 200 m, matured XII-91 (E. S. Ross); numerous juvenile, females and males, 2–5 km N. Puyo, Napo-Pastaza, 950 m, II-55 (E. S. Ross) colonies on stumps in pasture.

Gibocercus (*A.*) *nanai* Szumik

Gibocercus nanai Szumik, 1998:147.

Holotype.—Male, USNM. Data.—"Peru, Loreto, Callicebus Res. Station, Mishana, Rio Nanay, 25 km SW Iquitos, 10–17-1-80, S.B. Heppner."

Discussion.—Unfortunately this species was incompletely described from a single specimen. When I visited the Iquitos region in 1983 I secured cultures of two very distinct new species of *Gibocercus* which I have long had in manuscript pending an occasion to comprehensively treat them within a new genus. Szumik's color description, "General coloration brownish, 16° antennite to the

tip yellowish brown" is barely sufficient to distinguish *G.* (*A.*) *nanai* from the other Iquitos species, *G.* (*A.*) *flavipes* n. sp., which has pure white antennal apices, and the entire thorax and all legs pale yellow, as well as other distinct features. If Szumik's specimen had such distinctive coloration, she surely would have noted it. It is significant that the two species occur in the same habitat. I will now offer a more detailed color description of what I assume to be *G.* (*A.*) *nanai* based on my extensive series (CAS).

Plesiotype.—Male, on slide, CAS. Data.— Peru: Amazon Camp, Rio Momón, near Iquitos, matured in culture II-83 (E. S. Ross).

Description.—Appearance: Medium sized, generally yellow brown, head chestnut brown, eyes contrastingly black, antennae grading from chestnut brown at base to cream at apex; all legs cream. Color details (in alcohol): Cranium evenly chestnut brown, broadly paler from eye-to-eye (above brain). Eyes jet black. Antennae grading basally from chestnut brown to cream at apex. Mouthparts light chestnut brown. Body sclerites varied shades of chestnut brown on a yellowish base; all intervening membranes white, forming a conspicuous pale band between pro-and mesothorax. All coxae, trochanters, and femora cream white, tibia and tarsi grading to tan; foretarsi darker. Wings light brown, hyaline stripes not sharply defined. In forewing, one cross-vein between RP – MA_{1+2}, none between MA_{1+2} and MA_{3+4}, one MA – MP (midway on MA); cross-veins indistinctly white. Sclerotic portions of terminalia golden with amber margins; inner talon of left process (10 LP), and margins of more brownish basal segment of left cercus, dark amber; basal segment of left cercus pale tan, distal segments grading distad from pale tan to cream white. Dimensions (on slide): Body length 9.0 mm; forewing length 6.2 mm, breadth 1.5 mm.

Important integumental characters.—Cranium caudally convergent, sides about one-eye-length long. Eyes large, inflated; interspace one and one-half eye-widths. Medial flap (MF) of terminalia globose, smoothly sclerotized. Talon of right tergal process (10 RP) slender, elongate, darkly sclerotic. Lobe of left paraproct (LPPT) conical. Left cercus lobe especially long, projected diagonally forward; apical cercus segments exceptionally long, slender.

Szumik used as a key character (1998:142) the absence of a "membranous band" between the mentum and submentum. Slide preparations reveal that these structures are clearly separated by a membranous interval in all species of the order.

Female, in alcohol, CAS. Data.— Same as plesiotype.

Description.—Appearance: Cranium, prothorax fore and mid legs gold to light amber, remainder of thorax and most of abdomen shades of mahogany brown to medium brown; abdominal segments 8–10 pale yellow, cerci light tan. Color details: Cranium orange, paler between eyes; anterior tentorial pits piceous; venter of head and mouthparts orange. Eyes jet black. Basal antennal segment amber, segments 2–20 dark brown, 21–28 pure white. Pronotum dark amber, edges darker; acrotergite1 clear light amber. Mesonotum basically dark amber, heavily clouded with dark mahogany brown, anterior margin cream. Metanotum similar but more evenly mahogany, anterior cream margin narrower. Acrotergite 2 amber. Forelegs entirely light amber; midlegs similar but coxae are mahogany brown; hind legs with coxae, trochanters and basal two-thirds of femora mahogany brown, blending distad to pale amber; tibiae and tarsi light amber. Abdominal tergites 1 and 2 lighter mahogany brown, others caudad becoming lighter and cream white at sides, combining with pale pleurae to form pale lateral, longitudinal stripes; somites 8–10 abruptly narrowed and pale yellow. Venter of body anteriorly pale yellow becoming tan caudad; paragenital sternites tan at sides. Paraprocts translucent cream white. Basal segments of cerci light tan, distal segments paler. Body length 13.5 mm.

Available specimens.—Twenty-six adult males and three adult females with plesiotype data deposited in CAS, USNM, and MHNP.

Gibocercus (*A.*) *flavipes* Ross
new species

Holotype.—Male, on slide, CAS. Data: Peru: Amazon Camp, Rio Momón, near Iquitos, 6-XII-82 (E. S. Ross).

Name basis.—Refers to entirely yellow legs of males.

Description.—Appearance: Medium sized (body length 13.0 mm); dark mahogany brown except for white tipped antennae, thorax and legs entirely pale yellow, except for brown tarsi. Color de-

tails (in alcohol): Cranium mahogany brown except for diffuse, broad "cloud" between eyes (above brain). Eyes lavender black. Antennal segments 1–16 mahogany, 17 yellow brown with white apex, 18–24 pure white including setae (complete number). Mouthparts light mahogany, ventral area of head golden brown. Cervical and thoracic sclerites pale yellow, pronotum slightly darker; all associated membranes cream white. All legs entirely pale yellow except for brown tarsi. Wings medium brown except for white axillary region, narrow hyaline stripes. Forewings with one short cross-vein (not white) between RBS and RP, two white RP – MA_{1+2}, one between MA_{1+2} and MA_{3+4}, and one white one between fork of MA and MP. Abdominal somites 1–9 gray white heavily mottled subcutaneously with rust brown; somite10 and base of left cercus glossy mahogany brown blending to piceous, apices of 10 RP and LC_1, lobe and medial sclerite golden brown; membranes pink-white; other cercus segments yellow tan. Dimensions (on slide): Body length 13.0 mm; forewing length 8.5 mm, breadth 2.0 mm.

Important anatomical characters.—Cranium elongate-oval, sides behind eyes almost four eye-lengths long, broadly arcuate, scarcely convergent. Eyes small, strongly inflated; interspace about four eye-widths wide. Medial flap (MF) rather flat, microstrigose. Talon of right tergal process (10 RP) short. Left paraproct (LPPT) lobe broadly rounded. Left cercus lobe relatively short, apically narrowed, almost conical.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Appearance: Various shades of mahogany brown, pronotum darkest; membranous areas cream white. Cranium with a bright yellow interocular spot: antennae white-tipped. Color details (in alcohol): Cranium basically mahogany brown except for a very conspicuous, broad, diffused yellow band between eyes (above brain) and darker pigment pattern associated with internal muscle attachments. Antennal segments 1–19 mahogany brown, 20–28 pure white. Mouthparts and ventral area chestnut brown, clypeolabral membrane cream. Pronotum piceous brown, other thoracic tergites, including acrotergite 1, varied shades of dark mahogany brown; intersclerotal membranes cream, thus forming two intersomital pale bands on thorax. All legs varied shades of chestnut brown, fore and mid tarsi tan, hind tarsi cream. Abdominal tergites mottled mahogany brown with a conspicuous cream stripe on each side. Ventral body sclerites shades of translucent tan, except for chestnut brown prosternum; paragenital sternites blackish brown, except medially cream on segment 8. Paraprocts translucent pale tan. Basal segments of cerci dark tan, distals pale tan. Body length: 16.0 mm.

Paratypes and parallotypes.—Eleven males and three topotypic females, CAS, USNM, MHNP.

Genus *Pararhagadochir* Davis

Pararhagadochir Davis, 1940a:181; 1942:114.—Ross, 1944:420; 1972:133; 1992:123.—Szumik, 1996:51; 1998:141 (cladogram).

Type species. *Embia trinitatis* Saussure, 1896, by original designation.

Distribution. South America (at least one species, *P. trinitatis*, has spread, probably by means of commerce, into Central America).

Diagnosis. Males: Small to moderately large (6-14 mm), slender; usually richly pigmented and melanized. Head and eyes variable in form; antennae always unicolorous (never white-tipped); mandibles oligotomoid, apices dentate; submentum almost always sclerotic, shield-like, sides and anterior margin usually inflexed. Almost always alate (apterous or short-winged males occasionally occur in normal-winged species) vannal area reduced; usually no cross-veins in wings behind MA. Hind basitarsus with second papilla greatly reduced, often only a tiny membranous flat spot not visible from lateral aspect, apparently absent in males of some species. Tenth tergite broadly cleft to base. Left process (10 LP) almost always bifid, composed of an inner talon and a flat, often submembranous, outer portion (flange). Right process (10 RP) composed of a ventrally-directed talon, subtended by a small, submembranous, ventral nodule. Medial flap (MF) well developed, often a striated sclerotic arm extending almost to base of cleft; forward end often flared and directed toward, or into, a microspiculate pouch in the cleft membrane. Epiproct (EP) very large, caudally acute; its sclerite long and conspicuous. Left paraproct (LPPT) large, its caudal margin of two types: a *trinitatis*-type with the inner angle produced as a small spine and a *tenuis*-type with a medial, microspiculate, rounded nodule and no inner

spine. Basal segment of left cercus with a single, large, globose, densely-echinulate, inner-apical lobe; distal segments of cerci never white.

Females: With coloration similar to males. Generic anatomical characters not investigated. Second hind basitarsal papilla well developed.

Discussion: Except for two large new species from SE Brazil, and a very small new species from NE Brazil, which have a soft submentum, males of *Pararhagadochir* may be recognized by their sclerotic shield-like submentum in combination with an almost always bifid left process and a microspiculate membranous pouch opposite the forward end of a rod-like medial flap of the terminalia. The new genus *Litosembia* has these characters but differs in its very small size, minute 10 LP talon, and many other characters.

As suggested by at least thirty-five mostly new species in my collection (CAS), *Pararhagadochir* is the largest genus of New World Embiidae. At this time I will only review the named species and describe two interesting new ones. For convenience, figures of known species scattered in the literature are republished. Fortunately, I have been able to study the types of most of these. The genus promises to be "difficult" and must be studied on the basis of large, cultured series, with special consideration given to the coloration of females.

The various species occur in a wide range of habitats: on bark, road banks and under stones; from deserts to high páramo and cloud forests up to more than 3000 meters altitude.

KEY TO SPECIES OF *PARARHAGADOCHIR*

(Males)

1. Inner corner of left paraproct (LPPT) with a minute, sharp or blunt spine; caudal margin without a microspiculate nodule 2
— Inner corner of LPPT without a spine, caudal margin often with a microspiculate nodule ... 6
2. Outer flange of left tergal process (10 LP) long, acutely tapered, often apically twisted. N South America ..... *trinitatis* complex
— Outer flange of 10 LP short, apically rounded, or irregular in shape 3
3. Base of 10 LP greatly elongated, narrow; at least three-fourths of the process' length. Argentina ..... *trachelia*
— Base of 10 LP shorter, not exceeding half the length of the process. Widespread species 4
4. Exceptionally large, long-winged species, spine of left paraproct blunt. Machu Picchu, Peru ..... *picchua*
— Average or small sized species, spine of paraproct sharp. Lowland habitats 5
5. Apterous. Body and legs pale, translucent cream white; head and antennae chestnut brown. Northern Argentina ..... *pallida*
— Winged. Body and legs uniformly brown; prothorax often yellowish, or golden. Widespread species ..... *flavicollis* complex
6. Medial flap (MF) of tenth tergite dorsally sclerotized, strongly arched; left process (10 LP) with outer flange very short, narrow; talon of right process (10 RP) minute. Lower Amazon, NE Brazil ..... *christae*
— Medial flap narrow, sclerotized only on ventral surface, not arched; flange of 10 LP broad, almost as long as inner talon; talon of 10 RP large, conspicuous 7
7. Caudal margin of left paraparoct (LPPT) smooth, without a microspiculate nodule 11
— Caudal margin of LPPT with a microspiculate nodule 8
8. Talon of left tergal process (10 LP) evenly curved outward. Amazon Basin .... *bicingillata*
— Talon abruptly turned leftward, almost at 90°. Paraná Basin and southward 9
9. Head broadly circular in form. Eastern Paraguay, Argentina and S Brazil ..... *confusa*
— Head elongate-oval, sides behind eyes short, at times strongly convergent 10
10. Eyes very large, separated by only one eye-width; sides behind eyes short, less than length of an eye, strongly convergent. Santa Cruz region, Bolivia ..... *tenuis*
— Eyes small, separated by about four eye widths; sides behind eyes long, at least two eye-lengths long, only slightly convergent. Bolivia and Argentina ..... *birabeni* complex
11. Submentum strongly sclerotized, all margins inflexed. SE Brazil ..... *balteata*
— Submentum weakly sclerotized, anterior margin not inflexed, weak. NE Brazil ..... *minuta*

Pararhagadochir trinitatis (Saussure)

(FIGURE 15)

Embia trinitatis Saussure, 1896a:293; 1896b:352, fig. 13.—Enderlein, 1912:52, 106 (*trinitatensis* [*sic*]:30).—Navás, 1918:99.

Oligotoma trinitatis (Saussure), Krauss, 1911:42.

Pararhagadochir trinitatis (Saussure), Davis, 1940a:182; 1942:114.—Ross, 1944:421; 1992:124.—Szumik, 1998:141 (cladogram).

Oligotoma flavicollis Krauss, 1911:43 (not *Embia flavicollis* Enderlein).—Enderlein, 1912:100 (as a syn of *flavicollis* Enderlein, in error) .—Ross, 1944:422 (as syn. of *trinitatis* Saussure).

Type.—A cotype redescribed and figured by Davis (1940a), deposited in Mus. d'Hist. Nat, Geneva, Switzerland. Data.—Trinidad probably Port of Spain (Urich).

Discussion.—Based on hundreds of reared specimens (CAS) from Trinidad, Venezuela, Colombia, Panama, Costa Rica, Guatemala and Honduras, this appears to be a very widespread, variable species. At least in Central America, its range has been extended in human commerce. In many localities males are uniformly brown. One series from relatively high altitude in Venezuela, near Santo Domingo, Barinas, 1350 m, appears to represent a distinct race or species. For the present, how-

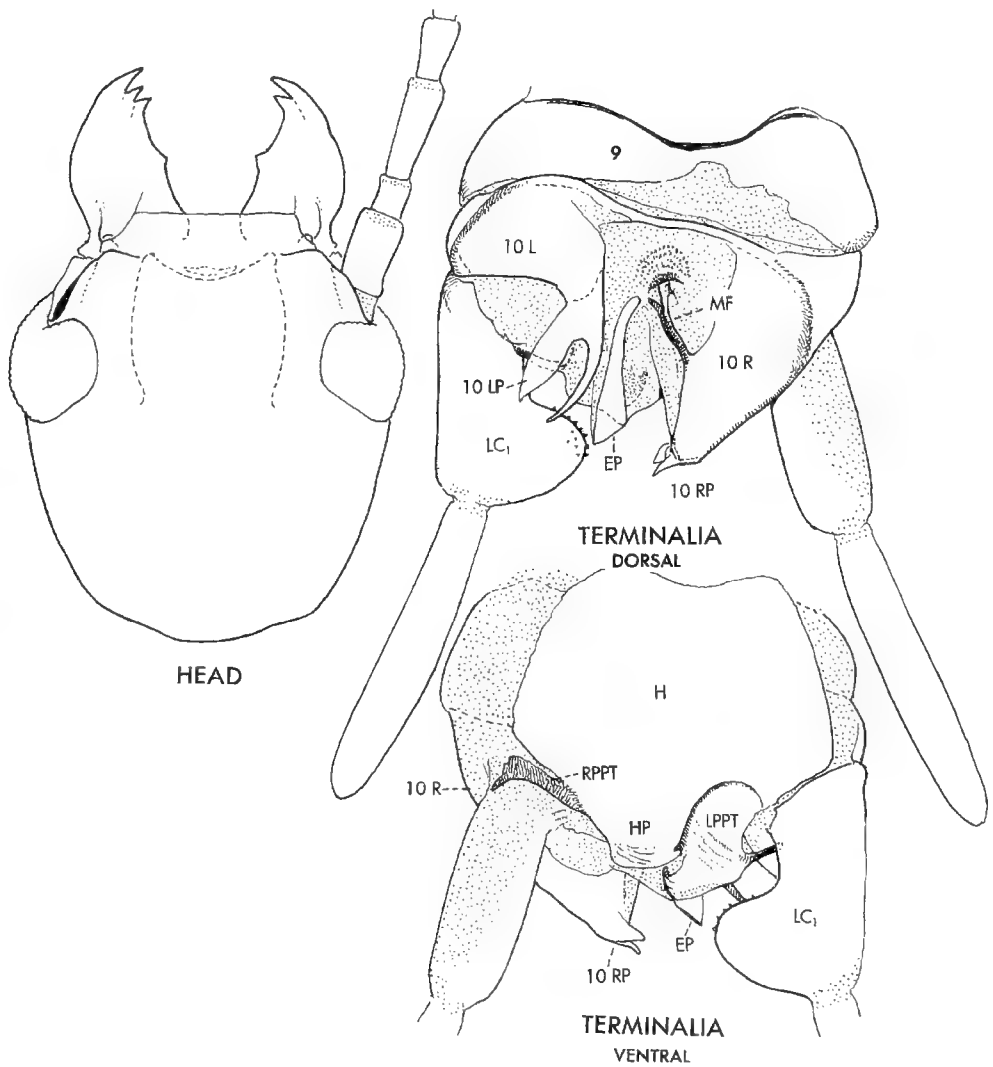

FIGURE 15. *Pararhagadochir trinitatis* (Saussure). Type locality: Trinidad. Specimen from near Azulita, Merida, 750 m, Venezuela (may be a subspecies).

ever, it is best to treat males of all northern South American *Pararhagadochir* having a tapered outer flange of 10 LP as *P. trinitatis*.

Records (all CAS, collected by me unless otherwise indicated).—Trinidad: numerous localities. Venezuela: Rancho Grande (granite road bank); 10 km S of Rancho Grande; 25 km SW Socopa, Barinas, 200 m; 5 km NW Azulita, Merida, 750 m; 6 km N Michelina, Tachira, 1200 m; near Santa Maria, N of Caripe, 250 m; 36 km N Bocono, Trujillo, 2225 m; Guanaguana, Monaga, 350 m; 3 km SE 1350 m and at 1550 m, 8 km SE of Santo Domingo, Barinas (both in páramo, may represent a distinct, high altitude species). Colombia: 4 mi SE Villavicencio, Meta, 410 m; San Sebastian de Rabaga, Sierra Nevada Santa Marta, 2000 m (Borys Malkin). Panama: Cerro Campaña. COSTA RICA: Finca la Lola, near Sequirres; 5 mi S Peña Blanca. Honduras: 23 mi. NE Talanga, 1700 ft (O'Brien). Guatemala: San Jose (coastal port).

Biology.—This species forms conspicuous colonies, especially on surfaces of road and trail banks, in diverse habitats from sea level tropical forest to páramo as high as 2225 m, and in deserts. Obviously a complex of difficult-to-define species and races awaits intensive study by a qualified resident specialist.

Discussion.—My notes on the synonym *Oligotoma flavicollis* Krauss, 1911, are as follows: Type.—Male, in fragmentary condition, deposited in the Zoologischen Museum der Univ. Berlin. Labels.—"Orinoco, Moritz"; "2737"; "type" (red); "Olyntha flavicollis Krauss Male Type!"; "Rhagadochir flavicollis Endl. Male Dr Enderlein det 1911."

The above type consists only of the pterothorax, two wings, and the first three abdominal somites. Krauss' description and figures covers more anatomical details and it is therefore evident that portions of his specimen were subsequently lost. A right forewing glued by a curator to the mesothorax belongs to some other species, apparently *Embia fibulatoria* Enderlein of which the Berlin Museum has a series. The right wing, however, attached to the type of *P. flavicollis* clearly indicates that the specimen is a *Pararhagadochir*, one with venation identical to that of *P. trinitatis*.

Even if an Orinoco population (somewhere on that long river) proves to be racially distinct, the name *P. flavicollis* Krauss, 1911, will not be available for it is a secondary homonym of *Pararhagadochir flavicollis* (Enderlein), 1909, of Bolivia. My examination of Enderlein's type indicates that it represents a distinct species and it is not a subspecies of *P. trinitatis* as suggested in my 1944 revision.

Pararhagadochir flavicollis (Enderlein)

(FIGURE 16)

Embia flavicollis Enderlein, 1909:184.—Krauss, 1911: 68.—Navás, 1918 p. 100.

Rhagadochir flavicollis (Enderlein), Enderlein, 1912:56, 100.

Pararhagadochir flavicollis (Enderlein), Davis, 1940a: 183.

Pararhagadochir trinitatis flavicollis (Enderlein), Ross, 1944:424 (in error as a subsp. of *trinitatis*).

Pararhagadochir schadei Ross, 1944:427. Holotype: Male, on slide, MCZ; data: Villa Rica, Paraguay, December (F. Schade). **New synonym**.

Lectotype (by present designation).—Male, on slide, deposited in the Polska Akademia Nauk, Warsaw. Labels.—"Bolivien Prov. Sara" [Dept. Santa Cruz, about 100 km NW city of Santa Cruz], "Embia flavicollis Enderl. Type det. Dr. Enderlein."

Description (of lectotype).—Appearance: Alate, rather small, slender; prothorax exceptionally narrow, cream yellow in contrast to dark brown head, body, and wings; wings unusually large in proportion to body size. Color details (dry): Cranium dark chocolate brown, edges of clypeus and anterior apophyseal pits, as well as venter, dark amber. Eyes piceous; antennae medium brown throughout, extreme apical segments lost. Mandibles pale amber with reddish amber incisor margins; submentum golden brown. Pronotum, its pleura, membranes and cervical sclerites cream yellow; prosternum golden brown. Pterothorax and abdomen mahogany brown; all leg segments similar but with coxae and trochanters yellow brown, forecoxae darker. Abdominal terminalia, including cerci, mahogany brown. Dimensions (on slide): Body length 8.5 mm.; forewing length 6.5 mm, breadth 1.6 mm. Important anatomical characters as figured.

Discussion.—My knowledge of *P. flavicollis* is based on a study of its lectotype, here figured, and large, almost topotypic series I reared from the Santa Cruz region of Bolivia. The lectotype of *P. flavicollis* closely resembles the holotype of *P.*

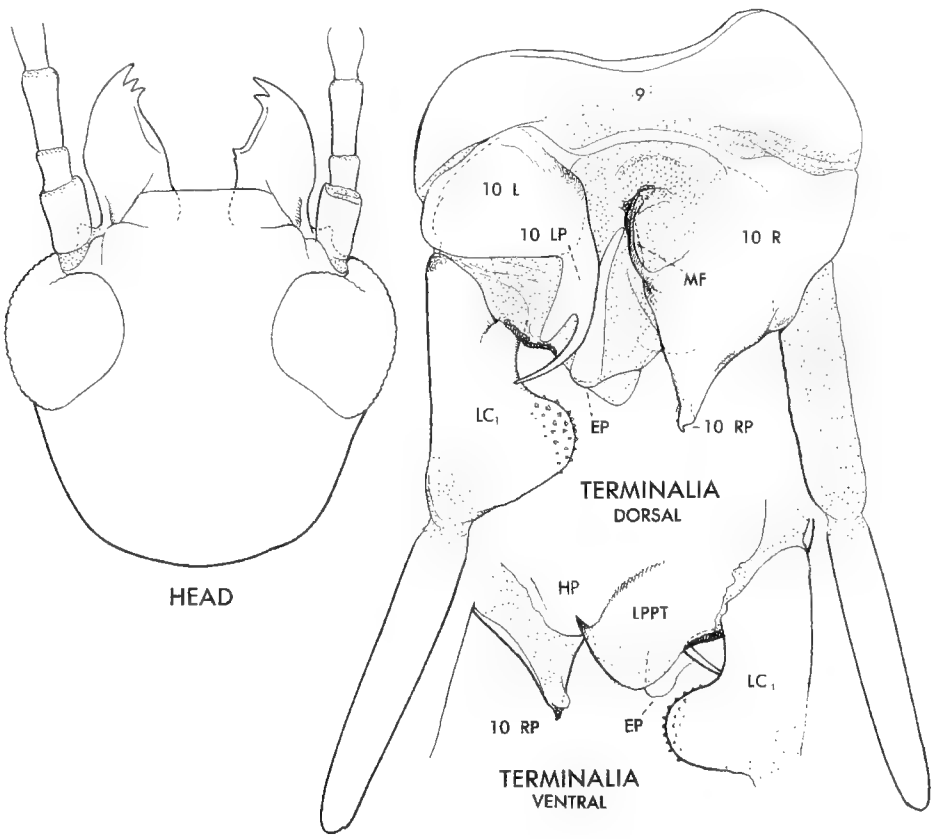

FIGURE 16. *Pararagadochir flavicollis* (Enderlein). Lectotype. Type locality: Santa Cruz region, Bolivia.

schadei and this justifies the latter's synonymy.

Records (all CAS).— Bolivia: Santa Cruz and Angostura (70 km SW Santa Cruz). Argentina: Corrientes; Tres Isletas, Chaco. Paraguay: Villa Rica (Schade).

Pararhagadochir flavicollis is the first named of a large, diverse complex of species related to *P. trinitatus* but usually smaller and always having the flange of 10 LP short and distally rounded instead of long and tapered. Many of the species and/or races occur in the Andes and Amazon and Paraná basins. Only two new species representing extremes in the diversity of the *P. flavicollis* complex are described at this time.

Pararhagadochir pallida Ross
new species
(FIGURE 17)

Holotype.—Male, on slide, IML. Data.—Argentina: Salta, Cabeza de Buey, matured in culture (C-756), 30-XII-64 (E. S. Ross).

Description.—Appearance: Apterous, very small (body length 8.5 mm), body and legs entirely translucent cream white, head and antennae contrastingly chestnut brown. Color details (in alcohol): Cranium uniformly chestnut brown, without pattern. Eyes black. Basal two antennal segments dark brown, all others uniformly medium brown, 18 segments. Mandibles pale amber, dentation dark amber; other mouthparts, including submentum and ventral bridge, translucent yellow tan, palpi medium brown. Body uniformly translucent cream white, legs slightly darker; terminalia concolorous with body except for amber left tergal process and pale brown cerci (except for pale basal segment of right cercus).

Anatomical characters.—As figured. Medial flap (MF) resembles a concave disc on edge; talon and flange of left tergal process (10 LP) almost equal in length; talon of right process minute, adja-

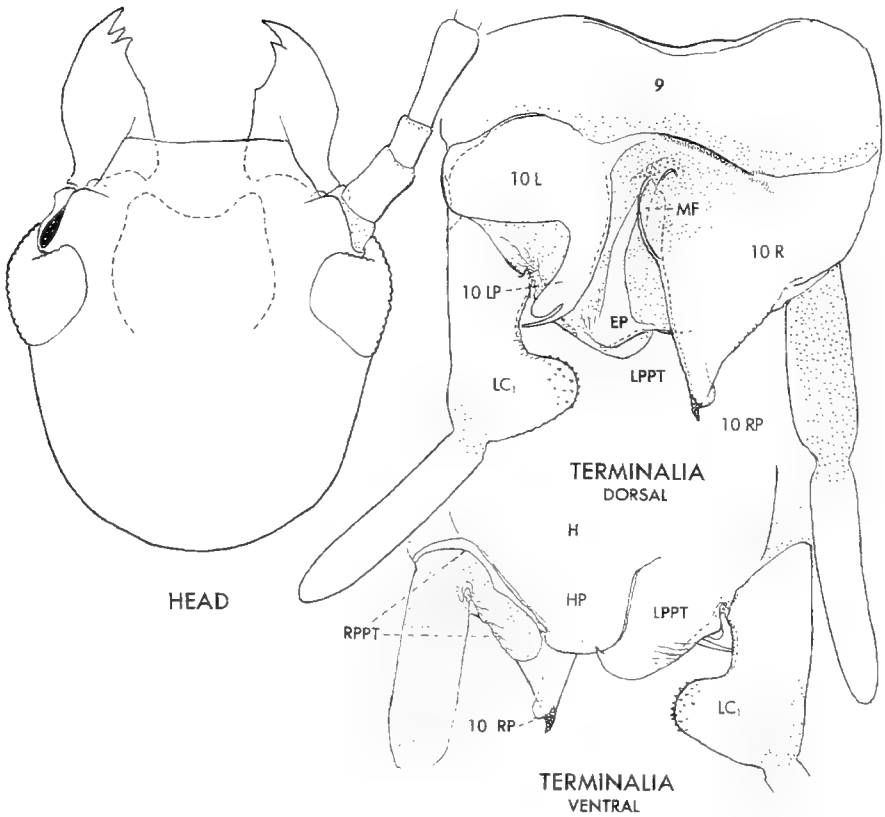

FIGURE 17. *Pararhagadochir pallida* Ross, n. sp., holotype. Type locality: Cabeza de Buey, Salta, Argentina.

cent ventral nodule larger than talon; left paraproct caudally de-sclerotized, inner corner bearing a sharp, acute projection.

Allotype.—Female, in alcohol, IML. Data,—reared in holotype's culture.

Description.—Appearance: Pale, only slightly darker than male. Color details (in alcohol): Cranium basically chestnut brown with pattern outlined in rust brown. Eyes black. Antennae cream white. Pronotum clear pale yellow, all other body sclerites pale amber but darkened by tinges of rust. Legs similar but with femora more heavily tinged. Cerci with basal segments tinged with rust, apicals paler. Body length 10.0 mm.

Paratypes and parallotypes.—Numerous adults of both sexes deposited in CAS, USNM, BMNH and MZUSP.

Discussion.—This remarkable pale species with terminalia very similar to *P. flavicollis* and *P. trachelia*, exhibits no color variation in my large cultured series. It was collected in a broad valley with low thorn forest at the site of a road maintenance camp. Embiid colonies were common under small stones and bricks in the thin shade of low, thorny trees. Also at this site: *Pararhagadochir trachelia* (Navás), *P. birabeni* (Navás) and *Chelicerca tigre* Szumik.

Pararhagadochir picchua Ross
new species

(FIGURE 18)

Holotype.—Male, on slide, CAS. Data.—Peru: Machu Picchu. Matured in culture 23-XII-82 (E. S. Ross).

Description.—Appearance: Very large (body length 14.0 mm), wings disproportionally large; body varied shades of chestnut brown with piceous sutural lines, head much darker than body. Color details (in alcohol): Cranium dark mahogany brown with darker pattern outlining muscle attachment areas and the clypeus. Eyes lavender black.

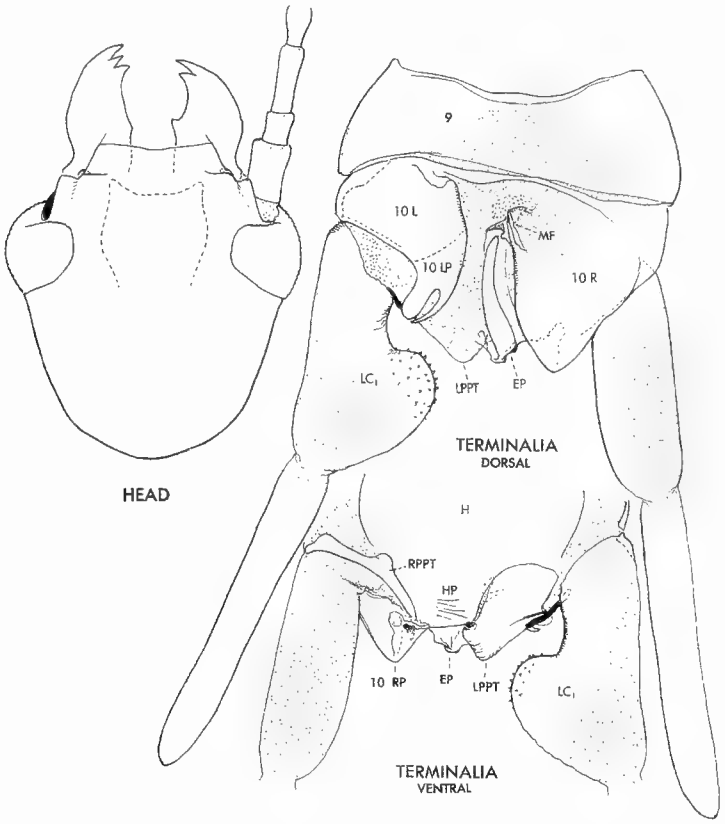

FIGURE 18. *Pararhagadochir picchua* Ross, n. sp., holotype. Type locality: Machu Picchu, Peru.

Basal antennal segment mahogany brown, all others to apex (segment 25) medium brown with cream joints. Venter of cranium and mouthparts golden brown, palpi darker. All thoracic sclerites and legs light chestnut brown with piceous sutural lines and edges; membranous areas cream white. Abdomen similar with cream white pleura forming pale lateral bands; terminalia darker, distal cercus segments pale tan. Dimensions (on slide): Body length 14.0 mm; forewing length 12.0 mm, breadth 2.5 mm.

Anatomical distinctions.—Cranium elongate-oval, sides behind eyes convergent; eyes bulging, separated by two and one half eye-widths; mandibles elongate; submentum with arcuate sides, apical corners produced forward. Forewings with RP – MA fork near wing base, 5 RP – MA_{1+2} cross-veins, 2 RP – MA_{2+3} cross-veins, no others behind these. Hind basitarsus with very dense setae, medial papilla absent. Terminalia as figured, with base of left tergal process (10 LP) exceptionally broad and short; inner talon feebly arcuated, narrow, very sharp; flange almost equal in length, narrow at base, then expanded distad, apex asymmetrically rounded. Spine at inner corner of left paraproct sclerotic but apically round, not sharp as in related species. Talon of right process short, small, directed ventrad, not visible from above.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Appearance: Large (body length 18.0 mm), blackish brown with whitish intersclerotal membranes; femoro-tibial joints cream white. Color details: Cranium entirely blackish brown except for very faint pattern. Eyes black. Basal antennal segment concolorous with cranium, all other segments to apex (segment 26) uniformly chocolate brown. All mouthparts dark mahogany brown. All body sclerites blackish brown except acrotergites which are dark chestnut, abdominal pleurites amber; all intersclerotal membranes whitish, forming a pale longitudinal pleural stripe on each side of abdomen. Legs and venter of body varied shades of

brown; hind trochanters pale amber, venter of hind femora shades of brown to tan. Basal segments of cerci almost black; apical segments extremely long, chestnut, blending distad to cream at extreme tip.

Paratypes and parallotypes.—Numerous cultured males and a few adult females deposited in CAS, MHNP, USNM and BMNH.

Discussion.—Males of this species, like those of so many other high altitude embiids, have very large wings in proportion to a smaller slender body. There are also distinctions in the terminalia. Farther north in the Andes I collected several related new species, one at over 3000 m elevation in páramo.

At Machu Picchu I encountered small colonies of this species in dense moss growing on trail banks. They were extremely rare, difficult to locate.

Pararhagadochir trachelia (Navás)

(FIGURE 19)

Rhagadochir trachelia Navás, 1915:135.

Embia trachelia (Navás), Navás, 1918:100; 1922:363 (record); 1923:197 (record); 1924:10 (records); 1930:72 (record).

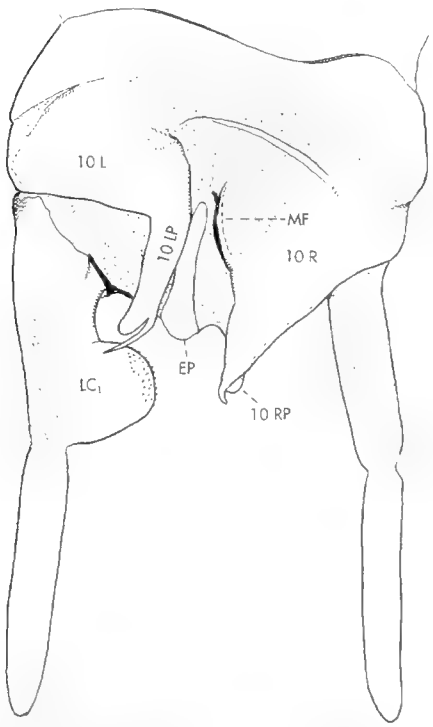

FIGURE 19. *Pararhagadochir trachelia* (Navás). Type locality: Prov. Santiago del Estero, Argentina.

Pararhagadochir trachelia (Navás), Davis, 1940a:184, figs. 51-66 (*ex parte*).—Ross, 1944:424 (redesc. type).—Szumik, 1998:141 (in cladogram); 1999:81 (biology).

Lectotype (by present designation, but specimen not so labeled).—Male on slide, La Plata Museum, Argentina. Labels.—"Rep. Argentina, Pr. Santiago d. Estero 190- C. Bruch." Another "Typus" with the above data is in the Navás collection (Barcelona).

Discussion.—*Pararhagadochir trachelia*, apparently restricted to Argentina, is readily recognized by the very narrow, greatly elongated base of 10 LP terminated by a short, apically rounded flange and a twice-as-long, evenly-tapered talon. Also, the inner spine of LPPT is exceptionally small. In some populations the prothorax is yellowish, in others it is brown (concolorous with the pterothorax). There is also much variation in body size from locality to locality and wings may be present or absent. However, the latter condition should never be the basis for proposing new species or racial names.

The following is a list of populations I have sampled during two trips to Argentina (1951 and 1964): Salta: Cabeza de Buey, males alate. Jujuy: 5 mi N Jujuy, males apterous, under stones; 10 km S Yuto, small, apterous and alate males in the population. Catamarca: 20 mi W Lavalle, large apterous, bicolorous males, colonies in matted leaves on a ridge crest; Tucuman: NW of Villa Padre Monti (Km 53 N of Tucumán), alate males bicolorous; Mendoza: 10 km E Villavicencio, under stones in extremely dry desert; males alate, unicolorous brown, base of 10 LP exceptionally long.

Pararhagadochir bicingillata (Enderlein)

(FIGURE 20)

Oligotoma bicingillata Enderlein, 1909:191; Krauss, 1911:45.—Enderlein, 1912:52, 93.—Navás, 1918: 102.—Davis, 1940c:384 .—Ross, 1944:497.

Pararhagadochir bicingillata (Enderlein), Ross, 1972:138 (new combination).

Pararhagadochir davisi Ross, 1944:432, figs. 52-56 (Type male, MCZ. Data: "Brasil: Parintins, Oct. 2 (Parish)"; Ross, 1972:138. **New synonym.**

Type.—Mature female, originally pinned, now on microscope slide (my preparation). Deposited in the Polska Akademia Nauk, Warsaw. Labels.—

"Pará" [Brazil], "Type" [red], "Oligotoma bicingillata Enderl, Female Type det. Dr. Enderlein."

Discussion.—Prior to Ross, 1972, all references to this name simply cited Enderlein's type. I have studied this specimen and noted that it is a badly damaged female of an endemic species representing a valid name. I have compared this type with females of several species I collected in the lower Amazon. A male, from a series which includes females similar to the holotype, was chosen to serve as a plesiotype (Ross, 1972:138) and is the basis for figure 20 (below). The task of associating the correct male with the female type was simplified by the female's distinctive coloration. It has a whitish band between each thoracic somite, a feature which must have suggested the name, *bicingillata*.

Redescription of Enderlein's type (female).—Appearance: Moderately small, piceous black throughout except for its dark brown head and two cream white thoracic bands. Color details (before slide preparation): Cranium dark chestnut brown throughout blending to piceous laterally and caudally, dark amber ventrally; without dorsal pattern, surface alutaceous; eyes piceous, antennae uniformly medium brown, apical segments lost. Entire thorax and abdomen piceous black, blending to mahogany brown laterally, except for a conspicuous cream white band between pro- and mesothorax and meso- and metathorax. All legs entirely piceous brown or black. Cerci medium brown. All body vestiture golden. Body length (on slide) 10.0 mm.

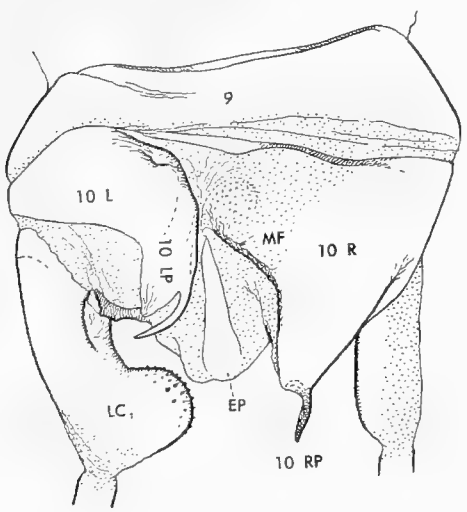

FIGURE 20. *Pararhagadochir bicingillata* (Enderlein). Type locality: Pará [Belém], Brazil. Figure after Ross, 1972.

Discussion.—Males can be readily recognized by reference to my 1972 figure (here republished as Fig. 20). Characters include the triangular, short, fleshy flange of the left tergal process and the very long, sclerotic talon of the right tergal process. The species may prove to be an Amazonian "weed," apparently having been extensively moved about in river commerce. A specimen from Tobago appears to be this species.

Records (all CAS except otherwise indicated).—Brazil: Manaus, on tree bark in city park (E. S. Ross); Coração near Macapá (E. S. Ross); Santa Isabel, Rio Arguiya, Goias, at light in forest (B. Malkin); Uaupés, Rio Negro, on bark in plantation (D. Lacombe); Mun. Boa Vista, Fazenda do Calioclo (Evangelista); Rio Preto "zw Boqueraou Sta Rita" (1 male, Vienna Mus.) Guyana: Blairmont, Oct. 1923 (F. X. Williams). Tobago: Pidgeon Point (J. S. Edgerly), probably introduced in commerce.

Pararhagadochir christae Ross

(FIGURE 21)

Pararhagadochir christae Ross, 1972:135.
Pararhagadochir cristae Szumik (*sic*), 1998:141 (in cladogram).

Holotype.—Male, on slide, CAS. Data.—Brazil: Belém, matured in culture 679, 18-IV-64 (E. S. Ross).

Name basis.—Named after the late Christa Sattler of the Max-Planck-Institut für Limnologie who sent me specimens and cultures from Belém.

Redescription (males).—Antennae especially long due to elongate segments; segment 1 dark brown, 2–3 pale amber blending distad to light brown, 3–24 especially long, with wavy setae. Submentum heavily sclerotized, with sides and anterior margins inflexed. Papilla of hind basitarsus a small, flat membranous spot. Wings narrow; hyaline stripes narrow, margins sharply defined; in forewing the fork of MA is within basal third, only one cross-vein between RP and MA_{1+2}, none behind MA_{1+2}. Terminalia with 10 LP relatively short, its flange sclerotized but exceptionally small; apical talon of 10 RP and its subtended lobe very small, both directed downward; medial flap (MF) sclerotic, strongly arched, spiculations in cleft membrane very fine, almost invisible; epiproct

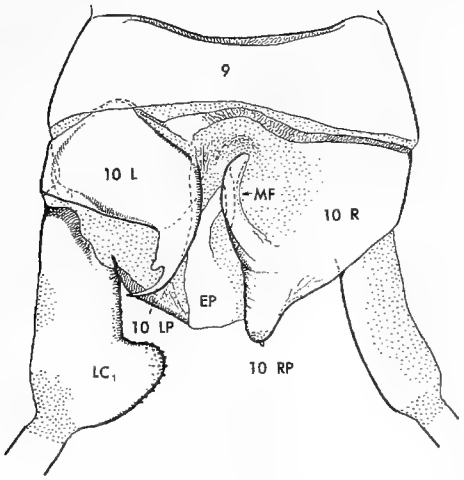

FIGURE 21. *Pararhagadochir christae* Ross. Type locality: Belém, Brazil. Figure after Ross, 1972.

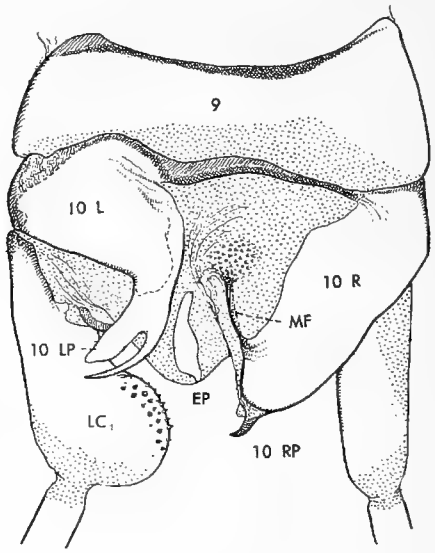

FIGURE 22. *Pararhagadochir balteata* Ross. Type locality: São Paulo, Brazil. Figure after Ross, 1972.

sclerite (EP) very large, flared caudad; caudal margin of left paraproct (LPPT) without spine, lobe, or microspiculation; left cercus lobe relatively small, somewhat hooked toward base of cercus.

Discussion.—In 1964 I found this very distinct species abundant on tree bark in park-preserved patches of original forest within the city of Belém. *Pararhagadochir bicingillata*, found in the same habitats, is readily distinguished by male terminalia characters and even more easily by the number of pale thoracic bands in adult females; one in *P. christae*, two in *P. bicingillata*.

I have collected this species, or a close relative, under stones in a low thorn forest in northeastern Brazil near Minas do Uranio, Ceara.

Pararhagadochir balteata Ross

(FIGURE 22)

Pararhagadochir balteata Ross, 1972:133.—Szumik, 1998:141 (in cladogram).

Holotype.—Male, on slide, CAS. Data.—Brazil: São Paulo, matured in culture C-706, 27-X-64 (E. S. Ross).

Redescription (Males).—Antennae especially long, due to elongate segments; uniformly light brown to apex, setae in basal half very long. Submentum heavily sclerotized, its sides and anterior margins inflexed. Papilla of hind basitarsus very small, scarcely inflated. Wings narrow, venation strong, pigment borders of RBS bright purple; in forewing, fork of MA is just within basal half; three cross-veins between RBS and RP, one between base of RP and MA_{1+2}, one between MA and MP one between base of MA_{3+4} and MP; hyaline stripes narrow, borders sharply defined. Terminalia similar to that of *P. trinitatis*. Apical talon of 10 RP large, down-curved, subtended ventral lobe large, membranous. Medial flap (MF) narrow, not strongly arched; spiculations in cleft membrane extensive but very fine. Epiproct sclerite (EP) small, narrow at base, flared caudad. Caudal margin of left paraproct (LPPT) without a spine, lobe or microspiculations.

Discussion.—This species is most readily distinguished by the pale bands between all body somites of adult females. Colonies are conspicuous on the bark of trees due to the white, uncovered surface of gallery silk.

For convenience, my original figure of the terminalia of the holotype is here republished as Fig. 22.

Additional record.—Brazil: Usina Ester, near Cosmópolis, São Paulo (CAS) (E. S. Ross).

Pararhagadochir tenuis (Enderlein)

(FIGURE 23)

Embia tenius Enderlein, 1909:186.—Krauss, 1911:69.—Navás, 1918:103.

Rhagadochir tenuis (Enderlein), Enderlein, 1912:60.

Pararhagadochir tenuis (Enderlein), Davis, 1940a: 188.—Ross, 1944:431.

Lectotype by present designation.—Male on slide deposited in Polska Academia Nauk, Warsaw. Labels.—"Bolivien Prov Sara, Steinbach S," on green card, "Embia tenuis Enderl. Male Type det. Dr. Enderlein," "Type" on red card.

Locality interpretation.—Prov. del Sara appears to be the old name of Prov. Gutiérrez, Dept. Santa Cruz, about 100 km NW of Santa Cruz de la Sierra.

Description of lectotype.—Appearance: Rather small, slender, wings relatively large; color uniformly medium brown. Color details (dry on pin): Cranium medium chestnut brown, lacking pattern. Eyes black. Antennae concolorous with cranium, color uniform from base to apex (20 segments present). Mandibles pale amber, remainder of specimen varied shades of medium brown, almost as dark as cranium. Lacking a pale band between pro- and pterothorax. Legs with paler femur-tibial joint. Dimensions (on slide): Body length 9.0 mm; forewing length 6.0 mm, breadth 1.5 mm.

Anatomical distinctions.—As figured. Most notable is the head with very large, coarsely-faceted, bulging eyes separated by little more than an eye-width. Also, the strongly caudally-convergent short sides, only one eye-length long. The flange of the left tergal process is broad, rather evenly margined and transparent apically. The microspiculate nodule of the left paraproct is narrow, abruptly rounded.

Females.—Uniformly chestnut brown with a conspicuous cream white band between each thoracic somite. Femur-tibial joints of mid and hind legs whitish; hind basitarsal mid-papilla present (absent in males).

Records.—Bolivia: Santa Cruz, males at light (G. Pinckert); Santa Cruz (C-768), large cultured series; stock from bark flakes of garden trees in town (E. S. Ross). My record (1944:431) of this

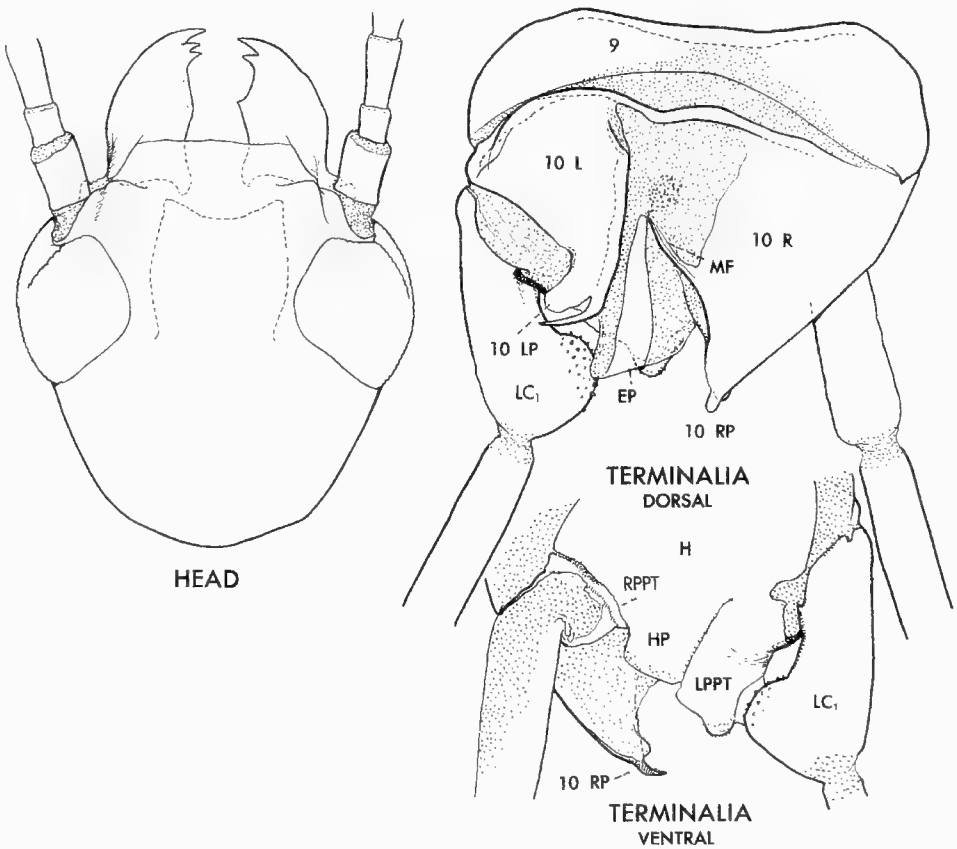

FIGURE 23. *Pararhagadochir tenuis* (Enderlein). Type locality: Santa Cruz region, Bolivia. Figure based on lectotype.

species from Rurrenbaque, Bolivia (USNM) is questionable in view of distinctions in the head and left tergal process and distinct habitat.

Discussion.—Although closely related to *P. birabeni, P. tenuis* males are readily distinguished by the absence of a whitish band between the pro- and pterothorax. The head and eye characters are also useful, being invariable in my large series. The head of *P. birabeni* is oval with less convergent sides and small eyes separated by at least four eye-widths.

A male of a possible new species, more related to *P. birabeni* than to *P. tenuis*, was collected by Borys Malkin in Bolivia at Coroicom, Yungas Prov. It has large wings and apparently no pale thoracic bands (not recorded before slide preparation), head and eyes similar to *P. birabeni*. The talon of the left tergal process is evenly curved, not abruptly as in *P. tenuis* and *P. birabeni*, and the paraproct lobe is larger and very broadly rounded.

Another discrepant male, collected by me at Angostura, 70 km SW of Santa Cruz, Bolivia, has many *P. birabeni* characters, especially in its oval cranium (with very strong pattern) and small, wide-spaced eyes. However, all membranous areas of the thorax are heavily tinged with dark purple, therefore, as in *P. tenuis,* there are no whitish intersomital bands on the thorax, as is characteristic of *P. birabeni*.

Pararhagadochir birabeni (Navás)

(FIGURE 24)

Embia birabeni Navás, 1918:105.—Davis, 1940b:352 (*Embolyntha?*).

Pararhagadochir birabeni (Navás), Ross, 1944:430.—Szumik, 1998:141 (in cladogram).

Embia piquetana Navás, 1919:25.—Davis, 1940b: 352.—Ross, 1944:497 (as unrecognizable). **New synonym**.

Lectotype, by present designation.—Male, on slide, La Plata Museum, Argentina. Data.—Argentina: "Unquillo (Cordoba) dr. Max Biraben." Details of labels in Ross 1944:431.

Discussion.—I have also studied a badly damaged cotype male with lectotype data, labeled "Typus" in the Navás collection, Barcelona. Because of its better condition and deposition in an Argentine museum, the above cited cotype was chosen to serve as lectotype.

Also studied in the Navás Collection when it was in Zaragoza (1960), was "Typus" of *Embia piquetana* Navás. It is a mature female labeled in Navás' hand: "Santa Fe (Argentina) 22-I-18" "Embia piquetana Female Nav.:Navás SJ det" "Typus" (pink paper), I found no difference between this female and those associated (by rearing) with typical males of *P. birabeni*. Therefore, unless the Santa Fe population should later prove to represent a distinct species or race, the name *E. piquetana* should be regarded as a synonym of *P. birabeni*.

Females.—Almost identical in appearance to those of *P. tenuis* in spite of the fact that *P. tenuis* males are unicolorous (without pale thoracic bands).

Biology.—*Pararhagadochir birabeni* is found in a wide variety of Argentine habitats: in bark flakes and under stones in seasonally dry arid zones characterized by thorn-scrub and cactus. It is also abundant, at least as high as 2000 m elevation, under stones on barren grassy slopes in the Volcan region of Jujuy.

Records.—I have cultured several large series from Argentina's Rio Quarto, Cordoba in the south to just beyond its Bolivian frontier in the north. Within this range, especially in the Andes, there is much variation, but this may be clinal. Therefore, one should hesitate to apply formal nomenclature to these locality-associated variants. Geographic vernacular names should serve. The most interesting variations involve the length and size of the wings. Such variation is cited in the following records (C-numbers = culture numbers).

Records.—Cordoba: 45 mi. N Rio Quarto (C-763), normal wings; Cosquin, Sierra de Córdoba (1M, Cornell U.). Catamarca: Frios, normal wings. Salta: Campo Quijane (P. Wygodzinsky), normal wings; Yatasto, near Metan (C-754), normal wings; Cabeza de Buey (C-756), normal wings; 20 mi. S. Rio de la Frontera, normal wings; 5 and 50 km S. Oran (C-759, 760), normal wings; 3 mi. S Salta, most specimens with miniature wings; a few with wings normal. Jujuy: 5 mi. NW Jujuy, 1000 m, all with miniature wings; Arroyo Yuto (C-762), normal wings; CTA-9 at Salta border (C-765), normal wings; 5 km S San Pedro (C-763), wings normal; 3 mi. S Volcan, 2000 m, wings half-size. Bolivia: Yacuiba (airport at S port of entry) (C-766), small

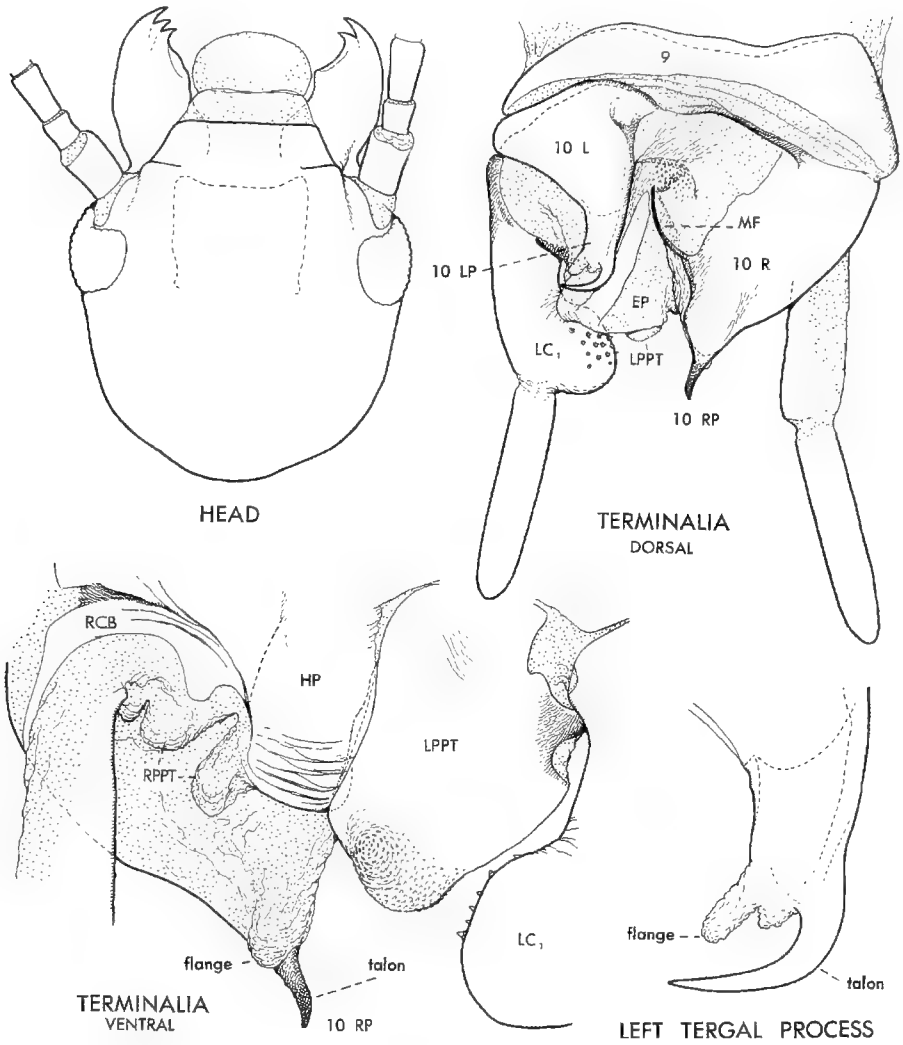

FIGURE 24. *Pararhgadochir birabeni* (Navás). Type locality: Unquillo, Córdoba, Argentina. Figure based on lectotype.

males with very small wings. Unless otherwise indicated, all collected by me and deposited in CAS.

Pararhagadochir confusa Ross

Pararhagadochir confusa Ross, 1944:428; Szumik, 1998:141 (in cladogram).

Holotype.—Male, on slide, MCZ. Data.—Paraguay: Villarica, March (F. Schade).

The following is a description of an adult female from Buenos Aires.

Description.—Appearance: Moderately large, body length 12.0 mm. Blackish brown throughout with a very broad cream white band between each thoracic somite. Color details (in alcohol): Cranium uniformly dark brown; antennae, mouthparts and venter of cranium chestnut brown. Cervical sclerites dark amber, ventral cervical membranes tinged with dark purple. Thoracic and abdominal tergites dark brown except for pale amber acrotergites which, with the extensive cream white membranes, form a pale broad band between each thoracic somite. Thoracic acrotergites shades of yellow tan; ventral sclerites, pleura and associated membranes dark purple brown. Legs dark brown except for chestnut coxae and trocanters of mid and hind legs. Abdominal tergites dark brown; except eighth and ninth which are translucent pale amber; all sternites and membranous areas dark purple. Paraprocts and cerci dark brown, including joint

membranes. Hind basitarsus with a large medial papilla.

Discussion.—*Pararhagadochir confusa* is very closely related to *P. tenuis* and *P. birabeni* but males are distinguished by the less abruptly curved talon of the left tergal process (10 LP) and the more regular shape of its outer flange. They also average larger size, much darker color and have a broader, more quadrate cranium. Their eyes are larger than those of *P. birabeni* but much smaller than those of *tenuis*.

Pararhagadochir confusa apparently is widespread in SE Paraguay, eastern Argentina and SE Brazil and probably is spread in human commerce. I found it common on the bark of shade trees in Corrientes, Argentina and Robin Leech provided a culture from tree bark in the city zoo, Buenos Aires. Adults in this culture matured during all months of the year. In addition, I have a series of males probably of the holotype series from the Crampton Collection. One male in this lot, apparently collected at light, is only half the size of *P. confusa* and has a head similar to that of *P. birabeni* and a distinct left cercus lobe. It may represent an eastern population of *P. birabeni* and therefore would indicate that the two species can be sympatric.

Pararhagadochir minuta Ross
new species

(FIGURE 25)

Holotype.—Male, on slide, MZUSP. Data.—Brazil: 37 km NE Tauá, 425 m, Ceara. Matured in culture 10-IV-99 (E. S. Ross).

Description.—Appearance: Smallest species of the genus (body length 7.5 mm), alate, almost black except for a white band between pro- and mesothorax. Color details (in alcohol): Cranium entirely black except for its lighter ventral bridge, dorsal surface finely alataceous. Eyes dark purple. antennae exceptionally long; segment (scape) black, 2nd brownish black, other segments at first dark amber, but grading distad to medium brown; 19-segmented (complete), flagellar segments bearing exceptionally long setae. Mandibles dark amber except for piceous margins and dentation; other mouthparts dark brown except for a brownish black submentum. Thoracic and abdominal sclerites varied shades of dark chestnut brown; membranous areas pinkish tan except for a white (due to internal fat) dorsal band between pro- and mesothorax. Legs concolorous with thorax. Sclerotic portions of terminalia (including segment 9) piceous black, talons of 10 LP and 10 RP very dark amber, membranous areas pinkish tan; LC_1 dark brown except for its cream outer basal angle, RC_1 yellow cream except for inner margin; joints and tips of discal segments white, otherwise pale brown. Dimensions (on slide): Body length 7.5 mm; forewing length 3.5 mm, breadth 0.9 mm.

Important anatomical features.—As figured. Submentum much broader than long, only moderately sclerotized, anterior margin weak, not inflexed (as in congeners); mentum well separated. Wings rather small, narrow, hind margin very narrowly tapered toward base; hyaline stripes narrow, well defined; no cross-veins; longitudinal veins MA, MP and Cu traceable only by their setae. Marginal lines of radial blood sinus (RCB) gray white instead of the usual pink. Hind basitarsus very short; medial papilla small, obscure; plantar setae large, basals which are slanted distad are broad; distals slanted basad are slender. Terminalia, as figured, microspiculate depression in cleft of 10 very large. Talon of 10 LP evenly curved and tapered; its flange short, basally sclerotic, its small apex white, unsclerotized. Dorsal portion of 10 RP irregular, truncate; its talon short, basally sclerotic, its small apex white, unsclerotized. Dorsal portion of 10 RP irregular, truncate; its talon short, narrow, directed ventrad. Epiproct sclerite (EP) prominent, very long, flared caudad from a long narrow base. Left paraproct (LPPT) very large closely appressed to HP, inner caudal angle not produced as a spine, or as a microsetose nodule. Lobe of LC_1 very large, margin a perfect semicircle, very densely and finely echinulate.

Allotype.—Female, in alcohol, MZUSP, from holotype's culture.

Description.—Appearance: Generally very dark brown except for a pale band between each thoracic somite. Antennae and cerci tan. Color details: Cranium dark on vertex, grading to amber yellow toward clypeus; vertex pattern very faint. Eyes concolorous with cranium. All antennal segments tan, joints cream, 24-segmented. All dorsal body sclerites and legs (except for cream femur-tibial joints) glossy dark chestnut brown; most membranous areas brick red, almost concolorous with sclerites. Acrotergite 1 and adjacent sclerites clear

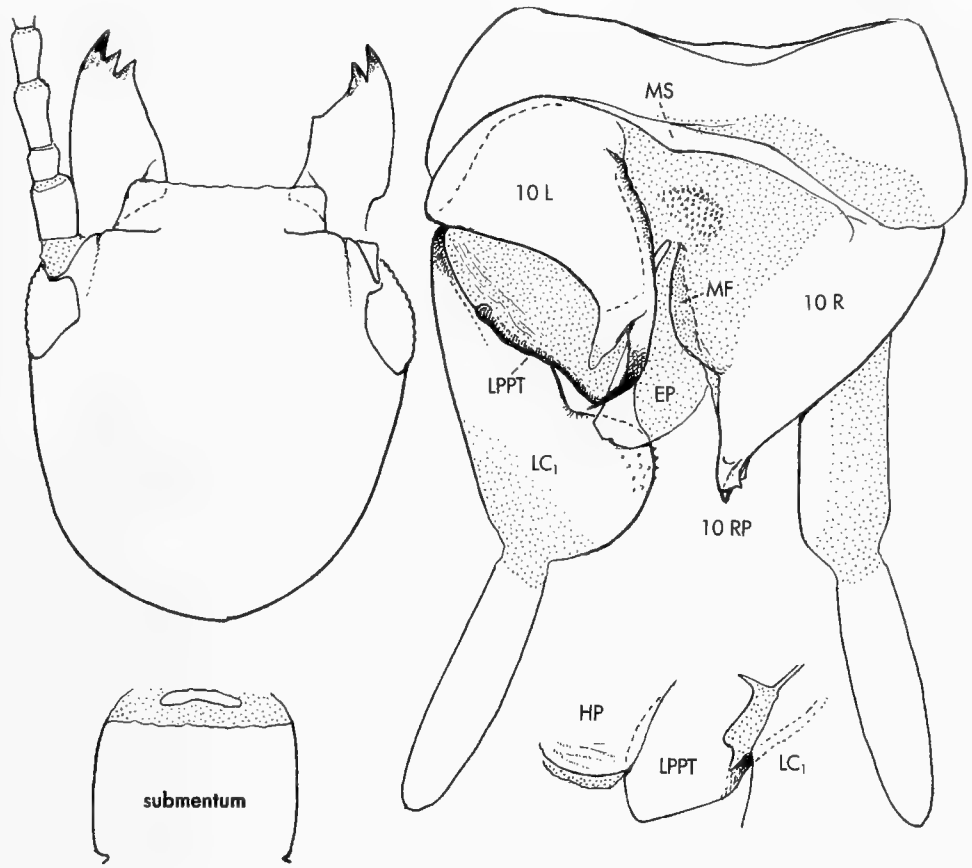

FIGURE 25. *Pararhagadochir minuta* Ross, n. sp. Type locality: NE Brazil: 37 km N Tauá, 425 m, Ceara.

pale amber; these combined with white surroundings (due to color of interior fat) create a broad promesothoracic band. A similarly-produced but narrower band is present between meso-and metathorax. All ventral body sclerites, except meso- and metasterna, which are mottled with rust brown, are clear amber. Those of prothorax, cervix, and paragenital sternites dark chestnut brown. Para-anal portions of paraprocts white due to fat visible through their translucent derm. Cerci very pale tan except for cream base of basal segments. Body length 10.0 mm.

Paratypes and parallotypes.—Adults from holotype's culture deposited in CAS, USNM, MNRJ and BMNH.

Additional records (all NE Brazil).—Paraiba: 15 km SE Patos; Microware station above Saõ Bentinao. Piauí: 15 km N Saõ Raimundo Nonato, 500 m; 24 km SW Picos. Ceara: Mina do Uranio. Bahia: 20 km SW Casa Nova (northern Bahia).

Specimens were collected in galleries at the edges of small stones and in adjacent leaf litter beneath low trees in usually dry habitats. Fortunately, during March 1999 there had been abundant rainfall, otherwise, embiids wouldn't have been present in new surface galleries. In cultures adults of both sexes matured throughout 1999 and increasingly-large cultures were maintained during 2000.

Discussion.—*Pararhagadochir minuta* is perhaps at least subgenerically distinct from other *Pararhagadochir*, as suggested by its very small size; the broad, weakly-sclerotized submentum with a non-inflexed anterior margin (a sclerotic, shield-like submentum is one of the characteristics of all other species of *Pararhagadochir*); the basally-tapered, small wings with weak veins and no cross-veins; and the exceptionally large, evenly-rounded left crcus lobe.

Genus *Litosembia* Ross
new genus

Type species.—*Litosembia oligembiodes* Ross, new species.

Distribution.—South America: Lower Amazon (one record).

Name basis.—Greek *litos* (plain, simple) in reference to the small, simple appearance.

Diagnosis.— Males very small (body length averaging 6.5 mm), alate; pale straw yellow, cranium darker with black eyes. Cranium circular in outline; eyes very large, inflated, interspace one eye-width, facets large; antennae unicolorous, 16-segmented; mandibles oligotomoid, incisor teeth well spaced; submentum shield-like, sclerotic, anterior and lateral margins inflexed, anterior angles projected forward. Hyaline stripes of wings broad, margins irregular; MA branches, MP and Cu_{1a} unsclerotized; cross-veins behind RP almost obsolete. Hind basitarsus without a second (medial) papilla; plantar setae large. Terminalia weakly sclerotized, sclerite margins faint; cleft of tenth tergite broad to basal margin. Left tergal process (10 LP) very short, broad, not projected beyond caudal margin of paraproct; inner margin sclerotized and produced caudad as a tiny, spine (talon); outer appendix (flange) broad, its outer margin indistinct. Basomedial and outer margins of right hemitergite (10 R) indistinct, mediocaudal margin strong; apex rugosely rounded, but not developed as a distinct process. Medial flap (MF) not developed; anterior extremity bearing a small, microspiculate nodule. Epiproct sclerite scarcely discernable. Ninth sternite (H) broad, margins indistinct; its lobe (HP) broadly rounded at apex, its right side narrowly sclerotic, almost fused to slender right paraproct (RPPT). Left paraproct (LPPT) fused basally to H; bearing a non-spiculate, elongate nodule on inner-caudal angle. Basal segments of cerci with outer side membranous, inner side sclerotized; left bearing a large distal lobe having numerous, coarse echinulations and it is arced basad.

Females: With distinct coloration but no generic-level anatomical characters except for the presence of a second hind basitarsal papilla.

Discussion.— *Litosembia* is one of the most distinct genera of American Embiidae. Because of its small size and coloration, it appears to be a teratembiid but there is no question that it is a scelembiine embiid. I am inclined to relate it to the genus *Pararhagadochir*. Its most distinctive characters include the broad, short, left process (10 LP) with a minute inner spine; the subobsolete right process (10 RP) and medial flap (MF) (except for its minutely spiculate nodule). The apparent absence of a second hind basitarsal papilla in males is also diagnostic. Reduction of structures apparently correlates with exceptionally small size—it is the smallest known species of Embiidae.

Only one species has been discovered to date but others should be collected in the future.

Litosembia oligembioides Ross
new species
(FIGURE 26)

Holotype.—Male, on slide, MNRJ. Type data.—Brazil: 5 km S. Belém, Pará. Matured in culture May 1, 1975 (E. S. Ross).

Description.—Appearance: Small, pale with mottled, subdermal rust red and yellow areas; eyes contrastingly dark. Color details (in alcohol): Cranium basically golden yellow but clouded subdermally with rust red except for clear vertex pattern. Eyes dark lavender. Antennal segments 1 and 2 yellow amber, segments 3–5 pale tan, all others to apex (segment 15) medium brown with pink joint membranes, apical segments as dark as subapicals. Mouthparts concolorous with antennae except for dark golden amber mandibles and submentum. Cervical area and anterior half of prothorax pale amber becoming whitish caudad and on coxal membranes. Pterothorax paler, especially due to extensive whitish, weakly sclerotized areas forming a distinct white band between meso- and metathorax; various promontories tinged with rust red. Wing bands pale brown; hyaline stripes broad with irregular margins; RBS lines very pale pink. Forelegs rust amber except for medial area of femur which blends to gray white. Mid- and hind legs transparent gray white except for femora which are broadly banded with rust amber basally and apically (similar to profemora). Abdomen pale lemon-yellow ventrally; distinctly banded dorsally due to rusty, subcutaneous pigment; terminalia pale, transparent tan except for medium brown inner margins of basal segments of cerci and entire apical segments. Dimensions (on slide): Body length 6.5 mm; forewing length 4.75 mm, breadth 1.1 mm.

Important integumental characters: As figured and cited in the generic diagnosis and discussion.

Allotype.—Female in alcohol with same data and disposition as holotype except for maturity date, October, 1975 (from same culture).

Description.—Appearance: Small, head golden, body rust brown with distinct cream white bands. Color details (in alcohol): Cranium bright yellow gold with very faint rust pattern lines. Eyes small, blackish. Antennal segments 1 and 2 yellowish, 3 gray white, 4–6 blending from pale tan to light brown, 7–15 dark chestnut brown with pink membranes, 16 (the apical segment) abruptly pale tan with whitish apex. Mouthparts pale amber except for apices of palpi which become light brown. Cervical membranes pale pink. Pronotum clear, pale amber blending caudad to pale cream; coxal membranes white. Acrotergite 1 transparent tan, adjacent membranes dark rust red. Mesothorax dark rust red except for caudal blend to transparent white which, with the white acrotergite 2 and its adjacent membranes, forms a broad, whitish, meso-metathoracic band; metathorax largely rust red except for white, subcutaneous caudal areas visible through derm. Forelegs rusty, mahogany brown except for coxae, medial area of femora and distal tarsal segment, which are cream white. Mid and hind legs cream white throughout except for rust red basal and apical pigmentation of femora. Cerci rust tan throughout (including joint membranes) except for white extreme apices of distal segments. Dimensions (in alcohol): Body length 8.0 mm.

Anatomical characters: The very slender proportions and the presence of a second hind basitarsal papilla.

Paratypes and parallotypes.—Thirteen adult males, one female; from type culture deposited in CAS, USNM and MZUSP.

Biology.—This species has been collected only once. Stock for the type culture was secured on dead bark of a small, native tree at the edge of semi-cleared, secondary forest in the public park on the southern outskirts of Belém, not far from the swimming pool. Silk galleries were beneath orchid roots growing on almost bare bark of the dead tree. Before the culture died, it produced a small series of

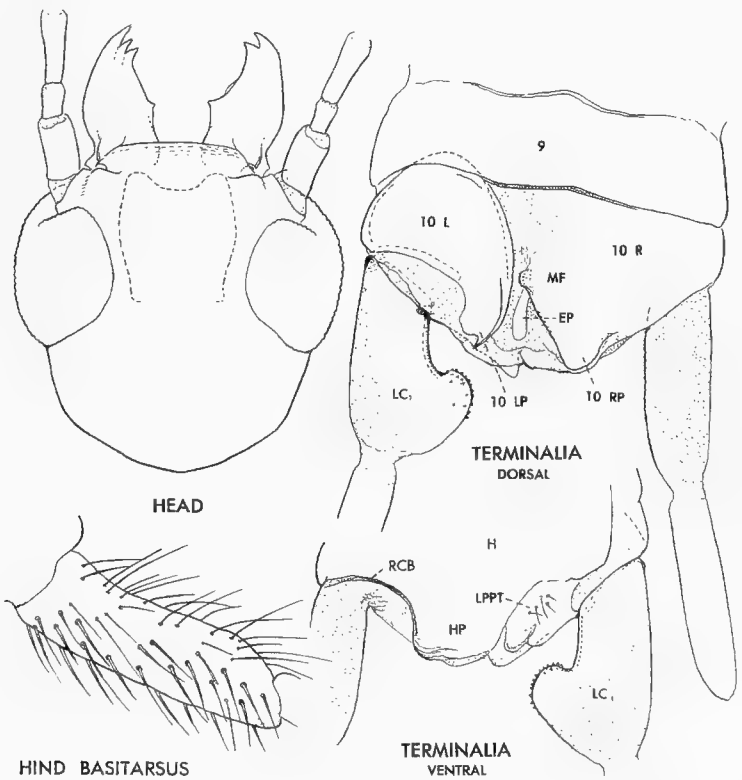

FIGURE 26. *Litosembia oligemboides* Ross, n. gen and n. sp., holotype. Type locality: Belém, Brazil.

males, most of which matured during the months of September and October; one as late as December. The pale color and large eyes of the male indicates that they probably disperse nocturnally and should be attracted to lights.

Genus *Biguembia* Szumik

Biguembia Szumik, 1998:149.

Type species.—*Biguembia copa* Szumik, by original designation.

Distribution.—Argentina (Santiago del Estero) and Brazil (Mato Grosso, and the northeast Piauí). Probably also in intermediate regions.

Discussion.—When the main body of this paper was written, I had no specimens of this genus. However, unexpectedly, two cultures I secured in northeastern Brazil early in 1999 are producing hundreds of adult specimens of both sexes of a new species very closely related to those described by Szumik. Therefore, it can serve as the basis for the following amplified generic description.

Generic description.—Males very large, body length averaging 15.0 mm, alate, varied shades of brown throughout. Cranium about as broad as long; ventral bridge short, weakly sclerotized; eyes large; antennae very long, 37-segmented (number probably variable), unicolorous to apex. Mandibles short, outer margins evenly arcuate; apical dentation large, well spaced, without proxidental cusps. Submentum much broader than long, weakly sclerotized, side and anterior margins not inflexed, setae evenly spaced; mentum well defined. Wing venation variable (even in a single specimen) but at least in *B. multivenosa*, MA always is multibranched (instead of only two-branched as in most other Embiidae). Rarely MP is also branched. Hind basitarsus with a conspicuous medial papilla; plantar setae dense, almost uniform in shape and length. Terminalia with tenth tergite broadly cleft, without a microspiculate depression in cleft membrane. Left hemitergite (10 L) strongly transverse, its base almost entirely separated from basal margin of tenth tergite by a narrow membranous interval, abruptly curved caudad to form the inner margin of the long, sclerotic talon of its process (10 LP) which is directed straight caudad and sharply tapered; to its left, and well-separated, a basally sclerotic flange extends caudad almost equal in length to the talon; apical two-thirds of flange is membranous, flexible and laterally compressed (in alcholic specimens the flange is stiff, but twists out of shape during slide preparation). Inner basal portion of 10 R, the medial sclerite (MS), is extensively depressed and lacks setae, its inner margin (MF) is evenly arcuated and continues caudad to become the left side of a peculiar rugose, setose lobe (Szumik's "hunch"). This lobe overlays a very long, narrow, spine-like process, or talon (10 RP) directed ventrad (Szumik figures this talon as rather short in her species). Epiproct sclerite (EP) long, narrow, inconspicuous due to weak sclerotization. Hypandrium (H) very large, its process (HP) very broad, arcuate apically. Sclerite of left paraproct (LPPT) very narrow, partially extended beneath edge of HP, but not fused to it or to H; terminated caudad as a rugose, sclerotic blunt lobe; LPPT's membranous inner-apical portion setose. Basal segment of left cercus (LC_1) very large, dorsally depressed; its straight, arcuate, or bilobed inner side is sclerotic and very coarsely echinulate. Other cercus segments normal, well sclerotized except for membranous outer base of RC_1.

Females.—Very large (body length averaging 20 mm); varied shades of mottled blackish brown except for a pale band between meso- and metathorax. Cranium basically dark chestnut brown, heavily mottled with dark mahogany brown. Antennae very long, segments 1–24 medium brown, thence to apex (segment 36) grading to gray white. Acrotergite 1 dark brown; acrotergite 2, prescutum and caudal margin of mesonotum, mottled pale amber, adjacent membranes cream white due to interior fat, this ensemble produces a pale intersomital band. Femur-tibial joints of mid and hindlegs whitish. Venter of body paler than dorsum; pleura of abdomen, tan to black not forming pale lateral stripes. Eight abdominal sternite pale, microhirsute medially, each side with an irregular dark brown pattern; ninth sternite uniformly mottled brown, its anterior margin partially overlays a deep, golden, sclerotic pouch (aperture of accessory gland ?). Cerci dark purple brown, including joint membranes.

Biguembia multivenosa Ross

new species

(FIGURE 27)

Holotype.—Male, on slide, MZUSP. Data.—Northeastern Brazil: 24 km SW Picos, Piauí, matured in culture 1-VI-99 (E. S. Ross).

Name basis.—Refers to variable multibranched MA and MP wing veins.

Description.—Appearance: Size, coloration and anatomical features as described for the genus. Wings unusual in having secondary branching of MA_{2+3} into MA_2 and MA_3 and secondary branching of MA_{4+5} into MA_5. Terminalia apparently very similar to those of Szumik's species, however, she figured 10 RP's talon relatively short (or is it foreshortened?). In *B. multivenosa* it is extremely long and slender—perhaps the longest of any species of the order. Another distinction is the bilobed basal segment of the left cercus (inner margin straight or convex in Szumik's species).

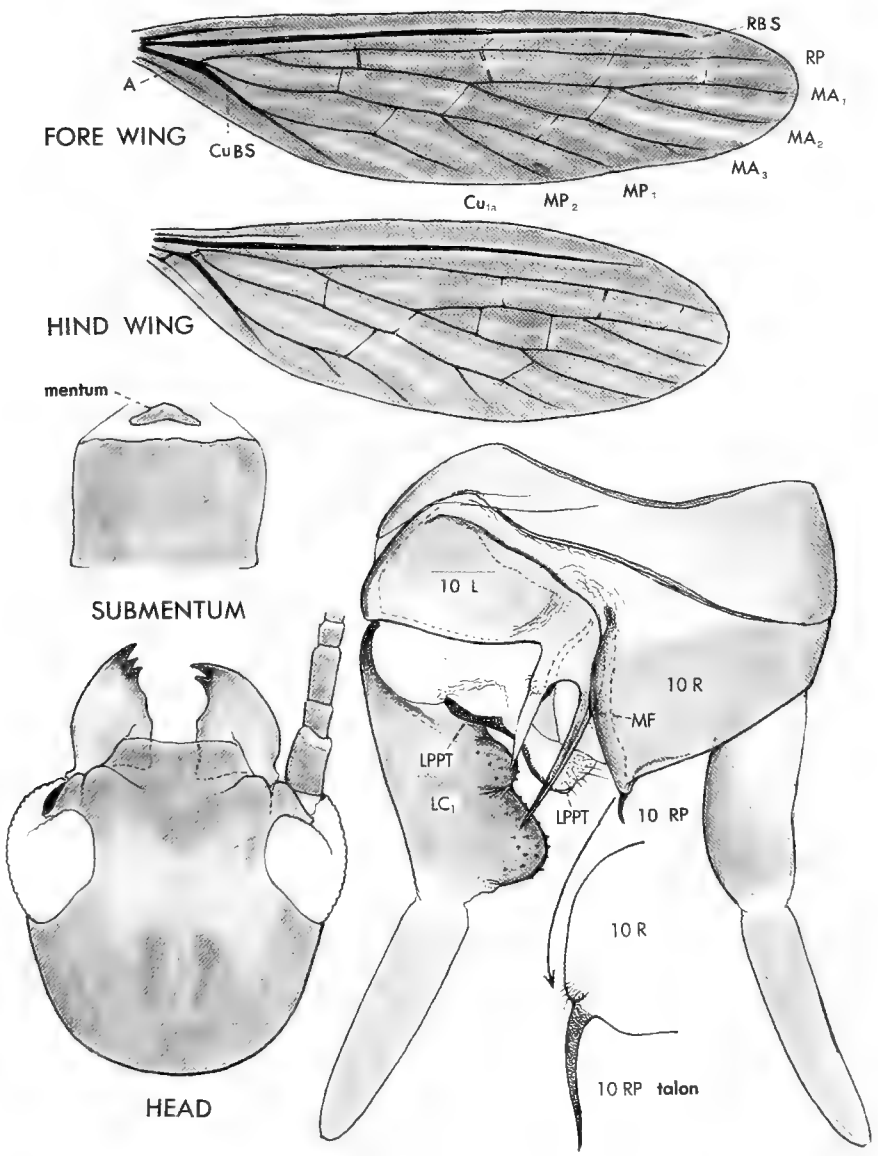

FIGURE 27. Important characters of *Biguembia multivenosa* Ross, n. sp. Wings with unusual venation. In some specimens MA_{1+2} may be simple with only M_{3+4} forked, or in others the converse; MP rarely is forked. In the insert, 10 R, its nodule and the long very slender talon, area is figured in profile. Type locality: NE Brazil, 24 km SW Picos, Piauí.

Allotype.—Adult female, in alcohol, from holotype's culture deposited in MZUSP.

Description.—As presented in the generic diagnosis.

Paratypes and parallotypes.—Numerous adults from holotype's culture deposited in CAS, USNM, MZUSP, MNRJ and BMNH.

Additional records.—Piauí: East of Nazarí do Piauí (E. S. Ross) CAS. From a thriving culture in my Academy laboratory, first instar nymphs appeared mid-II-00.

Discussion.—Future collecting and studies may reveal that *B. multivenosa* and Szumik's species may be varied geographical populations of a single species. However, amongst hundreds of topotypic males of *B. multivenosa,* LC_1 invariably is bilobed and MA always is multibranched. Szumik's series were too small to test consistency of characters of her species.

Biology.—The type cultures were secured on semishaded surfaces of spectacular, reddish sandstone cliffs next to a commercial, spring water, bottling enterprise. During March each colony comprised an extensive silk mat occupied by scores of young nymphs attended by a parent female. No adult males were present but these began to mature in cultures during late December 1999 increasingly so during January 2000. Therefore, the culture calendar coincides with that in the field, thus indicating a single annual brood. The galleries were very conspicuous, the silk being white, not coated with debris.

Less conspicuous on the cliffs were colonies of *Pararhagadochir minuta* and those of one or more species of Teratembiidae. All species utilized rock crevices as refuges from predators and excessive heat.

Later in March 1999 a single culture assumed to be *B. multivenosa,* was secured in a very distinct habitat—a dense, low, natural, apparently non-deciduous forest a short distance east of Nazarí do Pinhuí, Piauí (about 42 km SE of Floriano, about 84 km W of the type locality of *B. multivenosa*). Here colonies were very rare, being concealed in crevices of very hard, coarse, dry bark of large trees. Third instar nymphs were secured with great difficulty. No adults were encountered in the field but the cultures yielded adults late in November, 1999. Eggs were laid in single-layered masses—more than one hundred per mass. The eggs were protected by inter-egg, masticated paste placed by the parent female.

Adult females and juveniles are much darker than those of the type population due to the fact that all intersclerotal membranes are dark lavender black, whereas those of Picos females and larvae are consistently tan. However, anatomical characters of males appear to be identical. I will determine taxonomic status by hybridizing cultures.

Biguembia copo Szumik

(FIGURE 28)

Biguembia copo Szumik, 1998:149.

Holotype.—Male, IFML. Data.—Argentina: Santiago del Estero, Reserva Provincial de Copo, X-1989 (J.P. Pelotto).

Discussion.—Szumik illustrated the mentum as fused to the submentum (her Mn + Sm). Such fusion probably doesn't occur and requires confirmation. She states that the cubitus wing vein is forked but this isn't shown in her figure, unless she regards the distal half of the cubital blood sinus (CuBS) as a vein which is doubtful because the trachea of Cu emerges from the sinus well before it reaches the wing's margin. She states that R_1 (my RA or radial blood sinus, RBS) lacks longitudinal pigmented

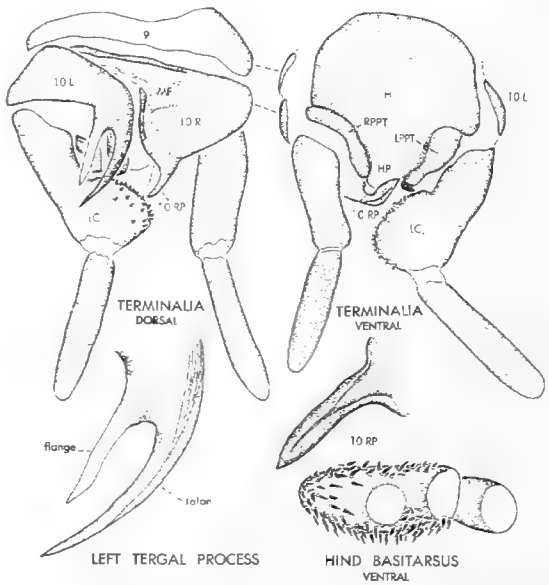

FIGURE 28. *Biguembia copo* Szumik. Type locality: Santiago del Estero, Argentina. Modified Szumik figures.

borders; if so, her males are the only specimens of the order with such a condition. Her few specimens have the normal, single forking of MA characterizing most Embiidae. MA in *B. multivenosa* is additionally branched in all examined specimens (about 100). Therefore, it probably is a good species character. The talon of 10 R is figured by her as relatively short on *B. copo* and broadly acute in contrast to the much longer, narrowly-tapered condition in *B. multivenosa*. *Biguembia copo* apparently lacks a lobe (her "hunch") above 10 RP's talon and LC_1 has a broadly rounded, not bilobed, inner face.

Females.—Unknown.

Paratypes.—Specimens from Argentina: 2 km W. Hickman, Ruta Nac. 81, 27-I-95 (Szumik and Goloboff), IML. "Collected on wet soil, many cross tunnels with a lot of spongy web."

Biguembia cocum Szumik

(FIGURE 29)

Biguembia cocum Szumik, 1998:152.

Holotype.—Male, MZUSP. Data.—Brazil: Mato Grosso, Serra do Urucum-Corumba, 30-XI-60 (K. Lenko).

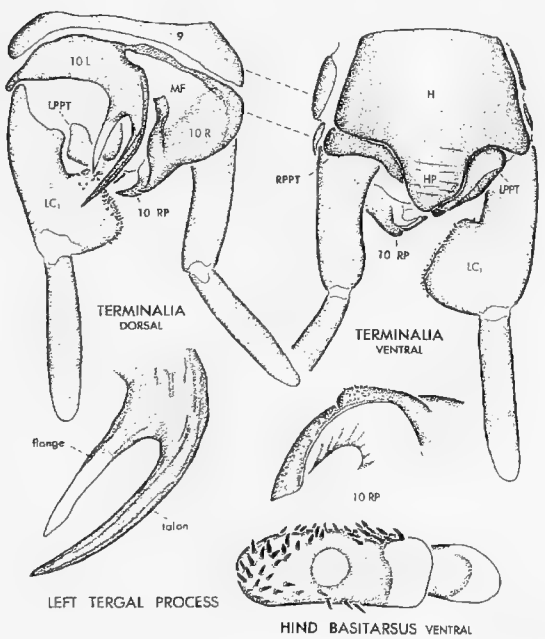

FIGURE 29. *Biguembia cocum* Szumik. Type locality: Serra do Urucum-Corumba, Mato Grosso, Brazil. Modified Szumik figures.

Discussion. —*Biguembia cocum* appears to differ from *B. coco* in the shape of 10 RP's talon, the presence of a lobe above base of the talon and the flat, instead of rounded inner face of LC_1.

Females.—Unknown.

Paratype. —Five topotypic males, presumably in MZUSP and IFML.

Genus *Argocercembia* Ross

new genus

Type species.—*Argocercembia guyana* Ross, new species, by present designation.

Distribution.—South America: Amazon Basin and Guyanan region.

Name basis.—Greek *argos* (white, bright) in reference to the almost entirely white cerci of the species.

Diagnosis.—Males small (body length averaging 7 mm), alate; dark brown to pale tan, surface usually with metallic-gold sheen; antennae unicolorous; cerci with apical segments pale; tibial and wing bases whitish. Cranium short, eyes generally large, inflated; antennae 20-segmented, without white apices; mandibles delicate, oligotomoid; submentum quadrate, weakly sclerotized, anterior margin not inflexed. Wings with apices of veins MA_{1+2}, MP and all of Cu1 reduced to rows of setae; apex of RBS curved into subapex of RP; cross-veins: 3 RBS – RP, 1 RP – MA_{2+3}, no MA_{2+3}– MA_{4+5} and 1 MA – MP; cross-veins never white when crossing hyaline stripes. Hind basitarsi with second papilla very small. Terminalia broadly cleft to basal margin. Left hemitergite (10 L) inflexed along outer and inner margins, but not along its weak caudal margin; mesal angle gradually narrowed to form a simple, acutely and narrowly-tapered process (10 LP) which lacks an outer flange. Right hemitergite (10 R) equilaterally triangulate, inner-basal margin weak; process (10 RP) very short, complex, composed of a short talon subtended by a small, ventral, membranous lobe. Medial flap (MF) prominent, projected almost straight forward, surface conspicuously strigose; membrane at apex complexly wrinkled, microdimpled but very weakly microspiculated. Epiproct sclerite (EP) large but not extending beyond apex of 10 LP. Left paraproct (LPPT) with caudal margin smoothly, broadly arcuated; extremities not sharply produced; ventro-caudal surface densely microspiculated.

Basal segment of left cercus short, apical third desclerotized; almost entire inner side forming a lobe, echinulations confined to inner edge of lobe; lobe strongly dorso-ventrally depressed. All other cercus segments desclerotized, appearing white in life, but membranous in cleared preparations.

Females: Without noteworthy generic characters except the slender body, the golden surface sheen, the lack of white apical antennal segments, the pale meso-metathoracic band, the whitish tibial bases and apical cercus segments.

Discussion.—The presence in my collection of four new species possessing the above characters strengthens this generic concept. Actually, it is not very closely related to any other known genus except *Xiphosembia* n. gen., from which it differs in many characters, e.g., shorter and broader-based 10 LP; scarcely-produced, trifid 10 RP; and short, depressed basal segment of the left cercus.

I collected three additional species in the following Brazilian localities: Vila Amazona, Amapá (semicleared rainforest); Mata da Firelli, near Belém, Para (virgin rainforest); and 20 km N Caracarai, Roraima (stones in seasonally-dry grassland). Probably males of some, or all, of these species may be attracted to lights.

Argocercembia guyana Ross
new species
(FIGURE 30)

Holotype.—Male, on slide, CAS. Data.—Guyana: Atkinson Airport, Georgetown 31-V-64 (E. S. Ross).

Description.—Appearance: Rather small, alate, light chestnut brown except for tan dorsum of pterothorax and partly to entirely white apical segments of cerci. Color details (in alcohol): Cranium chestnut brown with faint vertex pattern, sheen metallic. Eyes lavender black. Antennae chestnut brown to apex except for yellow segments 2–4 (20-segmented). Mouthparts varied shades of brown. Prothoracic sclerites chestnut brown with golden sheen; membranes tinged with rust brown. Pterothorax shades of yellow tan with darker promontories; ventral sclerites slightly darker. Legs concolorous with thorax except for whitish tibial bases and femoral apices. Wings light brown except for whitish bases and broad hyaline stripes. Abdomen rust brown dorsally, tan ventrally; terminalia concolorous except for whitish apical segments of cerci. Dimensions (on slide): body length 7.5 mm; forewing length 5.1 mm, breadth 1.1 mm.

Important integumental characters.—Until the three additional congeners are described, males of *A. guyana* can be identified by reference to figured generic characters and locality.

Allotype.—Female, in alcohol, with holotype data and disposition (from same culture).

Description.—Appearance: Small, slender, chestnut brown with whitish band between meso- and metathorax, all appendages dark to apex. Color details (in alcohol): Cranium golden brown, paler at vertex due to brain color within, clypeus darker. Antennae and mouthparts as in males. Prothoracic and cervical sclerites dark mahogany brown with a green gold metallic sheen; all membranes dark purple. Meso- and metathoracic sclerites a tone paler than those of prothorax, sheen also metallic; membranes purple except between somites where whitish internal tissues produce a whitish intersomital band. Legs concolorous with thorax except for whitish femur-tibial joints. Abdomen concolorous with thorax with golden sheen; basal segments of cerci lavender-black with pale spot at base of each trichobothrium, apical segments tan. Body length: 9.0 mm.

Important integumental characters: Those of specific importance will be described when additional new species in my collection are made known. Second hind basitarsal papilla inconspicuous.

Paratypes and parallotypes.—11 males and 9 females deposited in CAS, USNM, BMNH and MZUSP. All from type culture, matured during January–May and October–December.

Discussion.—The type culture was collected in bark crevices of small shade trees adjacent to the airport waiting room. *Argocercembia guyana* is most closely related to a new species from the Boa Vista, Roraima region of Brazil, differing primarily in size and coloration.

Genus *Aphanembia* Ross
new genus

Type species.—*Aphanembia obscura* Ross, new species, by present designation.

Name basis.—Greek *aphanes*, (unseen, invisi-

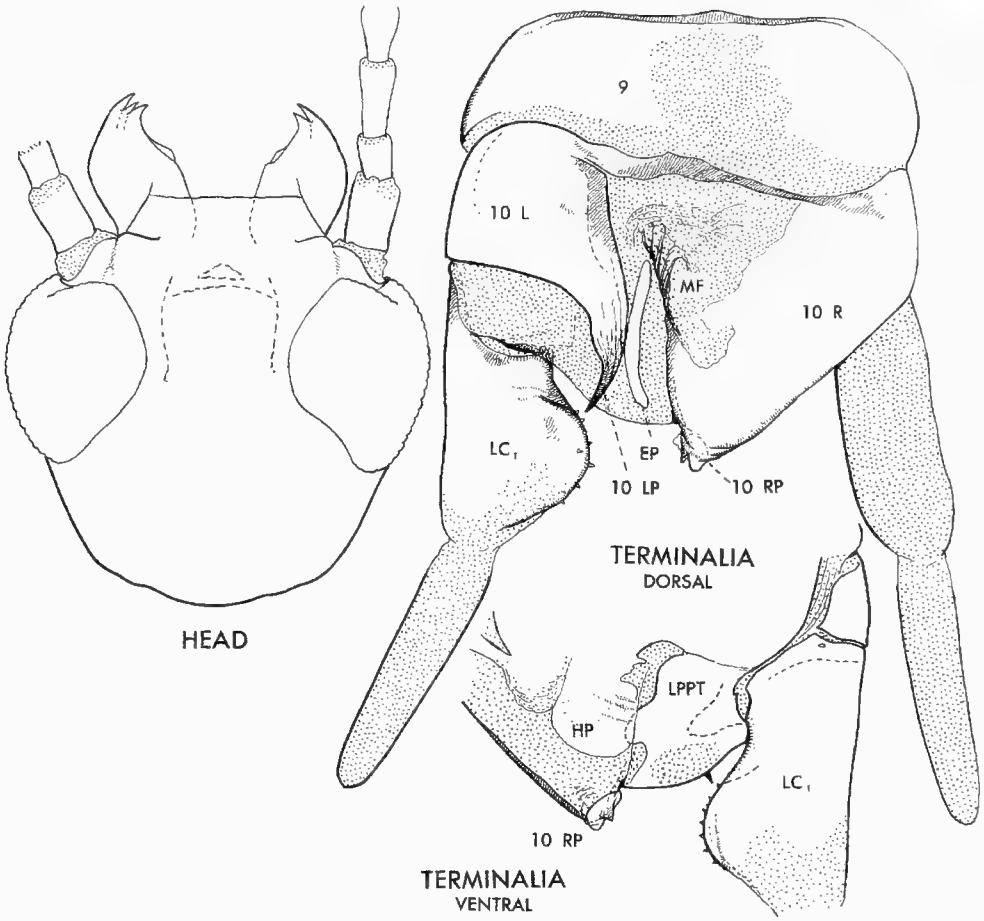

FIGURE 30. *Argocercembia guyana* Ross, n. gen and n. sp., holotype. Type locality: Georgetown, Guyana.

ble) in reference to hidden colonies under bark flakes.

Distribution.—South America: Amazon Basin.

Diagnosis.—Males: Rather small (body length averaging 8 mm), alate; body light tan, head and terminalia cinnamon brown. Cranium rectangulate-oval, or circular in outline; eyes rather large, inflated; antennae without pale distal segments, 14–16 segmented; submentum transversely rectangulate, anterior margin weak; mandibles flat, thin, short, apical teeth well-spaced, sharply acute. Hind basitarsus short, with two ventral papillae. Tenth tergite very broadly cleft to basal margin. Left hemitergite (10 L) triangulate; its process (10 LP) continuous with sclerotic, ridged, inner margin, of 10 L and represented as an arcuate narrowly-tapered inner talon and a lower, narrowly-acute, much shorter, translucent outer flange. Right hemitergite (10 R) with inner margin straight, outer margin sinuous with a small membranous interruption at outer base of process; right process (10 RP) continuous with acutely narrowed sclerotic apex of 10 R and formed as a striate downwardly-directed talon with a tiny nodule present ventrally beneath its base. Medial flap (MF) a sclerotized, strigose, forward-projecting "arm." Epiproct (EP) with its sclerite large, very weakly sclerotized. Hypandrium process (HP) with a deep, basal, membranous emargination on left side; its apex weakly sclerotized. Left paraproct large, transversely fused to H at base; its caudal margin well defined, evenly arcuate; a large, acute, cone-shaped, microspiculate, forward-directed lobe is highly characteristic. Left cercus lobe with a single, broadly-rounded, coarsely-echinulated, medial lobe; inner-basal margin of basal segment continued beneath lobe.

Females: With distinctive coloration. Cranium

translucent gold, prothorax pale amber; most other body sclerites dark mahogany brown. Legs extensively pale, cerci entirely dark. Without distinctive integumental characters except for the exceptionally circular head form.

Discussion.—Although its integumental characters do not appear to be very different from those of related genera, such as *Gibocercus, Aphanembia* has a generically distinct biology. Its colonies are very obscure, being concealed under bark flakes of large trees and stumps. No extensive galleries extend beyond edges of the covering flake. Collection of specimens thus often requires random lifting of bark flakes. Related genera, such as *Gibocercus*, make extensive, exposed gallery systems occupied by many individuals. Broods of *Aphanembia* appear to be small and thus its species will be rarely collected. A male of one species was collected at light.

The most distinctive character of adult males is the conical ventral lobe of the left paraproct. Adult females are unique in being markedly bicolorous—the head and prothorax are gold and amber respectively in sharp contrast to the otherwise dark brown body.

Component species.—My collection (CAS) contains small series of additional species from five localities in the Amazon Basin: Peru: Tingo Mariá region; Tambopata, Madre de Dios; Estiron, Rio Ampi Yacu, Dept Loreto. Brazil: 20 km N Manaus; Arequemes region, Rondonia. Colombia: near Leticia (at light). In spite of vast geographic separation, these populations may at best represent races of a single species with male distinctions occurring in cranial and eye form, and the shape of the paraproct's conical lobe.

Aphanembia obscura Ross
new species

(FIGURE 31)

Holotype.—Male, on slide, CAS. Data.—Peru: Yurac Plantation, 67 mi E of Tingo Mariá, 14-XII-1954 (E. S. Ross).

Description.—Appearance: Rather small, alate; pale tan except for darker head, terminalia, and wings. Color details (in alcohol): Cranium cinnamon brown with faint vertex pattern. Eyes blackish with pale margins. Antennal segments 1–8 pale amber, others to apex (segment 16) slightly darker. Mandibles clear amber with piceous margins, other sclerotic portions of mouthparts chestnut brown. Body sclerites and legs pale tan, prothorax neither darker nor lighter than other portions of body; all membranes cream white; wings pale tan, crossveins white when crossing a hyaline stripe; terminalia sclerites, including cerci, chestnut brown. Dimensions (on slide): Body length 9.5 mm; forewing length 6.7 mm, breadth 1.5 mm.

Important integumental characters.—As figured and described in the generic treatment. Of possible specific, or subspecific importance, is the elongate, rectangulate-oval cranial outline. Males from Manaus have a short, circular cranium with exceptionally large eyes.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Cranium, prothorax and legs golden to yellow, other sclerotized portions mahogany brown, all surfaces glossy; antennal apices and cerci not contrastingly pale. Color details (in alcohol): Cranium translucent gold, brain and muscles visible through surface, otherwise lacking pattern. Antennae medium mahogany brown from base to subapex, thence becoming tan distad; 16-segmented. Labrum yellow; mandibles amber; other mouthparts tan, apices of maxillary palpi red mahogany brown. Prothoracic and cervical sclerites amber; pronotum more brownish; acrotergite 1 translucent pale amber; surrounding membrances pale, transparent. Sclerites of remainder of thorax and abdomen shades of mahogany brown, all membranes cream white, color of abdomen increased by reddish brown subdermal tissue. Legs largely pale yellow, fore tarsi and hind femora more brownish. Cerci dark reddish brown. Body length 9.5 mm.

Paratypes and parallotypes.—A few topotypic adults deposited in CAS, USNM and MNP.

Biology.—As described in the generic discussion.

Genus *Ambonembia* Ross
new genus

Type species.—*Ambonembia incae* Ross, new species by present designation.

Distribution.—Peru (central Andean altiplano) and yungas of Bolivia.

Name basis.—Greek *ambon* (ridge) in refer-

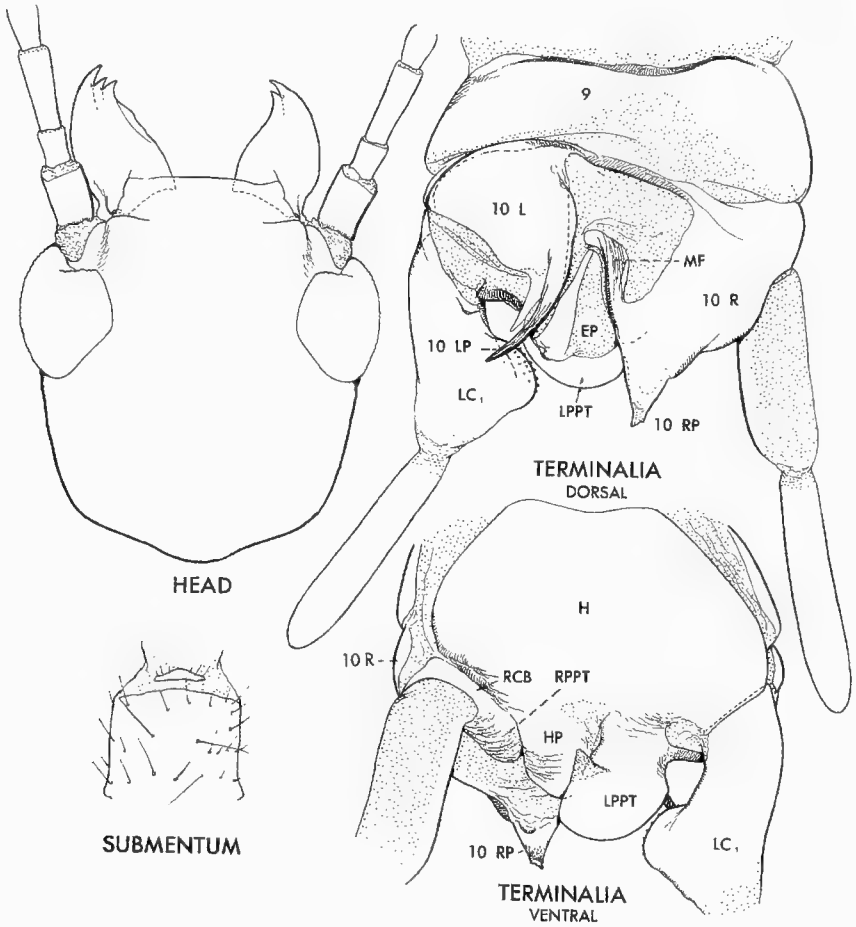

FIGURE 31. *Aphanembia obscura* Ross, n. gen and n. sp., holotype. Type locality: 67 mi. E. of Tingo Mariá, Peru.

ence to elevated, carinate surface of left hemitergite.

Diagnosis.—Males: Medium sized (body length averaging 12 mm), alate; uniformly dark brown except for darker terminalia. Cranium oval, eyes small; antennae uniformly brown to apex; mandibles with well-spaced, large apical teeth; submentum quadrate, sides straight, parallel, anterior margin unsclerotized, not inflexed. Hind basitarsus with a large, medial papilla. Terminalia's tenth tergite broadly cleft to base. Left hemitergite (10 L) strongly ridged, or diagonally carinate, continuously with base of its process (10 LP) which terminates with a talon-like inner process and an outer semitranslucent flange. Inner margin of 10 R blending to membrane, caudally tapered and terminated in a small sclerotic hook. Medial flap (MF) obsolete, represented only by wrinkles in cleft membrane which lacks a microspiculated depression. Epiproct sclerite (EP) narrow basally, flared caudad. Left paraproct (LPPT) large, darkly sclerotized along contact with side of HP; inner caudal angle with a small, sclerotic point, this point and caudal margin of LPPT not microspiculated. Lobe of left cercus (LC_1) very large, densely echinulated. Basal segment of right cercus extensively membranous on outer side. Apical segments of both cerci weakly sclerotized.

Discussion.—*Ambonembia* is somewhat related to *Malacosembia,* as suggested by its obsolete medial flap. Males differ in the following characters: *Ambonembia* eyes small, interspace five eye-widths. *Malacosembia* large eyes, interspace one eye-width. Left hemitergite (10 L) diagonally carinate in *Ambonembia*, flat in *Malacosembia*; 10 LP and 10 RP very distinct, as figured. Epiproct (EP) well developed in *Ambonembia* but not in *Malacosembia*, or only membranous with caudal margin

of LPPT smooth in *Ambonembia,* entirely microspiculate with inner caudal angle lobed in *Malacosembia*, instead of a sharp point.

The following two very distinct species are assigned to this genus. Future studies, hopefully based on knowledge of more new species, may indicate that the two are not congeneric. Among many distinctions, those of the left tergal process are most striking.

Ambonembia incae Ross
new species

(FIGURE 32)

Holotype.—Male, on slide, CAS. Data.—Peru: Sacsahuaman (Inca ruins), near Cuzco. Colonies in trail bank crevices in grassy area. Matured in culture March, 1983 (E. S. Ross).

Description.—Appearance: Moderately large (body length 12.0 mm), alate; generally dark chocolate brown, including all appendages. Color details (in alcohol): Cranium dark chocolate brown; vertex pattern lighter brown, indistinct; clypeus and interocular area darkest; venter of cranium paler due to larger, more distinct pattern; luster dull. Eyes as dark as cranium, almost black. Antennal scape dark brown; flagellar segments at first golden brown, thence becoming darker distad, apicals dark brown; twenty-three segments in complete antennae. Labrum dark brown, clypeo-labral membrane dark lavender gray; mandibles dark brown, other mouthparts medium brown. Prothorax and its pattern concolorous with cranium. Pterothorax generally chestnut brown with margins and sutural areas dark chocolate brown, all membranes lavender gray. All legs varied shades of chestnut brown. Abdomen essentially concolorous with pterothorax, terminalia darker; basal segments of cerci dark brown, distal segments chestnut brown. Dimensions on slide: Body length 12.0 mm, forewing length 7.2 mm, breadth 9.0 mm.

Anatomical features.—As illustrated. Particularly significant is the left hemitergite (10 L) which is longitudinally elevated and depressed in the medio-basal corner. Its process (10 LP) composed of a narrow, tapered, sinuous, inner talon and a broad, poorly defined, somewhat fleshy outer flange. Right hemitergite (10 R) lacks a medial flap or sclerotized inner margin; its process is a sharp, tapered talon curled downward, scarcely visible from above. Lobe of left cercus very large, bulbous, densely, microechinulate.

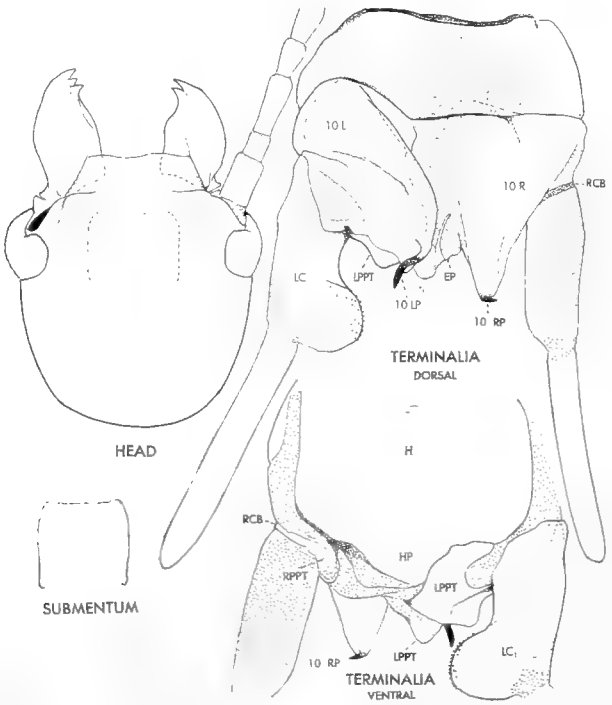

FIGURE 32. *Ambonembia incae* Ross, n. gen and n.sp., holotype. Type locality: Cuzco, Peru.

Paratypes.—Eight males deposited in CAS, USNM and MHNP.

Female.—No specimens. It is safe to assume that females are uniformly brown, including all appendages.

Ambonembia adspersa (Enderlein)

new combination

(FIGURE 33)

Embia adspersa Enderlein, 1909:185.—Krauss, 1911:669.—Navás, 1918:103.

Rhagadochir adspersa (Enderlein), Enderlein, 1912:58.

Pararhagadochir adspersa (Enderlein), Davis, 1940a:188.—Ross, 1944:434. (both after Enderlein).

Type.—Male, on slide, Polska Academia Nauk, Warsaw.

Type labels: "Bolivien Prov. Sara, Steinbach S." (green label), "*Embia adspersa* Enderl. Male Type det. Dr. Enderlein."

Locality interpretation.—Prov. del Sara is the old name of Prov. Gutiérrez, Dept. Santa Cruz, about 100 km NW of Santa Cruz de la Sierra, Bolivia.

Condition.—Originally on pin, with head, prothorax and forelegs missing, terminalia smashed on slide. I carefully transferred the fragments into balsam on a slide (coverslip supported). Due to Enderlein's poor slide preparation, the ninth sternite and tenth tergite are badly fractured and structures distorted in position.

Redescription.—Appearance: Large, wings extensive; medium brown. Color details (dry): Head and prothorax lost, but according to Enderlein, the head is dark brown with black eyes. No mention of a distinctive prothoracic coloration was made so it is assumed that the thorax was entirely dark chestnut brown laterally and ventrally and pale chestnut brown dorsally. Mid and hind legs medium chestnut brown with tarsi appearing golden due to color of dense setae. Abdomen dark chestnut brown. Wings light brown; hyaline stripes broad, margins indistinct; veins very straight, simple; cross-veins inconspicuous; two between RBS and RP, one subapical between RP and MA, none between MA_{1+2} and MA_{3+4} and one between stem of MA and base of MP. Hind basitarsi with second papilla in distal third. Tenth tergite broadly cleft but not quite to basal margin. Left hemitergite (10 L) inflexed and sclerotic only along outer-basal margin; longitudinally elevated. Base of process (10 LP) constricted, longitudinally sulcate; expanded distally with an inner, broad-based talon, curved outward at 90° and an outer-ventral, membranous, microspiculate, rounded lobe. Right hemitergite (10 R) triangulate, inner margin weak; bearing a short, claw-like process (10 RP), directed downward (this may be a stub of a broken-off longer process). Medial flap absent. Epiproct sclerite (EP) very narrow basally, broadly expanded caudad. Hypandrium (H) evenly sclerotized, margins weak, more sclerotic across the base of its extremely short process (HP) which is membranous along its caudal margin. Left paraproct (LPPT) very large, triangulate; sclerotic along its inner-basal margin which is fused to the hypandrium; extremities of its unlobed caudal margin minutely produced, the outer one microspiculate. Basal segment of left cercus well sclerotized; apical lobe an elongate cone densely micro-echinulate on inner surface. Basal segment of right cercus small, desclerotized on all but inner surface.

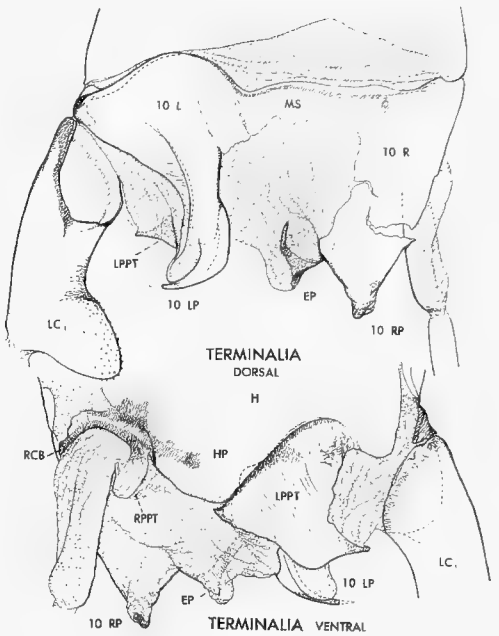

FIGURE 33. *Ambonembia adspersa* (Enderlein). Type. Type locality: Santa Cruz region, Bolivia.

Female: Unknown. Coloration probably similar to that of males.

Discussion.—This distinct species is known only from its holotype. Placement of the species in *Pararhagadochir* was erroneous on the basis of many characters, such as: the soft, not sclerotic

submentum; the obsolete medial flap and the absence of microspiculations in the membrane of the medial cleft.

Genus *Malacosembia* Ross
new genus

Type species.—*Malacosembia tucumana* Ross, n. sp., by present designation.

Distribution.—Argentina (Tucumán region), Bolivia (Santa Cruz region).

Name basis.—Greek *malacos* (soft) in reference to overall weak, or soft, body integument.

Diagnosis.—Males: Size medium to small (body length 7 to 10 mm), alate; generally medium brown to pale amber with slightly darker head and terminalia. Head, wings and hind basitarsi as in *Ochrembia* except for antennae which are not white-tipped. Terminalia's tenth tergite broadly cleft to base. Left hemitergite (10 L) about as long as broad, its base extended beneath caudal edge of ninth tergite (9); caudal margin weakly sclerotized; surface relatively flat. Process (10 LP) broad-based, arising from inner-caudal portion of 10 L; with a short, talon-like, sclerotic, inner portion and a narrow, flap-like, weakly-sclerotized, outer appendix. Inner-basal side of right hemitergite (10 R) weak; process (10 RP) an abruptly narrowed "talon" projected ventrad. Medial flap entirely absent. Epiproct (EP) obscure, its sclerite faint, if at all visible. Left paraproct (LPPT) with caudal margin almost straight, microspiculate on inner half, with a small acute point on inner corner and a lesser, blunt point on outer corner. Basal segment of left cercus with a prominent, echinulate, inner lobe.

Females: With pale coloration of males, without white-tipped antennae. With two hind basitarsal ventral papillae.

Discussion.—Although the left tergal process is somewhat similar to that of some species of *Pararhagadochir*, *Malacosembia* is not closely related. It is most closely related to *Ochrembia* but easily distinguished by its bifid, shorter, left tergal process; the absence of a globose, finely-echinulate nodule on the caudal margin of the left paraproct and other terminalia characters. The absence of white apical antennal segments may also be a consistent character in both sexes.

Component species.—Because *M. tucumana* is represented by the largest series of both sexes, it is selected as the type species of the genus. I also collected a closely related new species, *M. yungae*, near Santa Cruz, Bolivia.

Malacosembia tucumana Ross
new species
(FIGURE 34)

Holotype.—Male, on slide, Instituto Miguel Lillo, Argentina. Data.—Argentina: Tucumán, matured in culture August 24, 1964 (E. S. Ross).

Description.—Appearance: Moderately large, winged; mottled, medium brown throughout with darker head; body weakly sclerotized. Color details (alive): Cranium basically pale tan but heavily tinged with granular, subcutaneous dark brown, forming a definite dorso-basal pattern; ventrally paler. Eyes blackish lavender, darker than cranium. Basal segment of antenna dark brown, other segments light tan; segments beyond 16 broken off (22 when complete). Mandibles pale amber with red amber inner-apical margins; other mouthparts tan with distal palpal segments darkest. Submentum and mentum weakly sclerotized; subcutaneously, granular rust brown. Remainder of insect, including legs and membranes, basically cream yellow to tan but all dorsal sclerites appear darker due to granular, rust brown tinge; pronotum and propleurae darkest; ventral sclerites pale tan with thoracic sternites evenly light brown; all leg segments uniformly light brown. Wings pale tan with broad hyaline stripes having ragged margins; costal and RBS borders pink. Terminalia concolorous with abdomen, talon-like portions of tergal processes reddish amber; microspiculate caudal lobe of left paraproct clear yellow amber. Dimensions (on slide): Body length 10.6 mm; forewing length 7.5 mm, breadth 2.0 mm.

Important integumental characters.—As figured. Of special importance are size, form of tergal processes and the shapes of the lobes of the caudal margin of the left paraproct. Paratypes with complete antennae indicate that the segment number is 22 and that the apical segments are concolorous with other flagellar segments.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Medium sized, golden brown with cream white intersclerotal membranes (superficially resembling females of

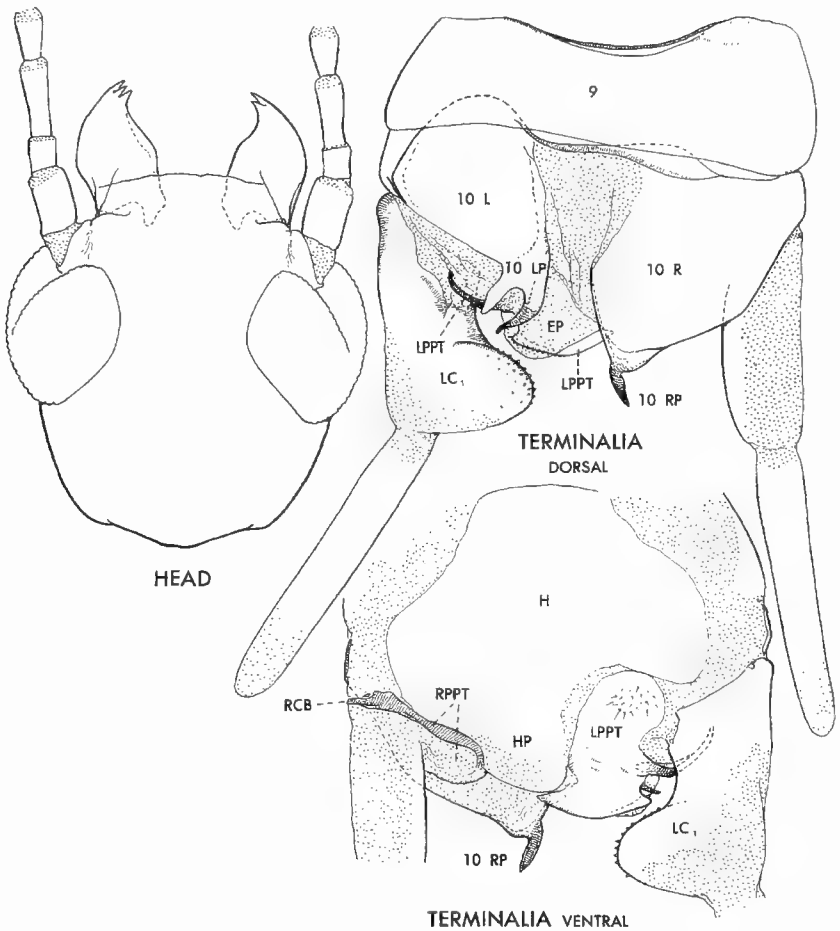

FIGURE 34. *Malacosembia tucumana* Ross, n. gen. and n. sp., holotype. Type locality: Tucumán, Argentina.

Oligotoma). Color details: Cranium basically golden but mottled with rust brown, producing a symmetrical vertex pattern. Eyes jet black. Basal antennal segment pale amber; other segments paler amber, distals becoming darker; 20-segmented. All dorsal body sclerites concolorous with cranium, extensively darkened by subcutaneous rust-brown; intersclerotal membranes and entire venter transparent cream white—revealing internal organs. Legs pale amber becoming darker distad. Cerci mottled with rust-brown. Body length: 10.5 mm.

Paratypes and parallotypes.—Large series from type culture deposited in CAS, IFML, MZUSP, USNM, BMNH.

Additional records (IFML): Several very damaged males from Cañete, Prov. Tucumán 14-X-1965 (EB 451). Tucumán, on citrus bark, X-11-65 (R. Goldbach).

Discussion.—*Malacosembia tucumana* has a close relative in Bolivia and it is expected that additional congeners will be discovered in neighboring regions, such as Paraguay.

Biology.—*Malacosembia tucumana*, collected on the bark of shade trees within the city of Tucumán, probably occurs on native trees in the immediate vicinity. Bark flakes and crevices serve as retreats. It is assumed that this widespread habit within the order applies to other species of the genus. The pale color and large eyes indicate that dispersal is nocturnal and that males are attracted to lights. Males matured in culture 749 from June to October, 1964.

Malacosembia yungae Ross
new species

(FIGURE 35)

Holotype.—Male, on slide, CAS. Data.—Bo-

livia: Montero, near Santa Cruz, matured in culture August 14, 1964 (E. S. Ross).

Name basis.—*Yungas* is the Indian name for a zone on the east slope of the Andes.

Description.—Appearance: Similar to *Oligotoma humbertiana;* medium sized, winged, golden brown throughout with gold head, antennae and eyes darker. Color details (alive): Cranium brilliant gold, lacking pattern, faintly tinged with granular rust red, rims of antennal sockets brown; ventrally straw yellow. Eyes blackish lavender. Antennae almost unicolorous chocolate brown; basal segment darkest, sub-basals lighter (segments beyond 14 are broken off). Mandibles straw yellow with piceous apical margins; submentum golden with brown lateral margins, outer mouthparts golden except for chocolate brown palpi. Thoracic sclerites various shades of light brown with piceous sutures and margins; dorsal and pleural membranes strongly rust red; ventral membranes golden due to color of fat visible beneath unsclerotized surfaces. All legs entirely tan, becoming somewhat darker distad. Wing bands light brown; hyaline stripes broad with margins dotted by circular pigmented spots at bases of macrotrichiae; all wing veins behind RBS, including cross-veins, pink; margins of RBS brighter pink, RP brown. Abdomen largely granular, rust red; tenth hemitergites dark brown, cleft membrane cream; hypandrium and paraprocts light brown; cerci rust red except for base and inner margins of basal segment of left cercus. Dimensions (on slide): Body length 7.5 mm, forewing length 6 mm, breadth 1.1 mm.

Important integumental characters.—As figured. Differs from *M. tucumana* in the more widely spaced, narrower forks of the left tergal process

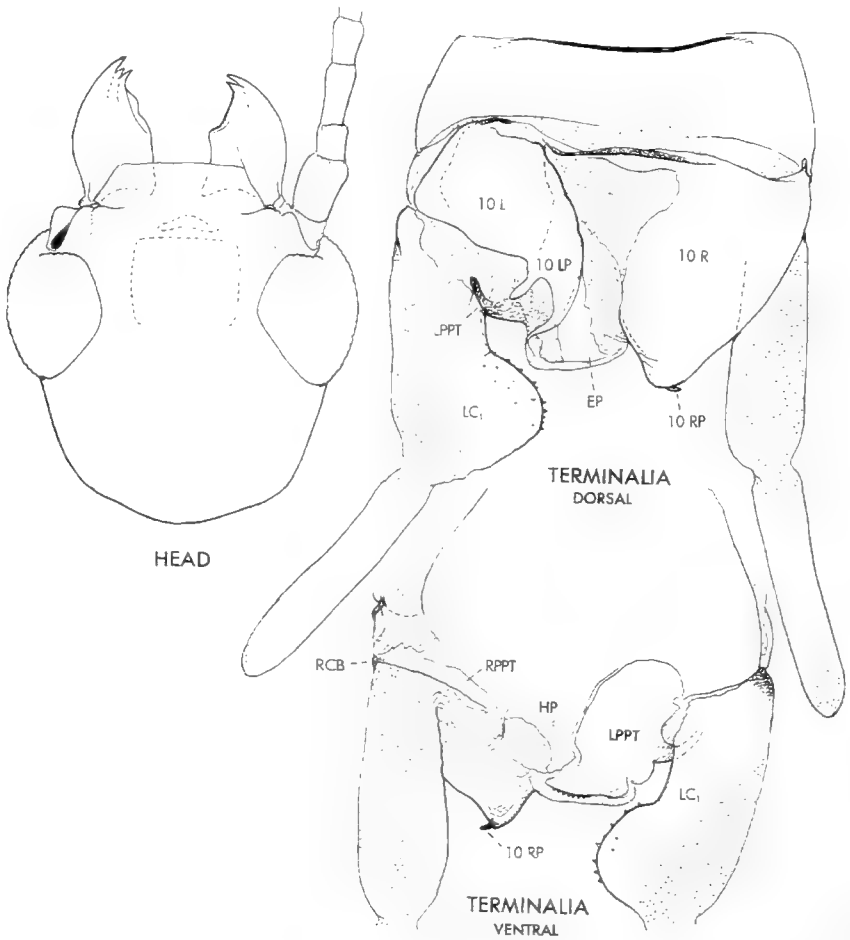

FIGURE 35. *Malacosembia yungae* Ross, n. sp., holotype. Type locality: Montero, near Santa Cruz, Bolivia.

(10 LP), the smaller right tergal process (10 RP) which is almost concealed from above by the rounded caudal margin of 10 R, the weak but discernable, broad epiproct sclerite (EP), the less acute inner process of the left paraproct (LPPT), and the more coarsely echinulate left cercus lobes. In addition, *M. yungae* is much smaller and overall more darkly pigmented than *M. tucumana*.

Allotype.—Female, in alcohol, CAS. Data.—reared in holotype's culture.

Description.—Appearance: Small, body length 7.5 mm; generally pale amber. Color details: Cranium amber yellow almost lacking pattern; translucent, brain visible between eyes; blackish at tentorial pits. Eyes black. Antennal segments amber except segments 4 and 5 and distals which are slightly paler, distal segment, the 20th, elongate, cream white at tip. Dorsal body sclerites and all legs varied shades of translucent amber; all membranous areas dark cream, almost concolorous with sclerites; abdominal somites 9 and 10 golden brown, their sternites and paraprocts pale amber; entire venter of specimen cream white. Cerci, including joints, mottled medium brown except for paler tip of apical segments.

Paratypes and parallotypes.—A series of both sexes reared in the same culture, deposited in CAS.

Discussion.—*Malacosembia yungae* is one of the smallest species of South American Embiidae. It has the general appearance of the pale species of Teratembiidae occurring in the Santa Cruz region of Bolivia. A comparison of my figures of its congener shows close relationships. From *M. tucumana, M. yungae* differs, as follows: one-third smaller size; overall darker pigmentation; forks of 10 LP smaller, narrower and more widely spaced; talon of 10 RP much smaller and almost obscured from above by the caudal margin of 10 R; and the epiproct sclerite of *M. yungae*, more apparent than that of *M. tucumana*, is unsclerotized.

Biology.—The type culture (C-777A) included a number of unrelated species webbing the under surfaces of logs and branches on leaf litter in thinned natural forest behind the agriculture college at Montero. Conditions prevailing in 1964 may be considerably changed today.

Genus *Ochrembia* Ross
new genus

Type species.—*Embia wagneri* Navás, 1923, by present designation.

Distribution.—North-central Argentina and south-central Bolivia (three records).

Name basis.—Greek *ochros* (pale yellow, sallow) in reference to the pale coloration of the type species.

Diagnosis.—Males: Moderately large (body length averaging 11 mm), alate; almost unicolorous, pale, yellow tan. Cranium large, broad; eyes exceptionally large, inflated, interspace less than one eye-width; antennae white-tipped; mandibles normal, teeth of left mandible equal in size; submentum weakly sclerotized, anterior margin not inflexed. Wings large, broad; hyaline stripes broad, their margins irregular; veins not straight, curved toward contacts with cross-veins; cross-veins numerous—3 between MA and MP. Hind basitarsus with two ventral papillae. Tenth tergite broadly cleft to basal margin. Left hemitergite (10 L) narrowly transverse, caudal margin weak, basal margin inflexed; cleft membrane extended leftward behind basal margin; its process (10 LP), an extension of inner side of 10 L, is arcuated caudad as a large, sclerotic, almost simple process (10 LP), its outer appendix, or flange, a tiny sliver, is almost completely invisible. Right hemitergite (10 R) with inner-basal margin obsolete, blending into cleft membrane; caudal margins sclerotized; process (10 RP) abruptly formed as a narrow, outwardly and ventrally-angled spine which is subtended by a small membranous lobe. Medial flap (MF) obsolete, represented only by a weak membranous wrinkle. Epiproct (EP) not prominent; its sclerite faint, but broad, almost horizontal (90° to axis of insect); left portion (beneath basal arc of 10 LP) inflated, densely microspiculate. Hypandrium lobe (HP) short, broad, truncate. Left paraproct (LPPT) with a prominent, broad, submembranous, caudal lobe which is densely microspiculate. Basal segment of left cercus with a very large, broadly-rounded, densely echinulate inner lobe. Basal segment of right cercus almost entirely without sclerotization.

Females: Unknown. Undoubtedly very pale in coloration.

Discussion.—From the only other South American genera with an obsolete medial flap, *Mala-*

cosembia Ross and *Ambonembia* Ross, *Ochrembia* is distinct in many characters—particularly in the almost simple, instead of conspicuously bifid, left tergal process. The genus is probably widespread in central and northern Argentina, as well as in southern Bolivia (east of Andes) and western Paraguay. Specimens from three widely scattered regions are remarkably similar. Those (CAS) from near Camiri, southcentral Bolivia have only a slightly distinct left cercus lobe. Pale color and large eyes suggests that the males disperse at night and that specimens collected to date were attracted to lights. Colonies of this genus should occur beneath coarse bark flakes and in crevices of tree trunks, and possibly beneath stones.

The poorly described type species is redescribed, from its holotype, as follows:

Ochrembia wagneri (Navás)

new combination

(FIGURE 36)

Embia wagneri Navás, 1924:13, fig. 3.
Embolyntha wagneri (Navás), Davis, 1940b:351, figs. 38–41.—Ross, 1944:413.

Holotype.—Male, on slide, deposited in the Museum National d'Histoire Naturelle, Paris. Labels.—"Embia Wagneri Nav. P. Navás S. J. det" (yellow) "Type" (printed, red), "Museum Paris Chaco de Santiago del Estero, Bords du Rio Salado La Palisa del Bracho 25 kil. N.O. D'Icaño E R. Wagner 1909."

Condition.—Excellent except for loss of hind legs. Originally on pin, now mounted (by Ross) in balsam on slide.

Description.—Appearance: Rather large, slender, large-winged; generally pale brown to tan in color. Color details (dry): Cranium pale brown, without distinct pattern; eyes black; basal antennal segment concolorous with cranium, basal flagellar segments pale tan, distals becoming medium brown except for 3 white apical segments (26 segments in complete antenna). Thorax, legs, and abdomen concolorous with cranium; wings pale tan with broad, weakly-defined hyaline stripes. Dimensions (on slide): Body length 11.5 mm; forewing length 9.25 mm, breadth 2.25 mm.

Important integumental characters.—Cranium short, broad; caudal margin indented on each side. Eyes very large, as long as head-sides behind eyes and broader than the cranial interspace. Mandibles small, oligotomoid; dentations acute, well-spaced; apical tooth on same plane as others, middle tooth of left mandible almost as large as the basal. Submentum quadrate weakly sclerotized, no inflexed margins. Terminalia, except for processes and lobes, weakly sclerotized. Left hemitergite (10 L) with outer and caudal margins weak, inner-basal margin inflexed; process (10 LP) abruptly sclerotic, conspicuous, darkly pigmented, long, slender, parallel-sided until twisted at apical third; arcuated at base, then becoming straight. Right hemitergite, (10 R) weakly margined except caudally, mesobasal side blending into cleft membrane; its process (10 RP) a narrowly-tapered, sclerotic spine directed latero-ventrad. Medial flap (MF) obsolete, simply a membranous fold angled leftward into cleft. Epiproct (EP) large but obscure, its sclerite horizontal, weakly sclerotized; membranous surface partially microspiculate. Left paraproct (LPPT) weak at base, increasingly sclerotized caudad; caudo-ventral margin bearing a low, broadly-rounded, microspiculate nodule. Lobe of left cercus large, broadly expanded, surface densely echinulate.

Additional records.—Argentina: "Ing Juarez,

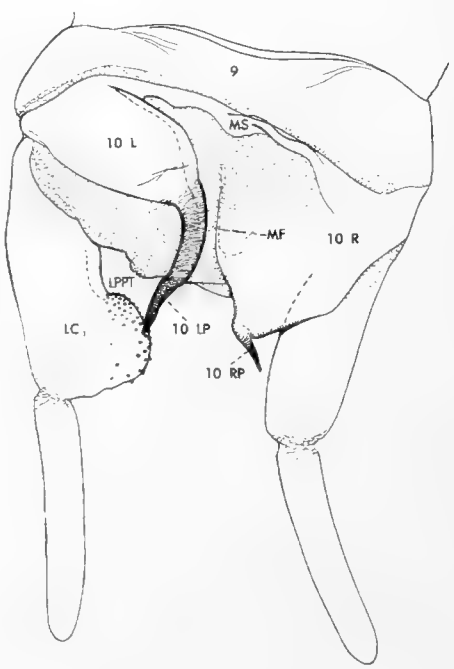

FIGURE 36. *Ochrembia wagneri* (Navás), type. Type locality: 25 km NE Icaño, Santiago del Estero, Argentina.

Formosa 2–7-I-1948 (R. Goldbach)." 1 male in Inst. Miguel Lillo, Tucumán. This specimen agrees closely with the above type but differs in having the left and caudal margins of 10 L well sclerotized and in the finer, more evenly and denser echinulation of the left cercus lobe. Bolivia: San Antonio de Parapeti, Rio Parapeti (near Camiri) 1–5-IX-1964, at light (B. Malkin), 3 males, CAS. These males closely resemble the above specimen except for the straight, slanted, basal side of the left cercus lobe with its more coarse echinulation.

Mesoamerican and Mexican Scelembiinae

Except for human-introduced *Pararhagadochir trinitatis* (Ross, 1992:124), the Embiidae of these regions have peculiar characters found in no South American genus. These include a basal, or no lobing, or acute, non-echinulate distal lobing of the left cercus. One is tempted to speculate that distinctions evolved during the long period in which the North and South American continents were separated.

Because the North American genera were extensively treated in my Mexican paper (Ross, 1984), the following treatments are brief. My 1984 figures of the male terminalia are republished for the reader's convenience.

Genus *Neorhagadochir* Ross

Neorhagadochir Ross, 1944:418; 1984:4.—Szumik, 1966:55; 1998:141 (in a cladogram).

Type species.—*Neorhagadochir inflata* Ross, 1944, by original designation.

Distribution.—Southern Mexico to Costa Rica.

Discussion.—This important genus is divided into subgenera: *Neorhagadochir*, s. str., for *N.* (*N.*) *inflata* Ross and *Drepanembia* Ross for a complex of species related to *N.* (*D.*) *salvini* (McLachlan). The two subgenera are readily distinguished by the length and shape of the left tergal process and many other characters.

Neorhagadochir (*N.*) *inflata* Ross

(FIGURE 37)

Neorhagadochir inflata Ross, 1944:419; 1984:5.

Holotype.—Male, on slide, USNM. Data: Guatemala: Cayuga, V-15 (Wm. Schaus). This locality is in the lower Montagua Valley.

Discussion.—Until very recently this easily recognized species was known only from its holotype, probably collected at light. Dr. Peter W. Kovarik collected five males at light in Belize, Orange Walk, Distr. Rio Bravo during April 1995 and permitted me to retain them in CAS.

Subgenus *Drepanembia* Ross

Neorhagadochir (*Drepanembia*) Ross, 1984:5.

Type species.—*Embia salvini* McLachlan, 1877, by original designation.

Distribution.—Southern Mexico to Costa Rica.

Neorhagadochir (*D.*) *salvini* (McLachlan)

(FIGURE 38)

Embia salvini McLachlan, 1877:380.—Enderlein, 1912:51.

Embia (*Olyntha*) *salvini* McLachlan, Hagen, 1885:198.

Olyntha salvini (McLachlan), Krauss, 1911:31.

Embolyntha salvini (McLachlan), Davis, 1940b:349.

Neorhagadochir salvini (McLachlan), Ross, 1944:419; 1984:6.

Haploembia neosolieri Mariño and Márquez, 1983:51, **new synonym.**

Holotype.—Male, BMNH. Data: Guatemala: "Chinuatta," 4100 ft (Salvin). The type locality is a suburb of Guatemala City.

Discussion.—I have cultured extensive series of *Drepanembia* from various localities in southern Mexico, and, during a trip by road, to the subgenus' southernmost known occurrence in Costa Rica. Included is a series from *N.* (*D.*) *salvini's* type locality in Guatemala. These series indicate that the subgenus comprises a complex of species or subspecies, without striking terminalia distinctions but which have differences in size, degree of apterism and coloration. For example, two unusual lots from seasonally arid Nicaraguan localities are subterranean and have pale amber coloration in both sexes. Intensive study based on these and other large, cultured series will be needed to properly treat the systematics of this subgenus.

The description of well-figured *N.* (*D.*) *salvini* (by Ross, 1984, and by Davis, 1940b), as a new

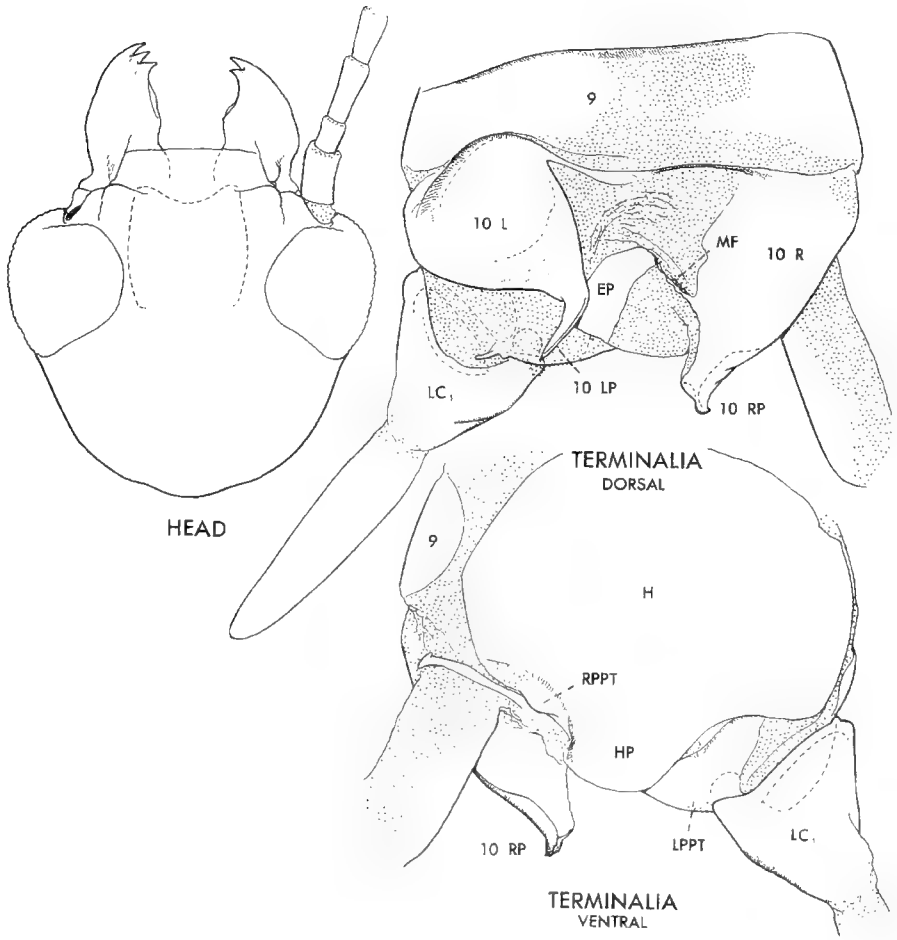

FIGURE 37. *Neorhagadochir* (*Neorhagadochir*) *inflata* Ross, holotype (after Ross, 1984). Type locality: Cayuga, Montagua Valley, Guatemala.

species of the Old World genus *Haploembia* by Mariño and Márquez (1983) is most surprising.

Genus *Brachypterembia* Ross

Brachypterembia Ross, 1984:7.—Szumik, 1998:141 (in a cladogram).

Type species.—*Brachypterembia moreliensis* Ross, by original designation.

Distribution.—Mexico: Pine-oak zone of mountains SE of Morelia, Michoacán, 8000 ft. elev.

Discussion.—This monotypic genus is readily recognized by its short wings (it is expected that normal winged males may occur in other localities), its long, sickle-shaped left tergal process and the conical basal segment of the left cercus which lacks a definite lobe and echinulations.

Brachypterembia moreliensis Ross

(FRONTISPIECE and FIGURE 39)

Brachypterembia moreliensis Ross, 1984:7.

Holotype.—Male, on slide, CAS. Data: Mexico: Parc Nac. José Maria Morelos, 14 mi. SE Morelia, 8000 ft. elev. (E. S. Ross).

Discussion.—This distinct species is easily recognized by its generic characters and the figure of its terminalia. It occurs commonly under pine and oak bark flakes and loose bark of fence posts.

Genus *Conicercembia* Ross

Conicercembia Ross, 1984:10.—Szumik, 1998:141 (in a cladogram).

*Coniceremb*ia (sic), Szumik, 1996:55.

Clothoda Enderlein, Mariño and Márquez, 1987:64

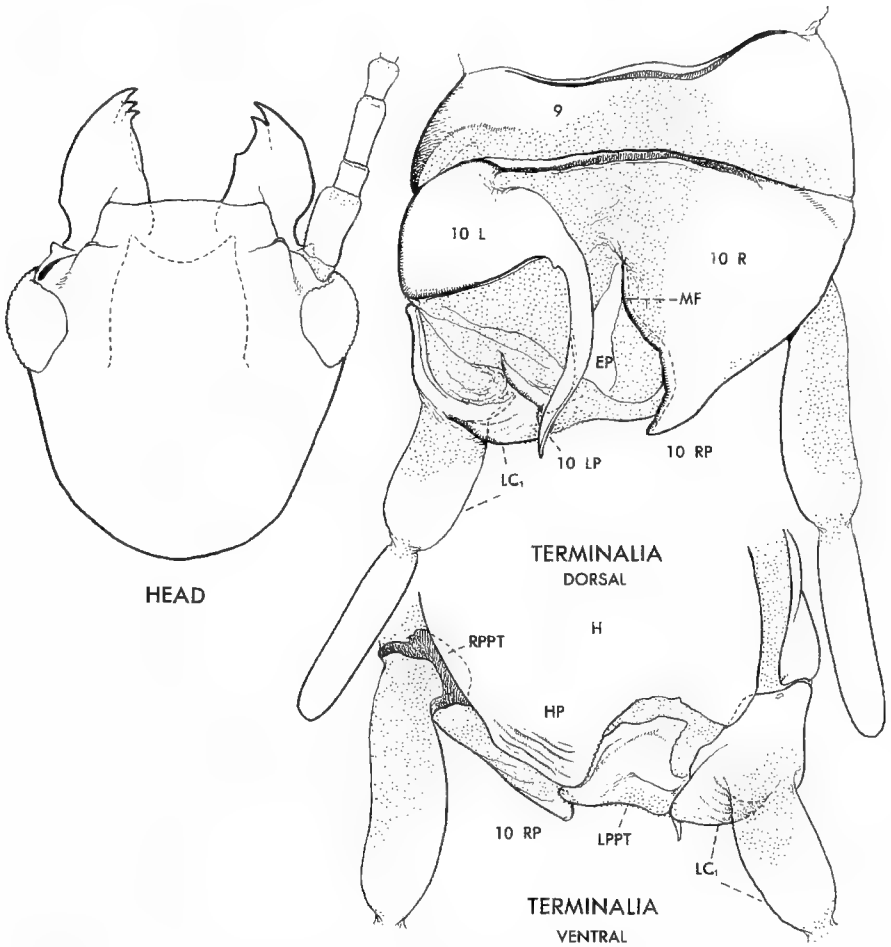

FIGURE 38. *Neorhagadochir (Drepanembia) salvini* (McLachlan), topotype (after Ross, 1984). Type locality: Chinuatta (Guatemala City), Guatemala.

Type species.—*Conicercembia tepicensis* Ross by original designation.

Distribution.—Mexico: Sierra Madre Occidental.

Discussion.—This is the only Mexican embiid genus with a distal inner lobe on the left cercus. However, it may not be a homolog of a lobe in this position elsewhere in Embiidae because the lobe lacks echinulations. In fact, there are no echinulations at all on the basal cercus segment, even on the slight swellings at its inner base.

The component species are very distinct; the type species having a sickle-shaped left tergal process and *C. septentrionalis* (Mariño and Márquez) having this process straight, and other distinctions.

Conicercembia tepicensis Ross

(FIGURE 40)

Conicercembia tepicensis Ross, 1984:11.

Holotype.—Male, on slide, CAS. Data.—Mexico: El Ocotillo, 3 mi NW of Chapalilla, Hyw. No.15, 4000 ft. elev. (E. S. Ross).

Discussion.—This species is readily identified by reference to the republished figure of the terminalia. The habitat is oak woodland. Most colonies were found under loose bark of freshly installed fence posts.

Conicercembia septentrionalis (Mariño-Márquez) new combination

(FIGURES 41A–E)

Clothoda septentrionalis Mariño and Márquez, 1988:64.

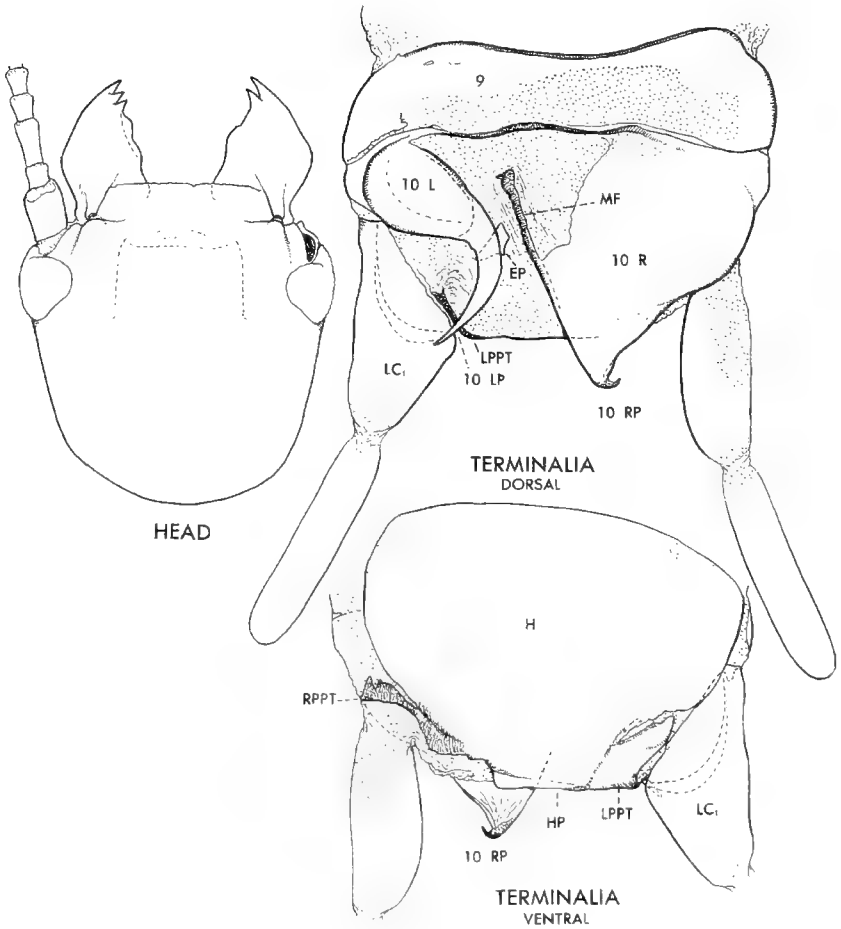

FIGURE 39. *Brachypterembia moreliensis* Ross, holotype (after Ross, 1984). Type locality: 14 mi SE Morelia, Mexico.

Holotype.—Male, IBUNAM. Data.—Mexico: Michoacan: km 37, camino Coalcomán – Las Nieves, 2050 m, 6 May 1983 (H. Brailovsky, E. Barrera and E. Mariño).

Unfortunately this species was described from a single male specimen with wing vein MP aberrantly forked instead of unforked. This seemingly plesiomorphic character probably caused the authors to assign their new species to the order's most plesiomorphic genus, *Clothoda* Enderlein. Actually, MP normally is simple in *Clothoda*, the multibranched cubitus being its most plesiomorphic venational character. In my many specimens of what may be *C. septentrionalis*, the forking of MP is variable, in some it is forked in the forewings of a specimen but not in its hind wings. It may even be forked or unforked in the left or right wings of a single specimen.

I have decided that *Clothoda septentrionalis* should be placed in *Conicercembia* Ross. It is very distinct, however, from *C. tepicensis*, the type species of this genus, as evidenced, for example, by the almost straight left tergal process (10 LP) and its more elongate, narrowly-acute right tergal process (10 RP). Additionally, a broad well-sclerotized epiproct sclerite (EP) is present in *C. tepicensis*, whereas in *C. septentrionalis* this sclerite is almost obsolete, being represented only by a minute spine beneath 10 LP.

Series of both sexes were reared from females and brood collected in two localities in pine-oak zones of Mexico's Sierra Madre Occidental. The largest series is from Puerto de Mazos, 1035 m elev. (crest of pass), about 8 miles SW of Autlán (Hyw. 80), Jalisco (Figs. 41A, B, D). A smaller series was reared from stock collected about 5 miles

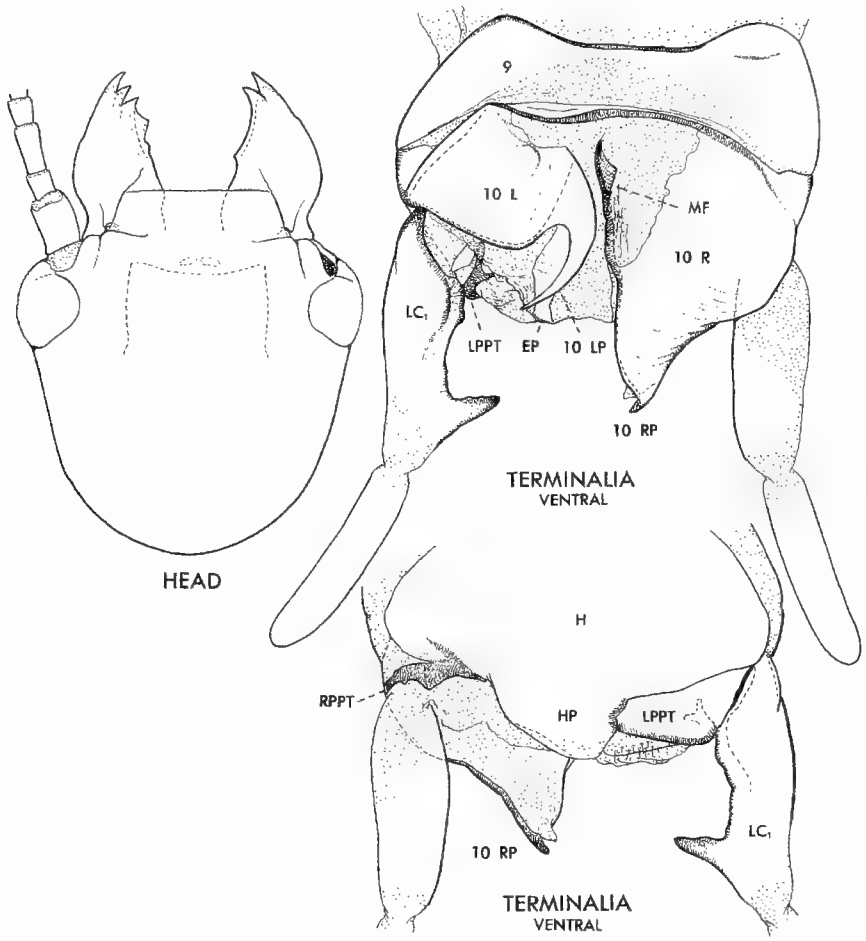

FIGURE 40. *Conicercembia tepicensis* Ross, holotype (after Ross, 1984). Type locality: 3 mi NW Chapalilla, Tepic, Mexico.

S. of Tecalitlán (Hwy. 110), 1240 m. elev., Colima (Figs. 41C, E). Adults in both cultures matured during May. Both occur on oak and pine bark, especially beneath loose bark on fence posts. Each colony consisted of a female and her brood of early instar nymphs.

It is possible that these two series represent distinct species, as well as being distinct from *C. septentrionalis*. As figured, there are slight distinctions in the shape of tergal processes and the left cercus lobe. The submentum of Puerto de Mazos males is broader than long (that of Tecalitlán males quadrate), the scape and basal antennal segments and mandibles are amber in the former, dark brown in the latter. More collecting in the Sierra Madre Occidental may reveal existence of a complex of closely related species and races. I have taken the conservative approach and regard specimens from all three localities as representation of one variable species.

INCERTAE SEDIS

Embia (*Olyntha*) *mulleri* Hagen

Embia (*Olyntha*) *mulleri* Hagen, 1885:206—Krauss, 1911:32.—Enderlein, 1912:52.—Navás, 1918:102.—Davis, 1940b:352.—Ross, 1944:497 (as unrecognizable).

Type.—Mature female, dry and crushed, MCZ.

Type labels.—"Type 156" (red label), "Embiden Larve," "Itajahy Brazil 1879 Fr. Mueller." "Itajahy" undoubtedly is the costal town of Itajai, state of Santa Catarina.

Description (based on my examination).—Entire (dry) specimen black except for a narrow, whitish band between each thoracic somite. Crani-

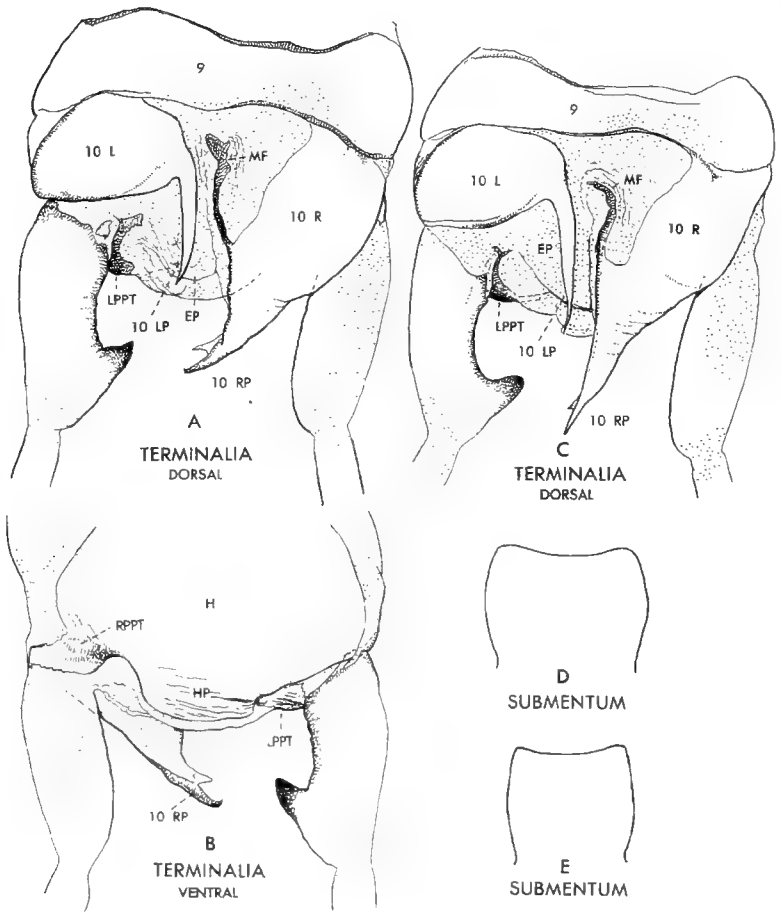

FIGURE 41. *Conicercembia septentrionalis* (Mariño and Márquez). Type locality: km 37, camino Coalcomá-Las Nieves, Michoacan, Mexico. Figures are of specimens from northern localities: Figs. 41A, B, D based on specimen from Puerto de Mazos, 8 mi SW Autlán, Jalisco; Figs.41C and E based on specimen from 5 mi. S. Tecalitlán, Colima.

um broad, circular, rugulose in clypeal region, entire surface microrugose, dull, vestiture cream white. Eyes, antennae (only nine segments present), and palpi concolorous with cranium. Preclypeal membrane paler than cranium. Body sclerites rather smooth, glossy black; meso- and meta-scuta finely rugose medially; body pubescence pale yellow. All legs unicolorous, dark brown, concolorous with body; hind basitarsi with chestnut brown plantar setae, second tarsal papilla not clear in the dry specimen but probably present; terminal hind tarsal segment black but abruptly golden in apical fifth, claws gray white except for dark brown distal third. Genital sternites nearly concolorous with other abdominal sternites. Cerci uniformly black. Body length: 15 mm.

Discussion.—During early 1999 I attempted, without success, to collect and culture topotypic specimens of *E.* (*O.*) *mulleri.* However, because the type locality has greatly changed during more than one hundred years since the type was collected, it may no longer be collected. It is also possible that the name "Itajai" may represent a region, not the town.

It is likely that the species, or close relatives, may have wide distribution in SE Brazil for I collected females almost identical to the type of *E.* (*O*) *mulleri* west of Curitiba but to date no males have matured in the culture. Unfortunately, the culture is diseased for males upon becoming penultimate fail to complete development. Through the transparent derm of one dead male nymph, adult terminalia structures are visible, yet distorted. These structures show that the species is generically distinct.

The locality is on PR376 near São Luis Purunã, Balsa Nova, about 25 km W of Curitiba, 1100 m. Colonies were rare in shale crevices in a high cliff opposite a fruit stand. Because of the much higher altitude, it is possible that the species isn't *E. (O) mulleri,* but almost certainly it is congeneric.

Similar females (CAS) were collected near Nova Teutonia, Santa Catarina, by Fritz Plaumann.

Pachylembiinae Ross
new subfamily

Type genus.—*Pachylembia* Ross, by present designation.

Distribution.—Mexico: Sierra Madre Occidental.

Diagnosis.—Males apterous, nymphaform; cranium oval, eyes small, mandibles coarsely dentate on a single plane; submentum sclerotic, sides and anterior margin inflexed. Hind basitarsus stout, with two papillae, setae dense. Basal margins of abdominal terga 7 to 9 with increasingly large lateral apodemes. Tergite 10 transverse, broadly cleft; basal cleft margin narrowly sclerotized. Sclerotized, margins of left hemitergite (10 L) inflexed, especially the posterior which projects caudad; very densely clothed with large setae which gradually decrease in length caudad while becoming increasingly erect and stiff. Left process (10 LP) very small, needle-like; at times entirely concealed beneath projected meso-caudad margin of 10 L. Right hemitergite (10 R) very broad, caudal two-thirds densely clothed with caudally-slanted setae, with a large portion of its surface depresssed, bearing very fine setae, or none. Right process (10 RP) usually spatulate and distally rounded; talon and its subtended nodule absent. Medial flap (MF) a diagonal, sclerotic "rod"; adjacent cleft membrane lacking a microspiculate depression. Epiproct sclerite (EP) broad, conspicuous. Hypandrium (H) very large, evenly sclerotized, lacking a process. Left paraproct (LPPT) membranous except for a narrow, medial sclerite. Basal segment of left cercus (LC_1) largely membranous, lacking an innner lobe; instead, bearing either a dorso-basal, small, partly membranous, nipple-like nodule directed upward, or a membranous triangular flap in this position.

Females.—Not investigated for subfamily characters.

Discussion.—Pachylembiine males differ from all other embiids in their minute, needle-like left tergal process, the abundance of short-to-long, erect setae on both hemitergites (10 L and 10 R), and several other features. It is likely that these dense setae help to prolong copulatory union in place of well developed processes and lobes.

The subfamily includes only its type genus which comprises five species.

Genus *Pachylembia* Ross

Pachylembia Ross, 1984:13.—Szumik, 1998:141 (in a cladogram).

Type species.—*Pachylembia chapalae* Ross, by original designation.

Distribution.—Mexico: Sierra Madre Occidental.

Diagnosis.—Characters of the subfamily.

Discussion.—All species occur under stones and leaf litter at higher elevations in the Sierra Madre Occidental. Because both sexes are apterous, it is likely that several difficult-to-define racial and species complexes exist. Important characters include coloration and dermal texture.

KEY TO SPECIES OF *PACHYLEMBIA*
(Males)

1. Right tergal process (10 RP) narrow, thumb-like. Basal segment of left cercus entirely membranous, dorso-basally bearing a broad, thin, leftward-folded flap ..... *taxcoensis*
— 10 RP broad, spatulate. Basal segment of left cercus only partially sclerotized, bearing dorso-basally a small, erect, nipple-like lobe 2
2. Thorax with only one narrow white band (on anterior margin of mesonotum) ..... *unicinta*
— Thorax with two white bands 3
3. Cranium and all body sclerites, especially of the thorax, dull jet black, microrugose .... *autlanae*
— Cranium and body dark brown, surface smooth, rather glossy 4
4. Relatively large (body length averaging 13.0 mm). Always uniformly dark brown. Hemitergites (10 L and 10 R) very densely setose, including entire caudal half of 10 R. Basal segment of left cercus tapered caudad, its inner side straight ..... *chapalae*

— Relatively small (body length averaging 10.0 mm). Body pigmentation variable (about 25% of type population with cranium, mandibles and submentum orange). Basal segment of left cercus short, globose, inner side aracuate ..... *colimae*

Pachylembia chapalae Ross

(FIGURE 42)

Pachylembia chapalae Ross, 1984:16.

Holotype.—Male, on slide, CAS. Data.—Mexico: Michoacan, 4 mi. NW of Sahuayo (E. S. Ross).

Discussion.—This species, occurring in the vicinity of Lago Chapala, is fully treated in the original reference. Distinguishing features of males include light to dark mahogany brown coloration, rather glossy surface texture; acrotergite 1 pale yellow or chestnut; acrotergite 2 dark mahogany brown; head never golden; submentum very dark, poststerna blackish brown; antenna 28 segmented; 10 L setae very dense, erect, much shorter and thicker on caudal margin which is very sclerotic and projected; 10 R longitudinally depressed in inner caudal area, this surface with very fine setae, or none.

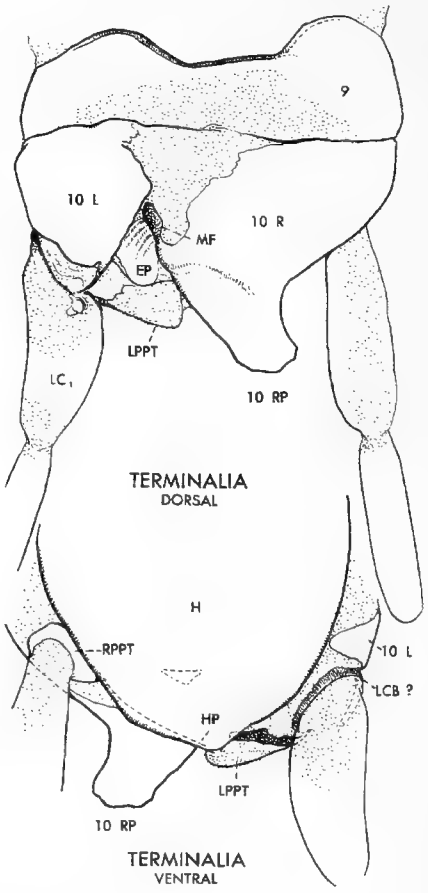

FIGURE 42. *Pachylembia chapalae* Ross, holotype (after Ross, 1984). Type locality: near Sahuayo, Michoacan, Mexico.

Pachylembia autlanae Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: NE of Autlán (on hyw. 80) at junction of access road to Microndas San Francisco, Jalisco, 1025 m; matured in culture 5-I-90 (E. S. Ross).

Description.—Appearance: Rather large, apterous; entirely dull black except for two very narrow, white thoracic bands. Color details (in alcohol): Cranium very dull black, lacking pattern; clouded golden mahogany brown ventrally. Basal antennal segments dark mahogany brown, other segments to apex (segment 28) lighter mahogany brown. Labrum and mandibles blackish brown, other mouthparts mahogany brown except submentum which is blackish brown. All body sclerites, especially dorsally, lusterless dull black except acrotergite 1 which is brown, margined with golden brown; acrotergite 2 dull black. All body membranes very dark lavender except for a very narrow white band between each thoracic somite. All legs varied shades of dark, glossy, mahogany brown. Abdomen dull blackish brown except for slightly paler membranous areas, surface with a faint metallic-blue luster; cerci dark brown except for tan nonsclerotic surfaces, including tips of distal segments. Body length 14 mm.

Anatomical distinctions.—Cranium large, globose; incisor teeth especially broad, wide-spaced. Left tergal process (10 LP) very long and slender in contrast to congeners, extending beyond caudal margin of 10 L, or equal to it.

Allotype.—Female, in alcohol (CAS). Data.—Reared in holotype's culture.

Description.—Sclerotized surfaces glossy dark mahogany brown except for broad, cream white thoracic bands, membranes otherwise purple. Antennae golden tan (25 segments). Labrum dark amber, mandibles piceous; other mouthparts, including venter of cranium, golden brown. Acroter-

gites dark mahogany brown; thoracic sternites golden brown; intensity of thoracic bands increased by very white fat on anterior edge of acrotergite 1 and anterior margin of mesonotum. Abdominal terga concolorous with thoracic scuta; sternites translucent amber except for brown paragenitals and paraprocts; cerci dark brown with pale tips. Body length: 16.0 mm.

Paratypes and parallotypes. From holotype's culture. Deposited in CAS, USNM, and UNAM.

Additional record.—A series from 6 mi. SW Union de Tula, Jalisco, 1410 m (a short distance SW of Autlán on Hyw. 80).

Pachylembia colimae Ross
new species
(FIGURE 43)

Holotype.—Male, on slide, CAS. Data.—Mexico: 15 km NE Colima, Colima, 1230 m, matured in culture I-90 (E. S. Ross).

Description.—Appearance: Medium sized, apterous; almost entirely dark brown except for two conspicuous white thoracic bands. Color details (in alcohol): Cranium largely piceous brown dorsally becoming dark golden brown between antennal bases and eyes, and ventrally; vertex pattern indistinct. Basal two antennal segments medium brown, others tan to apex (22 segments). Mandibles dark amber, piceous apically and basally; palpi medium brown; submentum dark amber, margins largely piceous. Thoracic sclerites varied shades of glossy, blackish brown, except acrotergite 1 which is very pale, translucent yellow, and prothoracic posternum which is yellow amber; all thoracic membranes dark lavender except when white between each thoracic somite (forming two conspicuous bands); legs varied shades of mahogany brown. Abdominal

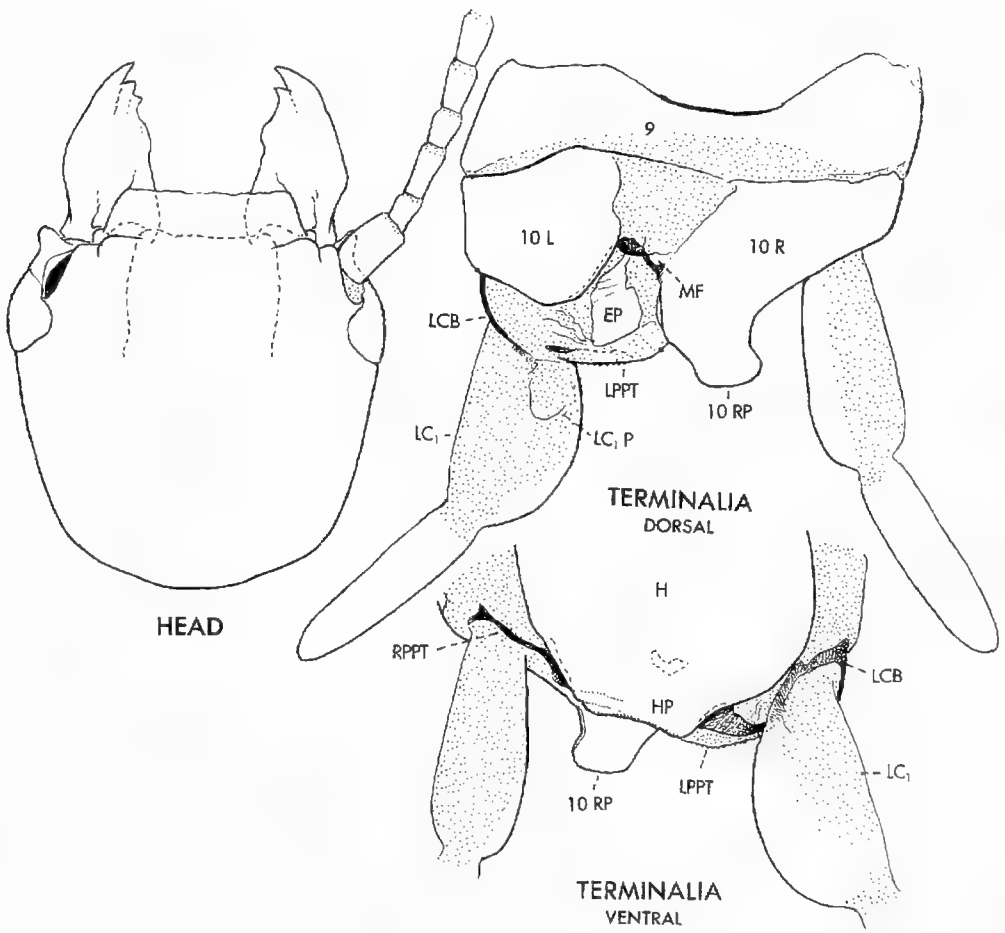

FIGURE 43. *Pachylembia colimae* Ross, holotype. Type locality: near Colima, Mexico.

terga mahogany brown except terminalia which are piceous; all membranes purple; cerci weakly sclerotized, light brown; extensive membranous areas, including tips of distal segments, pale tan. Body length 10.0 mm.

Allotype.—Female, in alcohol (CAS). Data: Reared in holotype's culture.

Description.—Coloration similar to that of males but overall paler. Cranium entirely orange with faint vertex pattern. Basal antennal segments lemon yellow, others tan to apex (22-segments). Body length 12.0 mm.

Paratypes and parallotypes.—Numerous adult males and females reared in holotype's culture, deposited in CAS, USNM, UNAM and BMNH.

Distinguishing features.—Males are quite colorful. Their body is dark, glossy chocolate brown; acrotergite 1 is colorless, transparent. About 25% of males have the cranium brilliant orange, the majority have the head dark brown. Setae on the hemitergites are fewer in number than in *P. chapalae*, less dense (sockets more widely spaced); 10 R lacks a longitudinal inner caudal depression; 10 LP is exceptionally minute, short, almost obsolete (not visible from above); 10 RP blends caudad from brown to amber; LC_1 is stubby, globose, inner margin arcuate, dorso-basal process reduced, at times obsolete, (if present triangular in profile).

Biology.—The type locality is a large rocky, almost level pasture without trees. Undoubtedly it was once forested but perhaps cleared very soon after the nearby town of Colima was established. Colonies were very rare under the numerous volcanic stones.

Pachylembia unicincta Ross

Pachylembia unicincta Ross, 1984:18.

Holotype.—Male, on slide, CAS. Data.—Mexico: Jalisco, 5 km E of Mazamitla, 5800 ft. elev., matured in culture I-79 (E. S. Ross).

Discussion.—Both sexes are readily recognized by the presence of only one pale thoracic band, instead of two. Colonies were rare in oak leaf litter on an open slope used by picnickers in a pine-oak forest adjacent to weekend cottages.

Pachylembia taxcoensis Ross

(FIGURE 44)

Pachylembia taxcoensis Ross, 1984:14.

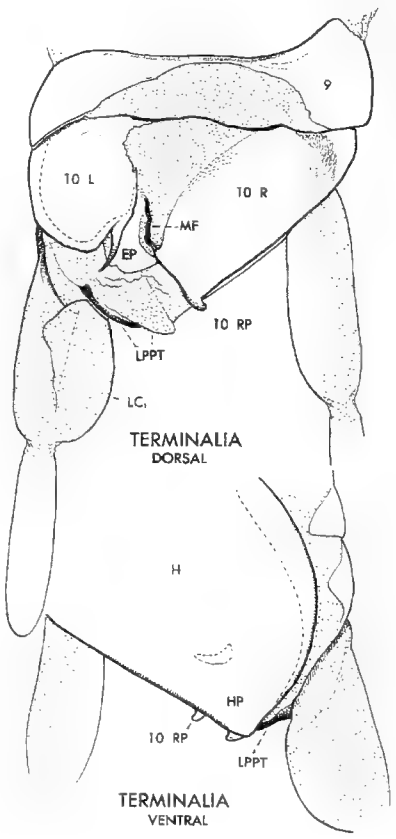

FIGURE 44. *Pachylembia taxcoensis* Ross, holotype (after Ross, 1984). Type locality: Taxco, Gro., Mexico.

Holotype.—Male, on slide, CAS. Data.—Mexico: Guerrero, 5 km E of Taxco, matured in culture 20-X-76 (E. S. Ross)

Discussion.—Nothing to add to the original description. The species is easily distinguished by its small, narrow process of the right hemitergite (10 RP). In congeners this process is broad, spatulate.

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