

**Notes on the Tropical American Species of Tipulidae (Diptera).
IV. The Primitive Hexatomi: Paradelphomyia, Austrolimnophila,
Epiphragma, Lecteria, Polymera, and Allies.**

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(With 33 figures)

In continuation of the present series of reports I am here discussing the short series of genera and subgenera constituting the so-called primitive or generalized Hexatomi. As originally grouped by Osten Sacken and other early students of the family, the Hexatomi included those genera having a four-branched radius, usually with cell M_1 preserved, normally 16-segmented antennae, and the tibiae with distinct spurs. The condition of the radius as described holds in all but the most specialized types now referred to the tribe, that is, *Hexatoma* Latreille (in part), *Atarba* Osten Sacken (in part) and *Elephantomyia* Osten Sacken. More commonly than was at first believed, the antennae of several types show a fusion of two or more segments at the base of the flagellum, forming the so-called "fusion-segment" in *Epiphragma* and others. The loss of tibial spurs in several groups, as *Polymera*, *Atarba*, *Elephantomyia* and others, has very greatly weakened this character for taxonomic use. In the single genus *Lecteria*, discussed later, we find a very curious condition in the manner of loss of one of the radial branches and, at the same time, the presence or loss of the tibial spurs. The more primitive members of this tribe show the so-called broken arculus, that is, with the basal section of vein M atrophied, most of the genera herewith considered showing this character. Although relatively few in number of genera, this section of the Hexatomi is very rich in species in certain groups, as *Austrolimnophila*, *Epiphragma*, *Polymera*, and others, including some of the most characteristic elements in the Neotropical crane-fly fauna.

The following subtribes, genera and subgenera fall in this section.

Subtribes	Genera	Subgenera
Phyllolabaria-	<i>Paradelphomyia</i> Alexander:	<i>Oxyrhiza</i> de Meijere
Paradelphomyaria-	<i>Phyllolabis</i> Osten Sacken	
Epiphragmaria-	<i>Austrolimnophila</i> Alexander:	<i>Limnophilella</i> Alexander <i>Austrolimnophila</i> Alex.
	<i>Epiphragma</i> Osten Sacken	
	<i>Edwardsomyia</i> Alexander	
Limnophilaria-	<i>Lecteria</i> Osten Sacken:	<i>Lecteria</i> Osten Sacken <i>Psaronius</i> Enderlein
(in part)		
	<i>Pseudolimnophila</i> Alexander	
	<i>Polymera</i> Wiedemann:	<i>Polymera</i> Wiedemann <i>Polymerodes</i> Alexander

The remainder of the Limnophilaria will be discussed in Part V of this series of reports.

Phyllolabis Osten Sacken

Phyllolabis Osten Sacken; Bull. U. S. Geol. Surv., 3: 202; 1877.

Attention is here called to the probability of occurrence of members of this very isolated genus in the mountains of northern Mexico. About a dozen species are known from the Nearctic Region, virtually all being far western in distribution, with two species having been found in San Diego Co., California, within a few miles of the border of Baja California. It would seem certain that species would occur in the Sierra de Juarez and elsewhere across the border. Elsewhere in the world various species of *Phyllolabis* occur in northern Europe, western China and rather numerous in the Himalayan Region. An entirely typical species has been taken in Baltic Amber, dating the genus back to the Eocene.

The members of the genus are most readily told by the venation, vein R_2 being entirely atrophied and $m-cu$ lying far distad, at or close to the outer end of cell $1st M_2$. The wing of *Phyllolabis meridionalis* Alexander is shown (Fig. 1). The male hypopygium of the different species is much enlarged and complicated, providing excellent characters for the separation of the species.

Paradelphomyia Alexander

Adelphomyia of authors, *nec* Bergroth; Mittheil. Naturf. Ges. Bern für 1890: 134; 1891; (type *helvetica* Bergroth, = *punctum* Meigen; genus *Limnophila* Macquart). *Oxydiscus* de Meijere; Tijd. voor Ent., 56: 350; 1891, preoccupied by *Oxydiscus* Koken, 1889; (type *nebulosus* de Meijere). *Haploneura* Meunier (*nec* Osten Sacken, Loew); Bull. Soc. Ent. France, 1899: 393-394, fig.; 1899, preoccupied by *Haploneura* Kohl, 1884; (type *hirtipennis* Meunier). *Gonomyiella* Kuntze; Deutsche Ent. Zeitschr., 1919: 141; 1919, preoccupied by *Gonomyiella* Meunier, 1899; *Gonomyella* Alexander, 1917; (type *furcata* Kuntze). *Adelphomyia* (*Paradelphomyia*) Alexander; Philippine Journ. Sci., 60: 184; 1936; (type *crossospila* Alexander). *Oxyrhiza* de Meijere; Entomologische Berichten, 12, 271-272: 68; 1946; (re-naming of *Oxydiscus* de Meijere, preoccupied).

The name *Paradelphomyia* was proposed for a single species from western China, the subgenus being based primarily on the presence of a supernumerary crossvein in cell R_3 of the wings. All other described species, lacking this crossvein, fall in the subgenus *Oxyrhiza* de Meijere, which appears to be the valid name for this section of the genus.

As regards the above synonymy, that concerning *Haploneura* had been discussed earlier by the writer (Bernstein-Forschungen 2: 92; 1931). Briefly, the name was first suggested by Loew (1850) without mention of a species; from his brief generic diagnosis it seems probable that he had intended this name for what we have called the subgenus *Palaeogonomyia* Meunier in the genus *Rhabdomastix* Skuse. Osten Sacken (Mon. Dipt. N. Amer., 4: 275-276; 1869), while examining the Loew Amber Diptera saw the type specimen of Loew's *Haploneura* and pronounced it to be an undoubted *Ula*, a genus that does not occur in Tropical America. In 1906, Meunier (Mon. Tipulidae Ambre Baltique, Ann. Sci. Natur. (Zool.), (9) 4: 389-390; 1906) validated the genus by name, description and figure, and this species is undoubtedly a member of the present group. Except for the earlier use of the name *Haploneura* by Kohl I would consider this to be the earliest valid name for the group. *Gonomyiella* Meunier, as discussed earlier by the writer (Bernstein-Forschungen, 2: 101; 1931) evidently refers to the present genus *Ormosia* Rondani. The confusion in the names *Gonomyella* and *Gonomyiella* has been listed by Neave.

Antennae short in both sexes, normally 16-segmented; in certain species (as *cayuga* Alexander) at least the two basal flagellar segments completely united, together with a partial fusion of the third; flagellar verticils very long and conspicuous, much exceeding the segments in length). Eyes not hairy (as in most Pediciini). Head not narrowed behind. Praescutum with the tuberculate pits remote from the anterior border, lying only slightly cephalad of the level of the pseudosutural foveae. Legs

with the tibial spurs unusually variable; in cases with two long strong hairy spurs, in others a single weak spur, in still others (as *ecalcarata* Edwards) the spurs quite lacking. It seems probable that there will be found to be a different number of spurs on the various legs of at least certain of the species, as is common in the Tipulinae and others. Claws simple; empodia conspicuous. Wings with vein R_2 faint to virtually lost by atrophy; cell M_1 usually present, more rarely lacking (in some Nearctic species); anterior arculus present. The venation of *Paradelphomyia oaxacensis* (Alexander) is shown (Fig. 2). Apical cells of wings with strong macrotrichia. As noted by Edwards, 1938, the sclerites of the ninth abdominal segment of the male are united into a virtually continuous ring, with the suture mid-dorsal instead of mid-ventral, as usual in the family. Basistyle in cases produced caudad as a strong lobe or spine beyond the level of the point of insertion of the dististyles, which thus appear to be subterminal in position. Two dististyles, the outer one of characteristic shape, bearing three terminal and subterminal teeth that provide strong characters for the separation of the different species. Base of the phallosome generally bearing two elongate spines or processes, termed by Edwards the *ventral fork*, these providing excellent specific characters; this structure is sometimes lacking (as *nielseni* Kuntze).

The genus is essentially Holarctic in distribution, with rather numerous species extending southward in the Himalayan Region of southeastern Asia virtually to Wallace's Line. A few further species are Ethiopian. In Tropical America there are relatively few forms, chiefly Mexican and Central American, with one occurring as far south as Ecuador. The group is an ancient one, with a species occurring in the Baltic Amber (Eocene).

In an earlier report (Cornell Univ. Agr. Expt. Sta. Mem. 38: 895; 1920) I erected the subtribe Adelphomyaria for this genus and placed it in the tribe Pediciini rather than with the Hexatomini where now assigned. This reference was made chiefly on the basis of the structure of the larva since the adult flies have retained most of the characters of the Hexatomini. In most recent treatments the group is placed in the latter tribe in a position indicating its relationship with the Pediciini (see Part VIII of this series of Notes).

The immature stages of *Paradelphomyia*, as known, are spent in saturated organic earth.

List of Species

- aequatorialis* (Alexander). — Ecuador.
costaricensis (Alexander). — Costa Rica.
destituta (Alexander). — Costa Rica.
mexicana (Alexander). — Mexico.
mexicana acutissima (Alexander). — Mexico.
morelosensis (Alexander). — Mexico.
oaxacensis (Alexander). — Mexico.

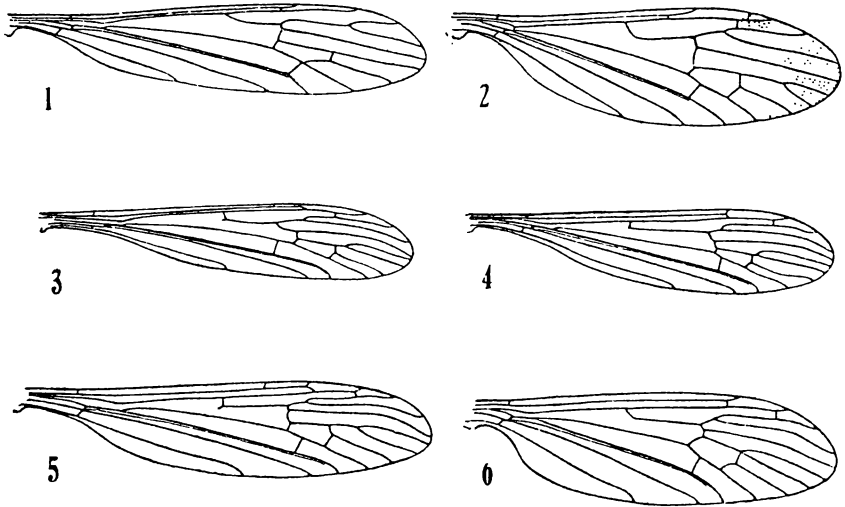


Fig. 1. *Phyllotabis meridionalis* Alexander; venation. — Fig. 2. *Paradelphomyia (Oxyrhiza) oaxacensis* (Alexander); venation. — Fig. 3. *Austrolimnophila (Limnophilella) schunkeana*, sp. n.; venation. — Fig. 4. *Austrolimnophila (Austrolimnophila) wygodzinskiyi*, sp. n.; venation. — Fig. 5. *Epiphragma (Epiphragma) persancta* Alexander; venation. — Fig. 6. *Edwardsomyia chitocensis* Alexander; venation.

Austrolimnophila Alexander

Austrolimnophila Alexander; Arkiv för Zoologi, 13, Nr. 6: 4-5; 1920.
Polymoria Alexander (nec Philippi, 1865); Ann. Mag. Nat. Hist., (9) 13: 367; 1924.

Head broad, not narrowed behind. Antennae 16-segmented, short to very long; in the latter cases, flagellar segments long-cylindrical, usually with short verticils, in still other species the verticils of the outer segments long and conspicuous; no fusion of basal flagellar segments as in *Epiphragma*. Mesonotum without tuberculate pits; pseudosutural foveae small, marginal in position; praescutal dorsocentral setae well developed. Legs with tibial spurs distinct; claws simple. Wings clear or variously patterned, banded or dotted but only rarely with an ocelliform distribution of markings, the common condition in the allied genus *Epiphragma*. Venation: Sc_2 near tip of Sc_1 ; Sc usually long, shortest in *celestissima* where Sc_1 ends about opposite midlength of Rs ; Rs long, angulated and often spurred near origin, in cases this

spur very long; R_{1-2} and R_2 commonly of nearly equal length or the former a little longer, in *inquieta* and some others with R_{1-2} elongate; R_{2-3-4} usually short; R_2 usually on vein R_3 , with an element R_{2-3} developed; in *celestissima*, R_2 is placed before cell R_3 , there being a short element R_{3-4} ; anterior cord approximately transverse; cell *1st M* widened outwardly; cell M_1 usually deep to very deep, the petiole correspondingly shortened, reaching its culmination in species such as *persessilis* where cell M_1 is sessile or virtually so; position of *m-cu* very variable, ranging from species having this at midlength of cell *1st M*₂ to others where it lies at or close to the fork of *M*; the extreme recession of *m-cu* in the entire tribe is found in species of the subgenus *Limnophilella*, culminating in the subspecies *retractior* (of *inquieta*) where the crossvein is from four to five times its own length before the fork of *M* or nearly opposite the base of the unusually long *Rs*; anterior arculus lacking or its position barely indicated, as in *tunguraguensis*. In some species, supernumerary crossveins in certain of the cells, in *multipicta* in cell R_3 , in *bifidaria* and *caparaoensis* in cell M_1 . The venation of two species is shown, *schunkeana* (Fig. 3), *wygodzinskyi* (Fig. 4). Abdominal tergites with faintly impressed transverse lines, somewhat as in *Epiphragma*. Male hypopygium showing a great diversity of structure, especially noteworthy when compared with the very uniform pattern commonly found in *Epiphragma*. Ninth tergite with the caudal margin variously bilobed. In cases a single dististyle (*merklei*, Fig. 13), usually with two such styles, of various forms. Interbase present and variously shaped in the different species, usually simple, in some species forked at apex. To show the range of structure in the local fauna, the male hypopygia of several previously unfigured species are shown herewith. (Figs. 7-18, inclusive).

The genus *Austrolimnophila* is essentially Antipodal in distribution, with the great majority of the rather abundant species in Australasia (Australia, New Zealand, New Caledonia, New Guinea and elsewhere) and in Tropical America. Fewer species occur in Africa while still fewer forms are found in the northern hemisphere of both the old and the new worlds. The distribution of the Neotropical species is shown by the list of species. From this it will be seen that members of the genus are particularly numerous in the Chilean and Brazilian subregions but there are rather numerous species occurring far to the north, especially along the Andean chain.

The early stages, as recorded for various species in Australia, New Zealand and the Holarctic Region, are spent in decaying wood, quite as in *Epiphragma*.

Subgenus *Limnophilella* Alexander

Limnophila (*Limnophilella*) Alexander; Journ. N. Y. Ent. Soc., 27: 146; 1919; (type *epiphragmoides* Alexander).

The members of this subgenus are defined chiefly on the recession of *m-cu*, as discussed under the generic account. This character has been deemed to be of importance in other subtribes of the primitive Hexatomini, as the Dactylobalaria, and presumably has some significance here. Correlated with the venational character is found an increased complexity in structure of the male hypopygium (Fig. 7, *multipicta*; Fig. 8, *patagonica*; Fig. 9, *schunkeana*).

List of Species

- caparaoensis* Alexander. — Southeastern Brazil.
- diversipes* (Alexander). — Ecuador, Peru.
- epiphragmoides* (Alexander). — Eastern Brazil.
- inquieta* Alexander. — Ecuador.
- inquieta retractior* Alexander. — Ecuador.
- multipicta* Alexander. — Southeastern Brazil.
- patagonica* (Alexander). — Patagonia, South Chile.
- schunkeana*, sp. n. — Amazonian Peru.
- subvictor*, sp. n. — Costa Rica.
- victor* (Alexander). — Panama.

Subgenus *Austrolimnophila* s. s.

List of Species

- aculergata* Alexander. — Southeastern Brazil.
- bifidaria* Alexander. — Southeastern Brazil.
- bradleyi* Alexander. — Northern Argentina.
- candiditarsis* Alexander. — Southeastern Brazil.
- celestissima* Alexander. — Chile.
- comantis*, sp. n. — Southeastern Brazil.
- duséni* Alexander. — South Chile.
- elnora* Alexander. — South Chile.
- eutaeniata* (Bigot). — Tierra del Fuego.
- fuscogalterata* Alexander. — South Chile.
- hazela* Alexander. — Patagonia, South Chile.
- infidelis* Alexander. — South Chile.
- iris* Alexander. — South Chile.
- joana* Alexander. — South Chile.
- merklei* Alexander. — Patagonia, South Chile.
- michaelseni* Alexander. — Tierra del Fuego.
- microspilota* Alexander. — Southeastern Brazil.
- microsticta* Alexander. — South Chile.
- nematocera* Alexander. — Ecuador (position in genus doubtful).

- nympha* Alexander. — Ecuador.
oroensis Alexander. — Ecuador.
pacifera Alexander. — Southeastern Brazil.
pallidistyla Alexander. — Southeastern Brazil.
pallidistyla perlimbata Alexander. — Southeastern Brazil.
persessilis Alexander. — Ecuador.
platensis (Alexander). — Southeastern Brazil, Argentina.
polyspilota Alexander. — Southeastern Brazil.
punctipennis (Philippi). — South Chile.
spinicaudata Alexander. — Southeastern Brazil.
subpacifera Alexander. — Southeastern Brazil.
tenuilobata Alexander. — Southeastern Brazil.
tremula Alexander. — South Chile.
tunguraguensis Alexander. — Ecuador.
varitarsis Alexander. — South Chile.
vivas-berthieri Alexander. — Venezuela.
wygodzinskyi, sp. n. — Southeastern Brazil.
xanthoptera Alexander. — South Chile.
xanthoptera cayutuensis Alexander. — South Chile.

Austrolimnophila (Limnophilella) multipicta
 Alexander

Austrolimnophila (Limnophilella) multipicta Alexander; Rev. de Entomologia, 10: 433-434, fig. 3 (venation); 1939.

The type was from Nova Teutonia, Santa Catharina, collected by Plaumann. Since its original discovery, the species has been found to be relatively common at the type locality. Male hypopygium (Fig. 7) with the tergite, *9t*, large, narrowed outwardly to appear gently convex; on either side of a shallow median emargination with a slender lobe that is tufted with short microscopic setulae. Margin of sternite bearing a low obtuse lobe. Basistyle, *b*, on mesal face near proximal end produced into an obtuse lobe that is densely and regularly set with small points and accompanying setae to produce a squamose appearance; near apex of style opposite the point of insertion of the dististyles with a brush of long dark setae. Interbase, *i*, appearing as a strong arm that is bent at a right angle at near midlength, thence produced into a long straight spike, the outer angle at point of angulation appearing as a rounded knob. Dististyles distinctive, the outer, *od*, a long pale fleshy lobe bearing on mesal face at base a further long slender arm, at its apex narrowed into a spine; mesal face of outer lobe with abundant very long yellow setae from conspicuous punctures and interspersed scabrous points. Inner dististyle, *id*, shown separately, very broad at base, narrowed to a compressed blade, its surface with abundant microscopic punctures.

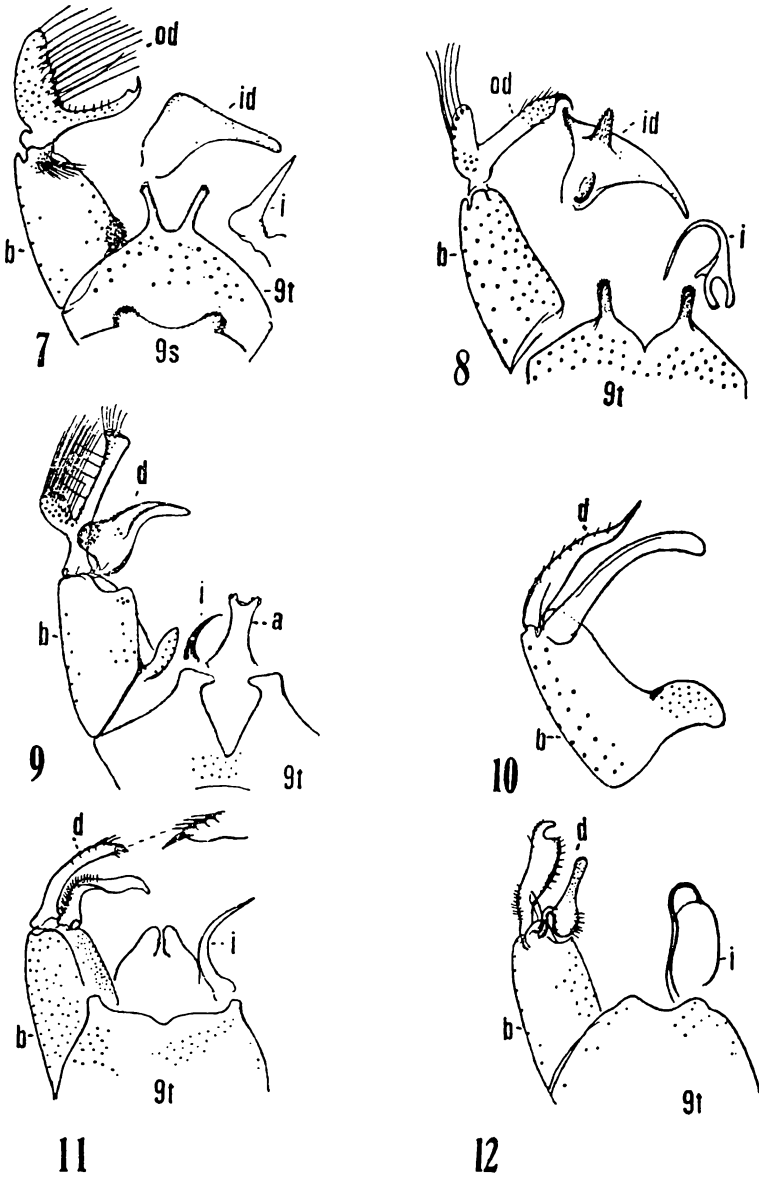


Fig. 7. *Austrolimnophila* (*Limnophilella*) *multipicta* Alexander; male hypopygium. —
 Fig. 8. *Austrolimnophila* (*Limnophilella*) *patagonica* Alexander; male hypopygium. —
 Fig. 9. *Austrolimnophila* (*Limnophilella*) *schunkeana*, sp. n.; male hypopygium. —
 Fig. 10. *Austrolimnophila* (*Austrolimnophila*) *bradleyi* Alexander; male hypopygium. —
 Fig. 11. *Austrolimnophila* (*Austrolimnophila*) *eutaeniata* (Bigot); male hypopygium. —
 Fig. 12. *Austrolimnophila* (*Austrolimnophila*) *hazela* Alexander; male hypopygium. —
 (Symbols: a, aedeagus; b, basistyle; d, dististyles; i, interbase; id, inner dististyle; od, outer dististyle; t, tergite).

Austrolimnophila (Limnophilella) schunkeana,
sp. n.

General coloration of mesonotum dark brown, the pleura pale yellow; antennae short; anterior vertex very narrow; femora yellow, the tips blackened; tibiae and tarsi yellowish white; wings whitish subhyaline, with a heavy brown pattern that is chiefly ocelliform; *m-cu* at least its own length before the fork of *M*; male hypopygium with the outer dististyle conspicuously bifid, the outer arm a large oval lobe that bears unusually long setae, the inner arm a straight rod; interbases appearing as slender horns.

Male. — Length, about 10.5 mm.; wing, 10 mm. antenna, about 2.1 mm.

Rostrum brown; palpi dark brown. Antennae (male) relatively short, as shown by the measurements; scape brown, pedicel yellow; flagellar segments pale yellowish brown, becoming linear, with very long verticils. Head with front and anterior vertex gray, the posterior vertex pale brown, the orbits and genae again light gray; extreme occipital region above with paired dark brown spots; anterior vertex very narrow, only about one-third the diameter of scape, the eyes correspondingly large.

Pronotum dark brown above, paling to yellow on sides. Mesonotum almost uniformly dark brown, the lateral borders of the praescutum restrictedly pale. Pleura and pleurotergite almost uniformly pale yellow, the ventral sternopleurite a very little darker. Halteres very long, dark brown, the base of stem narrowly yellow. Legs with the coxae and trochanters yellow; femora yellow, the tips rather broadly and conspicuously blackened, involving about the distal eighth of the segment; tibiae and tarsi pale yellowish white. Wings (Fig. 3) whitish subhyaline, with an extensive and handsome yellow and brown ocelliform pattern, the ocelli with yellow centers and pale brown margins; ocelli located at origin and fork of *Rs*, along cord, outer end of cell *1st M*₂, at ends of all longitudinal veins, those at and before wing tip confluent, forks of *R*₂₋₃₋₄ and *M*₁₋₂; outer radial field in cells *R*₁ and *R*₃ almost uniformly covered by confluent ocelliform areas; cells *C* and *Sc* more uniformly darkened, interrupted by pale near base and apex; prearcular field chiefly dark brown; costal darkenings almost solidly dark brown; veins brown, scarcely darker in the patterned areas. Venation: *Rs* long, angulated and spurred at origin; *Sc*₁ ending about opposite the

fork of R_{2-3-4} , Sc_2 longer, near its tip; R_{2-3-4} about three-fourths as long as R_{1-2} ; cell R_4 lying more basad than the other elements of cord; cell M_1 deep, nearly five times its petiole; $m-cu$ its own length or more before the fork of M .

Abdominal tergites dark brown, the posterior and lateral margins narrowly paler; sternites extensively pale yellow, each with a narrow brown ring shortly beyond base; segments eight and nine dark brown, the styli somewhat paler. Male hypopygium (Fig. 9) with the tergite, $9t$, large, the caudal border with a deep V-shaped emargination, the lateral lobes directed strongly mesad. Basistyle, b , on mesal face near proximal end with a pale flattened lobe that bears relatively few setae; interbase, i , appearing as a simple curved spine or slender horn. Dististyles, d , two; outer style conspicuously bifid, its outer arm a large oval lobe that is abundantly provided with setae, some of which are of unusual length; inner arm a straight, nearly parallel-sided rod, a little expanded at apex, with scattered elongate setae along the upper edge and with a concentration of bristles at the truncated apex; inner dististyle a flattened blade bearing a large obtuse posterior lobe, the surface of which is microscopically scabrous; rostral portion of style gently curved flattened. Aedeagus, a , at apex strongly emarginate, the lateral lobes with a few coarse lobules.

Habitat: Peru.

Holotype, ♂, Pucallpa, Rio Ucayali, Loreto, October 29, 1946 (José M. Schunke).

I am very pleased to name this distinct fly for the collector, Mr. José M. Schunke, to whom I am indebted for many interesting Tipulidae from the Upper Amazons. From the other allied members of the subgenus, this fly is readily told by the ocelliform pattern of the wings and by all details of structure of the male hypopygium. Such allied species include *epiphragmoides*, *inquieta*, *multipicta* and *victor*, as listed above.

Austrolimnophila (Limnophilella) patagonica
(Alexander)

Limnophilella patagonica Alexander; Journ. N. Y. Ent. Soc., 36: 51; 1928.

Bariloche, Rio Negro, Patagonia, April 1922 (A. Merkle); Cayatue, Llanquihue, Chile, March 10, 1938 (K. Wolffhügel); Valdivia, Chile, April 9-11, 1920 (J. C. Bradley). Male hypopygium (Fig. 8) with the caudal margin of the ninth tergite, $9t$, produced into two relatively slender straight darkened lobes that are densely setuliferous. Interbase, i , an unusually long

slender curved spine. Dististyles very complex, as in the subgenus; outer style, *od*, a long straight rod that terminates in a slender curved spine, the surface of this rod with numerous coarse setae; at base of style with a stout darkened lobe that bears a few (about 7 or 8) unusually long yellow setae, these fully one-half longer than the lobe itself; smaller, more normal setae nearer the base of lobe; inner dististyle (shown separately in figure), *id*, a larger triangular blade, the beak long extended, the outer apical angle a slender setuliferous lobe; on face of style at near the center with a stouter lobe bearing abundant setulae.

Austrolimnophila (Limnophilella) subvictor, sp. n.

General coloration of head and notum dark brown, the thoracic pleura yellow; antennae dark brown, the verticils of the outer segments very long and conspicuous; halteres elongate; wings narrow, pale brown, with a heavy darker brown pattern, the areas not or scarcely confluent; cell *2nd A* narrow; abdominal tergites dark brown.

Male. — Length, about 9 mm.; wing, 10 mm.

Rostrum obscure yellow; palpi dark brown. Antennae dark brown; flagellar segments subcylindrical to long-cylindrical, some of the verticils of the outer segments very long, approximately two and one-half times as long as the segment itself. Head dark brown, sparsely gray pruinose; anterior vertex narrow, less than the diameter of the scape.

Thoracic dorsum almost uniformly dark brown, the praescutum without pattern, postnotum somewhat more pruinose. Pleura yellow, the dorsal pleurites and the pleurotergite more infuscated. Halteres very long, dark brown. Legs with the coxae and trochanters yellow; femora and tibiae light brown; tarsi broken. Wings much narrower than in *victor*; general coloration pale brown, with a relatively heavy darker brown pattern, the areas arranged about the same as in *victor* but much smaller and not tending to become confluent with adjoining areas, the alternating ground markings correspondingly large and conspicuous. Venation: Much as in *victor* but the cells narrower, especially cell *2nd A*.

Abdomen elongate; tergites dark brown; basal sternites yellow, the intermediate ones more or less ringed with dusky; outer segments, including hypopygium, brownish black. Male

hypopygium with only the tergite preserved; large, its caudal border with a broad U-shaped notch, the lateral lobes obtuse; before apex near mesal edge of each lobe with a darkened cylindrical lobule that is tipped with a dense group or brush of setae.

Habitat: Costa Rica.

Holotype, ♂, La Suiza, April 1922 (Pablo Schild); my collection, through the kindness of Dr. A. L. Melander.

The most similar species is *Austrolimnophila* (*Austrolimnophila*) *victor* (Alexander), which differs especially in the broader wings with the brown pattern unusually heavy, as compared above.

Austrolimnophila (*Austrolimnophila*) *bradleyi*
Alexander

Austrolimnophila bradleyi Alexander; Journ. N. Y. Ent. Soc., 37: 93-95; 1929.

The type was from the Parque Aconquija, Tucuman, Argentina, taken in February 1920, by Dr. J. Chester Bradley. Male hypopygium (Fig. 10) with the basistyle, *b*, on mesal face at proximal end produced into a flattened cultrate blade, dark in color, margined with pale. Outer dististyle, *d*, an elongate rod that gradually narrows into a long terminal spine; outer margin of style with numerous long pale setae from small pale punctures. Inner dististyle a much longer and more compressed blade, the apex obtuse.

Austrolimnophila (*Austrolimnophila*) *comantis*, sp. n.

Allied to *polyspilota*; mesonotum almost entirely brownish yellow, the cephalic portion of the praescutum infuscated; antennae with the pedicel and flagellum yellow; femora yellow, the tips conspicuously blackened; wings grayish subhyaline, with an abundant dotted and spotted brown pattern, more numerous and more or less confluent in the cells of the anterior half of wing; R_{2-3-4} and the basal section of R_5 subequal in length; *m-cu* at from two-fifths to one-half the length of cell *1st M*₂; male hypopygium having the tergite with a relatively small V-shaped notch, the lateral lobes not or scarcely produced into a point; outer dististyle clothed with abundant long delicate setae, the apex abruptly narrowed into a small curved spine; inner dististyle a flattened blade that is slightly dilated beyond midlength.

Male. — Length, about 9-9.5 mm.; wing, 10-11 mm.; antenna, about 2.1-2.2 mm.

Female. — Length, about 11-12 mm.; wing, 12-13 mm.

Rostrum brown; palpi darker brown. Antennae with the scape dark brown; pedicel and flagellum yellow; flagellar segments long-oval, the longest verticils much exceeding the segments in length, unilaterally distributed. Head light brown, sparsely pruinose; anterior vertex narrow.

Pronotum brown above, paling to yellow on the sides. Mesonotum almost entirely brownish yellow, the cephalic portion of the praescutum infuscated. Pleura and pleurotergite uniformly pale yellow, unpatterned. Halteres elongate, stem yellow, knob infuscated. Legs with the coxae and trochanters yellow; femora yellow, the tips conspicuously blackened, the amount subequal on all legs, including about the distal eighth of segment; tibiae and tarsi pale yellow, the terminal tarsal segment blackened. Wings grayish subhyaline, with an abundant dotted and spotted brown pattern occupying most of the cells, more numerous and becoming more or less confluent in the cells of the anterior half of wing; on posterior half, these areas more sparse, especially in cells *Cu* and *1st A*; veins brown, a trifle darker in the patterned areas. Venation: *Sc* long, both *Sc*₁ and *Sc*₂ beyond the fork of *R*₂₋₃₋₄; *Rs* square and more or less spurred at origin; *R*₂₋₃₋₄ and basal section of *R*₅ subequal in length or the latter slightly shorter; *R*₁₋₂ and *R*₂₋₃ both long, subequal; petiole of cell *M*₁ short, subequal to or a little longer than *m*; *m-cu* at from about two-fifths to one-half the length of cell *1st M*₂.

Abdominal tergites of male dark brown, the posterior borders of the basal four segments narrowly pale; outer segments and hypopygium more uniformly brownish black; sternites light yellow, their bases restrictedly infuscated. In female, tergites somewhat paler brown. Ovipositor with cerci relatively slender, somewhat angularly upturned at near two-thirds the length. Male hypopygium with the ninth tergite large, its caudal margin with a relatively small V-shaped notch, the broad lateral lobes not or scarcely produced into a point. Outer dististyle clothed with abundant long delicate setae, most conspicuous on the inner face; apex of style abruptly produced into a small curved spine. Inner dististyle a flattened blade, beyond midlength somewhat dilated, thence gradually narrowed to the obtuse tip. Interbase a slender curved spine-like rod. In *polysticta*, the emargination of the tergite is larger and the lateral lobes are produced into small points. Outer dististyle with its outer angle produced into a larger

and more conspicuous spine; inner style long and slender, gradually narrowed to the obtuse tip.

Habitat: Southeastern Brazil.

Holotype, ♂, Theresopolis, Rio de Janeiro, altitude 1000 meters, October 1942 (Lauro Travassos Filho); returned to Souza Lopes. Allotopotype, ♀ Paratopotypes, ♂ ♀

The most similar described regional species is *Austrolimnophila (Austrolimnophila) polyspilota* Alexander (Rio to Paraná), which, while generally similar, differs in important details of coloration and, especially, in the structure of the male hypopygium, including the tergite and both dististyles, as compared above.

Austrolimnophila (Austrolimnophila) eutaeniata
(Bigot)

Limnophila eutaeniata Bigot; Miss. Scient. Cap Horn, Zool., 6: 9, pl. 2, fig. 3; 1888.

Rio Azopardo, near Admiralty Sound, Tierra del Fuego, March 1896 (Ohlin).

Male hypopygium (Fig. 11) with the tergite, *9t*, large, transverse, the outer lateral angle produced into a small subrectangular lobe, the broad space between these lobes with a rounded median notch. Basistyle, *b*, with the interbase a simple gently curved sclerotized horn or spine, narrowed very gradually into a long straight spine. Outer dististyle, *d*, a gently curved yellow rod, the apex suddenly narrowed into a blackened spine, before the tip with several strong yellow setae; outer margin of the distal fourth transversely corrugated. Inner dististyle fully as long, bent at a right angle at near one-third its length, the basal portion on outer surface with abundant erect pale setae; outer two-thirds more or less flattened, ribbon-like, the apex more slender, narrowly obtuse.

Austrolimnophila (Austrolimnophila) hazelae
Alexander

Austrolimnophila hazelae Alexander; Dipt. Patagonia and S. Chile, 1: 125-126, pl. 3, fig. 51 (wing); 1929.

Correntoso, Patagonia, November 18-25, 1926 (Edwards); Cayutue, Llanquihue, Chile, January 15, 1933 (E. P. Reed); Castro, Chiloë Island, Chile, December 20-22, 1926 (Edwards); Aysen, Chile, February 1934 (Pirion). Male hypopygium (Fig. 12) with the tergite very large, narrowed outwardly, the caudal margin with two lobes that are separated by an evenly rounded notch. Interbases, *i*, lying close to the midline of body, appearing

as flattened blades with obtusely rounded tips, the margin thickened and giving the appearance of a low terminal hook. Outer dististyle, *d*, a flattened blade, terminating in a strong lobe, its tip subobtuse, not spinous, with setae on the outer margin for about two-thirds the length of the lobe; other groups of setae along the dilated inner or lower margin of style and again on the subbasal swelling of the outer face. Inner dististyle nearly as long, the base dilated, conspicuously hairy, the outer half or more narrowed, straight, the tip obtuse.

Austrolimnophila (Austrolimnophila) merklei
Alexander

Austrolimnophila merklei Alexander; Journ. N. Y. Ent. Soc., 36: 50-51; 1928.

Bariloche, Rio Negro, Patagonia, April 1922 (Merkle); Termas Rio Blanco, Cura Cautin, Chile, altitude 1050 meters, March 30, 1938 (Bullock). Male hypopygium (Fig. 13) with the tergite, *9t*, transverse, the central region produced slightly caudad, on either end of the produced portion with a small fleshy lobe, the space between truncate. Basistyle, *b*, simple, on mesal face near apex with a concentration of long setae. Interbase, *i*, appearing as a long curved hook. A single dististyle, *d*, that is strongly bilobed into a more elongate beak and a stouter axial lobe, the latter further bearing a strong black spine on outer margin before apex; disk of style near base of axial lobe with several setae of unusual length.

Austrolimnophila (Austrolimnophila) microsticta
Alexander

Austrolimnophila microsticta Alexander; Dipt. Patagonia and S. Chile, 1: 119-121, pl. 3, fig. 49 (wing); 1929.

Peulla, Chile, December 12-13, 1926 (Edwards); Cayutue, Llanquihue, January 15, 1933 (E. P. Reed), November 13, 1935 (Wolffhügel). Male hypopygium (Fig. 14) with the tergite, *9t*, transverse, the lobes of the caudal margin very low and rounded. Interbase, *i*, appearing as a straight slender rod from a dilated base, at tip forking into two recurved slender spines. Basistyle, *b*, relatively long and slender. Outer dististyle, *d*, a relatively broad flattened blade, at apex suddenly narrowed into a strong curved spine, the surface of style with a lateral setiferous flange. Inner dististyle a slightly larger flattened blade, the apex widened, obtuse. Phallosome, *p*, with the aedeagus stout, straight, subtended by the large triangular apophyses.

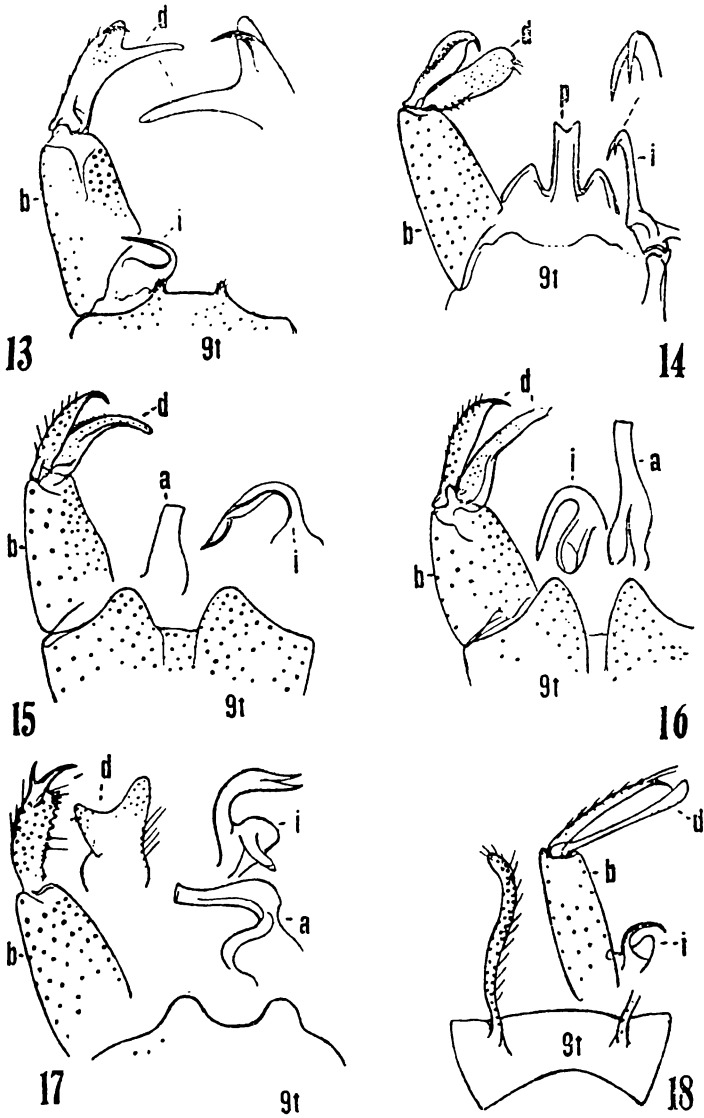


Fig. 13. *Austrolimnophila (Austrolimnophila) merklei* Alexander; male hypopygium. —
 Fig. 14. *Austrolimnophila (Austrolimnophila) microsticta* Alexander; male hypopygium. —
 Fig. 15. *Austrolimnophila (Austrolimnophila) nympa* Alexander; male hypopygium. —
 Fig. 16. *Austrolimnophila (Austrolimnophila) persessills* Alexander; male hypopygium. —
 Fig. 17. *Austrolimnophila (Austrolimnophila) platensis* (Alexander); male hypopygium. —
 Fig. 18. *Austrolimnophila (Austrolimnophila) wygodzinskiyi*, sp. n.; male hypopygium. —
 (Symbols: a, aedeagus; b, basistyle; d, dististyles; i, interbase; p, phallosome; t, tergite).

Austrolimnophila (Austrolimnophila) nymphea
Alexander

Austrolimnophila nymphea Alexander; Journ. N. Y. Ent. Soc., 51: 206-208; 1943.

Rio Zamora, Zumbi, Loja, Ecuador, altitude 700 meters, November 2, 1941 (Laddey). Male hypopygium (Fig. 15) with the tergite, *9t*, blackened, the caudal margin produced into two obtuse lobes that are separated by a much broader median emargination. Basistyle, *b*, whitened; interbase, *i*, strongly twisted, as shown. Two dististyles, *d*, both terminal; outer style slender, gradually narrowed into a strong curved apical spine; inner style a trifle longer, subangularly bent beyond midlength, narrowed to the obtuse apex; outer margin on basal portion with short erect to slightly retrorse bristles; side of style on outer half with a flange.

Austrolimnophila (Austrolimnophila) persessilis
Alexander

Austrolimnophila persessilis Alexander; Ann. Mag. Nat. Hist., (11) 3: 200-201; 1939.

Abitagua, Napo-Pastaza, Ecuador, altitude 1200 meters, September 21, 1937 (Macintyre); a further topotype male, altitude 1100 meters, March 18, 1940 (Macintyre) which is discussed herewith. Male hypopygium (Fig. 16) with the tergite, *9t*, deeply divided medially, the lateral lobes moderately produced; surface of tergite with long coarse scattered setae. Interbase, *i*, a simple, very strongly curved hook. Outer dististyle, *d*, relatively narrow, gently widened outwardly, terminating in a strong curved blackened spine; outer surface of style with scattered elongate setae; inner style a little longer, narrowed to the paler obtuse tip; surface with scattered pale setae from small tubercles.

Austrolimnophila (Austrolimnophila) platensis
(Alexander)

Limnophila platensis Alexander; Ent. News, 34: 184-185; 1923.

Rio Blanco, La Plata, Argentina, April-May 1920 (Bruch); Rio Negro, Parana, Brazil, April 25, 1945 (Witte). Male hypopygium (Fig. 17) with the tergite, *9t*, broad, narrowed outwardly, the caudal margin glabrous and darkened, with two rounded lobes that are separated from one another by a slightly wider notch. Basistyle, *b*, simple. Outer dististyle, *d*, narrowed into a strong apical spine, at base of which on outer margin,

with a smaller erect spine; outer surface of style with abundant delicate setulae and scattered coarse setae, with fewer such bristles on the lower face. Inner dististyle a very broad flattened blade that bears a strong broad-based lobe on its margin, the tip of the main axis obtusely rounded (style shown separately in figure). Interbase, *i*, terminating in two acute spines.

Austrolimnophila (*Austrolimnophila*)
wygodzinskyyi, sp. n.

Allied to *candiditarsis*; general coloration of mesonotum pale brown, sparsely pruinose, the praescutum with three inconspicuous yellowish brown stripes; antennae short, flagellar segments with a series of very long verticils; legs pale brown, tarsi and tips of tibiae snowy white; wings whitish subhyaline, restrictedly patterned with brown; male hypopygium with a long sinuous pale lobe arising from near the suture between the ninth tergite and ninth sternite; both dististyles very long and slender.

Male. — Length, about 9 mm.; wing, 9 mm.; antenna, about 1.6 mm.

Rostrum brown; palpi brownish black. Antennae relatively short; scape and pedicel yellow, flagellum pale brown; flagellar segments oval to long-oval, with an outer series of unusually long verticils, one to each segment, the longest more than three times the segment. Head gray; anterior vertex narrow, less than the diameter of scape.

Pronotum testaceous yellow. Mesonotal praescutum light gray with three inconspicuous confluent yellowish brown stripes; posterior sclerites of notum pale brown; pleurotergite paler, light gray pruinose. Pleura reddish yellow, sparsely pruinose. Halteres destroyed by ants. Legs with the coxae and trochanters yellow; femora obscure brownish yellow; tibiae pale brown, the tips, including about the outer third or fourth, snowy white; tarsi similarly whitened throughout. Wings (Fig. 4) whitish subhyaline, with a relatively inconspicuous pale brown pattern, arranged as follows: Arculus; origin of *Rs*; cord and outer end of cell *1st M*₂; stigma, continued backward across cell *R*₃; a second darkening near outer end of cell *R*₃; a seam over outer two-thirds of vein *R*₅, confluent with the area at outer end of cell *1st M*₂; veins brown. Stigma hairy on both sides of vein *R*₂. Venation: *Sc*₁ ending beyond fork of *R*₂₋₃₋₄, *Sc*₂ at its tip; *Rs* long, square and short-spurred at origin; *R*₁₋₂ about three times *R*₂; cord

oblique, the inner end of cell R_4 most basad; petiole of cell M_1 very short, about one-third m ; $m-cu$ nearly its length beyond the fork of M ; cell $2nd\ A$ long and narrow.

Abdomen brownish yellow, the bases of the segments dark brown, only about one-half as extensive as the pale apices; outer segments, including hypopygium, black. Male hypopygium (Fig. 18) with the region of the ninth tergite, $9t$, and ninth sternite, $9s$, almost transverse, without lobes or emarginations; on dorsal surface on the extreme margin of sternite close to the tergal suture and slightly back from margin with a long slender pale lobe, about one-third longer than either the basistyle or inner dististyle, provided with long conspicuous setae to the base. Basistyle, b , elongate, dark colored, without modified lobes; both dististyles, d , long and slender, the outer style terminating in an acute slender blackened spine that is gently curved; outer surface of style with several setae, two or three before apex being unusually long; inner style an even more slender and slightly longer yellow rod, somewhat dilated at apex. Interbase, i , appearing as a flattened plate that is extended into a slender curved spine.

Habitat: Southeastern Brazil.

Holotype, ♂, Sitio Bonfim, Nova Friburgo, Serra dos Organos, Rio de Janeiro, altitude 1000 meters, November 8, 1945 (Wygodzinsky).

I take great pleasure in naming this distinct fly for the collector, Dr. Petr Wygodzinsky, authority on the Thysanura and Reduviidae. I am greatly indebted to Dr. Wygodzinsky for many fine Tipulidae from the Organ Mountains and elsewhere. While generally similar to various other species in southeastern Brazil, including *Austrolimnophila* (*Austrolimnophila*) *candiditarsis* Alexander, *A. (A.) pallidistyla* Alexander and *A. (A.) tenuilobata* Alexander, the present fly is strikingly distinct in the structure of the male hypopygium, including the appendage of the ninth segment and both dististyles.

Epiphragma Osten Sacken

Limnophila (*Epiphragma*) Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia 1859: 238; 1859; (type *fascipennis*, as *pavonina* Osten Sacken).
Epiphragma Osten Sacken; Mon. Dipt. N. America, 4: 193-194; 1869.

Rostrum only slightly elongate. Antennae primitively 16-segmented, in such cases (as *celator* and others) with 14 entirely separate flagellar segments; in most species, the proximal two segments united into a fusion-segment, the suture between the two segments more or less indicated; antennae short to elongate, in the latter case (as *circinata* and others) the segments elongate-

cylindrical, with verticils that are shorter than the segments; in some, as *parviseta*, the verticils very small. Pronotum relatively large; tuberculate pits lacking; pseudosutural foveae reduced or lacking, when present lying close to margin; praescutum with conspicuous setae on the interspaces. Legs with the tibial spur-formula 1- 2- 2, the spurs long and hairy; claws relatively small, simple; empodia conspicuous; legs of many of the species handsomely banded with black and yellow, in still other species with at least the femora uniform in color, either black or yellow. Wings with a strong supernumerary crossvein in cell C, lying above R_s , in the subgenus *Eupolyphragma* with a series of such crossveins present; R_{2-3-4} of moderate length, always longer than the basal section of R_5 ; veins R_3 and R_4 long, extending generally parallel to one another for virtually the entire length; elements of the anterior cord in transverse alignment; cell 1st M_2 variable in size, in cases large; *m-cu* often at near midlength of cell 1st M_2 ; anterior arculus lacking; crossvein *h* lying some distance basad of the arculus; squamal setae present or lacking. The wings of all known species are patterned with brown, usually with an ocelliform arrangement; in fewer species the ocelli are much broken to produce a finely spotted or dotted pattern. Male hypopygium with the tergite emarginate medially to produce two low lobes. Interbases strongly developed, of various shapes, furnishing excellent specific characters. Phallosome subquadrate in outline, the aedeagus relatively small and slender. Dististyles two, the outer one terminating in a simple curved spine, the surface of the style conspicuously setiferous; outer style in cases very small. The male hypopygium is remarkably uniform and monotonous in structure in the various species, the chief distinctions being found in the tergite, dististyles and the interbasal rods. This unvaried nature contrasts with the condition in the allied genus *Austrolimnophila* where a great diversity of structure is evident in the various species, as previously described and figured. Some of the more striking deviations from this uniform type of structure in the local fauna are found in *cynotis*, where it involves the inner dististyle; *hirtistylata*, with greatly lengthened setae on the basistyle; and *oxyphallus*, with an unusual modification of the aedeagus. Ovipositor with elongate sclerotized valves. The abdominal tergites have a pair of transverse impressions before midlength, this being the character that gave the genus its name (*Epi-phragma*, = upon-partition). The wing venation is shown (Fig. 5, *persancta*).

The chief center of distribution of the genus is in Tropical America, where numerous species occur, as listed below. A very few species, including the genotype, *fascipennis* (Say), range northward into the Nearctic Region. Fewer species are found in the Old World but none, apparently, in the Ethiopian Region. In the Oriental and Australasian Regions there is a marked increase in the number of forms, many of them pertaining to a distinct subgenus *Eupolyphragma*, as discussed below. Members of the typical subgenus occur in Australia, New Guinea and New Caledonia, but none in New Zealand.

The immature stages of the species so far known occur in wet rotting wood, a habitat that is common in the more primitive Hexatomine genera. Rogers (1942) has found the larvae of *fascipennis* in very wet to sodden or temporarily submerged wood, these varying from logs to small branches that are not much thicker than a lead-pencil. Scores of larvae were taken from a two-foot length of wood only about six inches in diameter. This species, at least, appears to be confined to hardwood (angiosperm) species. Other species that have been found in rotting wood include *ocellaris* (Linnaeus), in Europe; *solatrix* (Osten Sacken), in the United States, and *imitans* Alexander in Argentina (Bruch, 1939).

At this time I am re-naming the following subgeneric group:

Eupolyphragma, n. n.

For *Polyphragma* Alexander (Philippine Journ. Sci., 45: 435; 1931), preoccupied by *Polyphragma* Quatrefages, 1866 (Polychaete Annelida) and by *Polyphragma* Reuss, 1871 (Protozoa). This subgenus includes about 25 species, centering in the Philippines, with other species in Borneo and Celebes.

List of Species

- adspersa* (Wiedemann). — British Guiana, Brazil.
amphileuca Alexander. — Panama.
annulicornis Alexander. — Northern Argentina, Peru.
atroterminata Alexander. — Peru.
auricosta Alexander. — Hispaniola: Dominican Republic.
buscki Alexander. — Hispaniola: Dominican Republic, Haiti.
celator Alexander. — Mexico.
circinata Osten Sacken. — Costa Rica, Panama.
claudia Alexander. — Peru.
cordillerensis Alexander. — Colombia.
cubensis Alexander. — Cuba.
cynotis Alexander. — Peru.
deliberata Alexander. — Ecuador.

- delicatula* Osten Sacken. — Colombia, Venezuela.
diadema Alexander. — Ecuador.
enixa Alexander. — Ecuador.
fabricii Alexander. — Brazil, Peru.
felix Alexander. — Peru.
filiiformis Alexander. — Ecuador.
gaigci Alexander. — Panama.
genualis Alexander. — Panama.
gracilicornis Alexander. — Colombia.
hirtistylata Alexander. — Ecuador.
histrío Schiner. — Venezuela (not Colombia, as stated).
imitans Alexander. — Brazil, Argentina, Bolivia (close to *solatrix*).
immaculipes Alexander. — Panama.
inaequicincta Alexander. — Costa Rica, Panama, Venezuela.
inornatipes Alexander. — Cuba.
jurator, sp. n. — Peru.
 (*maculata* Fabricius, see *fabricii* Alexander).
melaxantha Alexander. — Peru.
mephistophelica Alexander. — Venezuela.
muscolica Alexander. — Peru.
nebulosa (Bellardi). — Mexico.
nephele, sp. n. — Peru.
nigripleuralis Alexander. — Southeastern Brazil.
nigroplagiata Alexander. — Ecuador, Peru.
oreonympha Alexander. — Mexico.
oxyphallus Alexander. — Ecuador.
parviseta Alexander. — Ecuador.
persancta Alexander. — Venezuela, southeastern Brazil.
petalina Alexander. — Venezuela.
phaeoxantha Alexander. — Ecuador.
punctatissima (Wiedemann). — Brazil.
pupillata Alexander. — Southern Brazil.
sackeni Williston. — Lesser Antilles (St. Vincent).
sappho Alexander. — Peru.
serristyla Alexander. — Southeastern Brazil.
solatrix (Osten Sacken). — Mexico, northward into the southern U. S., south to Argentina.
subenixa Alexander. — Ecuador.
subsolatrix Alexander. — Ecuador.
sybaritica Alexander. — Venezuela.
varia (Wiedemann). — Panama, Ecuador, Peru, Venezuela, Brazil.
xanthomela Alexander. — Ecuador.

Epiphragma (Epiphragma) histrío Schiner.

Epiphragma histrío Schiner; Reise Novara, Diptera, p. 41; 1868.

The type, a male, was collected in Venezuela (not Colombia, as stated by Schiner) in 1864 by Lindig. In 1921 I was privileged to be able to study this type through the kindness of Dr. Hans Zerny. The following notes are based on the re-examination of this type.

Condition fairly good; all legs broken beyond the trochanters.
 Male. — Length, about 8 mm.; wing, 11 mm.

Rostrum and palpi dark brown. Antennae of moderate length only; scape, pedicel and first flagellar segment dark brown, the remainder of flagellum obscure yellow. Head brown.

Pronotum and about the anterior half of the mesonotal praescutum dark brown, this color extended along the margins of the praescutum almost to the suture; remainder of notum, excepting the lateral sclerites of the postnotum, pale buffy brown. Thoracic pleura and lateral parts of the postnotum dark brown, this color being an extension of the color of the anterior mesonotum. Halteres yellow. Legs with the fore coxae dark brown, only the tips yellow; middle and hind coxae with approximately the basal half dark brown, the distal portion yellow; trochanters light yellow; remainder of legs broken. Wings strongly yellow with a very pale brown ocelliform pattern, the centers of these markings being the arculus, origin of R_s , junction of $r-m$ and R_5 and the tip of R_{1-2} ; small brown clouds at the ends of the longitudinal veins; a series of about three linear brown marks in the end of cell *1st A* and five or six in the end of cell *2nd A*; a series of seven or eight parallel brown dashes in cell *Cu* behind vein *Cu*; cord, outer end of cell *1st M₂* and the fork of M_{1-2} narrowly seamed with brown; veins brown. Venation: Sc_1 ending shortly before the outer end of vein R_{2-3-4} , Sc_2 longer, beyond the fork of this vein; supernumerary crossvein in cell *C* about opposite midlength of R_s , the latter nearly square and short-spurred at origin; R_{1-2} a little longer than R_2 ; R_{2-3} nearly three times as long as R_{2-3-4} ; all branches of R_s extending generally parallel to one another virtually for their entire lengths; cell *1st M₂* widened outwardly; petiole of cell M_1 about one-fourth the cell and subequal to *m-cu*, the latter lying far distad, at near five-sixths the length of the cell or approximately one-half its own length before the fork of M_{3-4} .

Abdomen obscure brownish yellow, including the hypopygium.

Epiphragma (Epiphragma) jurator, sp. n.

Size relatively large (wing, female, 12 mm.); praescutum and scutum rich fulvous, the former with the lateral borders narrowly blackened; antennae beyond the fusion-segment brownish black; pleura and pleurotergite almost uniformly blackened; femora yellow with an indistinct pale brown sub-terminal ring; wings obscure brownish yellow, with a darker

brown pattern that is partly ocelliform, the band at the level of origin of *Rs* preceded and followed by similar broad bands of the ground; a single darkened area in cell *Cu*; abdominal tergites dark brown, virtually unpatterned.

F e m a l e. — Length, about 10 mm.; wing, 12 mm.

Rostrum light brown, more or less yellow pollinose; palpi black. Antennae with scape dark brown, the pedicel slightly paler; fusion segment of flagellum obscure yellow, comprised of two imperfectly fused segments; remainder of flagellum uniformly brownish black; segments nearly cylindrical, with long verticils. Head medium brown, the front and orbits somewhat clearer yellow.

Pronotum and pretergites clear light yellow. Mesonotal praescutum and scutum rich fulvous, the former with the lateral borders narrowly blackened, the color extending cephalad to just beyond the pseudosutural foveae; scutum with a median line and two smaller marks on either lobe pale brown; scutellum obscure yellow; mediotergite yellowish gray, each posterior-lateral angle dark brown; remainder of pleura and pleurotergite almost uniformly dark brown and black, the latter color appearing as a broad dorsal stripe lying immediately beneath the buffy dorsopleural region. Halteres yellow. Legs with the coxae dark brown basally, the tips paling to obscure yellow; trochanters yellow; femora yellow, with an indistinct pale brown subterminal ring; tibiae and tarsi yellow. Wings obscure brownish yellow, with a relatively restricted dark and paler brown pattern that is in part ocelliform; major ocellus centering at origin of *Rs*, behind completely crossing the wing to the end of vein *2nd A*, in cell *Cu* forming a single darkened area; an incomplete ocellus at arculus and a compact one over the anterior cord; ground bands between the darkened areas broad; darkened marginal areas at stigma and beyond solid; further clouds at ends of the longitudinal veins and with a series of three dashes in cell *1st A* and seven in *2nd A*, not including the ones at the ends of the veins; other brown clouds over outer end of cell *1st M₂*, fork of *M₁₋₂*, and as subterminal darkenings near wing tip; a broad pale brown seam extending the whole length of vein *R₅*, with another in basal half of cell *Cu*; veins yellow, brown in the clouded portions. Venation: *Sc₂* fully four times as long as *Sc₁*; supernumerary crossvein in cell *C* transverse; *Rs* square and long-spurred at origin; *R₂₋₃₋₄* about twice the basal section of *R₅*; *m-cu* at about two-fifths the length of cell *1st M₂*.

Abdominal tergites dark brown, virtually unpatterned, the sternites a trifle paler; ovipositor with the genital shield medium brown, the long slender cerci yellow, curved to the acute tips.

Habitat: Peru.

Holotype, ♀, Huacapistana, Junin, altitude 1600 meters, July 14, 1941 (José M. Schunke).

Among the described Neotropical species, the present fly is closest to *Epiphragma (Epiphragma) felix* Alexander and *E. (E.) nigropleuralis* Alexander, both of which have the pattern of the legs and the ground color of the wings approximately the same. These differ evidently in the details of coloration of the body and in the wing pattern and venation.

Epiphragma (Epiphragma) nephelae, sp. n.

Allied to *sappho*; mesonotum with the disk brownish gray, the cephalic and lateral borders of the praescutum dark brown; flagellar segments bicolored; femora brownish yellow with a vague darker brown subterminal ring; wings pale yellow, with a sparse brown spotted and abundantly dotted pattern, including a series of about seven darker areas along costa; supernumerary crossvein in cell C nearly transverse; R_{2-3-4} about four times the basal section of R_5 ; *m-cu* nearly at midlength of cell 1st M_2 .

Female. — Length, about 12 mm.; wing, 12 mm.

Type badly molded, the coloration describable in general terms only. Rostrum and palpi brown. Antennae with the scape and pedicel dark; fusion-segment yellow, elongate, comprised of two partly separated segments; succeeding flagellar segments bicolored, dark basally, with about the outer half yellow; outer segments with apical stem more slender; verticils elongate. Head brownish gray.

Pronotum and pretergites, with the dorsopleural membrane, chiefly yellow. Mesonotal praescutum with the cephalic and lateral borders dark brown, the disk chiefly brownish gray; posterior sclerites of notum chiefly of this same brownish gray color, the mediotergite darker behind. Pleura and pleurotergite chiefly dark brown, variegated with obscure yellow, especially on the dorsal sternopleurite. Halteres with stem yellow, knob more infuscated. Legs with the coxae yellow, the fore pair with a brownish ring on basal half, the middle coxae with a similar darkening at extreme base; trochanters yellow; femora brownish yellow, including the narrow tip, with a vague darker brown subterminal ring; tibiae and tarsi yellow. Wings with the ground color pale yellow, with a sparse brown spotted and abundantly

brown dotted pattern, the darkest brown spots including a series of about seven along costa, the second over the origin of *Rs*, the fourth at the fork of *Sc*; larger but paler brown spots over origin of *Rs*, cord, outer end of cell *1st M*₂ and fork of *M*₁₋₂, the first vaguely ocellate; still smaller brown spots at ends of the veins and as linear dashes in outer ends of both Anal cells; remainder of disk with unusually numerous pale brown dots; veins yellow, somewhat darker in the patterned areas. Venation: Supernumerary crossvein in cell *C* nearly transverse; *R*₁₋₂ a little longer than *R*₂, the latter at midlength of the fifth darkened costal area; *Rs* strongly angulated at origin; *R*₂₋₃₋₄ about four times the basal section of *R*₅; cell *1st M*₂ widened outwardly; *m* about two-thirds the petiole of cell *M*₁; *m-cu* at from about two-fifths to nearly midlength of cell *1st M*₂.

Abdomen obscure yellow, more or less patterned with darker; pleural area more darkened. Ovipositor with the cerci very slender, dark brown, strongly upcurved.

Habitat: Peru.

Holotype, ♀, Huacapistana, Junin, altitude 1200 meters, July 15, 1941 (José M. Schunke).

The nearest relative of the present fly appears to be *Epiphragma* (*Epiphragma*) *sappho* Alexander, likewise from Peru but from higher altitudes. This differs in the details of coloration of the body and wings and in the venation.

Edwardsomyia Alexander

Edwardsomyia Alexander; Dipt. Patagonia and S. Chile, 1: 112-113, fig. 197 (head), fig. 47 (venation), fig. 198 (male hypopygium); 1929.

Characters generally as in *Austrolimnophila*, differing especially in the structure of the rostrum. Rostrum longer than remainder of head; maxillary palpi 4-segmented. Antennae elongate, 16-segmented; no fusion-segment; terminal segment very small, subglobular; verticils relatively short, except on the outer segments being less than the segments alone. Pronotum relatively small. Pseudosutural foveae very indistinct or lacking; no tuberculate pits. Tibial spurs elongate. Halteres short, the knobs large. Wings broad. Venation: *R*₁₋₂ about one-half longer than *R*₂; cell *M*₁ sessile to short-petiolate; cell *1st M*₂ large, its inner end arcuate; *m-cu* about its own length beyond the fork of *M*; prearcular field very short; anterior arculus lacking; vein *3rd A* distinct, except at apex. The wing of the genotype is shown (Fig. 6). Male hypopygium with the median area of the ninth tergite gently produced. Basistyles relatively stout; interbase

a long sclerotized flattened rod arising from a more dilated base, at near two-thirds its length gently arcuate, the extreme tip truncate, its lower angle further produced into a small tooth. Outer dististyle broad-based, the outer portion fleshy, flattened, terminating in a fringe of conspicuous setiferous tubercles, the mesal portion of style produced into a blackened curved spine. Inner dististyle a little longer, appearing as a gently curved flattened blade that is narrowed to the obtuse apex, the distal two-thirds with numerous microscopic setulae. Aedeagus long and slender, straight, the subtending ear-like gonapophyses relatively small and inconspicuous.

The type and only known species is *Edwardsomyia chiloënsis* Alexander, of Chiloë Island, South Chile. The elongate rostrum separates the genus from the allied *Austrolimnophila*. In the Australasian fauna there are three further genera in this particular section of the Hexatomini that have the rostrum elongated, — *Rhamphophila* Edwards and *Tinemyia* Hutton of New Zealand, and *Tonnoirella* Alexander of Tasmania. All of these differ among themselves in the relative length of the rostrum, details of venation and in the structure of the male hypopygium.

Lecteria Osten Sacken

Lecteria Osten Sacken; Berlin. Ent. Zeitschr., 31: 206; 1887; (type *armillaris* Fabricius).
Lecteria Alexander; Proc. U. S. Nat. Mus., 44: 493-499; 1913.

Besides the typical subgenus, there are two further subgenera:

Psaronius Enderlein; Zool. Jahrb., Syst., 32: 50; 1912; (type *obscura* Fabricius, as *liturata* Enderlein).
Neolecteria Alexander; Philippine Journ. 53: 288; 1934; (type *bipunctata* Edwards, 1926- Borneo).

Palpi 4-segmented; rostrum short. Antennae 16-segmented; scape elongate, cylindrical; flagellar verticils elongate. Head narrowed behind; eyes widely separated by the broad anterior vertex. Pronotum large, massive. Tuberculate pits apparently lacking; pseudosutural foveae large and conspicuous. Legs with tibial spurs long and conspicuous in *Psaronius*, lacking in the subgenus *Lecteria*; claws with microscopic denticles on lower face near base. Venation: *Sc* unusually long, *Sc*₁ and *R*₁₋₂ ending relatively close together, *Sc*₁ varying from opposite to shortly before or beyond *R*₂, *Sc*₂ a moderate distance from the tip of *Sc*₁; *Rs* usually long, strongly arcuated to angulated and spurred at origin, in direct longitudinal alignment with *R*₂₋₃₋₄ and *R*₄; *R*₂₋₃ and *R*₅ forking at strong angles, in the former case usually

a rectangle; vein R_4 strong, ending just before the wing tip, R_5 just beyond this point. In the genotype, *armillaris* (Figs. 19, 20) vein R_3 is long and heavy, cell R_2 at margin being approximately as extensive as cell R_3 . In various species of *Psaronius* we find the behavior of vein R_3 most interesting, in the more generalized forms, as *fuscipennis*, *obscura* or *pallipes* (Fig. 21), vein R_3 is entire but in certain species paler at its outer end and showing signs of degeneracy; in still other species of *Psaronius*, vein R_3 becomes still weaker and more shortened, finally becoming contiguous (*triangulifera*, Fig. 22) with R_{1-2} ; as the specialization progresses, R_3 fuses backward from the margin with R_{1-2} , forming a constantly lengthening element R_{1-2-3} (*obliterata*, Fig. 23), with cell R_2 becoming smaller and smaller. As its culmination, shown by several species (*abnormis*, Fig. 24; *brevisector*, *brevitibia*, *manca*, *pygmaea*) vein R_3 is entirely gone and the short transverse vein that superficially appears to be vein R_2 in such species is actually a composite, its cephalic half being R_2 , the posterior part being R_{2-3} . Cell M_1 present in all species in the local fauna, including both *Lecteria* and *Psaronius*; lacking in *Neolecteria*; cell 1st M_2 pentagonal or hexagonal in outline, of characteristic shape in many species; *m-cu* far beyond the fork of M , at or beyond midlength of M_{3-4} ; anterior arculus preserved; prearcular crossveins in transverse alignment, both shortly before the level of h (Fig. 20); prearcular field short. For venation, compare Figs. 19-24, inclusive. Male hypopygium with the tergite large, slightly narrowed outwardly, the apex truncate. Basistyle simple; dististyles two, terminal; outer style a strong rod that narrows gradually into a strong curved hook; inner style broad at base, narrowed to the obtuse tip. Gonapophysis appearing as a long narrow blade. Ovipositor with the valves long and heavily sclerotized, especially the gently upcurved cerci.

Lecteria is a remarkably distinct genus whose strict affinities still remain much in doubt. Superficially the members of the group most resemble certain of the more primitive Hexatomi, as *Austrolimnophila* and *Pseudolimnophila*, and similarly the typical species of the genus *Limnophila* Macquart (including the genotype, *pictipennis* Meigen) but the venation, as detailed and figured above, is very distinct and peculiar. Although *Psaronius* possesses tibial spurs whereas *Lecteria* and *Neolecteria* lack these, the similarity of the venation in all these groups shows that they are very closely interallied and this relationship seems best expressed by considering all three groups as being subgenera

(see Alexander, C. P., Proc. U. S. Nat. Mus., 44: 493; 1913). It should be emphasized once more that the character of presence or absence of tibial spurs in the Tipulidae no longer has the value formerly attributed to it, as witness the condition in genera such as *Paradelphomyia*, *Polymera*, *Atarba*, *Elephantomyia*, and others.

All of the species of *Psaronius* are Neotropical and are listed below. The genotype of *Lecteria*, *armillaris*, is likewise Neotropical but the great concentration of species in this subgenus is in Tropical Africa, where more than a dozen species are found. This distribution in *Lecteria* provides the strongest known evidence of a relationship between the faunas of Tropical America and Africa as evidenced in the family Tipulidae. Such a type of distribution would be readily explainable by the Wegener hypothesis of continental displacement and the antiquity of the family, as now appreciated, adds support to such a hypothesis. Thus, the Baltic Amber, formerly considered to be Lower Oligocene, with an estimated age of from 35,000,000 to 40,000,000 years, is now considered to be much older, probably Lower Eocene, with an age of perhaps 60,000,000 years. As discussed in detail by the present writer (Crane-flies of the Baltic Amber, *Bernsteinforschungen*, 2: 1-135, 168 figs.; 1931) the Tipulid fauna preserved in the Baltic Amber was evidently as rich and diversified in the Samland of that period as it is in the same area of northern Europe at the present time. Furthermore, virtually every genus and subgenus in this family known to occur in the Baltic Amber is still living, attesting to the vast antiquity and persistence of the family. Besides the two subgenera above discussed, there is a third, *Neolecteria*, known only from Borneo, still further complicating our knowledge and interpretation of geographical distribution.

The immature stages of any species of *Lecteria* remain undiscovered.

List of Species

Lecteria

- armillaris* (Fabricius). — Central America, Panama, Peru, Brazil.
(calopus Walker, see *armillaris*).
matto-grossae Alexander. — Southern Brazil.

Psaronius

- abnormis* (Alexander). — Bolivia, Paraguay, northern Argentina.
brevisector Alexander. — Eastern Brazil.
brevitibia (Alexander). — Amazonian Brazil.
fuscipennis (Alexander). — British Guiana, eastern Brazil.

legata, sp. n. — Southeastern Brazil.

(*liturata* Enderlein, see *obscura*).

manca (Alexander). — Amazonian Brazil.

obliterata (Alexander). — British Guiana.

obscura (Fabricius). — British Guiana, Brazil.

pallipes (Alexander). — Amazonian Brazil.

pygmaea (Alexander). — Venezuela, British Guiana, Amazonian Brazil.

triangulifera (Alexander). — Amazonian Peru.

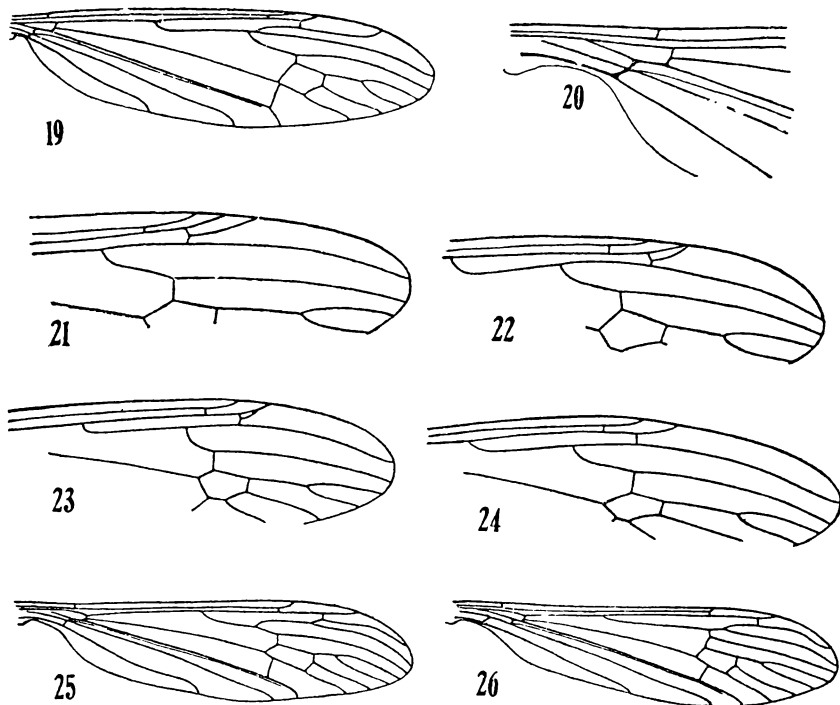


Fig. 19. *Lecteria (Lecteria) armillaris* (Fabricius); venation. — Fig. 20. The same; basal cells of wing and arculus. — Fig. 21. *Lecteria (Psaronius) pallipes* (Alexander); venation. — Fig. 22. *Lecteria (Psaronius) triangulifera* (Alexander); venation. — Fig. 23. *Lecteria (Psaronius) obliterata* (Alexander); venation. — Fig. 24. *Lecteria (Psaronius) abnormis* (Alexander); venation. — Fig. 25. *Pseudolimnophila megalops* Alexander; venation. — Fig. 26. *Pseudolimnophila pluto* Alexander; venation.

Lecteria (Psaronius) legata, sp. n.

Belongs to the *manca* group; general coloration buffy, the praescutum with a more brownish central stripe that is divided by a capillary black vitta on the cephalic third of sclerite; femora yellow, the tips narrowly reddish brown; wings narrow, buffy yellow, patterned with pale brown, the areas confined to the vicinity of the veins; *Rs* lying close and parallel to *R*₁.

Male. — Length, about 22 mm.; wing, 14.3 mm.

Rostrum light brown; palpi dark brown. Antennae with the scape brownish yellow, darker at tip; pedicel obscure yellow; basal flagellar segments yellow, the outer ones more infuscated; segments cylindrical or virtually so; longest verticils at near midlength of organ, approximately three times the segment. Head grayish brown; anterior vertex broad.

Pronotum light buffy brown. Mesonotal praescutum buffy, with a more brownish central stripe, this divided by a capillary black vitta on cephalic third of sclerite; lateral stripes very ill-defined; pseudosutural foveae black, very conspicuous; scutum and scutellum gray, patterned with brown, including a central vitta that becomes even more distinct over the mediotergite. Pleura reddish brown, gray pruinose, the anepisternum more infuscated. Halteres with stem pale, knob very weakly infuscated. Legs with the coxae reddish brown, sparsely pruinose; femora yellow, the tips narrowly reddish brown, the amount subequal on all legs; tibiae yellow, the tips more narrowly darker brown; tarsi obscure yellow, the outer tarsal segments infuscated. Wings much narrower than in *manca*, the cells correspondingly narrowed; ground color buffy yellow, patterned with pale brown, the marks including arculus, origin of *Rs*, cord, outer end of cell *1st M*₂, fork of *M*₁₋₂, tip of *Sc* and outer two-thirds of cell *C*; narrow brown washes in outer end of cell *R*₂, along veins *Cu* and *2nd A*, and as a complete border in cell *2nd A*; veins yellow, darker in the patterned areas. Venation: *Rs* lying close and parallel to *R*₁; *Sc*₁ ending before the level of *R*₂; basal section of *R*₅ approximately four times *r-m*; *m-cu* at two-thirds the length of *M*₃₋₄.

Abdomen elongate, as in the subgenus, chiefly reddish brown, the outer segments with a more clearly defined central stripe.

Habitat: Southeastern Brazil.

Holotype, ♂, Rio de Janeiro, Federal District, September 10, 1942 (Lerio Gomes).

Among the various regional species that have vein *R*₃ of the wings lacking, comprising the so-called *manca* group, and including *Lecteria* (*Psaronius*) *abnormis* (Alexander), *L. (P.) brevisector* Alexander, *L. (P.) brevitibia* (Alexander), *L. (P.) manca* (Alexander) and *L. (P.) obliterated* (Alexander), the present fly is closest to *manca*, differing in the wing characters above described and in the pattern of the body, legs and wings.

Pseudolimnophila Alexander

Limnophila (*Pseudolimnophila*) Alexander; Cornell Univ. Mem. 25: 917; 1919; (type *luteipennis* Osten Sacken).
Pseudolimnophila Alexander; *ibid.* 38: 848; 1920.

Head strongly narrowed and prolonged behind. Antennae short or of moderate length in both sexes; flagellar verticils long and conspicuous. Pronotum large and massive, the scutum and scutellum well separated, the former produced cephalad as a short flange overlapping the side of the head. Tuberculate pits and pseudosutural foveae both strongly developed but sometimes pale in color. Wings with *Rs* of moderate length, arcuated to angulated and spurred at origin; *R*₂₋₃₋₄ long to very long, in cases exceeding *Rs* in length (as *megalops*, Fig. 25), in other species (as *pluto*, Fig. 26) much shorter; radial and medial veins beyond cord generally long and sinuous, veins *R*₃ and *R*₄ extending generally parallel to one another for most of their lengths, diverging only near their outer ends; base of cell *R*₄ lying proximad of the other elements of the anterior cord; in cases (as *supplementa*), with a supernumerary crossvein in cell *R*₃; cell *M*₁ usually present, more rarely lacking (as *noveboracensis*, Nearctic); *m-cu* well beyond the fork of *M*; vein 2nd *A* curved strongly into the wing margin; anterior arculus preserved, placed at a moderate distance beyond h. No squamal setae. Abdominal tergites with weak transverse subbasal impressions, somewhat as in *Epiphragma*. Male hypopygium with the outer dististyle long and slender, narrowed into a long apical spine, the style exceeding the inner dististyle in length.

Besides the Neotropical species listed below, there are numerous representatives of the genus throughout the Holarctic and Ethiopian Regions, including Madagascar, as well as in the mountainous sections of the Oriental Region.

The immature stages, as known, live in wet or saturated organic earth.

It may be noted that while the structural characters of the adults closely approach those of the typical species of the genus *Limnophila* Macquart (see Part V of this series of Notes), the larval and pupal structures in the two groups indicate that the two genera are distinct.

List of Species

luteipennis (Osten Sacken); genotype. — Mexico and Central America, northward in the Nearctic Region.

megalops Alexander. — Southeastern Brazil.

pluto Alexander. — Ecuador.

supplementa Alexander. — Southeastern Brazil.

Polymera Wiedemann

Polymera Wiedemann; Diptera exotica, p. 40, fig.; 1821; (type *fusca* Wiedemann).

There is one further subgenus:

Polymerodes Alexander; Can. Ent., 52: 143; 1920; (type *parisht* Alexander).

Rostrum short; head not at all narrowed posteriorly; anterior vertex broad. Antennae of males of all local species greatly elongated and with the flagellar segments nodulose in various manners (Figs. 31-33); in cases (as *prolixicornis*), antennae much longer than the body. The simplest condition of the antennae is found in species such as *niveitarsis* (Fig. 31) and related forms, where the segments are elongate-cylindrical but virtually unmodified, with at most a slight basal swelling; here the very long verticils are distributed over the entire length of the segment. The majority of the species (as *obscura*, Fig. 32) have the flagellar segments beyond the first strongly binodose, with whorls of verticils at the nodes, the segments being strongly narrowed at midlength and at either end to produce a false multisegmented appearance. It was this apparent increase in number of antennal segments that suggested the generic name to Wiedemann who believed that the antennae of the males were 28-segmented, instead of the 16 segments actually present. In *nodulosa* (Fig. 33) there is a single very large basal swelling that bears the verticils, the remainder of each segment being gradually narrowed to the outer end. Certain species show very vague indications of a trinodose flagellar segment. A Japanese species (*parvicornis* Alexander) and the females of all other known forms have the antennae short and unmodified.

Pronotum reduced; tuberculate pits present, slightly removed from the anterior margin, linear; pseudosutural foveae appearing as linear impressed lines extending from the margin inward. Legs with tibial spurs long and conspicuous in the typical subgenus, lacking in the subgenus *Polymerodes*; claws very small and simple; legs often patterned with white, especially the outer tarsal segments. Wings (Figs. 27-30) having a characteristic venation that is very like the Pediciine subgenus *Dicranota* Zetterstedt, particularly the subgenera *Rhaphidolabis* Osten Sacken and *Plectromyia* Osten Sacken; vein R_{2-3-4} (petiole of cell R_3) present; vein R_2 preserved; cell M_1 present but small in virtually all species of the typical subgenus, lacking in *Polymerodes* and a few members of *Polymera* s. s.; cell M_2 open by the atrophy of m in all known species with the exception of *clausa* where cell 1st M_2 is closed; cell 2nd A broad. Macrotrichia of veins conspicuous. Wings commonly unpatterned, crossbanded in

hirticornis, *superba*, and others, variously spotted in *microstictula*, *obscura*, and others. Male hypopygium with the basistyles elongate, the two dististyles terminal in position, having an appearance somewhat as in *Paradelphomyia*, some *Limnophila*, and others.

It should be re-emphasized that females in the subgenus *Polymerodes*, lacking tibial spurs and having lost cell M_1 of the wings, very closely resemble species of the Eriopterine genus *Erioptera* Meigen and run to this latter group by means of existing keys. Such species are most readily told by the reduced meron in the case of *Polymera*.

Polymera is one of the most characteristic genera of Tipulidae throughout Tropical America. Two species occur in the southeastern Nearctic Region, members of the genus thence ranging southward into Paraguay, Bolivia and northern Argentina. A few species occur in the Antilles, including the Greater Antilles, but none is found as far south as Chile. Members of the genus are most characteristic of the Tropical and Subtropical Zones. A single species, *parvicornis* Alexander, is known from Japan and, despite its short antennae, seems to be correctly referred to this genus. A further species, *magnifica* Meunier, is known from the Baltic Amber (Lower Eocene), attesting to the antiquity of the genus.

The immature stages of the two Nearctic species of *Polymera* have been well described by Rogers (Occas. Papers Mus. Zool., Univ. Michigan 268: 1-13, 2 pls.; 1933; Ecol. Mon., 3: 1-74, 25 figs.; 1933). The carnivorous larvae of *Polymera* (*Polymera*) *georgiae* Alexander live in saturated silt, particularly the black, largely organic mud found at the margins of small pools and lake shores that are grown over with herbage. The related *P. (P.) rogersiana* Alexander more prefers saturated sand-clay in seepage areas. From his study of the larvae and pupae, Rogers considers that the genus should be placed among the higher Hexatomini, probably in the subtribe Limnophilaria. He finds that the immature stages show the closest affinities with *Limnophila* Macquart (Part V of this series of Notes). On the basis of the venation, in conjunction with the evidence of the immature stages, I would place the genus in the Limnophilaria, as suggested, but in a low position to indicate their suggested relationship to the more primitive Hexatomine genera discussed in this report.

List of Species

Polymerodes

- catharinae* Alexander. — Southeastern Brazil.
conjuncta Alexander. — Eastern Brazil.
conjunctoides Alexander. — Amazonian Brazil, Ecuador, Peru.
evanescens, sp. n. — Southeastern Brazil.
minutissima Alexander. — Ecuador.
parishi Alexander. — Brazil, Paraguay.
tasioceroides, sp. n. — Southeastern Brazil.

Polymera

- albitarsis* Williston. — Lesser Antilles (St. Vincent).
albitarsis dominicae Alexander. — Lesser Antilles (Dominica).
albogeniculata Alexander. — Ecuador.
albogenualis Alexander. — Ecuador.
anticalba Alexander. — Southeastern Brazil.
bruchii Alexander. — Northern Argentina.
chiriquiensis Alexander. — Panama.
cinereipennis Alexander. — Paraguay.
clausa Alexander. — Ecuador.
crystalloptera Alexander. — Amazonian Peru.
fusca Wiedemann. — Brazil.
fuscitarsis Alexander. — Southeastern Brazil.
geniculata Alexander. — Puerto Rico.
grisea Alexander. — Panama.
hirticornis (Fabricius). — Brazil: "South America" — Fabricius.
honesta Alexander. — Mexico.
inornata Alexander. — British Guiana.
leucopeza Alexander. — Mexico.
melanosterna Alexander. — Southeastern Brazil.
microstictula Alexander. — Peru, Brazil, Paraguay.
minutior Alexander. — Ecuador.
monosticta, sp. n. — Peru.
nimbipennis Alexander. — Ecuador.
niveitarsis Alexander. — Guatemala, Panama, Ecuador, Venezuela, Surinam, Brazil.
nodulifera Alexander. — Mexico.
obscura Macquart. — Cuba; Mexico, southward to Brazil, Bolivia.
ominosa Alexander. — Colombia.
pleuralis Alexander. — Brazil, Peru.
prolixicornis Alexander. — Mexico, Salvador.
pulchricornis Alexander. — British Guiana.
regina Alexander. — Paraguay, southeastern Brazil.
scclerosa, sp. n. — Bolivia.
sordidipes Alexander. — Colombia.
subsuperba Alexander. — Venezuela, Paraguay.
superba Alexander. — Panama, Ecuador, Brazil.
superba discalis Alexander. — Paraguay.
thoracica Alexander. — Brazil.
tibialis Alexander. — Eastern and southeastern Brazil.
unipunctata Alexander. — Northwestern Argentina.
verticillata, sp. n. — Southeastern Brazil.

Polymera (Polymerodes) evanescens, sp. n.

Size small (wing, male, about 3.5 mm.); general coloration dark brown or brownish black; male antennae elongate, exceeding the wing in length; wings with a faint brownish tinge; *Rs* relatively short, arcuated, less than one-half longer than R_{2-3} ; cell M_1 lacking or rarely preserved, in the latter case very small.

Male. — Length, about 2.8-3 mm.; wing, 3.4-3.6 mm.; antenna, about 4.1-4.2 mm.

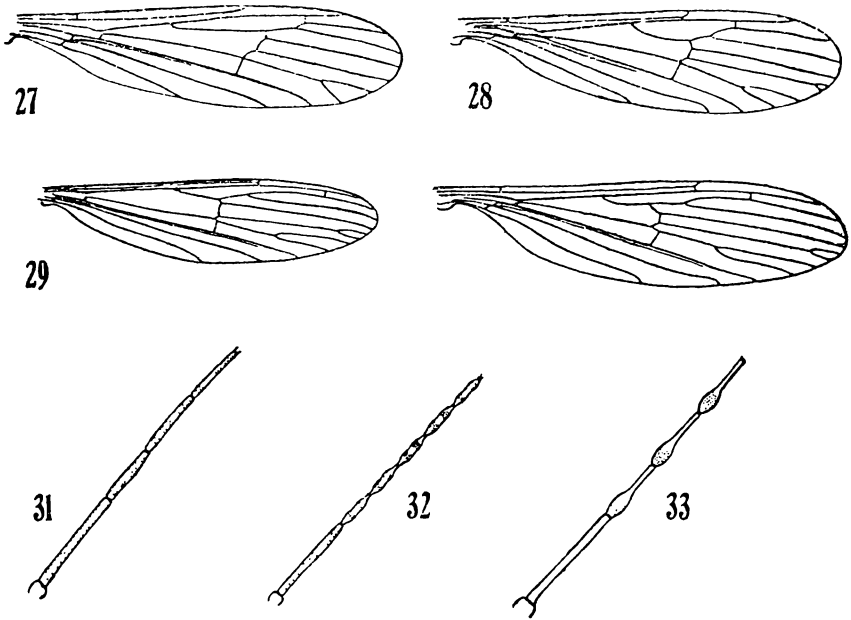


Fig. 27. *Polymera (Polymerodes) catharinae* Alexander; venation. — Fig. 28. *Polymera (Polymerodes) evanescens*, sp. n.; venation. — Fig. 29. *Polymera (Polymera) fusca* Wiedemann; venation (holotype). — Fig. 30. *Polymera (Polymera) verticillata* Alexander; venation. — Fig. 31. *Polymera (Polymera) niveltarsis* Alexander; male antennae, segments 2-6. — Fig. 32. *Polymera (Polymera) obscura* Macquart; male antennae, segments 2-7. — Fig. 33. *Polymera (Polymera) nodulosa* Alexander; male antennae, segments 2-6.

Rostrum and palpi black. Antennae (male) elongate, as shown by the measurements, exceeding in length either the body or wing, black throughout; individual flagellar segments elongate, binodose, with conspicuous outspreading verticils at the nodes. Head dark brown, opaque; anterior vertex broad.

Thorax almost uniformly dark brown or brownish black. Halteres dirty white, the knobs a trifle darker. Legs with the coxae and trochanters testaceous brown; remainder of legs dark brown, the tarsi vaguely to scarcely paler. Wings (Fig. 28) with a faint brownish tinge, unpatterned; veins brown. Venation: *Rs* relatively short, arcuated, less than one-half longer than vein

R_{2-3} ; cell M_1 lacking or, in cases, and including one wing of the holotype but not the other, present but very small, the majority of the type series without this cell.

Abdomen, including hypopygium, brownish black.

Habitat: Southeastern Brazil.

Holotype, ♂, Nova Teutonia, Santa Catharina, October 3, 1944 (Plaumann). Paratopotypes, several ♂♂, October 3-23, 1944 (Plaumann).

The most similar species is *Polymera (Polymerodes) catharinae* Alexander, which differs in all details of venation, as shown by the drawing (Fig. 27). The relative proportions of veins R_s , R_{2-3-4} and R_{2-3} .

Polymera (Polymerodes) tasioceroides, sp. n.

Size small (wing, male, less than 4 mm.); thorax almost uniformly very light brown, the pleura still paler, brownish yellow; antennae of male elongate, approximately one-half longer than the wing; wings grayish; R_s relatively short, arcuated; cell M_1 distinctly preserved.

Male. — Length, about 3-3.2 mm.; wing, 3.5-3.8 mm.; antenna, about 5.1-5.3 mm.

Rostrum pale brown; palpi darker. Antennae (male) elongate, as shown by the measurements, approximately one-half longer than the wing; scape and pedicel yellow, flagellum dark brown; flagellar segments elongate, binodose, the long nodes with very long outspreading verticils, the longest subequal to or longer than the segments. Head dark brown.

Thorax almost uniformly very light brown, the central portion of praescutum a trifle more darkened; pleura more brownish yellow, unpatterned. Halteres pale, the knob weakly darkened. Legs with the coxae and trochanters yellow; remainder of legs brown, the outer tarsal segments somewhat paler brown; tibiae without spurs but with a short ctenidium. Wings relatively narrow, grayish, unpatterned; veins pale brown; macrotrichia darker. Venation: Sc_1 ending about opposite three-fourths R_s , Sc_2 longer, close to its tip; R_s relatively short, arcuated; R_{2-3-4} straight, a little longer than R_{2-3} or subequal to R_{1-2} ; cell M_1 distinctly preserved; $m-cu$ at or very close to the fork of M ; anterior arculus preserved.

Abdomen dark brown, the sternites and hypopygium a trifle paler, brownish yellow.

Habitat: Southeastern Brazil.

Holotype, ♂, Nova Teutonia, Santa Catharina, October 5,

1944 (Plaumann). Paratopotypes, several ♂♂, October 5-23, 1944 (Plaumann).

The present fly is quite distinct from the various species of the subgenus *Polymerodes* in the constant retention of cell M_1 of the wings. It is similarly distinct from other small forms allied to *Polymera* (*Polymerodes*) *conjuncta* Alexander, *P. (P.) evanescens*, sp. n., and others by the pale color of the thorax, including the brownish yellow unpatterned pleura.

Polymera (Polymera) fusca Wiedemann.

Polymera fusca Wiedemann; Diptera exot., 1: 44; 1821.

The type, a female, was collected in Brazil, without further data, and is preserved in the Winthem Collection of the Vienna Museum. In 1921 I was able to study this type through the kindness of Dr. Hans Zerny.

The specimen is badly broken, the abdomen entirely lacking; of the legs a single fore leg remains, this broken beyond the tibia.

The wing measures 7.6 mm. The following further notes on the type are given. Head and antennae brown. Mesonotum light brown, the dorsum badly injured in pinning. Pleura shiny brownish yellow, unpatterned. Wings (Fig. 29, drawn from the holotype) conspicuously tinged with light yellow; veins dark brown. Venation as in *niveitarsis*, differing in the arrangement and proportions of the veins forming the cord; *m-cu* variable in position, even in the single type specimen, from about one-third to nearly its own length beyond the fork of *M*.

There can be little question but that the closest allies of this species are *Polymera (Polymera) niveitarsis* Alexander, *P. (P.) anticalba* Alexander, and similar forms.

Polymera (Polymera) monostica, sp. n.

Size large (wing, male, 8 mm.; antenna, 11.5 mm.); mesonotum light brown, restrictedly patterned with darker; antennal segments binodose, the segments weakly bicolored; thoracic pleura chiefly blackened, the color involving the fore coxae; femora obscure brownish yellow, deepening to a narrow brown ring before the yellow apex; wings yellowish brown, with a restricted brown cloud on cord; R_{2-3-4} and R_{1-2} nearly equal in length, either about two-thirds the suboblique *Rs*; cell M_3 exceeding its petiole in length.

Male. — Wing, 8 mm.; antenna, about 11.5 mm.

Rostrum yellow; palpi a trifle darker. Antennae (male) elongate, nearly one-half longer than the wing; scape dark brown;

flagellar segments weakly bicolored, obscure yellow, the nodes of the segments darker, the outer segments more uniformly darkened; segments binodose, with unusually long outspreading verticils from the nodes. Head dark brownish gray, vaguely patterned with darker.

Pronotum and mesonotum light brown; lateral pretergites restrictedly pale yellow; praescutum restrictedly patterned with darker, most evident on the posterior interspaces; scutal lobes darkened; mediotergite with cephalic third pruinose, the posterior two-thirds obscure yellow, with a capillary brown median vitta; pleurotergite chiefly obscure yellow. Pleura chiefly blackened, appearing as a very broad stripe involving almost the entire pleura with the exception of the extreme dorsal pteropleurite and the ventral sternopleurite and meron; dorsopleural membrane more obscured. Halteres with stem obscure yellow, knob weakly darkened. Legs with coxae and trochanters yellow, the fore coxae narrowly darkened basally; femora obscure brownish yellow, deepening to a narrow brown ring before the narrower yellow tip; tibiae yellowish brown, the tips blackened; basitarsi weakly darkened at proximal end, the remainder of tarsi paling to cream yellow. Wings with a yellowish brown tinge, with a restricted darker brown cloud on cord; veins yellowish brown, a little darker in the central clouded portion. Venation: R_{2-3-4} and R_{1-2} nearly equal in length, either about two-thirds the suboblique R_s ; cell M_3 exceeding its petiole; cell $2nd\ A$ wider than in *unipunctata*.

Abdomen broken.

Habitat: Peru.

Holotype, ♂, Huanuco, altitude 2000 meters, October 5, 1937 (Woytkowski).

Polymera (Polymera) monosticta is very close to the southern Andean *P. (P.) unipunctata* Alexander, differing only in slight details of coloration and venation, as described above.

Polymera (Polymera) scelerosa, sp. n.

Closely allied to *albogenualis*; wings narrow, strongly infuscated; antennae shorter, with the individual segments correspondingly shortened; *m-cu* slightly oblique, placed at a different angle from *r-m*.

Male. — Length, about 5.5 mm.; wing, 6.2×1.6 mm.; antenna, about 9 mm.

Allied to *albogenualis*, differing especially in the narrow,

strongly infuscated wings, with slight further distinctions of color and structure.

Rostrum and palpi brown. Antennae (male) elongate, approximately one-half longer than the wing; scape dark brown, pedicel testaceous; first flagellar segment chiefly obscure yellow, succeeding segments bicolored, dark brown on the nodes, the ends whitened, the apices more broadly so; the short space between the nodes only slightly infuscated; individual flagellar segments shorter than the corresponding ones of *albogenualis*, the longest verticils a little shorter. Head dark brown.

Pronotum and anterior sclerites of mesonotum almost uniformly medium brown, the scutellum and postnotum slightly darker. Pleura chiefly black, producing a broad dorsal stripe involving more than half of the fore coxae; ventral half of the sternopleurite, with the middle and hind coxae yellow. Halteres dusky, the base of stem restrictedly pale. Legs with the coxae as described above; trochanters testaceous; femora pale brown, the bases restrictedly paler, the tips narrowly but conspicuously snowy white; tibiae pale brown, the base narrowly, the tip more broadly white; fore and middle basitarsi infuscated, the outer third and remainder of tarsi white; posterior tarsi uniformly whitened. Wings narrow, as compared with *albogenualis* (compare dimensions above), very strongly tinged with brown; veins and macrotrichia darker brown. Venation: Much as in *albogenualis*, the cells narrower, conforming to the narrow wings; *m-cu* slightly oblique, at a different angle from *r-m*; in *albogenualis*, *m-cu* more transverse, in the same course as *r-m*.

Abdomen, including hypopygium, brownish black to black.

Habitat: Bolivia.

Holotype, ♂, Buenavista, Santa Cruz (Francisco Steinbach).

The comparisons with *Polymera (Polymera) albogenualis* Alexander have been given above.

Polymera (Polymera) verticillata, sp. n.

Mesonotum almost uniformly pale brown; dorsal pleurites covered by a broad darker brown stripe, the sternopleurite pale yellow; antennae (male) a little longer than the wing, the flagellar-segments binodose, the nodes with verticils of unusual length, the longest exceeding twice the length of the segment; legs uniformly brown; wings with a strong brownish tinge, unpatterned; *Rs* from one and one-half to slightly less than twice as long as R_{2-3-4} .

Male. — Length, about 5.5 mm.; wing, 6.5 mm.; antenna, about 6.8 mm.

Female. — Wing, 6.3 mm.

Rostrum obscure yellow; palpi pale brown. Antennae (male) brown, the scape and pedicel a trifle paler; flagellar segments elongate, binodose, the nodes with outspreading verticils of very unusual length, the longest more than twice the segments themselves; outer flagellar segments a little more elongate than the more basal ones but still much shorter than in *fuscitarsis*, the binodose nature persisting to the penultimate segment. In *fuscitarsis*, the flagellar verticils are only about one-half longer than the segments, on the elongate outer ones subequal in length to the segments or shorter. Head dark gray; anterior vertex reduced to a narrow strip that is about one-third to one-fourth as wide as the diameter of scape.

Pronotum testaceous yellow. Mesonotum almost uniformly pale brown, the lateral praescutal border and adjoining membrane pale yellow. Dorsal pleurites with a broad darker brown longitudinal stripe extending from the cervical region to and including the postnotum; sternopleurite pale yellow. Halteres weakly infuscated, base of stem narrowly yellow. Legs with the fore coxae weakly infuscated, the remaining coxae clear yellow; trochanters testaceous; remainder of legs uniformly brown. Wings (Fig. 30) with a strong brownish tinge, unpatterned; veins brown, macrotrichia darker; veins more conspicuous than in *fuscitarsis*, the macrotrichia longer and stronger, especially in the male. Venation: Sc_1 ending shortly beyond the fork of R_{2-3-4} , Sc_2 not far from its tip; R_s from one and one-half to slightly less than twice R_{2-3-4} ; R_{1-2} subequal to or longer than R_s ; R_{2-3-4} about three times $r-m$; cell M_1 less than one-third as deep as cell M_3 ; $m-cu$ about one-half its length beyond the fork of M .

Abdomen, including hypopygium, brownish black.

Habitat: Southeastern Brazil.

Holotype, ♂, Friburgo, Rio de Janeiro, altitude 1055 meters, November 1942 (Lerio Gomes). Allotype, ♀, Terezopolis, Serra dos Orgãos, altitude 1000 meters, September 1942 (Gomes).

The most similar described species is *Polymera (Polymera) fuscitarsis* Alexander, which similarly has the legs uniformly brown. The chief differences between the two flies is found in the antennae, as compared above. In *fuscitarsis*, the antennae are longer, with shorter verticils, and with several of the outer segments unusually long and virtually simple.