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THE HELEOMYZID FLIES OF AMERICA NORTH OF MEXICO (DIPTERA: HELEOMYZIDAE)

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Introduction

Adults of the North American Heleomyzidae may be distinguished from all other acalyptrate Diptera by the following combination of characters: postocellar bristles convergent, one or two fronto-orbital bristles, frontal plates present, oral vibrissae present, tibiae with dorsal preapical bristles, costal break near union of subcosta (auxiliary vein) with costa, subcosta entirely separate, costal spines present. In *Borboropsis* Czerny and *Oldenbergiella* Czerny, the dorsal preapical bristles of the tibiae are absent or inconspicuous, as are the costal spines; however, the specimens assigned to these genera appear to be typical heleomyzids in all other respects.

The frontal plates are strips, usually pollinose, which extend forward from the vertex on either side of the front and are differentiated from the surrounding area of the front. Their exact position varies in the subfamilies of Heleomyzidae.

Although the male terminalia have been used to some extent in the taxonomy of the Heleomyzidae and are sometimes mentioned briefly in species descriptions, illustrations or detailed accounts of their structure have for the most part been inadequate. However, Collart (1933, 1940) published some excellent illustrations of certain species

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of *Amoebaleria* and *Heleomyza*. An attempt is made here to give added emphasis to the male terminalia and in certain cases to use them as a basis for taxonomic discrimination. I have followed Crampton and others (1942, p. 76) in using "terminalia" for indicating the genital and post-genital segments, and have adopted the terminology used by Steyskal (1957) for the component structures. The male terminalia are not always symmetrical; therefore, the figures drawn from the left side will not compare exactly with specimens viewed from the right side of the insect. Most of the figures were drawn from cleared specimens, with the result that spines, setulae, etc. which occur on the medial side of a structure may appear in a lateral view of that structure. Because it is usually necessary to clear the terminalia before examining them, this method of illustration makes the figures coincide more closely with the actual appearance of the specimens.

The cheek-eye ratio had been utilized previously to a very limited extent in heleomyzid taxonomy, but in certain genera it seems to have some value in species discrimination. The ratio was obtained throughout the present study by viewing the head in lateral profile and by measuring the greatest vertical height of the cheek (usually along the posterior margin), which was then divided by the greatest vertical height of the eye.

Family limits have been variously placed with respect to the Heleomyzidae, Trixoscelidae, and Chyromyidae. Czerny (1927a) advocated treating both the Trixoscelidae and Chyromyidae as subfamilies of the Heleomyzidae, although in his 1924 monograph he included the Heleomyzidae only in the strict sense. Curran (1934) included the Trixoscelidae as a part of the Chyromyidae and separated both from the Heleomyzidae.

The Chyromyidae differ in several basic characters from both the Heleomyzidae and Trixoscelidae, namely in having poorly developed oral vibrissae (Collin, 1943, doubts that they are homologous with the oral vibrissae of the other groups), poorly developed costal spines, and no dorsal preapical bristles on the tibiae. These differences may be considered sufficient grounds for excluding the Chyromyidae from the Heleomyzidae.

The Trixoscelidae were separated from the Heleomyzidae and treated as a distinct family by Frey (1921), Hendel (1928), Séguy (1950), and Melander (1952). Czerny (1927a), Malloch (1930), Collin (1943), and Colyer and Hammond (1951) united the two groups under the Heleomyzidae. The Trixoscelidae differ from the Heleomyzidae in having the ocellar bristles placed laterad to the fore ocellus rather than between the fore and hind ocelli. They differ further in having frontal plates which reach the frontal suture,

whereas these structures are abbreviated in the Heleomyzidae. Aside from these characters, there seems to be no more differentiation between the Trixoscelidae and Heleomyzidae than between the subfamilies Heleomyzinae and Suilliinae. Furthermore, the only known data on the biology of trixoscelids show them to be inhabitants of bird nests (Collin, 1943; Ryckman, 1953; Lee and Ryckman, 1954), a character which they have in common with many of the Heleomyzinae. The question of separating the Trixoscelidae from the Heleomyzidae appears to be highly subjective at the present time. Because of this and the fact that there is a recent paper (Melander, 1952) which deals with the species of Trixoscelidae in North America, it seems best to concur with those who would consider the family distinct and to exclude the Trixoscelidae from further consideration in the present work.

I have followed Aldrich (1926), Sabrosky (1949), and James and Huckett (1952) in using the name Heleomyzidae, based upon the genus *Heleomyza*, erected by Fallén in 1810 to include *serrata* Linnaeus and three unnamed species. In 1820, Fallén included *serrata* Linnaeus in the genus *Helomyza*, without reference to the earlier spelling. Czerny (1924, p. 1) attempted to justify the emendation of *Heleomyza* to *Helomyza*, but because Fallén did not indicate in either case the intended derivation of the name, the original spelling should be retained.

Czerny's "Monographie der Helomyziden" (1924) and the subsequent "Ergänzungen" (1926, 1927b, 1929–33, 1935, 1937) give a virtually complete resume of taxonomic work on the Heleomyzidae. However, certain shortcomings seriously limit the usefulness of Czerny's monograph and supplements: For one thing, the species which have been described in 1940–60 were not treated by Czerny; furthermore, Czerny in many cases had to quote original descriptions without having the benefit of examining types or even specimens. Unfortunately, it is often impossible to identify the species from these original descriptions, and after examining the types of Loew, Aldrich, Garrett, and others, I find it necessary to correct several synonymies made by Czerny. It must be recognized, however, that Czerny's treatment of the group has provided invaluable assistance in the present study.

Brackets around question marks preceding items in synonymies indicate that the present author, not the previous user of the name, questions the synonymy.

I wish to acknowledge the cooperation of the many institutions and private collectors who loaned material or allowed me to visit and examine their collections. I am especially indebted to several individuals who made it possible for me to examine type material. These

are Mr. Curtis W. Sabrosky of the U.S. Department of Agriculture at the U.S. National Museum, Dr. J. R. Vockeroth of the Canadian Department of Agriculture, Dr. C. H. Curran of the American Museum of Natural History, Dr. William L. Brown, Jr., of Harvard University, and Mr. C. B. D. Garrett, who permitted me to examine the many important types in his private collection.

I am indebted to Dr. Maurice T. James for the many helpful suggestions given me during the course of this study, and to Mr. George C. Steyskal, who gave assistance in the interpretation of the male terminalia.

Taxonomic Treatment

The division of the Heleomyzidae into the subfamilies Suilliinae and Heleomyzinae is supported by biological as well as morphological characters. As noted by Bezzi (1911), the larvae of the Suilliinae develop in fungi, whereas those of the Heleomyzinae are found in a variety of other habitats, including nests of birds and the burrows of small mammals. They are separated by the following key:

Frontal plates oblique, directed inward anteriorly and distinctly separated from the eye margins; propleural bristle absent; sixth vein not reaching wing margin; 1 fronto-orbital bristle on each side . . . . . SUILLIINAE (p. 498)

Frontal plates parallel to eye margin, not oblique, propleural bristle present; sixth vein reaching wing margin; 1 or 2 fronto-orbital bristles on each side. HELEOMYZINAE (p. 510)

Subfamily Suilliinae

Key to the Genera of Suilliinae

1. Humeral bristle present . . . . . **Allophyla** (p. 508)
   Humeral bristle absent 2
2. One pair of dorsocentral bristles . . . . . **Porsenus** (p. 498)
   Five pairs of dorsocentral bristles . . . . . **Suillia** (p. 499)

Genus *Porsenus* Darlington

Porsenus Darlington, *in* Aldrich and Darlington, 1908, p. 69.—Czerny, 1924, p. 64.

This genus is known only from the single type female of *Porsenus johnsoni* Darlington.

Porsenus johnsoni Darlington

Porsenus johnsoni Darlington, *in* Aldrich and Darlington, 1908, p. 70.—Czerny, 1924, p. 64.

I have seen the type of this species (USNM Type 29348). It agrees with the original description of the genus and species, except as follows: supra-alar bristles 1+1; scutellum with a pair of strong apical bristles, a much weaker lateral bristle on one side only (no

evidence of such a bristle on the opposite side); anterior crossvein of wing darkened; posterior crossvein very slightly, if at all, darkened.

DISTRIBUTION.—Boston, Mass.; 19 October.

Genus *Suillia* Robineau-Desvoidy

Helomyza Fallén, 1820, p. 3 (part).—Meigen, 1830, p. 47 (part).—Macquart, 1835, p. 410 (part).—Zetterstedt, 1838, p. 764 (part); 1847, p. 2430 (part).—Loew, 1859, p. 17.—Schiner, 1864, p. 23.—Rondani, 1867, p. 116.—Pandellé, 1901, p. 335 (part).—Czerny, 1904, p. 212.—Aldrich and Darlington, 1908, p. 89.—Collin, 1943, p. 237.

Suillia Robineau-Desvoidy, 1830, p. 642.—Czerny, 1924, p. 8; 1927a, p. 6.—Steyskal, 1944, p. 173.

Herbina Robineau-Desvoidy, 1830, p. 698.

Heteromyza Fallén, Zetterstedt, 1838, p. 763 (part).

The preceding key to the subfamilies and the key to the genera of the Suilliinae include the important generic characters of *Suillia*. The general body coloration ranges from pale yellow to reddish brown. Whereas in the Heleomyzinae the arista is bare to pubescent, the arista in the Suilliinae is pubescent to plumose, depending upon the species. The thoracic chaetotaxy is as follows: dorsocentrals 1+4, prescutellar bristles absent, humeral bristle absent, 1 presutural bristle, 2 notopleural bristles, 3 supra-alar bristles, 2 pairs of lateral scutellar bristles; propleural bristle absent, mesopleuron variable, 1 sternopleural bristle, remainder of pleura bare.

Male *Suillia* may be separated on the basis of characters other than the terminalia; however, the shape of the surstylus is generally distinctive.

Key to the Species of *Suillia*

1. Mesopleuron with setae or hairs (may be confined to posterior edge) 2
   Mesopleuron bare 5
2. Scutellum with hairs of dorsum confined to the lateral edges, mostly bare. **apicalis** (Loew)
   Scutellum with hairs widely distributed on dorsum 3
3. Ends of longitudinal veins without distinct infuscations; orbito-antennal spot absent; male with long hairs on ventral side of tibiae and posterior side of metatarsi of fore and middle legs (cf. 9 below) . . . . **longipennis** (Loew)
   Ends of longitudinal veins with distinct infuscations; orbito-antennal spot present 4
4. Arista pubescent, the hairs usually less than twice the diameter of the base of the arista; forefemora dark, may be almost black . . **barberi** (Darlington)
   Arista long pubescent to plumose, the hairs usually more than twice the diameter of the base of the arista; forefemora usually pale . **nemorum** (Meigen)
5. Scutellum bare; wings without infuscations . . . . . **loewi** (Garrett)
   Scutellum with hairs, at least between the marginal bristles; wings with at least faint infuscations 6
6. Cheek-eye ratio 0.25 or less 7
   Cheek-eye ratio 0.3 or greater 9

7. Scutellum with hairs or setae between the marginal bristles only 8
   Scutellum with hairs widely distributed on dorsum . **quinquepunctata** (Say)
8. Eye round . . . . . **limbata** (Thomson)
   Eye higher than wide . . . . . **sororcula** (Czerny)
9. Scutellum with hairs of dorsum confined to basal half or less . **plumata** (Loew)
   Scutellum with hairs widely distributed on dorsum . . . **longipennis** (Loew)

Suillia loewi Garrett

FIGURE 2

Suilla loewi Garrett, 1925a, p. 3.—Czerny, 1930, p. 442.

The absence of wing infuscations and of scutellar hairs or setae usually distinguishes this species from others in the genus.

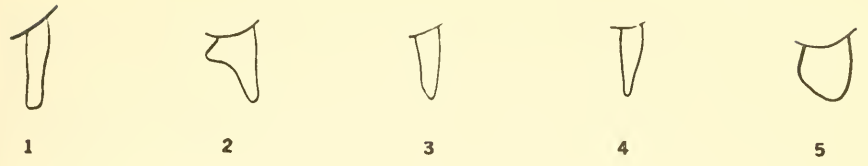
MALE.—Head yellow to yellowish orange, often quite pale on face and genae; front with scattered setae; aristae long pubescent; cheek-eye ratio from 0.25 to 0.33; oral vibrissae strong, buccal setae in about 3 irregular rows; no orbito-antennal spot.

Thorax yellow to yellowish orange; scutellum bare except for 2 pairs of lateral bristles; pleura bare except for sternopleuron, which has a strong bristle just posterior to the middle near the upper margin; several hairs lying near the bristle and 1 or more rows of hairs extending down to the numerous long hairs which lie between the coxae.

Legs yellow, becoming dark at the tips of the tarsi; anterior basitarsus with curved claw on ventral side of distal end; femora markedly swollen, particularly the fore and hind femora; forefemora with a posterodorsal row of bristles and a posteroventral row of bristles which merge with numerous long hairs of the ventral side; midcoxae with long hairs directed ventrad, intermingled with dense black shorter hairs which give a brushlike matted appearance.

Wings hyaline with no infuscations; first longitudinal vein ending at about the level of the anterior crossvein.

FIGURES 1–24.—Structures of the male terminalia of *Suillia*, *Allophyla*, *Borboropis*, *Orbellia*, *Tephrochlamys*, and *Aecothea*. Pile and setulae omitted in figs. 1–13. All views lateral, except those of figs. 20, 22, and 24, which are ventral. Figs. 1–9, left surstyli, X 25: 1, *Suillia bicolor* (Zetterstedt); 2, *S. loewi* Garrett; 3, *S. limbata* (Thomson); 4, *S. sororcula* Czerny; 5, *S. quinquepunctata* (Say); 6, *S. apicalis* (Loew); 7, *S. longipennis* (Loew); 8, *S. plumata* (Loew); 9, *S. barberi* (Darlington). Fig. 10, right surstylus of *S. barberi* (Darlington), X 25. Figs. 11, 12, surstyli of *S. nemorum* (Meigen), X 25: 11, left; 12, right. Figs. 13–19, left surstyli, X 25 (fig. 13) or 50 (figs. 14–19): 13, *Allophyla laevis* Loew; 14, *Borboropsis fulviceps* (Strobl); 15, *Orbellia barbata* (Garrett); 16, *O. petersoni* (Malloch); 17, *O. hiemalis* (Loew); 18, *Tephrochlamys rufiventris* (Meigen); 19, *Aecothea aristata* (Malloch). Fig. 20, epiphallus of *A. arista* (Malloch), X 50. Figs. 21, 22, *A. fenestralis* (Fallén), X 50: 21, left surstylus; 22, epiphallus. Figs. 23, 24, *A. specus* (Aldrich), X 50: 23, left surstylus; 24, epiphallus.



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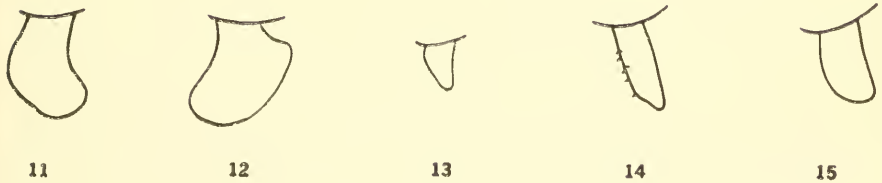

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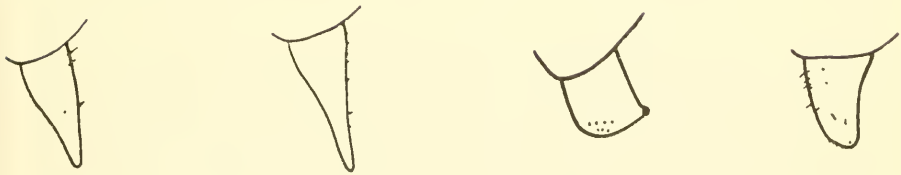

16 17 18 19

20 21 22 23 24

(For explanation see opposite page.)

Abdomen yellow, with tergites darkened along the posterior margins; tergites often more extensively darkened, at least in dried specimens.

FEMALE.—Similar to the male, except no claw on anterior basitarsus, femora only slightly thickened, and no brushlike hairs on the midcoxae.

LENGTH.—4.5–6.0 mm.

DISTRIBUTION.—Alaska, across Canada and northern United States to Newfoundland, south to California, Utah, Colorado, Tennessee; April–October.

REMARKS.—Garrett was apparently the first to recognize that this North American species is distinct from the European *Suillia bicolor* (Zetterstedt). In his original description Garrett pointed out the very conspicuous difference in the male terminalia. He also indicated that the wing veins of *S. loewi* Garrett are dark, rather than yellowish, but I have found this character to be variable in both *S. loewi* Garrett and *S. bicolor* (Zetterstedt). The brushlike matted hairs of the midcoxae of *S. loewi* Garrett are not prominent in *S. bicolor* (Zetterstedt). The terminalia are compared in figures 1 and 2.

Suillia limbata (Thomson)

FIGURE 3

Helomyza limbata Thomson, 1868, p. 569.—Aldrich and Darlington, 1908, p. 91. *Suillia limbata* (Thomson), Czerny, 1924, p. 41.

The relatively narrow cheek (cheek-eye ratio 0.25 or less) is a distinguishing character of *Suillia quinquepunctata* (Say), *S. sororcula* Czerny and *S. limbata* (Thomson). Of these, only *S. limbata* (Thomson) has the eye round in lateral view.

MALE AND FEMALE.—Back of head, ocellar triangle, and frontal plates yellow to reddish orange, often with a grayish pollinosity; front yellowish orange; face, cheeks, and proboscis yellow; antennae yellowish orange, the aristae dark brown to black; aristae plumose; oral vibrissae strong, buccal setae in 2 to 3 irregular rows; orbito-antennal spot absent; eye round; cheek-eye ratio 0.25 or slightly less.

Thorax with dorsum reddish orange; pleura usually lighter than dorsum; scutellum with setae or hairs confined to a small number (usually 1 to 3) on the lateral edge between the bristles; pleura bare except for sternopleuron, which has the usual strong bristle near the upper edge with several setae near it and longer hairs ventrally between the coxae.

Legs yellowish orange, becoming darker distally; forefemora with the usual posterodorsal and posteroventral rows of bristles; mid-

femora with several small bristles on anterior side; hind femora with about 4 strong bristles near the distal end on anterodorsal side.

Wings clouded with brown along crossveins and near the tips of the longitudinal veins.

Abdomen yellowish orange, with tergites darkened along posterior margins.

Length.—5.0–6.0 mm.

Distribution.—Alaska, British Columbia, Saskatchewan, Washington, Idaho, Oregon, California, Arizona, New Mexico, Utah, Colorado; collected during every month except January.

Biology.—*S. limbata* (Thomson) has been reared from the fungi *Lepiota rhacodes* and *Tricholoma* species (Kessel and Kessel, 1939). It has also been taken in a light trap by Wirth (specimens in USNM).

Suillia sororcula Czerny

Figure 4

Suillia sororcula Czerny, 1926, p. 53.

This species was described from a single female from San Mateo County, Calif. Dr. H. Weidner, Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg, informed me that Czerny's type was burned in the air raids of World War II; therefore I have relied entirely on the original description for my concept of the species.

I have seen several specimens from San Mateo and nearby counties which appear to be this species. The species is very similar to *Suillia limbata* (Thomson), including the structure of the male terminalia. In *S. sororcula* Czerny, the cheeks appear to be narrower, the eye is higher than wide and the general body coloration is lighter.

Male and female.—Front yellow to orange; antennae yellowish brown; aristae dark brown to black, except yellowish at base; remainder of head pale yellow, becoming whitish on cheeks; vibrissae strong; a single row of buccal setae, those immediately behind the vibrissae much stronger than the posterior ones; cheek-eye ratio from 0.11 to 0.20.

Thorax yellow, darker reddish orange on mesonotum; scutellum with 1 or more setae laterally between the bristles: legs yellow, tarsi darkened, similar to *S. limbata* (Thomson); wings similar to *S. limbata* (Thomson), except clouding much more faint in most of the specimens I have seen; abdomen yellow to brownish, with hind edges darkened.

Length.—4.5–6.0 mm.

Distribution.—California (Counties of San Mateo, Contra Costa, and Marin); January, April–July.

Suillia plumata (Loew)

FIGURE 8

Helomyza plumata Loew, 1862a, p. 227 (Centuria 2, 88).—Aldrich and Darlington, 1908, p. 90.
Suillia plumata (Loew), Czerny, 1924, p. 37.
Suillia chaetomera Czerny, 1933, p. 236.—Steyskal, 1944, p. 175. New synonymy.

Most of the specimens of this species which have been collected in eastern states have setae on the anterior half of the dorsum of the scutellum. Czerny (1933) described as a new species (*Suillia chaetomera*) a specimen from California which was similar to *S. plumata* (Loew) except that it lacked setae on the dorsum of the scutellum.

During the course of the present study I found that the pilosity of the scutellum in this group is highly variable. For example, in a series of 16 specimens collected on June 21–25 at Ledges State Park, Iowa (J. Laffoon), the number of setae on the dorsum of the scutellum varies from none to as many as thirty. Eastern specimens in the U.S. National Museum show a variation from none to 50. All specimens from the western United States have the dorsum of the scutellum bare, although they are otherwise indistinguishable from the eastern forms. Evidently there are genetic differences among these populations, but reproductive isolation is not indicated. Thus the presence or absence of setae on the dorsum of the scutellum is not sufficient grounds for splitting this group into two species. I have therefore synonymized Czerny's *S. chaetomera* with *S. plumata* (Loew).

I have examined the type (a male) of *S. chaetomera* Czerny. It is a shriveled specimen which was probably not well matured when pinned. It is a paler yellow than most specimens.

MALE AND FEMALE.—Head yellow (often very pale); front, vertex, and third antennal segment sometimes reddish; aristae brown, long, plumose; 3 or 4 irregular rows of buccal setae; cheek-eye ratio from 0.42 to 0.50.

Thorax reddish yellow on mesonotum, paler yellow on pleura; scutellum with none to 50 or more setae on dorsum (mostly on anterior half), several setae laterally between the bristles; mesopleuron bare, sometimes darkened in upper portion; legs yellow, darkened on distal tarsal segments; wings clouded with brown along crossveins and the ends of the second through the fourth longitudinal veins; abdomen yellowish orange with posterior margins darkened, hypopygium yellow.

LENGTH.—4.5–6.5 mm.

DISTRIBUTION.—British Columbia to Nova Scotia, south to California, Kansas, Georgia; May–November.

Suillia quinquepunctata (Say)

FIGURE 5

Helomyza quinquepunctata Say, 1823, p. 97.—Aldrich and Darlington, 1908, p. 91.
Helomyza latericia Loew, 1862a, p. 227 (Centuria 2, 89).
Suillia quinquepunctata (Say), Czerny, 1924, p. 36.

This species resembles *Suillia limbata* (Thomson) and *S. sororcula* Czerny in that the cheek is very narrow, the cheek-eye ratio being 0.25 or less. In *S. quinquepunctata* (Say) the dorsum of the scutellum is almost completely covered with hairs, and serves to distinguish it from the other two species.

MALE AND FEMALE.—Color similar to that of *S. limbata* (Thomson); head higher than wide, the ratio of width to height being about 0.7; third antennal segment ovoid; aristae plumose; about 2 irregular rows of buccal setae; no orbito-antennal spot; cheek-eye ratio 0.25 or less.

Thoracic chaetotaxy similar to *S. limbata* (Thomson), except scutellum is almost completely covered with setae or hairs (may be bare near the base) and the mesopleuron is bare; legs with forefemora thickened, more so in the male; wings with anterior and posterior crossveins and the ends of the second through the fourth longitudinal veins clouded with brown.

LENGTH.—About 6.0 mm.

DISTRIBUTION.—Throughout eastern United States from Ontario to Florida; records as far west as Nebraska, Kansas, and Texas; March–November.

Suillia apicalis (Loew)

FIGURE 6

Helomyza apicalis Loew, 1862a, p. 226 (Centuria 2, 86).
Suillia apicalis (Loew), Czerny, 1924, p. 14.—Steyskal, 1944, p. 175.

In this species the mesopleuron has only a very few setae along the posterior border, and the scutellum has the setae or hairs of the dorsum confined to the lateral edges. This combination of characters will distinguish *Suillia apicalis* (Loew) from related species.

MALE AND FEMALE.—Front yellowish orange; ocellar triangle, vertex, and back of head reddish orange, often with grayish pollinosity; antennae reddish yellow, aristae dark brown to black, short pubescent; third antennal segment ovoid; face, cheeks, and mouth parts yellow; oral vibrissae strong, buccal setae in 2 or 3 irregular rows; no orbito-antennal spot; cheek-eye ratio about 0.33.

Mesonotum reddish orange with faint grayish pollinosity; setae or hairs of scutellum confined to lateral edges; pleura yellowish orange

to yellowish brown; mesopleuron bare except for several setae (about 8 to 15) near the middle of the posterior margin; legs yellowish orange to yellowish brown, becoming darker distally; forefemora with the usual rows of posterodorsal and posteroventral bristles; midfemora with an anterior row of small bristles along the middle and a row of about 4 stronger bristles just below and toward the distal end; hind femora with about 4 or 5 strong bristles in a group near the distal end on the anterodorsal side; wings clouded with brown along crossveins and ends of the second through the fourth longitudinal veins; abdomen yellowish orange, darkened along posterior margins.

LENGTH.—About 6.0 mm.

DISTRIBUTION.—Alaska, Northwest Territories, British Columbia, Oregon, Idaho, Wyoming, Minnesota, Michigan, Ontario, Tennessee, North Carolina, Pennsylvania, New York, New Hampshire, Massachusetts, Maine, Nova Scotia; March–September.

Suillia longipennis (Loew)

FIGURE 7

Helomyza longipennis Loew, 1862a, p. 228 (Centuria 2, 90).
Suillia longipennis (Loew), Czerny, 1924, p. 24.

The long silky hairs on the legs of the male are the outstanding character of this species.

MALE.—Body entirely yellow to yellowish orange, except aristae and posterior margins of abdominal segments brownish; no orbito-antennal spot; aristae plumose; 3 or 4 irregular rows of buccal setae; cheek-eye ratio from 0.40 to 0.45.

Dorsum of scutellum almost completely covered with setae; mesopleuron bare or with a few setae along the middle of the posterior margin; femora and tibiae with long silky hairs on ventral side; fore and middle basitarsi with similar hairs along posterior side; several strong bristles in distal half of middle and hind femora on anterodorsal side; wings usually with crossveins and ends of longitudinal veins not distinctly clouded, but the costal region may be slightly darkened; abdomen yellow, becoming dark brown along posterior margins.

FEMALE.—Similar to male, but lacking the long silky hairs of the legs.

LENGTH.—6.0–7.5 mm.

DISTRIBUTION.—Alaska, Yukon Territory, British Columbia, Idaho, Montana, Minnesota, Wisconsin, Michigan, Tennessee, North Carolina, Virginia, Maryland, Pennsylvania, New Jersey, New York, Ontario, Quebec, Vermont, New Hampshire, Maine, Nova Scotia; June–September.

Suillia barberi (Darlington)

FIGURES 9, 10

Helomyza barberi Darlington, *in* Aldrich and Darlington, 1908, p. 93.
Suillia barberi (Darlington), Czerny, 1924, p. 15.

This species is very similar to *Suillia nemorum* (Meigen). The structure of the male terminalia is the most reliable character for distinguishing *S. barberi* (Darlington). The hairs of the aristae are shorter and the forefemora usually darker in this species.

MALE AND FEMALES.—Head similar to *S. apicalis* (Loew); a dark spot present between the eye and antenna; aristae short pubescent, the hairs usually less than twice the diameter of the base of the arista; cheek to eye ratio from 0.40 to 0.50.

Thorax reddish yellow to dark brown; bristles and setae of mesonotum usually arising from brownish spots; scutellum with setae present over most of dorsum; mesopleuron with setae scattered over most of posterior half; legs with forefemora darkened, almost black (thickened in male); wings strongly infuscated along crossveins and ends of longitudinal veins and along costal margin; abdomen reddish orange to reddish brown.

LENGTH.—5.5–6.0 mm.

DISTRIBUTION.—Throughout western United States and Canada from Alberta to Texas, and from South Dakota, Nebraska, Quebec, and Nova Scotia; February–October.

Suillia nemorum (Meigen)

FIGURES 11, 12

Helomyza nemorum Meigen, 1830, p. 52.—Zetterstedt, 1847, p. 2439.—Loew, 1859, p. 22.—Schiner, 1864, p. 28.—Rondani, 1867, p.123.—Czerny, 1904, p. 223.—Aldrich and Darlington, 1908, p. 93.
Helomyza assimilis Loew, 1862a, p. 226 (Centuria 2, 87).
Suillia assimilis (Loew), Czerny, 1924, p. 18.
Suillia nemorum (Meigen), Czerny, 1924, p. 20.; 1927a, p. 16.

This species is very similar to *Suillia barberi* (Darlington), except as follows: aristae long pubescent to plumose, the hairs usually more than twice the diameter of the base of the arista; forefemora usually pale.

As mentioned above, the structure of the male terminalia is the most reliable character for distinguishing this species from *S. barberi* (Darlington).

Although some variation in the relative length of the hairs of the aristae exists in the specimens which I have assigned to this species, I find an intergradation which prevents me from dividing the specimens into two groups on the basis of this character. Furthermore, I find them all alike so far as male terminalia and other basic char-

acters are concerned. I have examined European specimens of *S. nemorum* (Meigen) and find these indistinguishable from the North American forms. Thus I would consider the North American material which I have examined to be *S. nemorum* (Meigen).

Loew (1862a) described *S. assimilis* from North America, and Czerny considered this species to be distinct from *S. nemorum* (Meigen). I have examined Loew's type (a male) in the Museum of Comparative Zoology at Harvard University. It agrees with European specimens of *S. nemorum* (Meigen).

Steyskal (1944) included both *S. assimilis* (Loew) and *S. nemorum* (Meigen) in his key to *Suillia*. The character used by Steyskal to separate the two forms was the presence or absence of a crossband in the upper third of the eye in living specimens. The crossband was said to be present in *S. nemorum* (Meigen) but absent in *S. assimilis* (Loew). Although the crossband is not present in dried specimens, I have found that in relaxed specimens the crossband is restored, both in American and European forms.

Aldrich (*in* Aldrich and Darlington, 1908, p. 93) agreed, as shown by the following quotation, that these two species are synonymous:

> Loew did not identify *nemorum* from North America, but named our species *assimilis*, stating that it did not differ from *nemorum*, except in having a little shorter plumosity of the arista and general paler color; Czerny identified his American material as *nemorum*, and did not identify *assimilis*, merely quoting the description. . . . From these facts I feel safe in making *assimilis* a synonym of *nemorum*.

DISTRIBUTION.—Alaska, western Canada, and western United States as far south as Arizona and New Mexico; eastward through Montana, South Dakota, Minnesota, Michigan, Ontario, Quebec, and Vermont; May–October.

Genus *Allophyla* Loew

Allophyla Loew, 1859, p. 43; 1862b, p. 127.—Aldrich and Darlington, 1908, p. 98.—Czerny, 1924, p. 63; 1927a, p. 21.

This genus bears a general resemblance to *Suillia*, but is easily separated from it by the presence of a strong humeral bristle in Allophyla. The humeral bristle is absent in *Suillia*.

Contrary to the description of Aldrich and Darlington (1908), there is no propleural bristle in *Allophyla*.

Key to the species of *Allophyla*

Antennae black . . . . . ***atricornis*** Meigen
Antennae yellow (third segment may be darkened) . . . . . ***laevis*** Loew

Allophyla laevis Loew

FIGURE 13

Allophyla laevis Loew, 1862a, p. 225 (Centuria 2, 85).—Aldrich and Darlington, 1908, p. 98.—Czerny, 1924, p. 64.

MALE.—Entire head yellowish orange, darker toward the vertex and lighter toward the cheeks; a single fronto-orbital bristle; fronto-orbital plates oblique; vibrissae weak; 2 or 3 irregular rows of buccal setae; antennae yellowish orange, except for dark brown aristae; third antennal segment sometimes shading to brown; aristae long pubescent; cheek-eye ratio about 0.33.

Thorax uniformly yellowish orange; strong humeral bristle; dorsocentral bristles 1+4; no prescutellar bristles; scutellum bare except for 2 pairs of lateral bristles; pleura without bristles or setae, except sternopleuron, which has one strong bristle in upper hind corner (just caudad of middle of upper margin) and 1 or 2 rows of setae down the middle to the longer hairs between the coxae.

Legs yellowish orange, a little darker distally; hind femur with 3 or more bristles distally on anterodorsal side.

Wings hyaline; first vein ends at or slightly before the level of the anterior crossvein; sixth vein fades out before reaching the wing margin.

Abdomen yellowish brown to dark brown; scattered setae; segments 2–5 each with a row of bristles on the posterior margin.

FEMALE.—Similar to male except for terminalia; bristles of abdomen not so well developed.

LENGTH.—4.0–5.0 mm.

DISTRIBUTION.—British Columbia to Nova Scotia, south to California and Georgia; May–October.

REMARKS.—I have examined the male and female syntypes (Type 13192) in the Museum of Comparative Zoology, Harvard University. They agree with the above description.

Allophyla atricornis (Meigen)

Helomyza atricornis Meigen, 1830, p. 54.—Zetterstedt, 1847, p. 2437.—Schiner, 1864, p. 27.—Pandellé, 1901, p. 342.

Allophyla atricornis (Meigen), Loew, 1859, p. 43.—Meade, 1899, p. 100.—Czerny, 1904, p. 284; 1924, p. 63; 1927a, p. 21.—Collin, 1943, p. 240.

This species is apparently distinguishable from *Allophyla laevis* Loew only by the presence of black antennae. Although *A. laevis* Loew sometimes has the third antennal segment partially brown, I have seen only one specimen with the antennae wholly brownish black. This specimen is a female (in USNM) collected at Anchorage,

Alaska, 21 July 1921, by J. M. Aldrich. This tentative determination is the only record of *A. atricornis* Meigen in North America.

Subfamily Heleomyzinae

Key to the Genera of Heleomyzinae

1. Costal spines and dorsal preapical bristles of tibiae absent or inconspicuous . 2
   Costal spines and dorsal preapical bristles of tibiae present 3
2. Posterior portion of mesopleuron with bristle present. . **Borboropsis** (p. 511)
   Posterior portion of mesopleuron bare . . . . . **Oldenbergiella** (p. 512)
3. Prosternal bristles absent 4
   Prosternal bristles present 17
4. Midtibiae with 1 ventral apical bristle 5
   Midtibiae with several ventral apical bristles 7
5. First vein ending distinctly beyond anterior crossvein 6
   First vein ending at or near the level of anterior crossvein.
   Tephrochlamys (p. 516)
6. Three dorsocentral bristles. . . . . **Heteromyza** (p. 515)
   More than 3 dorsocentral bristles (in North America, fossils only have been recorded) . . . . . **Thelida** (p. 516)
7. Five or more pairs of dorsocentral bristles; 3 pairs of scutellar bristles.
   Orbellia (p. 512)
   Four or fewer pairs of dorsocentral bristles; 2 pairs of scutellar bristles . . 8
8. Anterior crossvein at or before basal fourth of discal cell . **Lutomyia** (p. 530)
   Anterior crossvein near middle of discal cell or beyond 9
9. Midtibiae without bristles except near apex 10
   Midtibiae with several bristles along middle on anterodorsal and posterodorsal surfaces . . . . . **Aecothea** (p. 518)
10. Midfemora with rows of bristles anteriorly . . . . **Eccoptomera** (p. 522)
    Midfemora without rows of bristles anteriorly; only setae or hairs or irregularly placed bristles anteriorly 11
11. Pteropleura with hairs or bristles . . . . . **Pseudoleria** (p. 533)
    Pteropleura bare 12
12. Mesopleura with hairs or bristles . . . . . **Anorostoma** (p. 541)
    Mesopleura bare 13
13. Fronto-orbital bristles equal in length . . . . . **Neoleria** (p. 554)
    Anterior fronto-orbital bristle shorter than posterior bristle 14
14. Arista relatively short, less than 3 times the length of third antennal segment. 15
    Arista relatively long, greater than 3 times the length of third antennal segment. 16
15. Arista clearly pubescent; body mostly yellow in known North American species . . . . . **Spanoparea** (p. 561)
    Arista bare or nearly so; body mostly black in known North American species.
    Morpholeria (p. 564)
16. One strong sternopleural bristle . . . . . **Acantholeria** (p. 565)
    Two (rarely 3) strong sternopleural bristles . . . . **Schroederella** (p. 569)
17. One (rarely 2 or 3) pairs of prosternal bristles; if more than 1 pair of prosternal bristles, then anterior fronto-orbital bristle shorter than posterior bristle 18
    Two or more pairs of prosternal bristles; anterior and posterior fronto-orbital bristles about equal in length 20

18. Pteropleura haired . . . . . **Scoliocentra** (p. 571)
Pteropleura bare 19
19. Fronto-orbital bristles equal in length . . . . . **Anypotacta** (p. 574)
Anterior fronto-orbital bristle shorter than posterior bristle.
Amoebaleria (p. 576)
20. Scutellum bare on dorsum; pteropleura bare (except in *H. difficilis*, new species) . . . . . **Heleomyza** (p. 588)
Scutellum and pteropleura haired . . . . . **Trichochlamys** (p. 595)

Genus *Borboropsis* Czerny

Borboropsis Czerny, 1902, p. 256; 1924, p. 67; 1927a, p. 21.

Certain typical heleomyzid characters are not developed in the genus. The costal spines and the dorsal preapical bristles of the tibiae are either absent or very obscure. Otherwise, the flies are clearly members of the Heleomyzinae.

The genus contains a single described species.

Borboropsis fulviceps (Strobl)

FIGURE 14

Anthomyza fulviceps Strobl, 1898, p. 269.
Borboropsis fulviceps (Strobl), Czerny, 1924, p. 67; 1927a, p. 22.

The following description is based primarily on specimens in the U.S. National Museum, but is in agreement with the description given by Czerny (1924, p. 67).

MALE.—Anterior half of front reddish yellow, becoming blackish posteriorly; fronto-orbital plates and ocellar triangle with a grayish pollinosity; fronto-orbital bristles about equal, with 1 or 2 setae between the bristles; back of head black, lower face and cheeks dirty yellow; basal segments of antennae reddish, third segment black, aristae minutely pubescent; oral vibrissae strong; eyes round; cheek-eye ratio from 0.55 to 0.60; palpi reddish yellow, remainder of proboscis blackish brown.

Thorax black with faint grayish pollinosity; dorsocentrals 2+3 (Czerny, 1924), but only the 2 hindmost clearly longer than the ground hairs; a pair of prescutellar bristles; scutellum bare, except for 2 pairs of lateral bristles; propleural bristle present; mesopleuron with a single bristle and 2 to 5 setae near the bristle; sternopleuron with a single bristle in upper hind area, scattered setae extending down to the longer hairs between the coxae; remainder of pleura bare.

Legs reddish yellow, tarsi not darkened distally; tibia with dorsal preapical bristles absent (Czerny, 1924, said an obscure preapical bristle may occur on the hind tibia); middle tibia with several ventral apical spines.

Wings hyaline, costal spines absent or obscure.

626053—62——2

Abdomen blackish brown; terminalia rather large and concolorous with remainder of abdomen.

FEMALE.—Similar to male, except for terminalia.

LENGTH.—2.0–2.5 mm.

DISTRIBUTION.—Alaska, Northwest Territories, Saskatchewan, Manitoba, Quebec; July–September.

Genus *Oldenbergiella* Czerny

Oldenbergiella Czerny, 1924, p. 69; 1927a, p. 22.

This genus is likely to be confused only with *Borboropsis* Czerny, from which it can be distinguished by the absence of a bristle in the posterior portion of the mesopleuron. There is but one species known from North America.

Oldenbergiella brumalis Czerny

Oldenbergiella brumalis Czerny, 1924, p. 70; 1927a, p. 22.

I have examined two females of this species, one a syntype (Type 29350) from Berlin and the other from Dauphin, Manitoba, collected by Mrs. M. E. Hippisley in 1935 (month not known). Both specimens are in the U.S. National Museum.

FEMALE.—Fronto-orbital plates, ocellar triangle, vertex, and back of head black with grayish pollinosity; front brownish black, reddish along anterior margin; cheeks brownish yellow; antennae brownish black, aristae minutely pubescent; cheek-eye ratio 0.75.

Thorax rather uniformly dark brown with faint gray pollinosity; dorsocentrals apparently 2+4, weaker anteriorly; scutellum with anterior pair of bristles much weaker than posterior pair; pleura bare except for propleural bristle, a few setae behind it on the mesopleuron, and a single sternopleural bristle with a few setae anterior to it.

Wings hyaline; costal spines present, but hardly more than hairs; second longitudinal vein curving slightly forward toward the distal end.

Legs dark brown; dorsal preapical bristles indistinct, except perhaps on hind tibiae.

Abdomen dark brown to black; sixth tergite very narrow.

LENGTH.—2.0 mm.

DISTRIBUTION.—Manitoba.

Genus *Orbellia* Robineau-Desvoidy

Leria Robineau-Desvoidy, 1830, p. 653 (part).
Orbellia Robineau-Desvoidy, 1830, p. 656.—Czerny, 1924, p. 70; 1927a, p. 22; 1937, p. 138.—Johannsen, 1941, p. 202.
Crymobia Loew, 1859, p. 45; 1862b, p. 127.
Anarostomoides Malloch, 1916, p. 15.
Barbastoma Garrett, 1921, p. 123.

All known North American species of this genus are characterized by having 3 pairs of lateral scutellar bristles instead of the usual 2 pairs. Johannsen (1941) points out the error of Aldrich (1926) and Curran (1934) in including this genus with those lacking a humeral bristle. The humeral bristle is present in all known North American species. The dorsocentral bristles are difficult to interpret, because they become weaker anteriorly. There are at least 4 or 5 pairs; Czerny (1924) described them as 2(3)+3(4).

Key to the Species of *Orbellia*

1. Legs (except tarsi) and palpi wholly yellow; male with long yellow hairs extending downward from post-oral region of head . . . . ***barbata*** (Garrett)
   Legs and palpi not wholly yellow; male without conspicuous long yellow hairs extending downward from post-oral region of head 2
2. Fore basitarsus of male shorter than second tarsal segment; palpi at least partially yellow . . . . . ***petersoni*** (Malloch)
   Fore basitarsus of male longer than second tarsal segment; palpi wholly black . . . . . ***hiemalis*** (Loew).

Orbellia petersoni (Malloch)

FIGURE 16

Anarostomoides petersoni Malloch, 1916, p. 16.
Orbellia petersoni (Malloch), Czerny, 1924, p. 71.

Malloch's original description is adequate for this species, although it appears that the color of the palpi is quite variable and may sometimes approach the wholly black condition found in *Orbellia hiemalis* (Loew).

DISTRIBUTION.—Washington, Idaho, Minnesota, Iowa, Illinois, Michigan, Ohio, Pennsylvania, New Jersey, Maine; October—December.

Orbellia hiemalis (Loew)

FIGURE 17

Crymobia hiemalis Loew, 1859, p. 46; 1862b, p. 127.
Leria longipennis Schiner, 1864, p. 30.
Orbellia hiemalis (Loew), Czerny, 1924, p. 72; 1927a, p. 23.—Johannsen, 1941, p. 202.

Czerny (1924) described *Orbellia hiemalis* (Loew) as having the proboscis and palpi all black and the fore basitarsus of the male longer than the second tarsal segment. Otherwise the species is similar to *O. petersoni* (Malloch). I have not yet seen a specimen from North America which I could assign with certainty to this species, although there are published records of the species from this area. I have examined European material sent to me by Linder and Hennig and find that the specimens conform with Czerny's description. The general color-

ation of the European specimens is much blacker than most of the North American specimens I have seen. I suspect that *O. hiemalis* (Loew) may not actually occur in North America and that published records of this species were based on specimens which were actually *O. petersoni* (Malloch).

DISTRIBUTION.—Colorado (based on a single female specimen in which the palpi are entirely black), Maine (Johannsen, 1941); "late fall to early spring" (Johannsen, 1941).

Orbellia barbata (Garrett)

FIGURE 15

Barbastoma barbatus Garrett, 1921, p. 123; 1924, p. 33.
Barbastoma barbatum (Garrett), Czerny, 1924, p. 68.

This species bears a general resemblance to *Orbellia petersoni* (Malloch). The fore basitarsus is no longer than the second tarsal segment. The yellow "beard" of *O. barbata* (Garrett) may be used to separate males, but the structure of the male terminalia is perhaps more reliable. In *O. barbata* (Garrett) the surstylus is somewhat rectangular and broadly rounded or blunt apically, whereas in *O. petersoni* (Malloch) and in *O. hiemalis* (Loew) the surstylus is long and tapering.

MALE.—Front dark orange with setae in anterior half; fronto-orbital bristles about equal; upper back of head, posterior portion of frontal plates, and ocellar triangle grayish, pollinose; lower back of head becoming pale yellow; face and cheeks pale yellow; setae of back of head black in upper half, becoming long fine yellow hairs below; oral vibrissae weak; black buccal setae anteriorly, becoming long yellow hairs behind; palpi yellow; third antennal segment dark brown or blackish, arista microscopically pubescent.

Thorax yellowish brown with gray pollinosity, mesonotum (except humeri) darker than pleura; usual 3 pairs of supra-alar bristles present (not 2, as in Garrett's description of the genus *Barbastoma*); pleura bare except for propleural and sternopleural bristle (sometimes an additional hair or two near the bristle), and the usual hairs on the sternopleuron between the coxae.

Legs yellow, except for blackish distal tarsal segments; anterior femora conspicuously swollen; fore basitarsus equal to or slightly shorter than the second tarsal segment; fore basitarsus with a conspicuous curved claw distally on anterodorsal surface; middle tibia with 2 dorsal preapical bristles and several ventral apical bristles; dorsal preapical bristles of fore and hind tibia very weak.

Wings with veins brownish, membrane hyaline with faint brownish tinge; costal spines sparse; first longitudinal vein long, ending about halfway between the level of the 2 crossveins; second vein

deflected slightly forward at the tip; subcosta joins costa at level of anterior crossvein.

Abdomen brownish, hypopygium yellow brown.

Female.—Similar to male, except that conspicuous "beard" is lacking; forefemora and tarsal segments normal, no curved claw present on the basitarsus.

Length.—4.0–6.0 mm.

Distribution.—British Columbia, Washington; October–November. There is a female in the U.S. National Museum determined by Aldrich as this species. It was collected in Maryland in November. In view of the difficulties in determining female specimens, I would consider this determination questionable, although the palpi of the specimen are yellow as in *O. barbata* (Garrett).

Genus *Heteromyza* Fallén

Heteromyza Fallén, 1820, p. 1.—Meigen, 1830, p. 45 (part).—Macquart, 1835, p. 415 (part).—Zetterstedt, 1847, p. 2461 (part).—Pandellé, 1901, p. 342 (part).—Collin, 1901, p. 106 (part); 1943, p. 241.—Czerny, 1924, p. 74; 1927a, p. 24

Lentiphora Robineau-Desvoidy, 1830, p. 656.

Tephrochlamys Loew, 1859, p. 72 (part).

Thelida Robineau-Desvoidy, Pandellé, 1901, p. 343 (part).

A single species of *Heteromyza* has been recorded from North America. I have seen only two males and two females of this species. The following description is based on these specimens.

Heteromyza oculata Fallén

Heteromyza oculata Fallén, 1830, p. 2.—Meigen, 1830, p. 46.—Macquart, 1835, p. 415.—Zetterstedt, 1847, p. 2463.—Collin, 1901, p. 111.—Czerny, 1924, p. 75; 1927a, p. 24.

Thelida oculata (Fallén), Pandellé, 1901, p. 344.

Lentiphora flaveola Robineau-Desvoidy, 1830, p. 656.

Heteromyza scutellata Macquart, 1835, p. 415.

Heteromyza eriphides Walker, 1849, p. 1088.

Heteromyza flavipes Walker, 1849, p. 1089.

Tephrochlamys magnicornis Loew, 1859, p. 73; 1862b, p. 128.—Meade, 1899, p. 101.

Male.—Front brownish yellow, darker brown toward the vertex; fronto-orbital area, vertex, and ocellar triangle with a grayish pollinosity; back of head ash gray, becoming yellow near the ventral margin; face, cheeks, and palpi yellowish orange; antennae yellowish orange to brown; aristae dark brown, minutely pubescent; third antennal segment slightly oval; 2 pairs of weakened fronto-orbital bristles; oral vibrissae strong; a single row of buccal setae; cheek-eye ratio from 0.18 to 0.2; eyes large, separated by only the width of the ocellar triangle at the vertex and upper half of front.

Thorax uniformly cinereous with 2 longitudinal dark brown vittae near the center of the mesonotum and a broad broken dark vitta laterad from each of these; dorsocentrals 0+3; scattered setae on mesonotum; scutellum bare, except for 2 strong lateral bristles; propleural bristle strong; sternopleuron with 1 strong bristle near the upper hind margin and several short setae anterior to the bristle; long hairs on sternopleuron between the coxae; remainder of pleura bare; no prosternal bristles.

Legs yellowish brown; middle tibiae with only 1 ventral apical bristle.

Wings with brownish tinge, but no distinct infuscations; first vein joins costa at a level distinctly beyond the level of the anterior crossvein; costal spines inconspicuous.

Abdomen dark brown.

FEMALE.—Similar to male, except that eyes are widely separated; cheek-eye ratio about 0.45.

DISTRIBUTION.—Alaska, Ontario, Quebec, Labrador; March, May, September.

Genus *Thelida* Robineau-Desvoidy

Thelida Robineau-Desvoidy, 1830, p. 655.—Schiner, 1864, p. 34.—Rondani, 1867, p. 129.—Pandellé, 1901, p. 343 (part).
Heteromyza Fallén, Meigen, 1830, p. 45.—Macquart, 1835, p. 415 (part).—Loew, 1859, p. 70.—Schiner, 1864, p. 33 (part).—Collin, 1901, p. 107 (part).
Anthomyza Fallén, Zetterstedt, 1846, p. 1626 (part).
Pegomya Robineau-Desvoidy, Meade, 1883, p. 9 (part).
Heteromyiella Hendel, 1910, p. 309.

This genus has been reported from North America (under the name *Heteromyiella*) on the basis of fossil evidence only.

Thelida miocenica (Cockerell)

Heteromyiella miocenica Cockerell, 1914, p. 644.

This species was found by Cockerell in "Miocene shales of Florissant, Wilson Ranch (Wickham)." One cannot accurately place the species from the information given, although Cockerell refers to the "short bristles on the costa," which make it fairly certain that the specimens were heleomyzids.

Genus *Tephrochlamys* Loew

Helomyza Fallén, Meigen, 1830, p. 47 (part).
Heteromyza Fallén, Macquart, 1835, p. 415 (part).—Zetterstedt, 1838, p. 763 (part); 1847, p. 2461 (part).—Schiner, 1864, p. 33 (part).—Rondani, 1867, p. 130.
Tephrochlamys Loew, 1859, p. 72—Loew, 1862b, p. 128.—Aldrich and Darlington, 1908, p. 71.—Czerny, 1924, p. 85; 1927a, p. 26—Collin, 1943, p. 241.
Leria Robineau-Desvoidy, Pandellé, 1901, p. 344 (part).

This genus is distinguished from related genera by a single ventral apical bristle on the middle tibia, three pairs of dorsocentral bristles, and the ending of the first vein of the wing at or very near the level of the anterior crossvein.

Key to the Species of *Tephrochlamys*

Scutellum and legs wholly yellow . . . . . ***flavitarsis*** Darlington
Scutellum and legs not wholly yellow . . . . . ***rufiventris*** (Meigen)

Tephrochlamys rufiventris (Meigen)

FIGURE 18

Helomyza serrata Linnaeus, Fallén, 1820, p. 4 (part).
Helomyza canescens Meigen, 1830, p. 57.
Helomyza rufiventris Meigen, 1830, p. 58.
Helomyza nigricornis Meigen, 1838, p. 369.
Heteromyza rufipes Zetterstedt, 1838, p. 764.
Helomyza laeta Zetterstedt, 1838, p. 766; 1847, p. 2452.
Tephrochlamys rufiventris (Meigen), Loew, 1859, p. 77.—Pandellé, 1901, p. 353.—Aldrich and Darlington, 1908, p. 72.—Czerny, 1924, p. 85; 1927a, p. 27.—Collin, 1943, p. 242.
Leria laeta (Zetterstedt), Rondani, 1867, p. 128.
Tephrochlamys rufiventris var. *nigriventris* Strobl, 1906, p. 353.

MALE.—Front reddish orange; fronto-orbital plates, ocellar triangle, and vertex cinereous, pollinose; lower half of head, including face and cheeks, yellow; antennae reddish brown, aristae dark brown to black, minutely pubescent; brownish area between antenna and eye; anterior fronto-orbital bristle about ½ to ¾ the height of the posterior bristle; oral vibrissae strong, a single row of buccal setae; a bristle on the postgenal area in addition to setae; cheek-eye ratio from 0.43 to 0.55.

Thorax blackish in ground color with a gray pollinosity; scutellum may be yellowed at the apex, otherwise concolorous with the remainder of the thorax; dorsocentrals 0+3; prescutellar bristles present; scutellum bare except for 2 pairs of lateral bristles; propleural bristle present; mesopleuron bare except for 1 or more small setae near the propleural bristle; sternopleural bristle present, a few small setae anterior to the bristle, longer hairs between the coxae; remainder of pleura bare; prosternal bristles absent.

Legs yellowish orange, becoming dark brown distally; forefemora darkened; middle tibia with 1 ventral apical bristle; tibia with dorsal prespical bristle present.

Wings hyaline; coastal spines present, but relatively short.

Abdomen yellow with uniformly scattered setae; segments 3–5 with a row of bristles posteriorly; terminalia small.

FEMALE.—Similar to male except for terminalia.

LENGTH.—4.0–5.0 mm.

DISTRIBUTION.—Alaska, British Columbia to Newfoundland, south to California, Colorado, North Carolina. Collections have been made during every month of the year.

BIOLOGY.—This species has been reared from immature stages in a potato, according to the label on a specimen in the U.S. National Museum. It was reported by Howard (1900) on human excrement and by Saunt (1934) from birds' nests. In the Canadian National Collection a series of 10 males and 5 females is recorded from *Spirea*, and 1 female was "bred from larva in *Dicrostonyx* burrow."

REMARKS.—It will be noted that strict observance of page precedence would give *Helomyza canescens* Meigen priority over *H. rufiventris* Meigen. Loew (1859) was chronologically the first to utilize either of Meigen's names. Loew used *Tephrochlamys rufiventris* (Meigen), but was probably not aware of its synonymy with *H. canescens* Meigen. Thus, Aldrich and Darlington (1908) are actually the "first revisers," and they clearly indicated that they recognized the synonymy and were in favor of retaining *Tephrochlamys rufiventris* (Meigen) as the name for this species.

Tephrochlamys flavitarsis Darlington

Tephrochlamys flavitarsis Darlington, *in* Aldrich and Darlington, 1908, p. 71.—Czerny, 1924, p. 83.

I have examined the type female in the U.S. National Museum (Type 11978). It agrees very closely with *Tephrochlamys rufiventris* (Meigen), except that the scutellum and legs are wholly yellow. The type is labelled "White Mts., Morrison."

MALE AND FEMALE.—Head similar to *T. rufiventris* (Meigen), except that orbito-antennal spot is less distinct; cheek-eye ratio from 0.35 to 0.55.

Mesonotum ash gray with 2 dark brown vittae between the dorsocentrals and a broader, discontinuous vitta lateral to each row of dorsocentrals; humeri and scutellum yellowish; pleura ash gray to brownish, may show a yellowing in some areas; chaetotaxy as in *rufiventris*.

Legs wholly yellow or slightly darkened on forefemora and tarsi; wings and abdomen as in *rufiventris*.

LENGTH.—4.0–5.0 mm.

DISTRIBUTION.—British Columbia, Ontario, North Carolina, New Hampshire, Quebec, New Brunswick, Nova Scotia; April–August.

Genus *Aecothea* Haliday

Helomyza Fallén, 1820, p. 3 (part).—Meigen, 1830, p. 47 (part).—Zetterstedt, 1847, p. 2430 (part).

Blephariptera Macquart, 1835, p. 412 (part).
Aecothea Haliday, 1838, p. 187.—Walker, 1849, p. 1094.—Coquillett, 1910b, p. 503.
Oecothea Haliday, Loew, 1859, p. 54; 1862b, p. 128.—Pandellé, 1901, p. 353.—Aldrich and Darlington, 1908, p. 73.—Czerny, 1924, p. 88; 1927a, p. 31; 1928, p. 54.—Curran *in* Curran and Alexander, 1926, p. 290.—Collin, 1943, p. 244.—Collart, 1948, p. 2.
Leria Robineau-Desvoidy, Schiner, 1864, p. 28.—Rondani, 1867, p. 124.

As stated by Aldrich (1926), *Aecothea* was the original spelling of the genus name. Walker (1849) and Coquillett (1910b) also used this spelling.

The genus is easily distinguished from all others except *Lutomyia* by the presence of antero- and posterodorsal bristles (in addition to the dorsal preapical bristles) on the middle tibiae. The position of the anterior crossvein at or before the basal fourth of the discal cell in *Lutomyia* will separate it from *Aecothea* and all other genera in the family.

Key to the Species of *Aecothea*

1. Scutellum bare except for usual lateral bristles . . . . . ***aristata*** Malloch
   Scutellum with setae on dorsum 2
2. Anterior crossvein with conspicuous dark clouding . . . . . ***fidelis*** Curran
   Anterior crossvein without conspicuous dark clouding 3
3. Epiphallus of male expanded into heart-shaped disc at distal end. ***specus*** (Aldrich)
   Epiphallus of male not expanded into heart-shaped disc at distal end. ***fenestralis*** (Fallén)

Aecothea aristata Malloch

Figures 19, 20

Oecothea aristata Malloch, 1919, p. 82.—Czerny, 1924, p. 89.

The absence of setae on the scutellum will very easily distinguish this species from others in the genus.

Distribution.—Type locality: Bernard Harbour, Dolphin, and Union Strait, Northwest Territories, 10 July 1916, F. Johansen; paratypes from same locality as type, 1–7, 14 Aug. 1915 and Sept. 1915, F. Johansen. In addition to the type locality, specimens have been collected from lat. 68°20′, long. 151°30′, Alaska, 26 Aug. 1948, N. A. Weber and lat. 69°10′, long. 141°, 14–17 Aug. 1912, Jessup. These specimens are in the U.S. National Museum.

Aecothea fenestralis (Fallén)

Figures 21, 22

Helomyza fenestralis Fallén, 1820, p. 5.—Meigen, 1830, p. 56.—Zetterstedt, 1847, p. 2460.
Helomyza fuscipennis Meigen, 1830, p. 59.
Blephariptera fenestralis (Fallén), Macquart, 1835, p. 414.

Aecothea fenestralis (Fallén), Haliday, 1838, p. 187.
Oecothea fenestralis (Fallén), Westwood, 1840, p. 145.—Loew, 1859, p. 55.—Pandellé, 1901, p. 354.—Aldrich and Darlington, 1903, p. 73.—Czerny, 1924, p. 90; 1927a, p. 31.
Leria fenestralis (Fallén), Schiner, 1864, p. 30.—Rondani, 1867, p. 126.

Male and female.—Front yellowish orange to yellowish brown, vertex darker, back of head yellowish below; face and cheeks yellow to brownish yellow; antennae reddish brown to dark brown, aristae dark brown to black, minutely pubescent; posterior fronto-orbital bristle well developed, anterior bristle weak or absent; oral vibrissae strong, a single irregular row of long buccal setae; cheeks deeper behind than anteriorly.

Thorax brown to blackish; edges of pleural sclerites, scutellum, and humeral calli may be yellowed to varying degrees, dorsocentral bristles 1+3; scutellum with many setae on dorsum in addition to usual 2 pairs of lateral bristles; prosternal bristles absent; mesopleuron with a few setae near the propleural bristle, otherwise bare; sternopleuron with 1 strong bristle and a few setae anterior to the bristle, and longer hairs between the coxae; hypopleuron with minute setae below spiracle; pteropleuron bare.

Legs yellowish brown, becoming darker distally; anterior of middle femur with a row of weak bristles along middle near upper edge, and a stronger row towards the distal end; middle tibia with at least 2 strong bristles near the middle along the anterior dorsal region, often with another weaker bristle in line proximad to these, and 1 or 2 more bristles near the middle along the posterodorsal side; middle tibia with 2 dorsal preapical bristles and 3 or 4 ventral apical bristles.

Wings tinged with brown; the crossveins may themselves be darkened, but the wing membrane is not distinctly clouded along the crossveins.

Abdomen yellowish brown, becoming yellowish posteriorly.

Length.—3.5–4.5 mm.

Distribution.—British Columbia, Minnesota, Iowa, Illinois, New York; January–June.

Biology.—This species has been reported from birds' nests by Leruth (1939).

Remarks.—I have examined a type specimen of *Helomyza fuscipennis* Meigen and confirmed its synonymy with *Aecothea fenestralis* (Fallén).

As will be noted below, *A. fenestralis* (Fallén) and *A. specus* (Aldrich) can be distinguished from each other only by means of the male terminalia. The latter has been considered a synonym of the former, with the result that practically all the specimens in collections have been labelled "*fenestralis*." Garrett recognized that there

was in North America a form different from the European *A. fenestralis* (Fallén) and described this as a new species, *A. canadensis* Garrett; however, when I examined the type of *Blepharoptera specus* Aldrich, I found it to be identical to Garrett's *A. canadensis* and not synonymous with *A. fenestralis* (Fallén).

Curran (1926) used the color of the scutellum in his key to *Aecothea*, but I find much variation in this character in both *A. specus* (Aldrich) and *A. fenestralis* (Fallén).

Because of the questionable identity of specimens of "*fenestralis*" referred to in the literature, I have listed only those states from which I personally determined specimens. Johnson (1925) listed Massachusetts and Connecticut also.

Aecothea specus (Aldrich)

FIGURES 23, 24

Blepharoptera specus Aldrich, 1896, p. 189.
Oecothea canadensis Garrett, 1921, p. 129.—Czerny, 1924, p. 90. New synonymy.

I have found no means of distinguishing this species from *Aecothea fenestralis* (Fallén) except by comparing the male terminalia. The surstylus of *A. specus* (Aldrich) is somewhat narrowed distally, whereas that of *A. fenestralis* (Fallén) is about as wide distally as it is in the basal half. A structure which Steyskal (personal communication) interpreted as the epiphallus (following Hennig, 1958) is also different in the two species. In cleared specimens of *A. specus* (Aldrich) the posterior end is clearly expanded into a heart-shaped disc which is pigmented to about the same degree as the narrower shaft-like portion. In *A. fenestralis* (Fallén) the posterior end is more heavily pigmented toward the median line, and the lateral edges of the expanded plate are hardly visible in cleared specimens.

DISTRIBUTION.—Alaska, British Columbia, Washington, Oregon, California, Colorado, Saskatchewan, Kansas, Iowa, Illinois, Indiana, Ontario, Ohio, Kentucky, Tennessee, Georgia, West Virginia, Virginia, Maryland; March–September.

BIOLOGY.—This species is very common in collections from caves. E. C. Carlson has collected the species in traps baited with fish meal and fermented syrup (specimens in the collection of the University of California, Davis). I have collected adults in traps baited with beef liver.

REMARKS.—*Aecothea praecox* Loew, found in Europe, is very similar to *A. fenestralis* (Fallén) and *A. specus* (Aldrich), except that the eye is smaller. Although the cheek-eye ratio in *A. specus* (Aldrich) is usually between 0.5 and 0.7, I found occasional specimens wherein the ratio approached 1.0, thus resembling *A. praecox* Loew

The male terminalia of these specimens, however, were identical to *A. specus* (Aldrich), whereas the terminalia of European specimens of *A. praecox* Loew differ noticeably.

Aecothea fidelis Curran

Oecothea fidelis Curran, *in* Curran and Alexander, 1926, p. 290.—Czerny, 1928, p. 54.

I have examined a female paratype of this species in the American Museum of Natural History. It appears very similar to the females of the preceding two species. The specimen was in poor condition and lacked the antennae (except bases), bristles of the head and thorax, and one wing. The remaining wing had a brownish tinge and the anterior crossvein was clouded. This clouded crossvein is the character used by Curran to separate this species from others in the genus.

LENGTH.—3.5–5.0 mm.

DISTRIBUTION.—Wrangel Island, Siberia.

Genus *Eccoptomera* Loew

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1847, p. 2430 (part).
Blephariptera Macquart, 1835, p. 412 (part).
Eccoptomera Loew, 1859, p. 47; 1862a, p. 127.—Aldrich and Darlington, 1908, p. 74.—Czerny, 1924, p. 92; 1927a, p. 31.—Collin, 1943, p. 245.—Collart, 1948, p. 1–3.
Leria Robineau-Desvoidy, Schiner, 1864, p. 28 (part).—Rondani, 1867, p. 124 (part).—Panellé, 1901, p. 344 (part).
Viatica Garrett, 1924, p. 32.—Czerny, 1927b, p. 40. New synonymy.

The presence of rows of bristles on the anterior surface of the middle femur will aid in distinguishing *Eccoptomera* from related genera.

When Garrett described the genus *Viatica*, the only species of *Eccoptomera* known from North America was *E. simplex* Coquillett. Garrett's *Viatica* differed from the latter in that the eye was much larger, two distinct fronto-orbital bristles were present, and the male hypandrium showed short, stout spines not found in *E. simplex* Coquillett. As more specimens have accumulated and new species been discovered, there appears to be an intergradation of characters which eliminates the distinction between *Viatica* and *Eccoptomera*. For

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FIGURES 25–40.—Structures of the male terminalia of *Eccoptomera* and *Pseudoleria*. All views lateral except those of 37–40, which are ventral. Figs. 25–28, left epiphallic processes and surstyli, X 100: 25, *Eccoptomera crypta*, new species; 26, *E. garretti*, new species; 27, *E. spinosa* (Garrett); 28, *E. simplex* Coquillett. Figs. 29–40, epandria, X 50 (figs. 29–36) or 75 (figs. 37–40); 29, *E. callipus* Garrett; 30, *Pseudoleria longigenoidea*, new species; 31, *P. longigena* Garrett; 32, *P. intermedia* Garrett; 33, *P. crassata* Garrett; 34, *P. media* Garrett; 35, *P. similis* Garrett; 36, *P. pectinata* (Loew); 37, *P. vulgaris* Garrett; 38, *P. parvitarsus* Garrett; 39, *P. robusta* Garrett; 40, *P. subrobusta*, new species.

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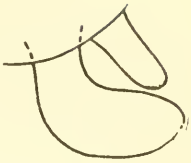

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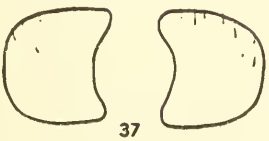

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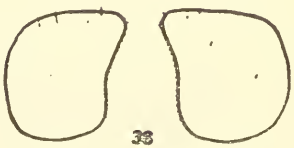

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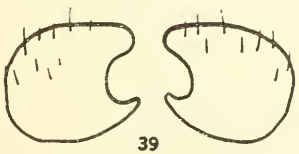

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(For explanation see opposite page.)

example, Czerny described *aldrichi* under *Eccoptomera*, whereas its characters are such that Garrett would probably have called it *Viatica*. The presence or absence of spines or teeth on the male hypandrium and setae on the scutellum appear to be the only characters which could be used to maintain the distinction between the genera, but I do not consider these characters to be of generic rank.

I have examined the following Palearctic species of *Eccoptomera*, none of which agree with any of the species described below: *emarginatum* Loew, *filiata* Loew, *infuscata* Wahlgren, *longiseta* (Meigen), *obscura* (Meigen), *ornata* Loew, *pallescens* (Meigen).

Key to the Species of *Eccoptomera*

1. Scutellum with setae 2
   Scutellum bare, except for usual 2 pairs of lateral bristles 5
2. Cheek-eye ratio usually more than 1.0; 1 to 3 rows of very sparse setae between dorsocentral bristles . . . . . **simplex** Coquillett
   Cheek-eye ratio usually less than 1.0; 5 or more rows of numerous setae between dorsocentral bristles 3
3. Ventral edge of epandrium of male with conspicuous fringe of hairs. **callipus** Garrett
   Ventral edge of epandrium of male without conspicuous fringe of hairs . . 4
4. Epiphallic process of male gradually tapering toward distal end. **garretti,** new species
   Epiphallic process of male bluntly rounded distally, not gradually tapering to a narrow tip . . . . . **crypta,** new species
5. Cheek-eye ratio from 0.5 to 0.7 6
   Cheek-eye ratio from 0.73 to 0.85 . . . . . **aldrichi** Czerny
6. Thorax bluish gray . . . . . **melanderi** (Garrett)
   Thorax brownish . . . . . **spinosa** (Garrett)

Eccoptomera simplex Coquillett

FIGURE 28

Eccoptomera simplex Coquillett, p. 32.—Czerny, 1924, p. 93.
Eccoptomera americana Darlington, *in* Aldrich and Darlington, 1908, p. 74 (part).

The small eye is the distinguishing character of this species.

MALE AND FEMALE.—Head higher than long, mostly yellow except for dark brown arista; a nearly vertical vitta usually present on each side of back of head from inner vertical bristle to cervical foramen; anterior fronto-orbital bristle very weak or undifferentiated from the frontal setae; oral vibrissae strong, a single row of buccal setae; cheek-eye ratio from 0.93 to 1.4; surface of eye with "flattened" appearance.

Remainder of body yellow to brownish yellow, mesonotum darker than pleura; dorsocentral bristles 1+3, 1 to 3 rows of very sparse setae between the dorsocentrals; sometimes evidence of a median

vitta and 2 lateral vittae on mesonotum; scutellum with several setae on sides of dorsum, in addition to the 2 pairs of lateral bristles; prescutellar bristles not much stronger than the mesonotal setae; propleural bristle present, but weak; one sternopleural bristle with 1 or 2 setae anterior to it and longer hairs between the coxae.

Legs yellow to brownish yellow; middle femur with rows of spines or bristles anteriorly; dorsal preapical bristle present on middle tibia and in addition a second bristle in a posterodorsal position; middle tibia with several ventral apical bristles; femora of male not conspicuously thickened.

Wings hyaline, tinged with brown; anterior crossvein slightly before middle of discal cell.

The male terminalia of this species resemble those of *E. crypta*, new species, very closely, but other characters will readily separate the two species.

A series of specimens from Ames, Iowa (in the collection of Iowa State College), appears to be *E. simplex* Coquillett, but the general body coloration is rather dark brown, as compared with the more yellowed appearance of other specimens. In this series the cheek-eye ratio ranges from 1.3 to 1.4, a greater ratio than in most of the western forms. The anterior fronto-orbital bristle may also be somewhat stronger. Further collecting and analysis of data may show that these darker specimens should be considered either a new species or subspecies.

Length.—3.5–5.5 mm.

Distribution.—British Columbia, Alberta, Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, Colorado, Wyoming, Minnesota, Iowa; June–October.

Biology.—Specimens have been collected in light traps and from the nest of *Thomomys*. In Colorado, specimens were taken at an altitude of 12,000 feet. These data are taken from labels on specimens in the collections of the University of Minnesota and the American Museum of National History.

Remarks.—The series of syntypes of *Eccoptomera americana* Darlington in the U.S. National Museum actually contains two species, one of which is synonymous with *E. simplex* Coquillett and the other of which is the same as *E. crypta* (described below). After examining these syntypes, I was tempted to choose one of the specimens other than *E. simplex* Coquillett as a lectotype, and thus resurrect the name *E. americana* Darlington for the other species. After I studied the original description of *E. americana* Darlington, however, it was clear that the description pertains to the form resembling *E. simplex* Coquillett. Furthermore, Aldrich (1910) interpreted *E. americana* Darlington as being synonymous with *E. simplex* Coquillett. To

designate a specimen of the other species as the lectotype would bring about a disagreement between the lectotype and the original description. For this reason, I designated an *E. simplex* Coquillett specimen as the lectotype of *E. americana* Darlington and thus retained the synonymy between the two.

Mayr, Linsley, and Usinger (1953, p. 241) cited a suggestion of Banks and Caudell which applies to this situation:

> If two or more species are included in the original series of specimens upon which a new species has been based and the author has not labeled, nor has he nor anyone else designated one as type, nor restricted the type material, and it results that one of the included species is a synonym of an older valid species . . . then the type is restricted to the remaining material.

The above suggestion would at first seem to contradict my decision in this case. However, my interpretation is that by publishing with the original description data that could apply only to certain of the type specimens, Darlington "restricted the type material" in such a way that the decision made here is justified.

Eccoptomera crypta, new species

FIGURE 25

The appearance of the eye readily distinguishes this species from *Eccoptomera simplex* Coquillett. The difference in eye size is accentuated by the flattened appearance of the eye in *E. simplex* Coquillett, as compared with the convex surface of the eye in *E. crypta*, new species. There is no indication that these differences are artifacts resulting from changes during the drying of the specimens.

This species is being described from male specimens only, inasmuch as I am not able to separate the females of *E. crypta*, new species, *E. garretti*, new species, and *E. callipus* Garrett. I have no females collected at the same time and place as males of *crypta*, but it is very likely that the female is similar to those of the other two species in this group.

MALE.—Similar to *E. simplex* Coquillett, except as follows: body yellow to dark orange; cheek-eye ratio from 0.75 to 1.0; surface of eye convex; thorax yellow, no vittae on mesonotum; at least 5 rows of setae between dorsocentral bristles; legs yellow, tarsi sometimes slightly darkened; anterior crossvein at or beyond middle of discal cell.

DISTRIBUTION.—Washington, Idaho, California; June–October.

TYPES.—Holotype: Moscow Mountain, Idaho, 28 Aug. 1949, L. R. Mewaldt. Paratypes: Pullman, Wash., 27 Sept., I. Matlock; Pullman, Wash., 8 Oct., 1954, G. D. Gill. The holotype has been deposited in the U.S. National Museum (USNM 65441) and the paratypes in the collection of the State College of Washington.

Eccoptomera garretti, new species

FIGURE 26

When working over the genus *Eccoptomera* I found, on the basis of general appearance, five groups. A detailed study of cheek-eye ratio, chaetotaxy, and male terminalia verified four of these groups, which were then given tentative species designations and subsequently matched with types of described species. The male terminalia of the fifth group showed one form to be very distinct from all others; this was *E. callipus* Garrett. The remaining specimens in the group were practically identical, except that there appeared to be two distinct shapes to the epiphallic processes, and to a lesser degree, two shapes to the posterior surstyli. Both forms must be described as new. The epiphallic process is gradually tapered toward the distal end in *E. garretti*, new species, whereas in *E. crypta*, new species, this structure is bluntly rounded distally and not tapered to a narrow tip. The surstylus appears to be more narrowed distally in *E. crypta*, new species.

The description of *E. garretti*, new species, then, is the same as for *E. crypta*, new species, except for the differences noted above. The cheek-eye ratio of specimens thus far examined is from 0.65 to 0.78. The females of the type series are similar to the males, except for the terminalia.

TYPES.—Holotype male, allotype, 4 male paratypes and 2 female paratypes, Santa Cruz, Calif., 1–2 June 1919, M. C. Van Duzee; all specimens sent on loan from the California Academy of Sciences. The holotype, allotype, 2 male paratypes, and 1 female paratype have been deposited in the California Academy of Sciences, 1 paratype of each sex in the collection of the U.S. National Museum, and 1 male paratype in the collection of the State College of Washington.

In addition to the type series, I have examined a male specimen from Soquel, Calif., 18–20 June 1950, M. T. James (in the collection of the State College of Washington).

Eccoptomera callipus Garrett

FIGURE 29

Eccoptomera callipus Garrett, 1925a, p. 2.—Czerny, 1930, p. 442.

This species resembles the preceding two species, but the unique appearance of the male terminalia will readily distinguish it. I have examined the types in the Garrett collection.

MALE.—Similar to preceding two species except as follows: cheek-eye ratio from 0.85 to 1.0; a distinct flattened knoblike protrusion

posteroventrally at distal end of hind tibia; hind femora thickened; ventral edge of epandrium with fringe of long hairs.

FEMALE.—Similar to male except lacking the knoblike protrusion on hind tibia; hind femora not thickened.

LENGTH.—About 5.0 mm.

DISTRIBUTION.—Oregon, California; June–July.

Eccoptomera spinosa (Garrett)

FIGURE 27

Viatica spinosus Garrett, 1924, p. 32.
Viatica spinosa Garrett, Czerny, 1927b, p. 41.

The well-developed anterior fronto-orbital bristle, the presence of two sternopleural bristles, and the structure of the male terminalia will aid in distinguishing this species.

MALE AND FEMALE.—Head yellowish brown, third antennal segment dark brown to black, arista black and minutely pubescent; anterior fronto-orbital bristle about one-half the height of the posterior bristle; cheek-eye ratio from 0.58 to 0.69.

Mesonotum brownish with grayish pollinosity; about 7 rows of setae between the dorsocentrals; scutellum without setae; pleura orangish brown; propleural bristle strong, several setae at its base; mesopleuron with several setae in anterior corner; 2 sternopleural bristles (the anterior one weaker) and 2 or 3 setae or hairs anterior to the bristles.

Legs yellowish brown; 1 strong dorsal preapical bristle on middle tibia, with another weaker bristle located distally below and behind the preapical bristle; middle tibia with several ventral apical bristles; middle femur with rows of bristles anteriorly.

Wings with brownish tinge.

Abdomen yellowish brown to brown.

LENGTH.—5.0–5.6 mm.

DISTRIBUTION.—The type (female) is from Yosemite Valley, Calif., 22 May 1908. Other records: Lake Wenachee State Park, Wash., 13 Sept. 1956, G. D. Gill; American River, 4 miles east on Chinock Pass, Wash., 27 Aug. 1949, M. T. James.

REMARKS.—The type is in the collection of the Academy of Natural Sciences, Philadelphia. Dr. S. S. Roback was kind enough to compare my other specimens with the type. The color and chaetotaxy were reported to be the same. The cheek-eye ratio of the type was 0.63.

Eccoptomera aldrichi Czerny

Eccoptomera aldrichi Czerny, 1928, p. 53.

Dr. M. Beier, Naturhistorisches Museum, Vienna, provided me

with a type specimen of each sex. Later I examined more types in the U.S. National Museum.

Male and female.—Vertex, ocellar triangle, and frontal plates dark gray; antennae becoming dark brown on third segment; remainder of head dirty yellowish orange; anterior fronto-orbital bristle ¼ to ½ the height of the posterior bristle; cheek-eye ratio from 0.73 to 0.85; eye with flattened appearance similar to *E. simplex* Coquillett.

Mesonotum dark grayish brown with humeri and scutellum yellowed; pleura yellowish brown; thoracic chaetotaxy similar to *E. spinosa* (Garrett), except 1 sternopleural bristle (sometimes a strong hair in front of the bristle).

Legs yellow, not darkened distally; chaetotaxy as in *E. spinosa* Garrett; wings hyaline; abdomen dark brown with grayish pollinosity; epiphallic process of male with several (more than five) short spines on dorsal side of distal end.

Length.—3.5–4.0 mm.

Distribution.—The type series was taken from a prairie dog hole, Laramie, Wyo., 10 March 1927, by C. L. Corins. There is one syntype female from Oxbow, Saskatchewan, 8 May 1907, but I believe that this specimen is probably *E. melanderi* (Garrett). The cheek-eye ratio of the latter is 0.6; the eye does not have the characteristic flattened appearance of *E. aldrichi* Czerny. A series of males collected at the entrance to a *Cynomys* burrow, Val Marie, Saskatchewan, 11 June 1955, by J. R. Vockeroth is in the Canadian National Collection.

Eccoptomera melanderi (Garrett)

Viatica melanderi Garrett, 1925a, p. 2.—Czerny, 1930, p. 442.

This species is very similar to *E. aldrichi*, but the eye is larger and not flattened in appearance.

I have examined the type male in the Garrett collection and two females in the collection of the California Academy of Sciences.

Male and female.—Similar to *E. aldrichi* Czerny, except as follows: anterior fronto-orbital bristle about one-fourth (or less) the height of the posterior bristle; cheek-eye ratio from 0.50 to 0.65; surface of eye convex; mesonotum dark bluish gray, with pleura similar but lighter, becoming yellowish at edges of sclerites and toward the propleura; scutellum yellowed toward the apex; legs may be darkened distally; epiphallic process of male with 5 short spines on dorsal side of distal portion.

Length.—3.5–5.0 mm.

Distribution.—California, Alberta, Idaho, Colorado; March, June–August. It was previously noted that one of the syntypes of *E. aldrichi* Czerny appeared to be *E. melanderi* (Garrett) (Oxbow, Saskatchewan, 8 May 1907).

Genus *Lutomyia* Aldrich

Lutomyia Aldrich, 1922, p. 108.—Czerny, 1924, p. 130.—Sabrosky, 1949, p. 2.
Criddleria Curran, 1929, p. 31.—Czerny, 1930, p. 440.

Sabrosky's (1949) treatment of *Lutomyia* is adequate for identifying the known species of this North American genus. Much of the material presented here is based on Sabrosky's work.

Characters of this genus are as follows: head higher than long; anterior fronto-orbital bristle weaker than the posterior bristle; dorsocentrals 1+3; scutellum bare except for 2 pairs of lateral bristles; propleural bristle present; mesopleuron bare except for occasional setae in anterior corner near propleuron; 1 (sometimes 2) sternopleural bristle in upper hind corner; remainder of pleura bare; prosternal bristles absent; middle tibia with dorsal preapical bristle and several ventral apical bristles, and sometimes additional anterodorsal bristles in certain species; middle femur with strong anterior bristles; anterior crossvein proximad of the apex of the first vein and close to the base of the discal cell; second vein parallel to the first vein and costa and lying close to or in contact with the costa.

Lutomyia is incorrectly placed in Czerny's (1924) key, inasmuch as it is included with those genera having prosternal bristles.

Key to the Species of *Lutomyia*

(After Sabrosky, 1949)

1. Midtibia with several strong anterodorsal bristles midway on the tibia; male with fine weak hairs ventrally on the hind femur . . . **hemiptera** (Curran)
   Midtibia without strong anterodorsal bristles midway on the tibia, at most a row of 3 to 6 short, slightly thickened hairs on the apical third 2
2. Entire body reddish yellow; second vein meeting costa just beyond the tip of first vein and closely apposed to costa from there to a point beyond the hind crossvein; fore crossvein less than twice its length from the base of the discal cell; male with a row of 12 unusually strong black posteroventral spines on the hind femur . . . . . **spurca** Aldrich
   Thorax black, heavily gray pollinose; abdomen reddish yellow to blackish; second vein throughout its length close to but distinctly separated from costa; fore crossvein 3.5 to 4 times its length from base of discal cell . . . 3
3. Frontal vitta black; front broad, nearly 3 times the width of an eye, slightly but distinctly narrowed anteriorly; midtibia without bristles anterodorsally; male with a row of strong black posteroventral spines on the hind femur. **aldrichi** Sabrosky
   Frontal vitta orange to reddish; front narrower, 1.9 to 2.1 times the width of an eye, the sides parallel; midtibia with bristlelike hairs in the apical third of the anterodorsal row; male without a row of strong posteroventral spines on the hind femur . . . . . **distincta** Garrett

Lutomyia spurca Aldrich

Lutomyia spurca Aldrich, 1922, p. 109.—Czerny, 1924, p. 130

The yellow to reddish orange color of the entire body and the row of very stout posteroventral spines on the hind femur distinguish this species.

I have examined the type male (No. 25314) and another male in the U.S. National Museum. One other male was found in the collection of Marshall R. Wheeler.

Male.—Front, vertex, and antennae reddish orange, arista brown, remainder of head yellow; fronto-orbital plates and ocellar triangle with silvery gray pollinosity; anterior fronto-orbital bristle about ½ to ¾ the height of the posterior bristle; oral vibrissae strong, 1 or 2 rows of buccal setae; cheek-eye ratio from 0.7 to 0.85; eye slightly elliptical.

Remainder of body more or less yellowish orange; mesonotum with slight grayish pollinosity; dorsocentrals and prescutellars distinct, but weaker than the other bristles of the mesonotum; chaetotaxy of pleura as in generic description; middle femur with about 3 irregular rows of short bristles on anterior and anteroventral sides; middle tibia without bristles, other than the dorsal preapical and several ventral apical bristles; hind femur much thickened, with about 4 to 6 bristles in distal half on anterodorsal side; a row of 11 or 12 conspicuous stout spines along posteroventral side of hind femur; wings hyaline with brownish tinge; abdomen with fifth tergite shieldlike, so that the small terminalia are hidden beneath.

Length.—About 6.0 mm.

Distribution.—Wisconsin, Virginia, New York; September–October.

Lutomyia aldrichi Sabrosky

Lutomyia aldrichi Sabrosky, 1949, p. 4.

Sabrosky's original description is adequate for this species.

Distribution.—Sabrosky gives the following:

Holotype, male, allotype, and three paratypes (two males and one female), Rocky Flat, sixteen miles northwest of Naches, altitude about 3,800 feet, Yakima County, Washington, collected November 14, 1946 (Harold E. Broadbooks), in nest of *Eutamias amoenus affinis;* four paratypes (three males and one female), collected November 13, 1947, otherwise same data. Type, allotype, and two male paratypes in the University of Michigan Museum of Zoology, two paratypes (male and female) in the United States National Museum, three paratypes (two males and one female) in the George Steyskal collection.

Lutomyia distincta Garrett

Lutomyia distincta Garrett, 1924, p. 30.—Czerny, 1927b, p. 40.—Sabrosky, 1949, p. 6.

This species was described by Garrett from a single female collected at Rushmer, Windermere, British Columbia, 15 Nov. 1922. There

appears to be no other published record of the species, except a series of 11 specimens reported by Sabrosky. The latter specimens were collected 16 Nov. 1946 and 13 Nov. 1947 from the nest of *Eutamias amoenus affinis*, Rocky Flat, 16 miles northwest of Naches, Yakima County, Wash. The Garrett collection contains two additional records (both males): Cranbrook, British Columbia, 22 Sept. 1923; Moscow, Idaho, 28 Aug. 1916.

The following incorporates the original description and the additional notes of Sabrosky (1949).

MALE AND FEMALE.—Front 1.9 to 2.1 times as broad as an eye, orange anteriorly, becoming reddish posteriorly; fronto-orbital plates and ocellar triangle bright gray and rather sharply demarcated; oral vibrissae strong, a single row of buccal hairs or setae; cheek-eye ratio 0.55.

Thorax grayish black, with brown shading; thoracic chaetotaxy as given in generic description; legs reddish yellow; distal 4 segments of the foretarsus somewhat broadened and flattened, those of the other tarsi slender and elongate; middle tibia with a row of 3 to 6 short bristlelike anterodorsal hairs extending from the distal end toward the middle of the tibia, these hairs only a little longer than the ordinary clothing hairs on the tibia but somewhat thickened and suggestive of a row of tiny bristles; hind femur of male without a row of strong posteroventral spines, but with an irregular row of short semierect hairs that are slightly thicker than the ordinary appressed clothing hairs of the femur; wings often mutilated, with only the basal portion remaining; second vein of wing near but not closely apposed to the costa; hind crossvein only half its length from margin of wing; abdomen reddish yellow.

LENGTH.—3.0–4.5 mm.

Lutomyia hemiptera (Curran)

Criddleria hemiptera Curran, 1929, p. 32.—Czerny, 1930, p. 440.
Lutomyia hemiptera (Curran), Sabrosky, 1949, p. 3 (fig. 5).

This species was described from specimens found in the nest of *Thomomys talpoides rufescens*. The species name was suggested by the mutilated wings of the type series, in which all but the basal portion is torn off.

This species is similar to the preceding, but may readily be distinguished by the relatively small eye. The cheek-eye ratio is 1.0 in the five specimens I have measured. The middle tibiae have several strong anterodorsal bristles. The male has weak hairs ventrally on the hind femur, but is without distinct spines. The male terminalia are similar to *Lutomyia distincta* Garrett, except distally the hypandrium is narrow, less than one-half the width of

the surstylus. In *L. distincta* Garrett, the distal hypandrium is at least half the width of the surstylus.

DISTRIBUTION.—Aweme, Manitoba; October–November.

Genus *Pseudoleria* Garrett

Leria Robineau-Desvoidy, Aldrich and Darlington, 1908, p. 77 (part).
Pseudoleria Garrett, 1921, p. 128.—Czerny, 1924, p. 100; 1930, p. 443.—Garrett, 1925b, p. 1.

The presence of hairs or bristles on the pteropleuron will distinguish this genus from closely related genera. For the most part, the species within this genus are very much alike and can be determined with certainty only by examining the structure of the male terminalia. Although I have presented below a key to the known species, the illustrations of certain structures of the terminalia will perhaps be more useful than the key.

Members of this genus are characterized as follows: anterior fronto-orbital bristle very weak, often indistinguishable from the frontal setae; posterior fronto-orbital bristle strong; dorsocentral bristles 1+3; scutellum with 2 pairs of lateral bristles, otherwise bare (rare exceptions are known); propleural bristle present; mesopleuron bare except for occasional setae in anterior corner; pteropleuron with several hairs or bristles; steropleuron with a single bristle in upper hind corner and scattered setae extending down to the longer hairs between the coxae; prosternal bristles absent; middle tibia with a dorsal preapical bristle and several ventral apical bristles; fore and hind basitarsi of male with a small clawlike protrusion distally on ventral side; wings hyaline, sometimes with faint brownish tinge, but no distinct infuscations; anterior crossvein sometimes slightly darkened.

Key to the Species of *Pseudoleria* (Males only)

1. Cheek-eye ratio usually greater than 0.60 2
   Cheek-eye ratio usually less than 0.60 3
2. Epandrium extended posteroventrally into a narrow rounded protrusion. **longigena** Garrett
   Epandrium becoming wider posteroventrally, but not extended into a narrow rounded protrusion . . . . . **longigenoidea,** new species
3. Hind basitarsus thickened and shorter than the following segment. **parvitarsus** Garrett
   Hind basitarsus no shorter than the following segment 4
4. Epandrium, when viewed laterally, with 2 distinct knoblike protrusions. **pectinata** (Loew)
   Epandrium, when viewed laterally, without 2 distinct knoblike protrusions. 5
5. Hypandrium with 2 stout black spines; epandrium turned under ventrally and with a notch in middle of apical margin, so that short anterior and posterior projections are formed . . . . . **robusta** Garrett

Hypandrium without 2 stout black spines, but weaker bristles may be present. 6

6. Epandrium conspicuously turned inward ventrally, so that apical edge is not seen in lateral view 7

Epandrium not conspicuously turned inward; apical edge usually visible in lateral view. 8

7. Apical edge of epandrium with short blunt protrusion.
subrobusta, new species

Distal edge of epandrium smoothly rounded, with no short blunt protrusion.
vulgaris Garrett

8. Epandrium with a rather dense group of bristles directed posteriorly from the lower half of the posterior margin; distal margin truncate.
similis Garrett

Epandrium without a dense group of bristles along lower third of posterior margin 9

9. Epandrium evenly rounded apically. 10

Epandrium not evenly rounded apically, but drawn out into a somewhat pointed apex . . . . . **media** Garrett

10. Epandrium about 3 times as long as greatest width . . . **erassata** Garrett

Epandrium about 2 times as long as greatest width . . **intermedia** Garrett

Pseudoleria longigenoidea, new species

FIGURE 30

This species resembles *longigena* and can be distinguished from it only by the structure of the male terminalia.

MALE.—Front yellow, becoming dark brown toward the vertex; frontal plates, ocellar triangle, vertex, and upper back of head grayish; antennae reddish orange, the third segment brownish; aristae dark brown, minutely pubescent; face, cheeks, and lower back of head yellow to yellowish orange; anterior fronto-orbital bristle very weak or absent; cheek-eye ratio from 0.7 to 0.8; buccal setae in 1 or 2 irregular rows.

Thorax ash gray, may be yellowish brown along edges of pleural sclerites; pteropleuron with about 10 to 12 hairs and sometimes a strong bristle which stands out among the hairs; legs brownish yellow; wings entirely hyaline, anterior crossvein not darkened; abdomen ash gray to reddish brown.

Terminalia of male with epandrium becoming wider posteroventrally but not extended into a narrow protrusion.

LENGTH.—3.0–3.5 mm.

TYPES.—Holotype male and allotype collected at Wawawai, Wash., 13 May 1956, by G. D. Gill. Paratypes (2 males and 2 females): Yakima County, Wash., 12 May 1952, collected by L. J. Lipovsky (from the collection of the University of Kansas). The holotype and allotype have been deposited in the State College of Washington, 1 paratype of each sex in the U.S. National Museum, and 1 paratype of each sex in the collection of the University of Kansas.

DISTRIBUTION.—Washington, California, New Mexico, Wyoming; April–July.

Pseudoleria longigena Garrett

FIGURE 31

Pseudoleria longigena Garrett, 1925b, p. 2.

This species is very similar to the preceding one. The above description will thus apply very well here, except as follows: cheek-eye ratio from 0.60 to 0.75; wings with anterior crossvein faintly darkened with brown; length 4.0–5.0 mm.; male terminalia with epandrium extended posteroventrally into a narrow rounded protrusion.

DISTRIBUTION.—Oregon, California, Arizona; March–November.

Pseudoleria crassata Garrett

FIGURE 33

Pseudoleria crassata Garrett, 1925b, p. 3.

Examination of the male terminalia of a large number of specimens of *Pseudoleria* showed that several distinct forms occur. When I subsequently examined the types of Garrett's species, it was possible to match most of his species with the forms I had previously recognized and identified with numbers. However, one group of species has proved particularly difficult to interpret; these species are *P. crassata* Garrett, *P. intermedia* Garrett, *P. media* Garrett, and *P. dubia* Garrett. The terminalia appear to be quite similar in all these, and I cannot apply the wing and tarsal characters given in Garrett's key. The differences in length of the tarsal segments appear to be so slight that they could be due to artifacts related to the drying of the specimens.

I have recognized the existence of three forms which seem to belong in the aforementioned group of species. I have matched the terminalia of one of these forms with *P. crassata* Garrett, on the basis of a type and two paratypes which I examined.

MALE AND FEMALE.—Front yellow to yellowish brown, darker toward the vertex; upper back of head grayish, base of antennae yellow to reddish orange, third antennal segment often becoming brownish, arista brown; oral vibrissae strong, buccal setae in 2 or 3 irregular rows; cheek-eye ratio from 0.45 to 0.60.

Thorax yellowish brown, with grayish pollinosity, especially on mesonotum; mesonotum sometimes with a thin median vitta and brown spots at bases of dorsocentrals; pteropleuron with several hairs, usually 1 stronger bristle standing out from among the neighboring hairs; legs yellow or brownish yellow; wings hyaline, anterior crossvein very slightly darkened; abdomen yellowish brown to dark gray

brown, with grayish pollinosity; epandrium of male relatively narrow, the length about 3 times the greatest width, as seen in lateral view.

LENGTH.—4.0–5.0 mm.

DISTRIBUTION.—Oregon, Idaho, California, Arizona, Texas, Colorado, Wyoming, Alberta, Saskatchewan, South Dakota, Nebraska, Iowa, Michigan, Ohio, Manitoba, Ontario, Tennessee, North Carolina, Maryland, New Jersey, New York; collected throughout the year.

BIOLOGY.—Adults have been reared from larvae found in pigeon feces and in the nests of bank swallows (specimens in USNM), and have been reared from pupae from the nest of *Microtus* (specimens in the Canadian National Collection). Also in the latter collection is a specimen taken at the entrance to a burrow of *Cynomys*.

Pseudoleria intermedia Garrett

FIGURE 32

Pseudoleria intermedia Garrett, 1925b, p. 3.

This species can best be separated from the preceding species by the shape of the epandrium of the male postabdomen. However, the general coloration of this species appears to be somewhat darker than that of *Pseudoleria crassata* Garrett. The thorax and abdomen are usually ash gray, with brownish pleura and brownish mesonotal vittae similar to those described for *P. crassata* Garrett. The femora of the legs are dark brown to ash gray, with a grayish pollinosity, especially on the forefemora. The epandrium of the male postabdomen is about twice as long as its greatest width, when seen in lateral view.

The first longitudinal vein (R_1) of *P. intermedia* Garrett is described by Garrett as being short, with the tip proximad of the small (anterior) crossvein. Although the tip does lie proximad of the small crossvein, this character is also found in related species and is therefore not a useful key character.

I have examined the type (a male) and 2 other male specimens determined by Garrett.

LENGTH.—3.5–5.0 mm.

DISTRIBUTION.—California, Arizona, Wyoming, Colorado, New Mexico, Kansas, Tennessee; January–August.

Pseudoleria media Garrett

FIGURE 34

Pseudoleria media Garrett, 1925b, p. 3.

I examined the type male of *Pseudoleria media* Garrett, but could find no means of distinguishing it from *P. intermedia* Garrett. The slide preparation of the terminalia is in such poor condition that I

could not be certain of the structural details. I obtained from the Garrett collection a paratype male from which the terminalia had been similarly mounted on a slide. I removed the terminalia from the slide in order to study its structure more effectively, but this preparation is also in very poor condition. The posteroventral margin of the epandrium apparently is not evenly rounded, but is drawn out into a somewhat pointed apex. This feature fits well with Garrett's description of the "disk with the tips moderately produced."

I have examined four other male specimens which are the same as *P. intermedia* Garrett, except that the posteroventral margin of the epandrium is drawn out as described above.

Distribution.—California, Arizona, Texas, Kansas; March–July, October, December.

Biology.—One specimen in the U.S. National Museum was collected "in burrow of *Diplodomys*" in California.

Pseudoleria dubia Garrett

Pseudoleria dubia Garrett, 1925b, p. 3.

Garrett's description, the only one available, is as follows: "An imperfect specimen is very close to *media* but the disk is very narrow. Tips rounded but shorter . . ."

I have examined the type. The terminalia are mounted on a slide which is in poor condition and difficult to interpret.

The type was collected at Sarita, Tex., 30 Nov. 1911.

Pseudoleria similis Garrett

Figure 35

Pseudoleria similis Garrett, 1925b, p. 2.

The terminalia of the type of this species is mounted on a slide. The condition of the slide is too poor for me to be able to make out the structural details with certainty, but I believe that the species is the same as my "species 6," upon which my concept of *Pseudoleria similis* Garrett is based. As indicated in Garrett's description, the fourth tarsal segment of the hind leg is about twice as long as wide and its sides are nearly parallel. The best distinguishing character, however, is the presence of rather dense bristles on the posterior margin in the lower half of the epandrium of the male postabdomen. The distal margin of the epandrium is more or less truncate. Aside from this, the characters of this species appear to be the same as those of *P. intermedia* Garrett.

Distribution.—Idaho, California; February–June, December.

Pseudoleria pectinata (Loew)

FIGURE 36

Blepharoptera pectinata Loew, 1872, p. 99. (Centuria 10, 79).
Leria pectinata (Loew), Aldrich and Darlington, 1908, p. 82.
Pseudoleria pectinerata Garrett, 1921, p. 128.
Pseudoleria pectinata (Loew), Czerny, 1924, p. 101.—Garrett, 1925b, p. 2.

The male of this species is very similar to the preceding, except that the fourth tarsal segment of the hind leg is less than twice as long as wide, the cheek is narrower (cheek-eye ratio from 0.35 to 0.45), the epandrium has two protruding "knobs," and there are 3 or 4 stout spines on the ventral edge of the hypandrium. The female is quite distinct from all other known species, having a thick patch of short hairs on each side of the third abdominal tergite.

DISTRIBUTION.—British Columbia, California, Arizona, Utah (Knowlton and others, 1939), Texas, Minnesota, Iowa, Missouri, Georgia, South Carolina, Ohio, District of Columbia; March–August, December.

REMARKS.—Tonnoir and Malloch (1927) synonymize *Leria placata* Hutton with *P. pectinata* (Loew). In view of the fact that such a decision necessitates an examination of the male terminalia of Hutton's type, I have not listed the synonymy here. Hutton (1901, p. 82) described the species as having the eye "small." This description casts further doubt on the synonymy with *P. pectinata* (Loew).

Although *P. pectinata* (Loew) was reported by Howard (1901) from human excrement, the specimens (in USNM) on which the record is based are females and do not appear to be of this species.

Pseudoleria vulgaris Garrett

FIGURE 37

Pseudoleria vulgaris Garrett, 1925b, p. 2.

The fourth tarsal segment of the hind leg of the male is very short in this species, and is usually no longer than it is broad. The epandrium of the male postabdomen is turned under ventrally, and the distal edge is rather truncate and rounded at the anterior and posterior corners. The very dark forefemora is a useful supplemental character in identifying both sexes of this species.

MALE AND FEMALE.—Front yellowish brown, darker toward the vertex; frontal plates, ocellar triangle, and back of head grayish pollinose; antennae dark brown; remainder of head dirty yellow; buccal setae in 1 or 2 irregular rows; cheek-eye ratio from 0.4 to 0.55.

Thorax ash gray, pollinose, sometimes brownish along edge of sclerites; mesonotum usually with a median brown vitta which extends

to the disk of the scutellum; dorsocentrals and sometimes other bristles of the mesonotum arising from brown patches; pteropleuron usually with a strong bristle and several neighboring hairs; legs yellowish brown, femora with dark gray pollinosity, especially the fore-femora; tibia and tarsi reddish brown; fourth tarsal segment of hind leg of male about as broad as long; wings hyaline, anterior crossvein slightly darkened; abdomen ash gray, sometimes brownish; epandrium of male turned inward ventrally, the distal edge slightly concave and rounded at the anterior and posterior corners.

Length.—3.0–4.5 mm.

Distribution.—British Columbia, Washington, Oregon, Idaho, Utah, (Knowlton and others, 1939), Alberta, Saskatchewan, Montana, Wyoming, Colorado, New Mexico, Nebraska; March–October, December.

Pseudoleria parvitarsus Garrett

Figure 38

Pseudoleria parvitarsus Garrett, 1925b, p. 2.

Pseudoleria parvitarsus Garrett is easily distinguished from other species in the genus by the fact that the hind basitarsus of the male is shorter than the following segment. In *P. parvitarsus* Garrett, *P. robusta* Garrett, and *P. subrobusta*, new species, the male postabdomen is unusually large. Whereas in the other species of the genus the terminalia are folded under and more or less concealed, they are usually conspicuously exposed in the three species mentioned.

The coloration of this species is: vertex and back of head gray, antennae reddish orange to dark brown, aristae dark brown, remainder of head yellow to yellowish brown; thorax ash gray to brownish, sometimes with thin median vitta and the dorsocentrals arising from small brown spots; legs yellow to yellowish brown, femora usually dark and with a grayish pollinosity; wings hyaline with crossvein not darkened; abdomen yellowish brown to ash gray.

The cheek-eye ratio is about 0.50. The hypandrium of the male has two stout spines as in *P. robusta* Garrett.

Length.—4.0–5.0 mm.

Distribution.—British Columbia, California, Nevada, New Mexico, Alberta, Saskatchewan, Montana, South Dakota, Nebraska, Indiana; April–June, August–October.

Biology.—Specimens have been collected in picric acid traps at depths of 350 to 750 feet in the Carlsbad Caverns, according to labels on specimens in the U.S. National Museum. Other specimens in this institution were collected from the nest of a burrowing owl and from *Atriplex canescens*. Specimens in the Carnegie Museum and Canadian National Collection were collected at a burrow of *Cynomys*.

Pseudoleria robusta Garrett

FIGURE 39

Pseudoleria robusta Garrett, 1925b, p. 2.

This species is likely to be confused only with *Pseudoleria subrobusta*, new species, from which the male can be easily distinguished by the presence of two stout spines on the ventral edge of the hypandrium. The size and coloration is similar to that given for *P. parvitarsus* Garrett, except that the legs on specimens examined have been more yellowish than in *P. parvitarsus* Garrett. The cheek-eye ratio is from 0.35 to 0.44.

DISTRIBUTION.—British Columbia, Washington, California, Utah, Montana; March–April, July–October.

BIOLOGY.—This species has been collected from a swallow nest, according to the label on a specimen in the U.S. National Museum.

Pseudoleria subrobusta, new species

FIGURE 40

This species has the same coloration as described for *Pseudoleria parvitarsus* Garrett, except that the anterior crossvein of the wing is slightly darkened. The hind basitarsus of the male is longer than the following segment. The cheek-eye ratio is from 0.48 to 0.60.

The species is best recognized by the appearance of the male terminalia. The absence of stout spines will distinguish *P. subrobusta*, new species from *P. robusta* Garrett. In the former there is a single short toelike projection at the posterior corner of the distal edge of the epandrium.

TYPES.—Holotype (male) and allotype: San Joaquin Experiment Station, Madera County, Calif., 22 Feb. 1953, collected by P. D. Hurd. Paratypes: 1 female with same data as holotype and allotype; 1 specimen of each sex from Redlands, Calif., 14 Dec.; 1 specimen of each sex from Morengo Valley, San Bernardino, Calif., 28 Mar. 1952, collected by E. L. Schlinger; 1 male from Calienti Mountain, San Luis Obispo County, Calif., 14 Mar. 1953, collected by K. W. Tucker; 1 male from Davis, Calif., 14 Mar. 1953, fermented syrup bait, collected by E. C. Carlson.

The holotype and allotype have been deposited in the U.S. National Museum (USNM 65442). Paratypes have been deposited in the State College of Washington and the University of California at Davis and at Berkeley. All types were from the collections of the University of California at Davis and at Berkeley.

DISTRIBUTION.—In addition to the type specimens from California, I have seen 1 male from Wheeler Springs, Tex., 30 Oct. 1949, col-

lected by M. R. Wheeler. This specimen is in the personal collection of Dr. Wheeler.

Genus *Anorostoma* Loew

Anorostoma Loew, 1859, p. 47.—Aldrich and Darlington, 1908, p. 75.—Czerny, 1924, p. 113; 1927a, p. 28; 1935, p. 282.—Curran, 1932, p. 10; 1933, p.1.

The head in this genus recedes from the lunule toward the oral margin. The anterior fronto-orbital bristle is usually about one-half the height of the posterior bristle, but the ratio is variable. The third antennal segment is oval and the arista microscopically pubescent. The eye is horizontally oval, usually more so in the male than the female.

The thoracic chaetotaxy is as follows: dorsocentrals 1+3; scutellum bare except for 2 pairs of lateral bristles; propleural bristle present; mesopleuron with 1 or more bristles along posterior margin, often with small hairs above and (or) below the bristle; sternopleuron with 1 or more bristles; remainder of pleura bare; prosternal bristles absent.

The middle tibiae have several ventral apical bristles, as well as the usual dorsal preapical bristle.

The color of the wings and abdomen may vary with the species.

I have examined the types of all species of *Anorostoma* from North America which have been described, except *A. raca* Garrett. I have utilized the male terminalia to a great extent in working out the following revision of the genus. Although Garrett's descriptions give no illustrations or detailed accounts of the appearance of the male terminalia of his species, his personal notes and drawings, which he permitted me to examine, show that he used these structures extensively.

Key to the Species of *Anorostoma*

1. Wings with a mottled appearance, contrasting whitish and dark gray areas, somewhat opaque 2
   Wings hyaline or tinged with yellowish brown or black, but not mottled in the form of contrasting whitish and dark gray areas 4
2. No black spot from the base of antenna to eye; cell R_1 (marginal cell) not completely darkened with gray . . . . . ***cinereum*** Curran
   A black spot from the base of antenna to eye; cell R_1 (marginal cell) may or may not be completely darkened with gray 3
3. Cell R_1 completely grayish (in contrast to whitish areas in other parts of wing); length of body about 7 mm . . . . . ***opacum*** Coquillett
   Cell R_1 not completely grayish, distal area of cell whitish; length of body about 4.5 mm . . . . . **maculatum** Darlington
4. Mesonotum mottled with many brownish spots, or if not so, the mesonotum is a bluish gray which contrasts with the non-pollinose reddish yellow abdomen; sternopleuron usually with 2 or more strong bristles 5

Mesonotum not mottled with many brownish spots or not with a bluish-gray color that contrasts with a non-pollinose reddish yellow abdomen; sternopleuron usually with only 1 strong bristle 7

5. Abdomen reddish yellow, without pollen . . . . . **alternans** Garrett
Abdomen pollinose 6

6. Wings completely clear, not tinged with faint yellow brown; front brownish. **grande** Darlington
Wings tinged with faint yellowish brown; front reddish . . **wilcoxi** Curran

7. Wings hyaline or faintly tinged with yellow[1] 8
Wing with anterior cells distinctly darkened with blackish; mesonotum with evidence of 3 brownish vittae; epiphallic process of male with short, fingerlike posteroventral apex . . . . . **fumipenne,** new species

8. Posterior ventral apex of male epiphallic process extended into a fingerlike portion which is at least twice as long as wide 9
Posterior ventral apex of male epiphallic process not extended into such a fingerlike portion 11

9. Two strong mesopleural bristles; about 5 irregular rows of setae between the dorsocentral bristles . . . . . ***jamesi,*** new species
One strong mesopleural bristle; about 1 to 3 irregular rows of scattered setae between the dorsocentral bristles 10

10. Middle tibia of male with hairs as long as the dorsal preapical bristle; epandrium of male with hairs as long as the length of the surstylus. ***longipile,*** new species
Middle tibia of male without hairs as long as the dorsal preapical bristle; epandrium of male with hairs shorter than length of surstylus. ***carbona*** Curran

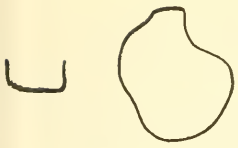
11. Epiphallic process of male with conspicuous, well-differentiated spines along posterior surface; ventral edge with a distinct notch . . . ***currani*** Garrett
Epiphallic process of male without well-differentiated spines along posterior margin; ventral edge with a slight inward curve, but no distinct notch . 12

12. Surstylus of male longer than wide; mesonotum yellow to yellowish orange 13
Surstylus of male about as long as wide; mesonotum variable in color, but with a grayish or silvery pollinosity 14

13. Epiphallic process of male slightly extended posteroventrally; general body coloration yellowish orange . . . . . ***lutescens*** Curran
Epiphallic process of male with practically no indication of a posteroventral extension; general body coloration pale yellow . . . ***marginatum*** Loew

[1] Of the remaining species, *A. carbona* Curran, *A. lutescens* Curran, and *A. currani* Garrett were described from males only, and females are poorly or not at all known; thus the remainder of this key is inadequate for determining females.

FIGURES 41–55.—Structures of the terminalia of *Anorostoma.* All views are lateral, except those of figs. 53–55, which are dorsal. Figs. 41–52, left epiphallic processes and surstyli, X 25: 41, *Anorostoma maculatum* Darlington; 42, *A. grande* Darlington; 43, *A. alternans* Garrett; 44, *A. marginatum* Loew; 45, *A. coloradense* Garrett; 46, *A. lutescens* Curran; 47, *A. jersei* Garrett; 48, *A. currani* Garrett; 49, *A. carbona* Curran; 50, *A. longipile,* new species; 51, *A. fumipenne,* new species; 52, *A. jamsei,* new species. Figs. 53–55, tip of abdomen of female, X 50: 53, *A. marginatum* Loew; 54, *A. coloradense* Garrett; 55, *A. jersei* Garrett.



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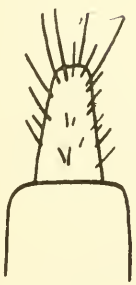

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(For explanation see opposite page.)

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14. Posterior edge of surstylus of male distinctly receding below; spines at tip of abdomen of female less than the width of the posterior end of the terminal abdominal segment . . . . . ***coloradense*** Garrett
Posterior edge of surstylus of male not distinctly receding below; spines at tip of abdomen of female may be about as long as the width of the posterior end of the terminal abdominal segment . . ***jersei*** Garrett (=***hinei*** Garrett?)

Anorostoma cinereum Curran

Anorostoma cinereum Curran, 1932, p. 10; p. 2.

Anorostoma cinereum Curran, *A. maculatum* Darlington and *A. opacum* Coquillett are very similar to one another in chaetotaxy, coloration, and appearance of the male terminalia. *A. cinereum* Curran may be distinguished from the others in that it lacks a black spot between the antenna and the eye, and the wings have less area darkened with gray. Cell R_1 is almost entirely whitish.

MALE.—Cheeks, face, fronto-orbital plates, vertex, and back of head with a silvery pollinosity, sometimes becoming faint yellowish; front yellow to yellowish brown; ocellar triangle darker gray; area between antenna and eye appearing yellowish orange to silvery gray, depending upon the light, but never as a blackish spot; antennae dark brown to black, including the aristae, which are relatively short and are minutely pubescent; aristae with a white ring in proximal half; front with sparse setae, mostly towards anterior half; oral vibrissae weak, about as long as the third antennal segment; a single row of sparse weak buccal setae; cheek-eye ratio from 1.1 to 1.2.

Thorax mostly a pollinose silvery gray; upper half of mesopleuron and the humeral callosity sometimes appearing yellowish; a yellowish shading may extend through the presuturals to anterior supra-alars, with a similar shading through the dorsocentrals; the latter shading may become dark brown posteriorly and the 2 darkened areas through the dorsocentrals may merge in the region of the prescutellars; scutellar bristles may each arise from a brown spot; mesopleuron with a single strong bristle along the posterior margin, with sometimes 1 or 2 small hairs near it; sternopleuron with 1 strong bristle, with scattered setae anterior to it, forming 1 to 3 irregular rows down the middle to the longer hairs between the coxae.

Legs silvery gray to yellowish.

Wings mostly whitish, with darkened gray areas near the end of the subcostal vein, along the anterior crossvein, along the anterior half of the posterior crossvein, in the discal cell, and in the first, second, and third posterior cells; in the marginal cell (cell R_1), there is a very small, hardly noticeable gray area.

Abdomen a pollinose silvery gray; scattered small setae above, but a bare longitudinal area forms a vitta down the middle; hypopygium large, its setae sparse.

Female.—Similar to male, except for terminalia.

Length.—4.5–6.5 mm.

Distribution.—Washington, Oregon; May, July, August, October.

Biology.—All specimens examined were collected along the coastal areas of the states mentioned. The habits of this species are probably similar to *A. maculatum* Darlington (see below).

Anorostoma maculatum Darlington

Figure 41

Anorostoma maculata Darlington, *in* Aldrich and Darlington, 1908, p. 76.
Anorostoma maculatum Darlington, Czerny, 1924, p. 115.—Curran, 1933, p. 3.

Male.—Front orange; vertex and upper part of back of head dark gray with a silvery pollinosity; antennae black, except for white ring in proximal half of the aristae; a black spot covers the area between the antenna and the eye; remainder of head pale yellow with a silvery pollinosity; vibrissae short, about as long as the third antennal segment; eye horizontally oval, the cheek-eye ratio about 0.9.

Thorax blackish or brownish in ground color, with a silvery gray pollinosity; chaetotaxy and coloration very similar to *A. cinereum* Curran.

Legs yellow, with femora darkened and with a silvery pollinosity.

Wings with contrasting whitish and grayish areas; marginal cell (cell R_1) is grayish except for the distal part, which is distinctly whitish. (In *A. cinereum* Curran this cell is practically all whitish, whereas in *A. opacum* Coquillett it is entirely darkened.)

Abdomen black, with a silvery pollinosity; postabdomen pale yellow.

Female.—Similar to male except for terminalia and femora, the latter not as greatly thickened as in the male.

Length.—4.0–4.5 mm.

Distribution.—California; April–August.

Remarks.—It was noted in the original description that these flies are common in sand-dune areas, where they fly close to the sand and so resemble grains of drifting sand. It was further noted that when the flies alight, their mottled color blends perfectly with the sand.

I have examined 15 syntypes (No. 11980) of this species in the U.S. National Museum.

Anorostoma opacum Coquillett

Anorostoma opaca Coquillett, 1901, p. 614.—Aldrich and Darlington, 1908, p. 76.
Anorostoma opacum Coquillett, Czerny, 1924, p. 114.—Curran, 1933, p. 3.

I have examined the type (No. 5500), a female, in the U.S. National Museum. It resembles *A. maculatum* Darlington very closely, except

that it is much larger, the length being 7.0 mm. The wings have less whitish area than either *A. cinereum* Curran or *A. maculatum* Darlington; thus in *A. opacum* Coquillett the marginal cell (cell R_1) is entirely gray, without any whitish areas. The cheek-eye ratio is about 1.0.

Thoracic color patterns are used in Curran's key, but are not reliable in separating *A. maculatum* Darlington from *A. opacum* Coquillett. Four golden-brown vittae appear on the mesonotum of the type of *A. opacum* Coquillett, but in *A. maculatum* Darlington this character is variable and some specimens have evidence of mesonotal vittae. The mesopleuron of *A. opacum* Coquillett has a golden cast to the upper half, but *A. maculatum* Darlington may also show this character.

DISTRIBUTION.—The only specimen which I have seen is the type, collected in Los Angeles County, Calif.

Anorostoma grande Darlington

FIGURE 42

Anorostoma grandis Darlington, *in* Aldrich and Darlington, 1908, p. 75.
Anorostoma grande Darlington, Czerny, 1924, p. 113.—Curran, 1933, p. 3.

This species is very similar to *Anorostoma wilcoxi* Curran. I have found the shading of the wings a useful character in separating the two species. In *A. grande* Darlington the wings are very clear, with no indication of a yellow tinge, whereas in *A. wilcoxi* Curran there is a definite yellowish tinge to the entire wing. The color of the front was used by Curran to separate these two, the front being brownish in *A. grande* Darlington and reddish in *A. wilcoxi* Curran. This front coloration appears to be a useful supplementary character.

The male terminalia of the two species are very similar.

MALE.—Front and vertex brown, with a grayish pollinosity; front with setae on anterior half or more; back of head yellowish brown, pollinose; dense setae between the eye and antenna; face and cheeks yellowish; antennae dark brown, aristae black and minutely pubescent; oral vibrissae strong, a single irregular row of long buccal setae; cheek-eye ratio from 0.75 to 1.1.

Mesonotum with many brown spots at bases of hairs and bristles; remainder of thorax yellowish or yellowish brown and with a grayish pollinosity; propleural bristle strong; mesopleuron with 1 or 2 strong bristles and 1 or more smaller hairs along the hind margin; sternopleuron with 2 to 4 bristles and 2 or 3 rows of hairs down the middle to the longer, more numerous hairs between the coxae; remainder of pleura bare.

Legs yellowish, sometimes darkened distally, and with a grayish

pollinosity; 6 to 8 stout bristles anterodorsally on hind femur, irregularly placed; femora thickened, especially the hind pair.

Wings hyaline, without any yellowish tinge; crossveins and end of subcosta clouded with brownish black.

Abdomen dark brown with grayish pollinosity; postabdomen yellowish to orangish brown; segments 2–5 with long bristles along lateral hind margins; scattered setae over entire dorsum of abdomen.

Female.—Similar to male, except for terminalia; femora not so markedly thickened.

Length.—5.5–7.0 mm.

Distribution.—Washington, California (coastal areas); April, May, July, August.

Biology.—The type male was collected in a "wet meadow in the woods near the seashore." There is in the University of California (Davis) collection a series of 3 males collected on *Cirsium occidentale*.

Anorostoma wilcoxi Curran

Anorostoma wilcoxi Curran, 1933, p. 4.

As noted above, *Anorostoma wilcoxi* Curran and *A. grande* Darlington are very similar to each other, except for the color of the front and wings. As far as wing coloration is concerned, there appear to be no intermediate forms, and thus it is best to continue to consider the species distinct.

Distribution.—Washington, Oregon, California (coastal areas). Records from all months except January, July, November, and December.

Anorostoma alternans Garrett

Figure 43

Anorostoma alternans Garrett, 1925b, p. 4.—Czerny, 1930, p. 447.—Curran, 1933, p. 3.

This species appears to be related to *A. grande* Darlington and *A. wilcoxi* Curran, particularly inasmuch as the male terminalia show a similarity of structure. The non-pollinose reddish yellow abdomen distinguishes *A. alternans* Garrett from the other two species.

Male.—Front yellowish orange; back of head, vertex, ocellar triangle, and frontal plates bluish gray, pollinose; antennae yellow to yellowish orange, aristae dark brown; remainder of head yellow to yellowish orange; oral vibrissae strong, a single row of buccal setae; cheek-eye ratio 0.62 to 0.85.

Thorax bluish gray with grayish pollinosity; small brown spots at bases of dorsocentrals and minute spots at bases of many setae; chaetotaxy similar to *A. wilcoxi* Curran and *A. grande* Darlington;

sometimes only the hindmost sternopleural bristle is well developed.

Legs yellowish orange; forefemora darkened with a grayish pollinosity; femora thickened; similar to *A. wilcoxi* Curran and *A. grande* Darlington.

Wings tinged with yellow; anterior crossvein darkened; posterior crossvein may be slightly browned.

Abdomen a non-pollinose orangish yellow to reddish yellow, often rather shining.

FEMALE.—Similar to male, except femora less conspicuously thickened.

DISTRIBUTION.—Washington, Oregon, California (coastal areas); March–June, August.

Anorostoma marginatum Loew

FIGURES 44, 53

Anorostoma marginata Loew, 1862a, p. 223.—Aldrich and Darlington, 1908, p. 77.—Curran, 1933, p. 6.
Anorostoma marginatum Loew, Czerny, 1924, p. 116.
Anorostoma raca Garrett, 1923, p. 244. New synonymy.

Most specimens of *Anorostoma* which I found in various collections throughout the country were labelled "*marginatum*," yet relatively few were actually this species. This discrepancy may stem from the fact that *A. marginatum* Loew was the first species described from North America and from the fact that Garrett's descriptions are inadequate for use in discriminating his several related species which resemble *A. marginatum* Loew.

Type specimens clearly contradict Curran's (1933) statement that *A. marginatum* Loew is synonymous with Garrett's *A. coloradense*.

The placement of *A. raca* Garrett in synonymy with *A. marginatum* Loew is based on the examination of a male specimen in the Garrett collection. (The type of *A. raca* Garrett is in the Canadian National Museum.) The specimen was determined by Garrett; its terminalia are mounted on a slide. Garrett indicated in a personal interview that the distinctness of the male terminalia was the basis on which he described his species; he had not had the opportunity to examine the types of *A. marginatum* Loew, which are represented by 2 males (No. 13195) in the Museum of Comparative Zoology at Harvard.

MALE.—Front yellowish orange, aristae dark brown, remainder of head pale yellow. Cheek-eye ratio from 0.6 to 0.8.

Mesonotum yellow to yellowish orange (may be almost grayish black in ground color), remainder of thorax pale yellow; 1 to 3 irregular rows of setae between the dorsocentrals; legs yellow; wings tinged faintly with yellow, especially along crossveins and costal margin.

Abdomen yellow, may be a little darkened along middorsal line.

Epiphallic process of terminalia with no distinct posteroventral projection or elongation.

FEMALE.—Similar to male; tip of abdomen without distinct spines, but with long silky hairs.

LENGTH.—5.5–6.0 mm.

DISTRIBUTION.—Manitoba, Michigan, New York, Quebec; June–August.

Anorostoma lutescens Curran

FIGURE 46

Anorostoma lutescens Curran, 1933, p. 8.

This species is very similar to *Anorostoma jersei* Garrett. In fact, the type male of *A. lutescens* Curran agrees with specimens in the Garrett collection which are labelled *A. jersei* var. *occidentialis* Garrett. The best means of distinguishing the two species from each other appears to be the structure of the male terminalia (refer to the key to species of *Anorostoma*, p. 542). The reddish vittae on the mesonotum of *A. lutescens* Curran and their absence from *A. jersei* Garrett appear to be a useful supplementary character, and perhaps the only means of distinguishing the females from each other.

Curran's original description is based on a single male from Boiler Bay, Oreg., 18 May 1930, J. Wilcox. The description is adequately detailed, except that it gives insufficient information on the structure of the male terminalia.

DISTRIBUTION.—Oregon, Washington; May–July.

Anorostoma jersei Garrett

FIGURES 47, 55

Anorostoma jersei Garrett, 1924, p. 29.—Curran, 1933, p. 5.
Anorostoma jerseyae Garrett, Czerny, 1927b, p. 37.

This species is best distinguished by the structure of the male terminalia. The spines at the tip of the female abdomen may be of some use (refer to the key to the species of *Anorostoma*).

The species was described from a single male taken at Manumuskin, N.J., 10 May 1903, by J. M. Aldrich.

MALE AND FEMALE.—Similar to *A. lutescens* Curran; cheek-eye ratio usually from 0.55 to 0.65, but in some specimens it may reach 0.75. Thorax brownish in ground color and may appear so in "wet" specimens, but usually there is a heavy silvery pollinosity over the entire thorax; mesonotum with dark spots at bases of bristles, sometimes evidence of shaded vittae, but not reddish vittae as in *A. lutescens* Curran; scutellum usually bare, except for 2 pairs of lateral bristles, but I have seen 2 specimens with several scattered lateral setae.

Legs yellowish with silvery pollinosity. Abdomen yellowish brown to blackish in ground color, usually with a silvery pollinosity.

LENGTH.—4.5–6.0 mm.

DISTRIBUTION.—Alaska, Washington, Oregon?, California, Utah, Arizona, Colorado, New Mexico, Nebraska, Michigan?, New Jersey; May–August. (The questionable localities are based on determinations of female specimens.)

Anorostoma hinei Garrett

Anorostoma hinei Garrett, 1925b, p. 4.—Czerny, 1930, p. 446.—Curran, 1933, p. 8.

I examined the holotype female and three female paratypes in the Garrett collection. They were collected at Katmai, Alaska, July 1917, by J. S. Hine.

I cannot distinguish this species from *Anorostoma jersei* Garrett. Because the females of several related species in this complex are poorly known and perhaps not distinguishable from one another, it is difficult to establish the correct status of *A. hinei* Garrett. Further effort to collect male specimens from the type locality seems desirable.

Anorostoma coloradense Garrett

FIGURES 45, 54

Anorostoma coloradensis Garrett, 1924, p. 28.
Anorostoma coloradiniense Garrett, Czerny, 1927b, p. 37.
Anorostoma marginata Loew, Curran, 1933, p. 6.

Curran (1933) stated that this species was synonymous with *A. marginatum* Loew, but as mentioned previously, the types of the two species are quite distinct. This species is very common in collections, but is easily confused with others unless the male terminalia are carefully examined.

The tip of the female abdomen has spines which are weaker than those of *A. jersei* Garrett and which may help to distinguish it.

MALE AND FEMALE.—Upper back of head and vertex with grayish pollinosity, front yellowish orange, aristae dark brown, remainder of head pale yellow; area between antenna and eye may be somewhat darkened, but this darkness is not a constant character; oral vibrissae moderately strong with a single row of buccal setae; eye horizontally oval; cheek-eye ratio from 0.55 to 0.7.

Mesonotum brown to blackish in ground color, with a grayish to golden pollinosity; scutellum yellowish; setae between the dorsocentrals variable, usually 3 to 5 irregular rows; bristles of mesonotum may arise from dark spots, but the setae usually do not; pleura yellow to yellowish brown with a grayish-yellow pollinosity; the upper part of the mesopleuron may be concolorous with the remainder of the pleura or it may be slightly or distinctly darkened.

Legs yellow to yellowish orange, slightly darkened distally.

Wings with slight brownish tinge, especially along costa; crossveins faintly clouded, but otherwise no distinct infuscations.

Abdomen brownish to black in ground color, with gray pollinosity.

LENGTH.—4.0–7.0 mm.

DISTRIBUTION.—British Columbia, Oregon, California, Nevada, Arizona, New Mexico, Colorado, New Jersey, New York, Massachusetts, Quebec; June–August.

Anorostoma currani Garrett

FIGURE 48

Anorostoma currani Garrett, 1922, p. 176—Czerny, 1927b, p. 37.—Curran, 1933, p. 5.

The stout spines of the epiphallic process easily distinguish the male of this species. The female is not known, although two female specimens with the same collection data as an *Anorostoma currani* Garrett male have been examined. They appear similar to the female of *A. coloradense* Garrett.

MALE.—Head, thorax, and legs yellow with grayish pollinosity, except front darkened to orange; abdomen yellowish brown to blackish in ground color with grayish pollinosity.

Cheek-eye ratio about 0.65.

A median row of setae lies between the dorsocentrals, with other scattered setae present; sternopleural hairs may be slightly longer than in related species.

The general appearance of this species is very similar to *A. jersei* Garrett, *A. coloradense* Garrett, and related species.

Epiphallic process with large notch in ventral edge and with long stout spines.

DISTRIBUTION.—British Columbia, Washington, Colorado, Montana, Manitoba, North Dakota; June–September.

REMARKS.—The Garrett collection contains a specimen labelled "Holotype, *Anorostoma currani* var. *mica*." The specimen is heavily covered with mold and I could not observe any significant difference from the type of *A. currani* Garrett. The allotype bearing the same determination label had strong terminal abdominal spines similar to *A. jersei* Garrett. It was not collected in association with the holotype.

Anorostoma carbona Curran

FIGURE 49

Anorostoma carbona Curran, 1933, p. 7.

The shape of the epiphallic process and of the surstylus best distinguishes the male of this species from all others. The cheek-eye

ratio is from 0.59 to 0.67. The species is further described in Curran (1933). It was described from a holotype and three paratypes (all males) from Carbon County, Wyo.

DISTRIBUTION.—Wyoming, Colorado, Nebraska; June, September.

Anorostoma longipile, new species

FIGURE 50

This species is very similar to *A. carbona* Curran, but the long silky hairs in certain areas of the body of the male of *A. longipile*, new species, will readily distinguish it. The shape of the surstylus differs slightly in the two species. The entire type series, which was collected at Arnold Ranch, Pecos, N. Mex., 3 Sept. 1909, by J. D. Mitchell, was deposited in the collection of the U.S. National Museum. I have seen no specimens other than the type series.

MALE.—Head as in *carbona* and related species; thorax yellowish orange to yellowish brown, with grayish pollinosity; mesonotum darker than pleura; mesonotal setae very sparse; sternopleuron with a single row of hairs down the middle, in addition to the usual bristle.

Forecoxae with long hairs hanging down posteriorly, resembling a beard; all legs with long fine hairs in addition to the usual bristles; the ventral hairs of the middle tibiae are about as long as the dorsal preapical bristle; the hind basitarsus is thickened and about equal to (or very slightly longer than) the length of the following segment.

Wings with brownish tinge and with the crossveins slightly clouded with brown.

Abdomen black or dark brown in ground color with grayish pollinosity; postabdomen yellowish orange; hairs of epandrium as long as the length of the surstylus.

FEMALE.—Similar to male, except lacking the long hairs; hind basitarsus longer than the following segment and not thickened; terminal abdominal spines strong, as in *A. jersei* Garrett.

LENGTH.—4.0–5.5 mm.

TYPES.—The holotype male, allotype, 1 paratype male, and 3 paratype females have been deposited in the U.S. National Museum (USNM 65443); 1 paratype of each sex has been deposited in the collection of the State College of Washington.

Anorostoma fumipenne, new species

FIGURE 51

The smoky clouding of the wings, the evidence of dark mesonotal vittae, and the shape of the epiphallic process distinguish the male of this species.

Male.—Head similar to *A. coloradense* Garrett; cheek-eye ratio from 0.45 to 0.50.

Mesonotum dark brown in ground color with ash-gray pollinosity; pleura more yellowish; dorsocentrals arising from brown spots with longitudinal shading between the dorsocentrals, so that a pair of vittae is suggested; setae between dorsocentrals in about 5 irregular rows; a thin dark median vitta in anterior third of mesonotum; scutellum concolorous with remainder of mesonotum; pleura as in *A. coloradense* Garrett, with mesopleuron slightly darkened above.

Legs yellowish or slightly darkened with brownish.

Wings with smoky brown clouding, mostly in cell R_1, but also in the interior of other cells; crossveins clouded.

Abdomen dark brown to black in ground color with grayish pollinosity.

Female.—The allotype female is similar to the male, except that the vittae through the dorsocentrals are even more definite and become wider posteriorly and extend on to the scutellum; the third antennal segment is brownish yellow; darker than in the male.

Length.—4.0–5.0 mm.

Types.—The holotype (male) and allotype were collected at Mount Rainier, Washington, "7–6–35," by R. H. Beamer; they are in the University of Kansas collection. Two paratype males were sent to me on loan from Oregon State College; one has been returned and the other deposited in the collection of the State College of Washington. These specimens were collected at Lake of the Woods, Ore., 17 July 1932, by J. E. Davis.

Distribution.—In addition to the types, I have seen a male and female in the Steyskal collection. Collection data: Camp Abbot, Deschutes County, Oreg., 24 May 1944.

Anorostoma jamesi, new species

Figure 52

The long fingerlike projection of the epiphallic process readily distinguishes the male of this species. It is the only species of *Anorostoma* which has two equal (or nearly equal) mesopleural bristles.

Male and female.—Head similar to *A. coloradense* Garrett; third antennal segment yellow to yellowish brown; pollinose triangular area enclosing the ocelli has its apex close to the frontal suture, although the raised ocellar triangle is as usual; cheek-eye ratio from 0.68 to 0.81.

Thorax yellow to yellowish brown in ground color with a grayish pollinosity; a narrow brownish nonpollinose vitta extends longitudinally along the median line of mesonotum; wider vittae extend

through the dorsocentrals and may extend onto the scutellum; all mesonotal bristles are relatively long; mesopleuron may be darkened in upper half; mesopleuron with 2 strong bristles in the middle of the posterior margin and 1 or more setae near the bristles; sternopleuron with 1 strong bristle, a weaker bristle or hair anterior to it, and a group of setae anterior to the bristles and extending in about 2 irregular rows down the middle to the longer hairs between the coxae.

Legs yellow; hind femora sometimes showing a row of about 6 bristles anterodorsally in the proximal half and usually about as many stronger ones arranged irregularly in the anterodorsal part of the distal half; hind basitarsus of male longer than the following segment.

Wings with faint yellowish brown tinge; crossveins darkened with brown.

Abdomen yellowish brown with grayish pollinosity.

LENGTH.—5.5–6.5 mm.

TYPES.—The type series consists of 7 males and 2 females collected by Dr. Maurice T. James, "Pismo Beach, California, Lupine and on sand, July 2, 1954." The holotype (male) and allotype have been deposited in the State College of Washington; 1 paratype of each sex has been deposited in the U.S. National Museum, and the remaining paratypes have been deposited with the holotype and allotype.

Genus *Neoleria* Malloch

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1838, p. 764 (part); 1847, p. 2430 (part).

Blephariptera Macquart, 1835, p. 412 (part).

Blepharoptera Macquart, Loew, 1859, p. 57 (part).

Leria Robineau-Desvoidy, Pandellé, 1901, p. 344 (part).—Aldrich and Darlington, 1908, p. 77 (part).

Neoleria Malloch, 1919, p. 83.—Czerny, 1924, p. 116; 1927a, p. 28.—Collin, 1943, p. 243.

Postleria Garrett, 1921, p. 124.

Specimens of this genus are likely to be confused only with the

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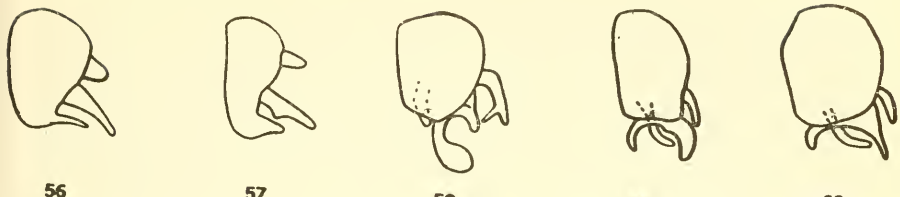
FIGURES 56–73.—Structures of the male terminalia of *Neoleria*, *Spanoparea*, *Morpholeria*, *Acantholeria*, *Schroederella*, *Anypotacta*, and *Scoliocentra*. Pile and setulae are omitted in figs. 56–65. All structures are shown in lateral view, except those of figs. 67 and 69, which are in ventral view. Figs. 56–65, epandria and associated structures, X 25: 56, *Neoleria prominens* (Becker); 57, *N. fuscolinea* (Garrett); 58, *N. tibialis* (Zetterstedt); 59, *Spanoparea walkeri* Garrett; 60, *S. laffooni*, new species; 61, *Morpholeria tristis* (Loew); 62, *Acantholeria abnormalis* Garrett; 63, *A. armipes* (Loew); 64, *A. cineraria* (Loew); 65, *A. moscowa* Garrett. Figs. 66, 67, *Schroederella iners* (Meigen), X 50: 66, left surstylus; 67, distal edge. Figs. 68, 69, *S. fuscopicea*, new species, X 50: 68, left surstylus; 69, distal edge of surstylus. Figs. 70–73, left surstyli: 70, *Anypotacta aldrichi* Garrett; 71, *A. czernyi* Garrett, new species; 72, *Scoliocentra fraterna* Loew; 73, *S. tincta* (Walker).



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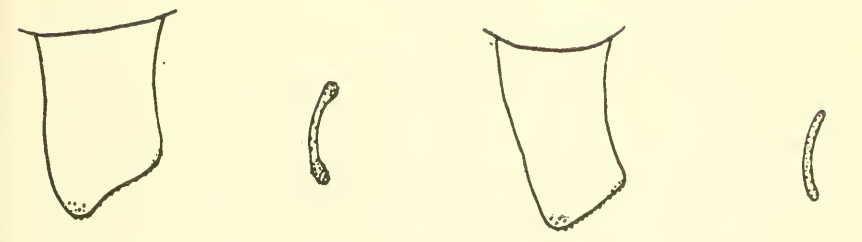
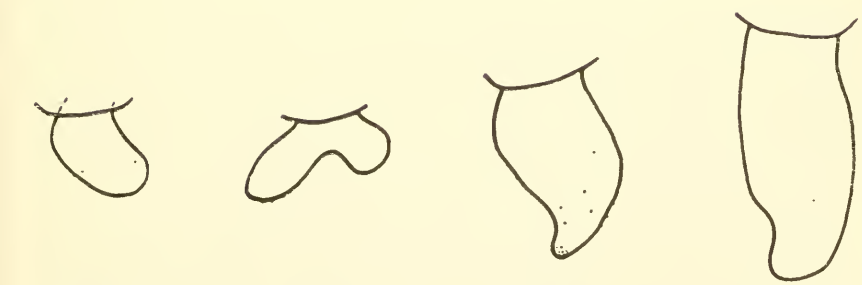


66 67 68 69



70 71 72 73

(For explanation see opposite page.)

Spanoparea-Morpholeria-Acantholeria group, from which *Neoleria* differs in having the anterior and posterior fronto-orbital bristles about equal in length. Other characters of the genus are: third antennal segment large and round, the arista relatively short and minutely pubescent; dorsocentral bristles 1+3, but anterior bristles in some species weakened so that they are hardly distinguishable; scutellum bare except for the usual 2 pairs of lateral bristles; propleural bristle present, 2 in *N. fuscolinea* (Garrett); mesopleuron bare except for several setae sometimes present in anterior corner; sternopleuron with 1 or 2 bristles in upper hind corner, several hairs or setae in front of the bristle and longer hairs ventrally between the coxae; remainder of pleura bare; prosternal bristles absent; middle tibia with several ventral apical bristles.

Key to the Species of *Neoleria* [2]

1. Mesonotum without evidence of vittae 2
   Mesonotum with vittae, at least for part of its length 5
2. Mesonotum uniformly brown to black. 3
   Mesonotum with humeri and (or) a portion of the scutellum yellowed . . . 4
3. All dorsocentral bristles about equally strong . . . . . **diversa** (Garrett)
   Anterior dorsocentral bristles becoming much weaker than the posterior pair . . . . . **prominens** (Becker)
4. Mesonotum uniformly yellow to yellow orange. . . . . **lutea** (Loew)
   Mesonotum mostly grayish brown or black, with the humeri and (or) a portion of the scutellum yellow . . . . . **inscripta** (Meigen)
5. Mesonotum with 2 darkened vittae between the dorsocentral bristles . . . 6
   Mesonotum with a medium-dark brown vitta and a lateral vitta through the dorsocentrals on each side . . . . . **tibialis** (Zetterstedt)
6. Mesonotal vittae very distinct anteriorly in presutural area; 2 propleural bristles present, although 1 is stronger than the other . **fuscolinea** (Garrett)
   Mesonotal vittae distinct in middle of mesonotum, but disappearing anteriorly; 1 propleural bristle . . . . . ***ruficauda*** (Zetterstedt)

Neoleria inscripta (Meigen)

Helomyza inscripta Meigen, 1830, p. 59.
Helomyza humeralis Zetterstedt, 1838, p. 767; 1847, p. 2455.
Blepharoptera inscripta (Meigen), Loew, 1859, p. 66.
Blepharoptera leucostoma Loew, 1863, p. 28 (Centuria 3, 53).
Blepharoptera humeralis (Zetterstedt), Meade, 1899, p. 101.
Leria repetenda Pandellé, 1901, p. 347.
Leria leucostoma (Loew), Aldrich and Darlington, 1908, p. 87.
Neoleria inscripta (Meigen), Czerny, 1924, p. 123; 1927a, p. 29.
Neoleria leucostoma (Loew), Czerny, 1924, p. 124. New synonymy.

Specimens of this species in North American collections have often been labelled *discolor* Loew, which is in *Spanoparea*, and *leucostoma* Loew, which is a junior synonym of *Neoleria inscripta* (Meigen).

[2] I am not able to place *Neoleria czernyi* (Garrett) in this key.

I have compared North American specimens with European material determined by various dipterists as *Neoleria inscripta* (Meigen) and conclude that they are the same. I have seen specimens determined by George Steyskal which indicate that he independently came to the same conclusion concerning the identity of the North American forms.

Male and female.—Ocellar triangle, vertex, and upper back of head grayish, the remainder of head yellow, becoming very pale below, aristae dark brown; oral vibrissae strong, a single row of buccal setae; cheek-eye ratio about 0.33.

Mesonotum dark grayish brown or black with humeri and usually a portion of the scutellum yellowed in contrast; dorsocentrals weaker anteriorly, but all clearly stronger than the surrounding setae; pleura yellow or shaded with brownish in some areas; a single propleural bristle present; legs yellowish, becoming darker distally; femora swollen; wings hyaline, with costal spines relatively short; abdomen yellowish brown to brown, terminalia yellow; bristles along posterior margins of tergites 2–5, except near midline.

Length.—3.5–4.0 mm.

Distribution.—Alaska, British Columbia, Washington, Oregon, Montana, Michigan, Ontario, New York, New Hampshire, Maine; April–September. Aldrich (1905) cited Lundbeck's record of *Leria humeralis* (Zetterstedt), a synonym of *N. inscripta* (Meigen), from Greenland.

Neoleria lutea (Loew)

Blepharoptera lutea Loew, 1863, p. 28 (Centuria 3, 52).
Leria lutea (Loew), Aldrich and Darlington, 1908, p. 88.
Neoleria lutea (Loew), Czerny, 1924, p. 125.

I have examined two type males in the Museum of Comparative Zoology at Harvard University. These specimens resemble *Neoleria inscripta* (Meigen) very closely, including the structure of the terminalia, but the coloration is quite different in the two forms.

The preceding description of *N. inscripta* (Meigen) will apply to *N. lutea* (Loew), except as follows: head entirely yellow; cheek-eye ratio from 0.28 to 0.36; thorax entirely yellow, may be darkened above to yellowish orange; no color contrast between humeri and (or) scutellum and remainder of mesonotum; legs yellow to yellowish orange.

Length.—4.0–4.5 mm.

Distribution.—Alaska, Oregon, California, Montana, Quebec, New Hampshire; April, July–September.

Neoleria prominens (Becker)

Figure 56

[?]*Helomyza tibialis* Zetterstedt, Staeger, 1845, p. 367.
Tephrochlamys prominens Becker, 1897, p. 402; 1907, p. 1.

Leria crassipes (Loew), Aldrich and Darlington, 1908, p. 86.
Neoleria rotundicornis Malloch, 1919, p. 83.—Czerny, 1924, p. 125.
Leria septentrionalis Collin, 1923, p. 121; 1931, p. 90.
Neoleria tibialis (Zetterstedt), Czerny, 1924, p. 122; 1927a, p. 30.—Malloch, 1934, p. 22.

This species has been confused by Czerny and others with *Neoleria tibialis* (Zetterstedt). Collin (1931) was aware of this confusion; he pointed out that the "*tibialis* recorded from Greenland by Staeger in 1845 may well have been the same as *septentrionalis*," which is here considered to be a junior synonym of *N. prominens* (Becker). Nielsen, Ringdahl, and Tuxen (1954) also noted that Czerny's concept of *N. tibialis* (Zetterstedt) was incorrect.

The specimens referred to as *Leria crassipes* (Loew) by Aldrich and Darlington (1908) were actually *N. prominens* (Becker). These specimens are in the U.S. National Museum.

The solid blackish of the mesonotum, without evidence of vittae, and the much weakened anterior dorsocentral bristles of *N. prominens* (Becker) will distinguish it from other North American species of the genus.

Male and female.—Similar to *N. inscripta* (Loew) except as follows: front, vertex, and back of head dark gray to black; antennae darkened, with third segment becoming blackish; aristae black; cheek-eye ratio from 0.35 to 0.45; mesonotum entirely dark ash gray to black; dorsocentral bristles becoming gradually weaker anteriorly; pleura grayish brown to black; legs reddish brown to dark brown; abdomen dark ash gray; terminalia often becoming a yellowish orange, similar in structure to *N. inscripta* (Meigen).

Length.—3.5–4.0 mm.

Distribution.—Alaska, Northwest Territories, Manitoba, Greenland; May–August.

Biology.—Collin (1943) recorded this species (as *septentrionalis* Collin) from the nest of *Larus glaucus* Linnaeus. I collected adults from a garbage dump, and Weber (1954) collected specimens from the carcass of a dog.

Neoleria czernyi (Garrett)

Postleria czerni Garrett, 1925a, p. 2.
Neoleria czernyi (Garrett), Czerny, 1930, p. 447.

This species was described from St. Paul Island, Alaska, from 10 males and 2 females. I did not find any specimens labelled as this species in the Garrett collection or in the collections of the various institutions from which I have examined material.

I suspect that this species may be synonymous with *Neoleria prominens* (Becker), but will postpone judgment until a type can be located. The original description is:

Male and female.—Gray-brown, a dark brown stripe from the ocelli to the antennae, leaving only a pale narrow line by each eye; face and cheeks yellow; 1 vibrissa, with a single row of hairs behind. Front orbital bristle equal to the hind one. Antennae darker, segment 3 round and mostly black; arista short, about as long as the eye; cheek deep square; head below eye narrowed in the lateral view.

Thorax and pleura brown to dark brown. Dorsum with 4 to 5 dorsocentral bristles. The posterior pair longest, then gradually diminishing to the suture, where they are often absent. Many setulae, 1 humeral and 2 pair of scutellar bristles. Pleura bare except a few hairs below the disk near the 1 or 2 propleural bristles. Sternopleura on top with 1 bristle and a row of hairs in front of it, the whole middle bare and many bristles between the coxae. Abdomen black. Legs: all femora swollen, much polished and deep red yellow, looking black; fore femora with top and bottom row of bristles; hind femora with no bristles. Tibiae and tarsi red yellow. Hypopygium very similar to that of *P. ruficauda* and *P. fuscolinea.*

Holo-, allo-, and paratypes. St. Paul Isle, Alaska, 10 male, 2 female. A male and female from Funk Isle, Newfoundland differ in many ways, but until I get more males I cannot say if they are *P. minuta* Zett. Type No. 139, Garrett coll.

Neoleria diversa (Garrett)

Postleria diversus Garrett, 1925b, p. 4.
Neoleria diversa (Garrett), Czerny, 1930, p. 447.

This species is known only from the single type female in the Garrett collection (labelled *Neoleria divisus*). It is type 146, collected at Marysville, British Columbia, 14 August. The original description with typographical errors corrected, is quoted here; however, the cheek-eye ratio is actually 0.39.

Female.—Head, occiput, also back of head red yellow, front orange; front orbital bristle nearly as long as the hind one. Antennae red yellow, segment 3 round, arista brown, perhaps a little longer than the vibrissae, the latter being rather long. Eye large, the cheek one-quarter the diameter. Thoracic dorsum brown, with 4 long equal dorsocentrals, prescutellars short. Pleura black brown. Propleura with 1 long bristle. Sternopleura with 1 long bristle and a long hair in front, the rest bare except bristles between the coxae. Abdomen black to brown black, marginal bristles short and few. Halteres yellow. Wing hyaline, veins yellow brown, costal bristles short, as short as the hairs; legs red yellow, the last tarsi dark, femora not enlarged, the hind one with 1 bristle on top near the apex. Mid-tibial spurs short and nearly straight. Marysville, August. Type No. 146, G. Coll.

Neoleria fuscolinea (Garrett)

FIGURE 57

Postleria fuscolinea Garrett, 1921, p. 124.
Neoleria fuscolinea (Garrett), Czerny, 1924, p. 126.

Czerny (1924) noted the resemblance of this species to *Neoleria ruficauda* (Zetterstedt); however, I compared *N. fuscolinea* (Garrett) with European specimens determined as *ruficauda* (Zetterstedt) and found them to be different.

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MALE AND FEMALE.—Vertex and upper half of front dark brown to blackish, lower half of front dark orange to brown; back of head ash gray in upper half, becoming more yellowish below; antennae reddish yellow with upper half or more of third segment brownish; arista dark brown to black; face cheeks and palpi yellow; oral vibrissae strong, a single row of buccal setae; cheek-eye ratio from 0.40 to 0.50.

Mesonotum grayish brown with 2 median dark brown vittae between the dorsocentrals on each side of the median line, usually more distinct anteriorly; similar dark vitta-like areas near lateral margins of mesonotum; scutellum grayish brown; dorsocentrals becoming very weak anteriorly; pleura brown, becoming yellowish toward the propleura; 2 propleural bristles, although 1 is usually weaker than the other; 1 sternopleural bristle.

Legs yellowish, becoming darker distally.

Wings hyaline with brownish tinge; costal bristles somewhat stronger than in other members of the genus.

Abdomen dark brown, sometimes somewhat grayish or yellowish; a row of bristles along dorsal posterior margins of segments 2–5.

LENGTH.—4.5–5.0 mm.

DISTRIBUTION.—Alaska, British Columbia, Montana, Manitoba; May–September.

BIOLOGY.—I have collected this species in traps baited with carrion and excrement.

Neoleria ruficauda (Zetterstedt)

Helomyza ruficauda Zetterstedt, 1847, p. 2456.
Blepharoptera crassipes Loew, 1859, p. 68; 1862b, p. 128.
Leria ruficauda (Zetterstedt), Schiner, 1864, p. 31.
Leria flavicornis Pandellé, 1901, p. 351.
Neoleria ruficauda (Zetterstedt), Czerny, 1924, p. 120; 1927a, p. 30.—Collin, 1943, p. 243.

In the U.S. National Museum are a male and a female of this species from Austria, determined by Czerny. They do not agree with any specimens which I have yet seen from North America. Czerny (1924) included North America in the distribution of the species, but I suspect this inclusion is based on the work of Aldrich and Darlington (1908). Aldrich and Darlington claimed the first published reference to this species in North America; however, the specimens on which the record is based are in the U.S. National Museum and are *Neoleria prominens* (Becker).

Johnson (1929) listed *N. ruficauda* (Zetterstedt) from Labrador.

The European specimens in the U.S. National Museum have the mesonotum entirely grayish, with two faint vittae between the dorsocentrals near the middle of the mesonotum, but not anteriorly as in *N. fuscolinea* (Garrett).

Neoleria tibialis (Zetterstedt)

FIGURE 58

Helomyza tibialis Zetterstedt, 1838, p. 767; 1847, p. 2456.

This species has been confused in the literature and in collections with *Neoleria prominens* (Becker) and with the junior synonyms of *N. prominens* (Becker). I examined the type, a specimen from Kengis, Sweden, in the collection at Lund, and found the species to be quite distinct from any other described species.

MALE AND FEMALE.—Fronto-orbital plates, ocellar triangle, and back of head ash gray; front reddish orange on anterior half, becoming reddish brown posteriorly; antennae reddish orange, becoming brown on third segment; aristae dark brown to black, microscopically pubescent; face and cheeks dirty yellow; oral vibrassae strong, a single row of buccal setae; cheek-eye ratio about 0.45.

Mesonotum ash gray; a dark brown median vitta between the dorsocentral bristles and ending before the prescutellar bristles; dorsocentral bristles arising from dark brown spots which may fuse to give the appearance of a longitudinal vitta through each row and extending along the sides of the scutellum; all dorsocentral bristles strong; about 5 to 7 rows of setae between the dorsocentrals; prescutellar bristles weak, but distinguishable; scutellum bare except for 2 pairs of lateral bristles; pleura ash gray, becoming brownish on upper half of mesopleuron; propleural bristles present; several setae in anterior corner of mesopleuron; usually 2 bristles in upper hind corner of sternopleuron, although the anterior bristle is sometimes much weaker than the posterior one; a few setae before the sternopleural bristles and longer hairs between the coxae.

Legs with femora ash gray and swollen; distal portions of legs reddish brown; wings hyaline with brownish tinge.

Abdomen ash gray to black; terminalia yellowish brown.

LENGTH.—4.0–5.0 mm.

DISTRIBUTION.—Alaska, Greenland? (Staeger, 1845). April–June, September.

Genus *Spanoparea* Czerny

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1847, p. 2430 (part).
Blepharoptera Macquart, Loew, 1859, p. 57 (part).
Spanoparea Czerny, 1924, p. 103; 1927a, p. 36.

Spanoparea is not included in Curran's (1934) key to the genera of North American Heleomyzidae—perhaps an indication that it was considered a synonym of *Morpholeria*. I have used general body coloration and length of antennal pubescence to separate these two genera in my key; however, it is the structure of the male terminalia which prompts me to consider the two distinct. I have examined

European species in addition to those described here, and find in all the more or less horseshoe-shaped surstyli not found in *Morpholeria*. *Spanoparea* has been confused with *Neoleria*, but the relative lengths of the fronto-orbital bristles will separate these genera.

I have not included a key to the North American species of *Spanoparea* because I am able to distinguish the species only by means of the male terminalia.

Spanoparea walkeri Garrett

FIGURE 59

[?]*Leria discolor* (Loew), Aldrich and Darlington, 1908, p. 84.
Spanoparea walkeri Garrett, 1925b, p. 3.—Czerny, 1930, p. 445.

MALE.—Head, thorax, and legs yellow to yellowish orange; mesonotum sometimes yellowish gray; abdomen yellowish brown to dark brown.

Anterior fronto-orbital bristle one-half to three-fourths the height of the posterior fronto-orbital bristle; vibrissae strong; 1 row of buccal setae; aristae short-pubescent, dark brown; cheek-eye ratio from 0.25 to 0.35.

Mesonotal bristles all strong; acrostichal setae sparse, in about 3 irregular rows; 1–3 setae on mesopleuron behind propleural bristle; 1 sternopleural bristle with 1 or more setae in front of it; middle of sternopleuron bare, but long hairs between the coxae; remainder of pleura bare; no prosternal bristles.

Legs with femora swollen; middle tibiae with 2 or 3 strong ventral apical bristles.

Wings entirely hyaline.

FEMALE.—Similar to male except the femora only slightly swollen.

LENGTH.—4.0 mm.

DISTRIBUTION.—British Columbia, Colorado (at altitude of 11,000 feet), Wyoming, Michigan, Quebec, New Hampshire, Maine; June–September.

REMARKS.—Aldrich and Darlington (1908) determined a series in the U.S. National Museum as *Leria discolor* (Loew). The specimens were from New Hampshire. I have examined what is probably the same series and found it to be *S. walkeri* Garrett, as shown by the male terminalia. The identity of the females is, of course, open to question; therefore I have included reference to Aldrich and Darlington under both *S. walkeri* Garrett and *S. discolor* (Loew).

Spanoparea discolor (Loew)

Blepharoptera discolor Loew, 1872, p. 99 (Centuria 10, 78).
[?]*Leria discolor* (Loew), Aldrich and Darlington, 1908, p. 84.
[?]*Neoleria discolor* (Loew), Czerny, 1924, p. 125.

I have examined the type (a female) of *Blepharoptera discolor* Loew in the Museum of Comparative Zoology, Harvard University (Type 13196). It is not a *Neoleria*, as was considered by Czerny. It may be the same species as *Spanoparea walkeri* Garrett; however, inasmuch as there are at least two species of *Spanoparea* in North America and because I cannot at present separate the females of any of the species within the genus, I cannot determine the correct status of *B. discolor* Loew. For the time being it seems best to transfer *discolor* Loew to *Spanoparea*. Future studies may reveal a means of distinguishing the females of *Spanoparea*, at which time *discolor* may either be placed as a senior synonym of another species or proved to be distinct.

The type of *S. discolor* (Loew) has a cheek-eye ratio of about 0.43, which is greater than that observed in other specimens of North American *Spanoparea*. The general coloration may be slightly darker than in other specimens, although the entire series was not before me for comparison at one time. The mesonotum is grayish or tannish yellow and the abdomen is brownish black, with a slight pollinosity. The length of the specimen is about 4.5 mm. (The original description says 5.0 mm.)

Distribution.—New Hampshire (no other data given).

***Spanoparea laffooni*, new species**

Figure 60

I found in the collection of Dr. Jean Laffoon a single male specimen which resembles *Spanoparea walkeri* Garrett in all respects, except that the terminalia are distinct. I have seen no variation or intergradation in the surstyli of *S. walkeri* Garrett which would cause me to suspect that this specimen is but a variant of that species. The posterior lobe (in the extended terminalia) of the surstyli in *S. walkeri* Garrett is bluntly rounded, whereas in *S. laffooni*, new species, this lobe tapers to a narrow projection. Otherwise, the characters are the same as those found in the description of the male of *S. walkeri* Garrett. The cheek-eye ratio is 0.29.

I compared this specimen with the described European species of *Spanoparea* in order to establish its distinctness. An examination of the male terminalia is probably the most important criterion, and this was possible for *S. ruficornis* (Meigen) and *S. variabilis* (Loew), for specimens of both species are in the U.S. National Museum. The presence of two sternopleural bristles in *S. limbinervis* (Czerny) apparently eliminates that species from consideration. *S. obscuriventris* (Zetterstedt) is reported to have the cheeks one-fifth of the eye height, slightly narrower than in the North American specimens of *Spanoparea*. *S. dudai* Czerny has the thorax blue gray, with the dorsocentral bristles arising from small black spots.

With the consent of Dr. Laffoon, the type has been deposited in the collection of the U.S. National Museum (USNM 65444).

DISTRIBUTION.—The single male specimen was collected by Dr. Laffoon at Lake Itasca, Clearwater County, Minn., 3 Sept. 1950.

Genus *Morpholeria* Garrett

Morpholeria Garrett, 1921, p. 127.—Czerny, 1924, p. 111; 1927b, p. 36.—Collin, 1943, p. 245.

Comments concerning the separation of *Morpholeria* from related genera will be found under the discussions of *Spanoparea* and *Acantholeria*.

Morpholeria tristis (Loew)

FIGURE 61

Blepharoptera tristis Loew, 1862a, p. 225 (Centuria 2, 84).
Morpholeria melaneura Garrett, 1921, p. 127.—Czerny, 1924, p. 112.
Morpholeria tristis (Loew), Czerny, 1924, p. 111.

MALE.—Front reddish orange to yellow; fronto-orbital plates, ocellar triangle, vertex, and back of head cinereous; face and cheeks dirty yellow; antennae brown, darker distally; arista dark brown to black, minutely pubescent (may appear bare); arista less than 3 times the length of third antennal segment; anterior fronto-orbital bristle about one-half the length of the posterior bristle; oral vibrissae moderately strong, a single row of buccal setae; cheek-eye ratio from 0.34 to 0.45.

Thorax uniformly ash gray to black, with brownish spots at bases of dorsocentrals; sometimes evidence of a brownish median vitta on mesonotum; dorsocentrals 1+3; prescutellar bristles weak; scattered setae on mesonotum form 3 irregular rows between dorsocentrals; scutellum bare, except for 2 pairs of lateral bristles; mesopleuron with several setae in anterior corner behind the propleural bristle; sternopleuron with a strong bristle in upper hind corner and setae anterior to it, and sometimes a few setae forming a line down the middle to the long hairs between the coxae; remainder of pleura bare; no prosternal bristles.

Legs grayish brown to black; middle tibiae with 3 or 4 strong ventral apical bristles, with shorter bristles between these.

Wings hyaline with no distinct infuscations.

Abdomen grayish brown to black; sparsely scattered setae; segments 2–5 with bristles along posterior margins, mostly laterally; terminalia dark brown to black.

FEMALE.—Similar to male, except for terminalia.

LENGTH.—2.5–3.5 mm.

DISTRIBUTION.—Alaska, British Columbia, Alberta, Saskatchewan, Manitoba; February–October.

Remarks.—Aldrich (1926) synonymized *M. melaneura* Garrett with *Blepharoptera tristis* Loew. I have seen Garrett's unpublished notes which indicate that he, too, recognized the synonymy. I have examined the types of each species, and they are synonymous. I could not interpret the scribbled label on the type of *Blepharoptera tristis* Loew (Type 13203, Museum of Comparative Zoology, Harvard University). The type of *B. tristis* Loew is a female; thus no comparison of male terminalia of *B. tristis* Loew and *M. melaneura* Garrett is possible.

Czerny (1924) separated *M. tristis* (Loew) and *M. melaneura* Garrett in his key to *Morpholeria*, claiming that in *M. tristis* (Loew) the mesopleuron was without hairs, whereas in *M. melaneura* Garrett the mesopleuron had 5 or 6 hairs in the lower hind corner. Czerny apparently made an error in interpreting Garrett's original description, which states, "Mesopleura bare except 5 or 6 hairs below the disk." Garrett's "disk" is probably the anterior spiracle, for such hairs are found below the spiracle in the anterior corner of the mesopleuron. They are variable and of no value in species discrimination.

Genus *Acantholeria* Garrett

Blepharoptera Macquart, Loew, 1862a, p. 57 (part).
Leria Robineau-Desvoidy, Rondani, 1867, p. 124 (part).—Aldrich and Darlington, 1908, p. 77 (part).
Acantholeria Garrett, 1921, p. 130.—Czerny, 1924, p. 107; 1927a, p. 37.—James and Huckett, 1952, p. 267.

Acantholeria, *Schroederella*, *Morpholeria*, and *Spanoparea* have a similarity of chaetotaxy which makes them somewhat difficult to separate in a key, yet the distinctness of the male terminalia in each genus discourages any attempt to lump any of these genera. The relative length of the arista, by means of which I have separated *Acantholeria* and *Schroederella* from *Morpholeria* and *Spanoparea*, is admittedly a poor key-character because this structure is often broken in pinned specimens. Yet I feel that this character is as reliable as others which have been used to separate these genera.

Acantholeria has been separated from *Schroederella* in other keys by the presence of distinct antennal grooves in the latter and by the absence of these grooves in the former. This character may be difficult to interpret, and I prefer to use the number of sternopleural bristles. Even when these bristles are broken at the base, their location is usually indicated by pits in the sternopleura. Although I would not consider this a character of generic rank, it will nevertheless serve very well to separate the North American species of *Acantholeria* and *Schroederella*.

Except for the structure of the male hind leg and terminalia, all species of *Acantholeria* appear to be very similar to one another. Slight differences in coloration may occur among the species, but apparently not enough to be a sound basis for a key. At present, I am able to distinguish with certainty only male specimens. A general description of the flies of this genus follows.

MALE AND FEMALE.—Lower back of head yellow, blending into the grayish vertex, ocellar triangle, and frontal plates; antennae yellowish orange to brownish, aristae dark brown, minutely pubescent; remainder of head yellow; anterior fronto-orbital bristle usually less than one-half the height of the posterior fronto-orbital bristle; oral vibrissae strong, a single row of buccal setae.

Thorax grayish yellow to grayish brown, often becoming quite yellowed at edges of sclerites and on the scutellum; dorsocentrals 1+3; prescutellar bristles present (but weak); humeral bristle present; 2 notopleural, 3 supra-alar, and 2 pairs of lateral scutellar bristles; 3 rows (often irregular) of setae between the dorsocentral bristles; propleural bristle strong, mesopleura bare except for several small setae near the propleural; no prosternal bristles; 1 strong sternopleural with several small setae anterior to it and longer hairs ventrally between the coxae; remainder of pleura bare.

Legs yellow to yellowish or reddish orange, sometimes becoming darker distally; all tibiae with dorsal preapical bristle; middle tibiae with several bristles ventrally; hind leg shows great diversity in the males of the individual species.

Wings hyaline, no distinct infuscations, costal spines well developed.

Abdomen gray to grayish brown; dorsum with scattered setae and a row of bristles at the posterior margins of segments 2–5.

LENGTH.—5.0–7.0 mm.

Key to the Species of *Acantholeria* (Males only)

1. Hind tibia with a distinct knob posteroventrally, the knob about twice as long as wide and projecting slightly toward the distal end of the tibia. **abnormalis** Garrett
   Hind tibia with at most a bumplike swelling less than twice as long as wide. . 2
2. Hind femur with a row of 12 to 20 spines; the tibia with a slight swelling near the middle . . . . . **moscowa** Garrett
   Hind femur with a row of 7 to 12 spines; tibial swelling present or absent . . 3
3. Hind femur with spines arising from a slightly raised ridge; tibia with bumplike swelling . . . . . **armipes** (Loew)
   Hind femur with spines not arising from a raised ridge; tibia with no distinct swelling . . . . . **cineraria** (Loew)

Acantholeria moscowa Garrett

FIGURE 65

Acantholeria moscowa Garrett, 1925a, p. 3.—Czerny, 1930, p. 446.

This species conforms to the generic description given above, but it should be added that the dorsocentral bristles arise from definite brownish spots and the mesonotal setae may arise from small dark spots. The legs are slightly (if at all) darkened distally.

The males of this species are easily recognized by the presence of a row of about 12 to 20 stout spines along the posteroventral side of the hind femur. There is also a row of about eight spine-like shorter hairs along the anteroventral side of the hind femur. The hind tibia has a distinct swelling on the ventral side near the middle, but no distinct knob.

This species is represented by Type 125 in the Garrett collection.

DISTRIBUTION.—The only specimens which I have seen are from Moscow Mountain, Idaho. Collection dates are late August and early September. Some of the specimens were collected by J. M. Aldrich in a mine tunnel at 4,500 feet.

REMARKS.—Mr. C.B.D. Garrett has provided me with some interesting information about the publication of the paper in which this species was described. The paper was privately published, and Mr. Garrett did not have an opportunity to see proof before the final printing. The description of *A. moscowa*, new species, followed that of *Eccoptomera callipus*, new species, and the printer inadvertently omitted the line which should have read "*Acantholeria moscowa* n. sp." Thus the species name did not appear in the original copies and several of these were distributed before the omission was noted. Garrett then had the name *Acantholeria moscowa*, new species, printed in the appropriate place in the remaining copies of the publication.

This situation could result in some disagreement as to the validity of Garrett's species, but no one else has since described it and the question of priority does not exist. The name applied by Garrett is, consequently, being used here, with the consent and sanction of that author.

Acantholeria cineraria (Loew)

FIGURE 64

Blepharoptera cineraria Loew, 1859, p. 67; 1862b, p. 128.
Leria chaetomera Rondani, 1867, p. 127.
Leria barbigera Mik, 1869, p. 31.
[?]*Leria cineraria* (Loew), Aldrich and Darlington, 1908, p. 85.
Acantholeria cineraria (Loew), Czerny, 1924, p. 108; 1927a, p. 37.

This species is perhaps paler in coloration than the others of the genus. The thorax is grayish above, becoming pale yellowish gray on

the pleura. The legs are yellow. The male hind tibia lacks the swelling or knob which is characteristic of the other species. The male hind femur has a comb of about eight spines as in *Acantholeria armipes* (Loew), but the spines are weaker than in *A. armipes* (Loew) and they do not appear to be on a slightly raised ridge.

REMARKS.—Aldrich and Darlington recorded specimens from Moscow Mountain, Idaho, and Czerny (1924) listed North America. However, in the United States National Museum there are 2 males and 1 female determined by Czerny as *Acantholeria cineraria* (Loew). The specimens are from Austria. They are distinct from all North American specimens which I have seen, and I doubt very much that *A. cineraria* (Loew) actually occurs on this continent. Czerny incorrectly synonymized *A. armipes* (Loew) with *A. cineraria* (Loew), with the probable result that specimens of the former were erroneously reported as records of *A. cineraria* (Loew) from North America. Inasmuch as this error is difficult to prove, I have included the reference to Aldrich and Darlington (1908) under *A. cineraria* (Loew), although it seems probable that the species which they had was actually *A. armipes* (Loew).

Acantholeria armipes (Loew)

FIGURE 63

Blepharoptera armipes Loew, 1862a, p. 224. (Centuria 2, 83).
Acantholeria oediemus Garrett, 1921, p. 131.—James and Huckett, 1952, p. 267. New synonymy.
Acantholeria oedicnema Garrett, Czerny, 1924, p. 109.

The dorsocentrals in this species arise from brownish spots. The median mesonotal setae may also arise from spots, which may give a suggestion of a faint median vitta. The male hind tibia has a bump-like swelling on the ventral side near the middle. The male hind femur has a row of 7 to 12 strong spines on the posteroventral surface. The bases of the spines lie very close together and the tips are hooked. The spines arise from a slightly raised ridge.

I have seen the type (No. 13197) in the Museum of Comparative Zoology, Harvard University.

DISTRIBUTION.—Northwest Territories, Yukon Territory, British Columbia, Alberta, Saskatchewan, "H. B. T.," Oregon, Arizona, New Mexico, Utah, Colorado, Montana, South Dakota; June–October.

REMARKS.—I have examined the types of both *A. armipes* Loew and *A. oediemus* Garrett and found them to be identical. As mentioned above, the types of *A. armipes* (Loew) do not agree with European specimens of *A. cineraria* (Loew). The male terminalia are distinct, and it is unlikely that Czerny studied this character

when the synonymy of *A. armipes* (Loew) and *A. cineraria* (Loew) was made.

Acantholeria abnormalis Garrett

FIGURE 62

Acantholeria abnormalis Garrett, 1921, p. 131.—Czerny, 1924, p. 110.

The mesonotum of this species usually does not have distinct brownish spots at the bases of the dorsocentrals. The male hind tibia readily distinguishes this species because there is a stumplike knob (not a mere swelling) posteroventrally, proximad of the middle, and directed slightly toward the distal end of the tibia. The knob is about twice as long as wide. The hind femur of the male has a cluster of 2 to 6 stout spines on the posteroventral side. The tips of the spines are straight.

DISTRIBUTION.—Alaska, British Columbia, Wyoming, Montana, Colorado; May–July.

Genus *Schroederella* Enderlein

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1847, p. 2430 (part).
Blepharoptera Macquart, Loew, 1859, p. 57 (part).
Leria Robineau-Desvoidy, Pandellé, 1901, p. 344.—Aldrich and Darlington, 1908, p. 77 (part).
Schroederia Enderlein, 1914, p. 314.—Enderlein, 1917, p. 67.—Czerny, 1924, p. 101.
Schroederella Enderlein, 1921, p. 231.—Collin, 1943, p. 245.

A discussion of the characters used to separate *Schroederella* from related genera will be found under *Acantholeria* Garrett. *S. iners* (Meigen) is the only species recorded from North America to the present. Czerny (1924) mentioned that Aldrich and Darlington's description of *S. iners* (Meigen) agreed with the original description, except from the general body coloration. Garrett, too, recognized that two forms are present; in his collection he labelled the dark form *S. iners* (Meigen) and described the light form as a new species, *Amoebaleria* (*Edioamoeba*) *luteoala* Garrett (Garrett, 1925b, p. 3).

The two forms of *Schroederella* differ not only in color, but also in the structure of the male terminalia. The latter difference is admittedly slight, yet distinct. There appear to be no intermediate forms. I previously believed that the dark form was restricted to the western states and the light form to the eastern states; however, specimens in the U.S. National Museum and the Museum of Comparative Zoology at Harvard indicate that the ranges of the two forms may overlap. These facts prompt me to consider the two forms as distinct species. Inasmuch as the original description of *S. iners* (Meigen) was of the light form, the dark form must be described as new.

***Schroederella fuscopicea*, new species**

FIGURES 68, 69

MALE AND FEMALE.—Front rusty brown; ocellar triangle and vertex ash gray; back of head becoming yellowish in lower half; antennal segments 1 and 2 reddish brown, the third segment dark brown, aristae dark brown or black, minutely pubescent; remainder of head brownish yellow; anterior fronto-orbital bristle ½ to ¾ the height of the posterior bristle; front with setae on lower half; 1 pair of strong oral vibrissae, buccal setae in 1 or 2 irregular rows; subantennal grooves distinct.

Thorax rather uniformly brownish black with an ash gray pollinosity; brownish areas at bases of dorsocentrals and along the median line sometimes giving the appearance of vittae; dorsocentrals 1+3; prescutellars present; scutellum with 2 pair of bristles and no setae; propleural bristle strong, often with an adjacent hair which may be almost bristlelike; mesopleuron bare except for several short setae in the anterior corner; sternopleuron with 2 strong bristles along posterior upper margin (rarely 3 such bristles), with several short setae anterior to the bristles; remainder of pleura bare; prosternal bristles absent.

Legs reddish brown, somewhat darkened distally; forefemora darkened; middle tibia with about 3 strong and 3 or 4 weaker bristles ventrally and the usual dorsal preapical bristle.

Wings tinged with brownish, but no distinct infuscations.

Abdomen brownish black, with ash gray pollinosity; segments 2–5 with bristles along dorsal posterior margins; scattered setae or hairs present on all segments.

Surstylus of male terminalia with short spines evenly distributed along distal edge.

LENGTH.—6.0–7.5 mm.

TYPES.—Holotype (male) from Pullman, Wash., October 1952; allotype from same locality, 5 Oct. 1949, collected by C. C. Rosecrans. The holotype and allotype have been deposited in the U.S. National Museum (USNM 65445). Paratypes which have been deposited in the collection of the State College of Washington are: Pullman, Wash., 14 Oct. 1949, D. Perkins (1 male); Pullman, Wash., 15 Oct. 1949, Rich Woodruff (1 male); Kamiak Butte, Pullman, Wash., 9 Oct. 1953, O. B. Heck (1 male); Pullman, Wash., 11 Oct. 1928 (1 female); Palouse, Wash., 16 Oct. 1949, L. R. Mewaldt (1 female); Chiwawa, Wash., 15 Oct. 1949, F. E. Newby (1 female).

DISTRIBUTION.—Washington, Idaho, Indiana, Virginia; October–November.

Schroederella iners (Meigen)

FIGURES 66, 67

Helomyza iners Meigen, 1830, p. 57.
Helomyza longiseta, var. b, Zetterstedt, 1847, p. 2445.
Blepharoptera iners (Meigen), Loew, 1859, p. 63.
Leria iners (Meigen), Pandellé, 1901, p. 346.—Aldrich and Darlington, 1908, p. 82.
Scoliocentra latimanus Schroeder, 1913, p. 173 and 335.
Schroederia iners (Meigen), Czerny, 1924, p. 102.
Amoebaleria (*Edioamoeba*) *luteoala* Garrett, 1925, p. 3.—Czerny, 1930, p. 448. New synonymy.
Schroederella iners (Meigen), Czerny, 1927a, p. 35.

Schroederella iners (Meigen) is very similar to the preceding species, except that the general coloration is a reddish or yellowish brown. The short spines along the distal edge of the surstylus in *S. iners* (Meigen) are more numerous towards the anterior and posterior corners.

DISTRIBUTION.—Iowa, Illinois, Minnesota, Michigan, Ontario, New Hampshire, Massachusetts; September–November.

REMARKS.—This species was collected alive off snow in November 1933 by D. Denning at Plummer, Minn. The previous lowest fall temperature that year had been −12° F. These data are taken from a specimen in the collection of the University of Minnesota.

Genus *Scoliocentra* Loew

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1838, p. 764 (part); 1847, p. 2430 (part).
Leria Robineau-Desvoidy, Schiner, 1864, p. 28 (part).—Pandellé, 1901, p. 344 (part).—Aldrich and Darlington, 1908, p. 77.
Scoliocentra Loew, 1859, p. 43; 1862b, p. 127.—Czerny, 1924, p. 136; 1927a, p. 40.—Collin, 1943, p. 246.
Achaetomus Coquillett, 1907, p. 75.—Aldrich and Darlington, 1908, p. 70.
Amoebaleria Garrett, 1921, p. 125 (part).

The haired mesopleura and pteropleura, combined with the presence of a pair (rarely 2 or 3 pairs) of sternopleural bristles, will readily distinguish members of this genus.

Key to the Species of *Scoliocentra*

1. Hind tarsus shorter than hind tibia; foretarsus only slightly longer than foretibia . . . . . **thoracica** Collin
   Hind tarsus not shorter than hind tibia; foretarsus 1.25 to 1.5 times the length of foretibia 2
2. Thorax reddish orange; anterior dorsocentral bristles of male much weaker than the posterior dorsocentrals . . . . . **tincta** (Walker)
   Thorax dark gray; anterior dorsocentral bristles of male not conspicuously weaker than the posterior dorsocentrals . . . . . **fraterna** Loew

Scoliocentra tincta (Walker)

FIGURE 73

Actora ferruginea Walker, 1849, p. 1066. New synonymy.
Helomyza tincta Walker, 1849, p. 1092.
Blepharoptera pubescens Loew, 1862a, p. 224 (Centuria 2, 82).
Achaetomus pilosus Coquillett, 1907, p. 75.—Aldrich and Darlington, 1908, p. 71.
Leria fraterna (Loew), Aldrich and Darlington, 1908, p. 79.
Amoebaleria gigas Garrett, 1921, p. 126.
Scoliocentra tincta (Walker), Czerny, 1924, p. 142.

MALE.—Head yellowish orange, darker toward vertex; fronto-orbital plates, ocellar triangle, and vertex dusted with grayish pollen; antennae yellow orange with aristae dark brown to black, minutely pubescent; anterior fronto-orbital bristles about three-fourths the length of the posterior bristle; oral vibrissae strong, several irregular rows of long buccal setae; cheek-eye ratio 0.5.

Thorax uniformly reddish orange; mesonotum usually with a faint dark median vitta and a wider vitta on each side; dorsocentrals 1+3, all but the posterior pair conspicuously weakened; humeral bristles weak; prescuttellar bristles present; scutellum bare except for 2 pairs of lateral bristles; propleural bristle present, with 0–3 smaller hairs anterior to the bristle; mesopleura covered with fine hairs; pteropleura with fine hairs on the anterior half; hypopleura and metapleura bare; sternopleura with a single bristle (rarely 2) in the upper hind corner, the remainder of the sternopleura with fine hairs, becoming longer and stronger ventrally between the coxae; prosternal bristles usually 1 strong pair, but sometimes 1 or 2 additional bristles may be found on one or both sides.

Legs reddish orange, becoming somewhat darker distally on the tarsi; all tibiae with dorsal preapical bristle; middle tibia with about 3 strong and 4 or 5 weaker bristles ventrally at the distal end; tarsal segments with lateral apical spines, most prominent on the middle tarsi.

Wings hyaline, with a brownish tinge, but no distinct infuscations.

Abdomen reddish orange, sometimes with darkened areas in pinned specimens; uniformly covered with fine hairlike setae.

FEMALE.—Similar to male, except that the bristles of the mesonotum are uniformly strong; the pilosity of all areas is less pronounced, as compared with the male.

LENGTH.—6.0–8.5 mm.

BIOLOGY.—I have trapped adults in screen-wire traps baited with beef liver and excrement.

DISTRIBUTION.—Alaska, British Columbia, Alberta, Idaho, California, Manitoba, Minnesota, Wisconsin, Michigan, Ontario, Penn-

sylvania, New Hampshire, Massachusetts, Maine, Quebec, New Brunswick, Nova Scotia; March–August.

Remarks.—I have 1 male from Alaska and 1 from British Columbia which appear to be *S. tincta* (Walker), except that the anterior dorsocentrals and humeral bristles are not weakened. However, the terminalia agree with other specimens of *S. tincta* (Walker) and I would include the specimens in this species.

Mr. C. W. Sabrosky (personal communication) examined the type of *Actora ferruginea* Walker and suspected it to be synonymous with *Helomyza tincta* Walker. Mr. H. Oldroyd (personal communication) of the British Museum of Natural History has compared the types of each and expressed the opinion that "they are probably conspecific." Czerny's (1924) use of *Scoliocentra tincta* (Walker) has placed this name in general use, and it is therefore being retained here, although *ferruginea* Walker has page precedence.

Scoliocentra fraterna Loew

Figures 72

Scoliocentra fraterna Loew, 1863, p. 27 (Centuria 3, 51).—Czerny, 1924, p. 141. *Amoebaleria fraterna* var. *hyalina* Garrett, 1925a, p. 4.—Czerny, 1930, p. 449.

Male.—Head similar to *S. tincta* (Walker), except buccal setae in 2 or 3 irregular rows, fewer and shorter setae than in *S. tincta* (Walker).

Thorax uniformly ash gray; prosternals, humeri, and scutellum usually becoming yellowish; evidence of 3 longitudinal vittae on mesonotum; chaetotaxy as in *S. tincta* (Walker), except that all bristles of mesonotum are well developed; 1 pair of prosternal bristles.

Legs and wings as in *S. tincta* (Walker).

Abdomen variable as to coloration (see Biology, below); pilosity less than in *S. tincta* (Walker).

Female.—Similar to male except for terminalia.

Length.—5.0–6.0 mm.

Distribution.—Alaska, Yukon Territory, Northwest Territories, British Columbia, Alberta, Colorado, Minnesota, New York, "Hudson Bay," Quebec, Laborador, Greenland; April–August.

Biology.—I have seen specimens from St. Paul Island, Alaska, (in the collection of the California Academy of Sciences) which appeared to be *S. fraterna* Loew, but the general body coloration was darker, the legs and abdomen being a rusty brown rather than the usual reddish yellow. The male terminalia, however, showed no distinguishing features from the typical *S. fraterna* Loew. Garrett (1925) recognized the variation in coloration and named the variety *hyalina* to apply to those forms with the reddish yellow abdomen. I do not care to make subspecific designations at this time; further collecting,

particularly in Alaska, may reveal more data concerning variations within this species.

Scoliocentra thoracica Collin

Scoliocentra thoracica Collin, 1935, p. 381.

This species was among those reported by Collin from Akpatok Island, Ungava Bay, Canada. I have not seen the species, but according to the original description, the foretarsi are only slightly longer than the foretibiae, and the hind tarsi are shorter than the tibiae. This character will apparently serve to distinguish the species from *S. tincta* (Walker) and *S. fraterna* Loew.

Genus *Anypotacta* Czerny

Anypotacta Czerny, 1924, p. 143.

Members of this genus have 1 pair of prosternal bristles, the anterior and posterior fronto-orbital bristles are equal in length, and the pteropleuron is bare. This combination of characters will distinguish *Anypotacta* from related genera.

Key to the Species of *Anypotacta* (Males only)

Surstylus single-lobed . . . . . **czernyi** Garrett, new species
Surstylus with two distinct lobes . . . . . **aldrichi** (Garrett)

Anypotacta aldrichi (Garrett)

FIGURE 70

Leria aldrichi Garrett, 1921, p. 121.
Anypotacta aldrichi (Garrett), Czerny, 1924, p. 143.

MALE.—Front reddish yellow; fronto-orbital plates, ocellar triangle, and vertex ash gray; face and cheeks dirty yellow; antennae reddish brown, aristae minutely pubescent; oral vibrissae strong, the hairs immediately behind the vibrissae bristlelike, grading into the rather long buccal setae; buccal setae in a single row, often irregular; cheek-eye ratio 0.35.

Thorax cinereous, scutellum concolorous with the remainder of the thorax; evidence of a brownish median vitta, a lateral vitta through each row of dorsocentrals sometimes present; dorsocentrals 1+3; prescutellar bristles weak; mesonotum with scattered setae, about 3 to 5 irregular rows between the dorsocentrals; scutellum bare except for 2 pairs of lateral bristles; pleura may be somewhat brownish along edges of sclerites; propleural bristle present; mesopleuron with a few small setae in anterior corner, otherwise bare; sternopleuron with a strong bristle in upper hind corner, a few scattered setae near the

bristle, longer hairs ventrally between the coxae; remainder of pleura bare.

Legs dark rusty brown, becoming lighter distally; femora may have faint grayish pollinosity; middle tibiae with several ventral apical bristles.

Wings hyaline, costal spines distinct.

Abdomen dark brown with faint grayish pollinosity; scattered setae, segments 2–5 with bristles along posterior margins; terminalia concolorous with remainder of abdomen.

Female.—I am not able to distinguish the females of *A. aldrichi* (Garrett) from those of *A. czernyi* Garrett. Females taken on the same date and from the same locality as the *A. aldrichi* (Garrett) male are similar in appearance to the male. Cheek-eye ratio from 0.35 to 0.42.

Distribution.—The species was described from British Columbia (March). I have examined undetermined *Anypotacta* females from Alaska (April) and California (May).

Biology.—The female collected in Alaska was collected on human excrement. No other data on the biology of *Anypotacta* are known.

Remarks.—The illustration of the male terminalia was drawn from the extended terminalia of the holotype. The terminalia were not removed from the specimen and cleared, but the bilobed structure of the surstyli is sufficient to distinguish this species from *A. czernyi* Garrett.

Anypotacta czernyi Garrett, new species

Figure 71

In the Garrett collection I found a series of type specimens labelled *Anypotacta czernyi* Garrett. The holotype (male) was from Jemez Springs, N. Mex., 9 July? 1914 (month not clear, but appeared to be "Jl"), J. Westgate. The allotype had the same collection data. One male paratype had the same data as the holotype and allotype. Two male paratypes had the same data, except that they were collected July 26. There are specimens in the U.S. National Museum collected from caves in Nevada during July and August.

I find no record of Garrett's having published a description of *Anypotacta czernyi*. The only "*czernyi*" he described was *Postleria czernyi* (1925a, p. 2.); however, the description does not fit the types of *Anypotacta czernyi*, and the localities also differ.

I can find no reliable character for separating *A. aldrichi* (Garrett) from this species other than the structure of the male terminalia. The above description of *A. aldrichi* (Garrett) thus applies also to *A. czernyi* Garrett. As previously mentioned, I cannot separate the females of the two species.

626053—62——6

Although inclusion here constitutes the first published description of *Anypotacta czernyi*, Garrett should be given credit for the species. This is done with the permission and sanction of Mr. Garrett.

Genus *Amoebaleria* Garrett

Helomyza Fallén, Meigen, 1830, p. 47 (part).—Zetterstedt, 1838, p. 764 (part); 1847, p. 2430 (part).
Dryomyza Meigen [sic], Walker, 1849, p. 983 (part).
Blepharoptera Macquart, Loew, 1859, p. 57 (part).
Leria Robineau-Desvoidy, Schiner, 1864, p. 28 (part).—Rondani, 1867, p. 124 (part).—Pandellé, 1901, p. 344 (part).—Aldrich and Darlington, 1908, p. 77 (part).
Amoebaleria Garrett, 1921, p. 125 (part).—Czerny, 1924, p. 131; 1927a, p. 39.
Chaetomus Czerny, 1924, p. 128; 1927a, p. 38.—Collin, 1943, p. 246.
Scoliocentra Loew, Collin, 1943, p. 246 (part).

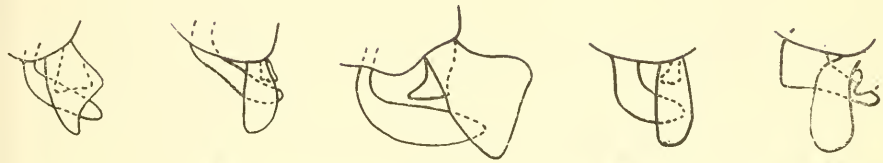
This genus is characterized as follows: anterior fronto-orbital bristle shorter than posterior bristle, dorsocentral bristles 1+3, scutellum bare except for 2 pairs of lateral bristles, propleural bristle present, pteropleuron bare, 1 pair of prosternal bristles, middle tibia with dorsal preapical bristle and several ventral apical bristles.

I do not agree with Czerny in splitting off *Amoebaleria flavotestacea* (Zetterstedt) and *A. confusa* (Wahlgren) into a separate genus, *Chaetomus*. The character used to separate the two genera in Czerny's (1924) key, couplet 21, is the distance between the anterior and posterior fronto-orbital bristles. In checking this character among specimens of *Amoebaleria* I found considerable variation, even among specimens of the same species. Thus it does not appear to be a suitable character for use at the generic level.

With few exceptions it is the structure of the male terminalia which will best distinguish the species of *Amoebaleria*. The illustrations accompanying the present paper may thus be more useful for male specimens than the following key. In the key I have purposely avoided, whenever possible, the use of characters involving terminalia, so that within limits it may be used for specimens of both sexes.

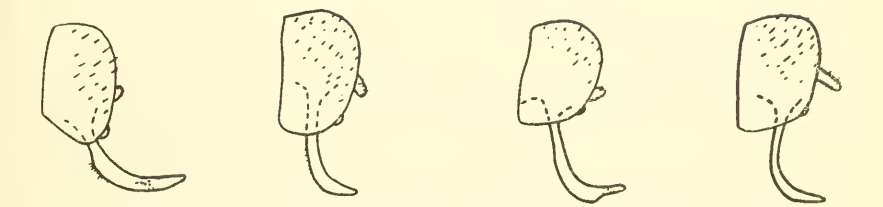
FIGURES 74–96.—Structures of the male terminalia of *Amoebaleria* and *Heleomyza*. All structures are shown in lateral view, except that of fig. 96 which is in ventral view. Figs. 74–88, left epiphallic processes and surstyli, X 25: 74, *Amoebaleria defessa* (Osten-Sacken); 75, *A. sackeni* Garrett; 76, *A. flavotestacea* (Zetterstedt); 77, *A. confusa* (Wahlgren); 78, *A. triangulata* Garrett; 79, *A. perplexa* Garrett; 80, *A. caesia* (Meigen); 81, *A. helvola* (Loew); 82, *A. scutellata* Garrett; 83, *A. spectabilis* (Loew); 84, *A. glauca* (Aldrich); 85, *A. infuscata*, new species; 86, *A. gonea* Garrett; 87, *A. sabroskyi*, new species; 88, *A. tularensis*, new species. Figs. 89–96, epandria and associated structures, X 25: 89, *Heleomyza serrata* (Linnaeus); 90, *H. genalis* (Coquillett); 91, *H. tristissima* (Garrett); 92, *H. pleuralis* (Becker); 93, *H. bisetata* (Garrett); 94, *H. brachypterna* (Loew); 95, 96, *H. nebulosa* (Coquillett).

74 75 76 77 78

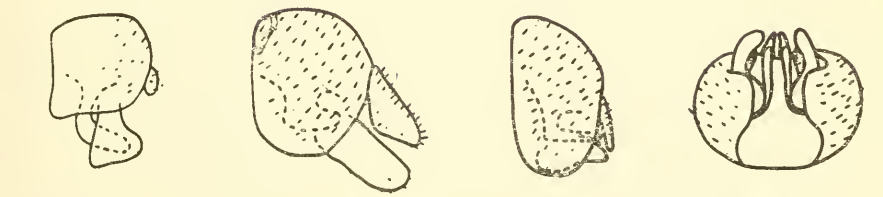


79 80 81 82 83

84 85 86 87 88



89 90 91 92



93 94 95 96

(For explanation see opposite page.)

There are cases, however, where I am at present unable to distinguish the females of certain species. The collection and study of more material may reveal intraspecific variations that make this key incorrect.

Key to the Species of *Amoebaleria*

1. Mesopleuron with setae on posterior half 2
   Mesopleuron bare, except for occasional setae near the propleuron 3
2. Surstylus of male not curved downward at distal end, but straight and fingerlike . . . . . **defessa** (Osten-Sacken)
   Surstylus of male curved downward at distal end . . . . . **sackeni** Garrett
3. Two sternopleural bristles; entire body yellow to yellowish orange. **flavotestacea** (Zetterstedt)
   One sternopleural bristle; body color variable 4
4. Wings clouded along one or both crossveins and (or) at the ends of longitudinal veins 5
   Wings not clouded along either crossvein, entirely hyaline 6
5. Anterior and posterior crossveins clouded; ends of longitudinal veins not clouded; thorax bluish gray . . . . . **infuscata,** new species
   Posterior crossvein clouded with light brown; anterior crossvein not clouded; ends of longitudinal veins clouded; thorax mostly yellow. **helvola** (Loew)
6. Thorax yellow to reddish orange 7
   Thorax bluish gray, sometimes brownish 9
7. Cheek-eye ratio greater than 0.65 . . . . . **perplexa** Garrett
   Cheek-eye ratio less than 0.55 8
8. Distal portion of epiphallic process of male without downward bend near the tip . . . . . **confusa** (Wahlgren)
   Distal portion of epiphallic process of male with a distinct bend near the tip. **triangulata** Garrett
9. Buccal setae in a single row 11
   Buccal setae in 2 or more rows or irregularly placed so as not to appear in a single row 10
10. Epiphallic process of male curving posteriorly with a rounded obtuse angle; bluntly rounded apically; entire distal portion with small scattered spines. **scutellata** Garrett
    Epiphallic process of male turning posteriorly at a sharp angle, with apex slightly expanded or swollen; distal portion with small spines at apex only. **gonea** Garrett
11. Humeri bluish gray, concolorous with the disk of mesonotum 12
    Humeri yellow to yellowish brown, in contrast to bluish gray disk of mesonotum 13
12. Male with distal portion of epiphallic process (beyond the angle) longer than the length of the surstylus; no authentic record from North America. **caesia** (Meigen)
    Male with distal portion of epiphallic process (beyond the angle) no longer than the surstylus . . . . . **glauca** (Aldrich)
13. Anterior crossvein at about the level of the middle of discal cell 14
    Anterior crossvein at a level distinctly beyond the middle of discal cell. **tularensis,** new species
14. Surstylus of male very narrow, reveals the distal portion of the much broader epiphallic process . . . . . **sabroskyi,** new species

Surstylus of male not reduced, wider than the distal portion of the epiphallic process . . . . . **spectabilis** (Loew)

Amoebaleria defessa (Osten-Sacken)

FIGURE 74

Blepharoptera defessa Osten-Sacken, 1877, p. 168.
Leria pubescens (Loew), Aldrich and Darlington, 1908, p. 80.
Leria defessa (Osten-Sacken), Aldrich and Darlington, 1908, p. 81.
Amoebaleria defessa (Osten-Sacken), Czerny, 1924, p. 132.

The presence of setae or hairs in the posterior half of the mesopleuron will distinguish *Amoebaleria defessa* (Osten-Sacken) and *A. sackeni* Garrett from other species of *Amoebaleria*. These two species can be distinguished from each other only by the structure of the male terminalia.

MALE AND FEMALE.—Ocellar triangle, vertex, and back of head grayish pollinose; front reddish orange; antennae yellow to brownish; remainder of head yellow; anterior fronto-orbital bristle about ½ to ¾ the height of the posterior bristle; about 2 to 3 irregular rows of buccal setae.

Thorax grayish brown; brown spots at bases of dorsocentrals and sometimes the other bristles of the mesonotum; scutellum may be yellowed; propleural bristle strong; mesopleuron with several setae in anterior corner and a group of setae in the lower hind portion; 1 strong sternopleural bristle and setae down the middle to the longer hairs between the coxae; legs yellowish brown, darker distally; wings with brownish tinge, but no distinct infuscations; abdomen grayish brown; surstylus of male straight and fingerlike distally; epiphallic process of male gradually expanded towards the base, when viewed from below.

LENGTH.—4.5–7.0 mm.

DISTRIBUTION.—Alaska, Missouri, Tennessee, Kentucky, Indiana, West Virginia, Virginia, Pennsylvania; April–November.

BIOLOGY.—A female of *A. defessa* (Osten-Sacken) or *A. sackeni* Garrett was collected "at sap in woods" (specimen in Carnegie Museum). Another such female was labelled "at maple sap" (specimen in U.S. National Museum). Other females of one or both of these species were collected in caves as much as 600 yards from the mouth (specimens in U.S. National Museum). Series which have included males, and could therefore be determined as *A. defessa* (Osten-Sacken), have been collected on cave walls as deep as 150 yards from the mouth. Both *A. defessa* (Osten-Sacken) and *A. sackeni* Garrett have proved to be very common in collections made in caves of the eastern United States.

Amoebaleria sackeni Garrett

FIGURE 75

Amoebaleria sackeni Garrett, 1925a, p. 3.—Czerny, 1930, p. 448.

I am not able to distinguish from each other the females of *Amoebaleria defessa* (Osten-Sacken) and *A. sackeni* Garrett. The males can be distinguished from each other only by the structure of the terminalia. In *A. defessa* (Osten-Sacken) the surstylus is straight and fingerlike in the distal portion, whereas *A. sackeni* Garrett has a distinct downward bend at the tip of this structure. The epiphallic process of *A. sackeni* Garrett widens more abruptly at the base than does that of *A. defessa* (Osten-Sacken).

DISTRIBUTION.—Iowa, Minnesota, Wisconsin, Illinois, Missouri, Indiana, Ohio, Kentucky, Tennessee, West Virginia, Pennsylvania, New York, Ontario, Quebec; collections have been made throughout the year.

BIOLOGY.—See "*A. defessa* (Osten-Sacken)" above.

Amoebaleria flavotestacea (Zetterstedt)

FIGURE 76

Helomyza flavotestacea Zetterstedt, 1838, p. 765.
Helomyza longiseta Zetterstedt, 1847, p. 2445 (part).
Dryomyza convergens Walker, 1849, p. 983 (part).
Blepharoptera biseta Loew, 1859, p. 62.
Leria longiseta (Zetterstedt), Schiner, 1864, p. 31.
Eccoptomera flavotestacea (Zetterstedt), Strobl, 1893, p. 83.
Leria biseta (Loew), Aldrich and Darlington, 1908, p. 81.
Chaetomus flavotestaceus (Zetterstedt), Czerny, 1924, p. 128; 1927a, p. 39.—Collin, 1943, p. 246.

The presence of two strong sternopleural bristles and the yellowish-orange color of the entire body will distinguish this species from others in the genus.

MALE AND FEMALE.—Head yellow to yellowish orange, darker on front; aristae dark brown; anterior fronto-orbital bristle one-half or less the height of the posterior bristle; oral vibrissae strong, a single irregular row of buccal setae, which may sometimes appear as 2 irregular rows.

Thorax yellow to yellowish orange, darker on mesonotum, with sometimes a dark vitta through each row of dorsocentrals; mesopleuron bare except for occasional setae in anterior corner; sternopleuron with 2 strong bristles in upper hind portion, with sparse setae anterior to the bristles and longer hairs between the coxae; legs yellow to yellowish orange, sometimes darker distally; hind femur usually with 2 bristles near distal end on anterodorsal side; wings

with brownish tinge and slight clouding at the ends of 1 or more of the longitudinal veins; abdomen yellowish orange to brownish.

LENGTH—6.0–7.0 mm.

DISTRIBUTION.—British Columbia, Washington, Oregon, California, Wyoming, Manitoba, Minnesota, Michigan, Ontario, Quebec, Labrador, New York, New Hampshire; June–November.

Amoebaleria confusa (Wahlgren)

FIGURE 77

Helomyza longiseta Zetterstedt, 1847, p. 2245 (part).
Helomyza confusa Wahlgren, 1918, p. 6.
Chaetomus confusus (Wahlgren), Czerny, 1924, p. 129; 1927a, p. 39; 1933, p. 238.—Collin, 1943, p. 246.

This species was reported from California by Czerny (1933). Czerny apparently did not utilize the structure of the male terminalia in making determinations, so this record may be open to question. I have not seen any North American specimens of this species.

Dr. Willi Hennig sent a specimen of each sex from Europe. These specimens were very similar to *Amoebaleria flavotestacea* (Zetterstedt), except as follows: only 1 sternopleural bristle; legs with 1 bristle (2 on one side only in the female specimen) near distal end on anterodorsal side of hind femur; wings with faint brownish tinge, but no distinct clouding at the end of longitudinal veins or along posterior crossvein.

The male terminalia of *A. confusa* (Wahlgren) are distinct from *A. flavotestacea* (Zetterstedt).

The cheek-eye ratio is about 0.5, which will help distinguish this species from *perplexa*.

LENGTH.—4.5–6.5 mm. (Czerny, 1924, p. 130).

DISTRIBUTION.—Humbolt, Calif.

Amoebaleria triangulata Garrett

FIGURE 78

Amoebaleria triangulata Garrett, 1925a, p. 4.—Czerny, 1930, p. 448.

I have examined the holotype male and the allotype of this species in the Garrett collection. I have also seen a paratype male which I obtained from Mr. Garrett.

MALE AND FEMALE.—Front orange, remainder of head yellow, but ocellar triangle, frontal plates, and back of head with grayish pollinosity; a single row of buccal setae; cheek-eye ratio about 0.45.

Thorax yellowish orange, darker on mesonotum; sternopleuron with 1 bristle in upper hind corner and setae down the middle to the longer hairs between the coxae, but the anterior third of the

sternopleuron is without setae; thorax otherwise similar to *A. flavotestacea* (Zetterstedt); legs yellow, becoming darkened at ends of tarsi; 2 or 3 bristles on distal anterodorsal surface of hind femur; wings hyaline with faint yellowish or brownish tinge; abdomen grayish yellow.

LENGTH.—4.5–5.0 mm.

DISTRIBUTION.—British Columbia, Washington, Idaho, Wyoming, Colorado; June, August, October.

Amoebaleria perplexa Garrett

FIGURE 79

Amoebaleria perplexus Garrett, 1924, p. 27.
Amoebaleria perplexa Garrett, Czerny, 1927, p. 39.

The male of this species is very similar to *Amoebaleria triangulata* Garrett, except as follows: third antennal segment brownish; eye relatively small, the cheek-eye ratio from 0.70 to 0.75; buccal setae in 2 irregular rows; dorsocentral bristles becoming weaker anteriorly; mesonotal setae rather long, especially toward the anterior portion; sternopleural setae covering all but the anterior corner and a narrow strip along the posterior margin; hind femur with no strong bristles on anterodorsal side.

The male terminalia of *A. triangulata* Garrett and *A. perplexa* Garrett will distinguish one species from the other.

I have examined the type male and a male paratype in the Garrett collection. Two males in the U.S. National Museum are each accompanied by a female with the same collection data. The female is similar to the male, but the dorsocentral bristles are not weakened anteriorly and the mesonotal setae are short.

LENGTH.—6.0 mm.

DISTRIBUTION.—Alaska, British Columbia; July–August.

Amoebaleria helvola (Loew)

FIGURE 81

Scoliocentra helvola Loew, 1862a, p. 223 (Centuria 2, 80).—Czerny, 1924, p. 141.
Leria helvola (Loew), Aldrich and Darlington, 1908, p. 83.
Leria helvola var. *angustifrons* Banks, 1926, p. 43.
Scoliocentra helvola var. *angustifrons* (Banks), Czerny, 1928, p. 53.

The yellow color of the entire body, the large size, and the presence of brownish clouding (sometimes very faint) along the posterior crossvein and ends of the longitudinal veins will distinguish this species from others in the genus.

MALE AND FEMALE.—Head yellow to yellowish orange, darker above; arista dark brown, anterior fronto-orbital bristle about one-

half the height of the posterior bristle; buccal setae in 2 or 3 irregular rows.

Thorax yellowish orange; dorsocentral bristles becoming weaker anteriorly, especially in the male (see "Remarks" below); sternopleuron with 1 strong bristle in upper hind corner and with setae covering the remainder of the sternopleuron, longer hairs between the coxae; thorax otherwise similar to *A. flavotestacea* (Zetterstedt); legs yellowish orange; wings with brownish clouding (sometimes very faint) along posterior crossvein and at ends of longitudinal veins; abdomen yellow to reddish orange, posterior margins of segments often much darkened.

Length.—7.0–11.0 mm.

Distribution.—South Dakota, Minnesota, Iowa, Illinois, Michigan, Indiana, Ohio, Arkansas, Tennessee, Georgia, North Carolina, West Virginia, Virginia, District of Columbia, Maryland, Pennsylvania, New Jersey, New York, Ontario, Quebec, Massachusetts, Vermont, New Hampshire, Maine; May–September.

Remarks.—Banks (1926) used the variety name *angustifrons* for a series of specimens which he observed were different from the typical *A. helvola* (Loew). The chief difference was that in the typical *A. helvola* (Loew) the anterior dorsocentral bristles of the male are very much weaker than the posterior pair of bristles, whereas in the *angustiforms* series these anterior bristles are not so distinctly weakened. The mesonotum of the *angustifrons* series was described as having shorter hairs than the typical *A. helvola* (Loew), the front of the head as being narrower, and the total body size smaller.

I have examined all the types involved and concur in the observations on the mesonotal chaetotaxy. I determined the ratio of the length of the front to the width on all the specimens. In the two types of *A. helvola* (Loew), the ratios were 0.74 and 0.75; in the types of *angustifrons* Banks, the ratios were from 0.76 to 0.84.

Despite these differences in the type specimens, there appears to be enough intergradation among specimens in general to make it unwise to designate distinct subspecies at this time, particularly inasmuch as it is difficult to correlate these morphological differences with geographical populations.

Amoebaleria caesia (Meigen)

Figure 80

Helomyza caesia Meigen, 1830, p. 56.
[?] *Leria mustelina* Robineau-Desvoidy, 1841, p. 261.
Blepharoptera caesia (Meigen), Loew, 1859, p. 59.—Schmitz, 1909, p. 85.
Leria caesia (Meigen), Schiner, 1864, p. 29.—Rondani, 1867, p. 127.—Pandellé, 1901, p. 350.
Amoebaleria caesia (Meigen), Czerny, 1924, p. 134; 1927a, p. 40.

This species is best distinguished by the structure of the male terminalia. My interpretation of the species is based on European specimens (8 males and 2 females) determined by Czerny and others. I have not observed any similar specimens from North America, and it appears likely that previous records of this species are incorrect.

MALE AND FEMALE.—Front orange, ocellar triangle, vertex, and upper half of back of head with dark gray pollinosity, third antennal segment yellow to brownish, aristae dark brown, remainder of head yellow; anterior fronto-orbital bristles about one-half the height of the posterior bristle; a single row of buccal setae; cheek-eye ratio about 0.55.

Thorax bluish gray, humeri and scutellum concolorous with the remainder of the mesonotum; dorsocentral bristles all about equally strong; mesopleuron with several setae in anterior corner, otherwise bare; sternopleuron with a single bristle in upper hind corner; middle of the sternopleuron covered with several rows of hairs extending ventrally to between the coxae; legs yellow to yellowish orange; wings entirely hyaline; abdomen usually with first 3½ or 4 segments dark bluish gray, the remaining segments yellowish orange.

LENGTH.—5.0–7.0 mm.

Amoebaleria scutellata Garrett

FIGURE 82

Amoebaleria scutellata Garrett, 1921, p. 125.—Czerny, 1924, p. 133.

This species is known only from a holotype male and a metatype male in the Garrett collection. I have examined these specimens. Because the species is very similar to others in the genus, the structure of the male terminalia is of great importance in distinguishing it. In the illustration I have tried to interpret the appearance of the terminalia as viewed from the left side of the insect. All of Garrett's terminalia preparations are mounted on slides and it is not always possible to see them in the desired position.

MALE.—Front yellowish orange anteriorly, becoming rusty toward the vertex; ocellar triangle and upper back of head dark gray; arista dark brown or black; remainder of head yellowish orange; anterior fronto-orbital bristle ½ to ¾ the height of the posterior bristle; buccal setae irregular, so that they appear in more than a single row.

Thorax dark gray (specimen is "wet" and coloration is difficult to interpret); mesonotum with thin brown median vitta, and dorsocentrals arising from brown spots; upper part of pleura may be brownish; all dorsocentral bristles about equally strong; scutellum concolorous with remainder of mesonotum; remainder of thorax as in *A. caesia*

(Meigen); legs reddish orange; wings hyaline, with faint brownish tinge, especially along costal margin; abdomen reddish orange.

LENGTH.—7.0–8.0 mm.

DISTRIBUTION.—Cranbrook, British Columbia, 3 May, at 4,000 feet; Michel, British Columbia, 1 Sept. 1921, at 5,400 feet.

Amoebaleria gonea Garrett

FIGURE 86

Amoebaleria gonea Garrett, 1925a, p. 3.—Czerny, 1930, p. 448.

The type of this species is a male specimen collected at Bull River, British Columbia, 28 Oct. 1923. I have seen the specimen in the Garrett collection. A series of 9 males and 6 females of this species are in the U.S. National Museum. They were collected at Logan Canyon, Utah, 19 Dec. 1918. Another male in the U.S. National Museum was collected at Chicago, Ill., 30 Mar. 1952. This species is best distinguished by the appearance of the male terminalia.

MALE AND FEMALE.—Front orange, brownish toward vertex; frontal plates, ocellar triangle, vertex, and upper half of back of head grayish pollinose; third antennal segment brownish, aristae dark brown to black; remainder of head dirty yellowish orange; anterior fronto-orbital bristle about one-half the height of the posterior bristle; buccal setae in about 2 irregular rows; cheek-eye ratio about 0.66.

Thorax dark gray, brownish on pleura; mesonotum with humeri yellowed, a dark brown median vitta and dorsocentrals arising from dark brown spots which may take the form of vittae; scutellum may be slightly yellowed; all dorsocentrals about equally strong; several hairs in anterior corner of mesopleuron; sternopleuron with one strong bristle, the remainder of sternopleuron covered with fine hairs, becoming longer ventrally between the coxae; legs reddish brown; wings hyaline, with faint brownish tinge; abdomen reddish orange to dark gray pollinose.

LENGTH.—6.0–7.0 mm.

DISTRIBUTION.—See above.

Amoebaleria glauca (Aldrich)

FIGURE 84

Leria glauca Aldrich, *in* Aldrich and Darlington, 1908, p. 87.

The type of this species is a female and cannot be distinguished with certainty from *A. caesia* (Meigen). The abdomen is a little more brownish and the scutellum is partially yellowed. Accompanying the type in the U.S. National Museum is a male specimen determined by Aldrich as "*Leria glauca* Ald." It appears similar to the type in coloration and chaetotaxy; the terminalia are different from any

other described species, although I had previously seen a similar male and had labelled it tentatively as a new species. Characters other than the male terminalia (see key to the species of *Amoebaleria*, (p. 578)) apparently may be used to separate the aforementioned three specimens from all other North American species, except *A. caesia* (Meigen), which may not occur on this continent. Thus I interpret the species on the basis of the male specimen determined by Aldrich.

DISTRIBUTION.—The type female is from Pullman, Wash., 16 Apr. 1904. The male determined by Aldrich has no data other than the number 1205. The other male specimen which I have seen is from Solano County, Calif., 1 Apr. 1951 (in the collection of the University of California at Davis).

Amoebaleria spectabilis (Loew)

FIGURE 83

Blepharoptera spectabilis Loew, 1859, p. 58; 1862b, p. 128.
Amoebaleria spectabilis (Loew), Czerny, 1924, p. 134.—Czerny, 1927a, p. 40.

There is a single male in the U.S. National Museum; it differs from any other North American species of *Amoebaleria*. It is very similar to *A. caesia* (Meigen) except that the humeri are distinctly yellowish orange. The distance from the base of the discal cell to the anterior crossvein is equal to, or slightly less than, the distance from the anterior crossvein to the distal end of the discal cell, measured along the fourth longitudinal vein. The terminalia are distinct and appear to be very close to Collart's (1940) illustration of *A. spectabilis* (Loew). The specimen also compares favorably with a European specimen which had been determined as *A. spectabilis* (Loew).

DISTRIBUTION.—Large Cave, Tulare County, Calif., 2 July 1952.

Amoebaleria infuscata, new species

FIGURE 85

This species may be distinguished from related species by the presence of clouding on the membrane of the wing along both the anterior and posterior crossvein.

MALE.—Front yellow, becoming orange posteriorly; frontal plates, ocellar triangle, vertex, and upper half of back of head grayish pollinose; antennae reddish orange, aristae brown; remainder of head yellow; anterior fronto-orbital bristle less than one-half the height of the posterior bristle; oral vibrissae strong, a single row of buccal setae; cheek-eye ratio about 0.5.

Thorax bluish gray, brownish on pleura and darker on mesonotum; humeri concolorous with disk of mesonotum, scutellum slightly yellowed toward the apex; all dorsocentral bristles about equally strong;

mesonotum with a dark brown median vitta; dorsocentrals arising from brown spots which may give the appearance of longitudinal vittae; propleural bristle strong; mesopleuron with several setae in anterior corner, otherwise bare; sternopleuron with a single bristle and about four rows of setae extending down the middle to the longer hairs and bristles between the coxae.

Legs yellowish brown; femora slightly thickened and with faint grayish pollinosity.

Wings with distinct infuscations along the anterior and posterior crossveins, otherwise hyaline with very faint brownish tinge; distance from proximal end of discal cell to anterior crossvein 1.2 times the distance from anterior crossvein to distal end of discal cell, measured along the fourth longitudinal vein.

Abdomen reddish orange.

The distal portion of the epiphallic process is unusually narrow.

LENGTH.—5.0–6.0 mm.

TYPES.—All males. Holotype: Moscow Mountain, Idaho, 9 Sept. 1908, "in path near summit." Paratypes: Berkeley, Calif., 2 Sept. 1939, B. Brookman; Longs Peak trail, Colorado, at timberline, 11,200–11,300 feet, August 28 (number not clear on label), Cockerell. The holotype has been deposited in the U.S. National Museum (USNM 65446). The first-mentioned paratype has been deposited in the California Academy of Science and the second in the collection of the State College of Washington.

Amoebaleria sabroskyi, new species

FIGURE 87

This species can be distinguished with certainty only by the appearance of the male terminalia, in which the surstylus appears to be very much narrowed and shaped like an inverted J, when seen in lateral view.

The type specimen is a male collected at White Pine Hollow, Dubuque County, Iowa, 4 July 1949, by Jean Laffoon. The type has been deposited in the U.S. National Museum (USNM 65447). The Garrett collection contains a specimen (No. 5360) collected on Moscow Mountain, Idaho, 17 Apr. 1915, which was labelled *glauca* by Garrett. A single female collected from Northumberland Cave, Nye County, Nev., 18 Aug. 1952, is in the U.S. National Museum. This female is very similar to the aforementioned males and was determined by Mr. Curtis W. Sabrosky as a possible new species. I have named the species after Mr. Sabrosky.

The preceding description of *Amoebaleria infuscata*, new species, will apply equally well to *A. sabroskyi*, new species, except as follows: cheek-eye ratio 0.59; mesonotum with humeri and scutellum yellowed

in contrast to the bluish-gray color of the remainder of the mesonotum; wings entirely hyaline, with no clouding; distance from proximal end of discal cell to anterior crossvein 1.1 times the distance from anterior crossvein to distal end of discal cell, measured along fourth longitudinal vein; surstylus very narrow, in the shape of an inverted J, when seen in lateral view.

***Amoebaleria tularensis*, new species**

FIGURE 88

In the USNM collection I discovered a specimen in which the male terminalia differed from all other species previously described in the present work. The specimen was collected in "Unnamed Cave," Yucca Creek Canyon, Sequoia National Park, Tulare County, Calif., 6 Nov. 1949, by Arthur Lange.

The description given for *A. infuscata*, new species, will apply equally well to this species, except as follows: humeri, scutellum, lateral edges of mesonotum, and upper parts of pleura yellowish brown in contrast to the ash gray disk of the mesonotum; wings entirely hyaline, with no clouding along the crossveins; distance from the proximal end of discal cell to anterior crossvein about 1.4 times the distance from the anterior crossvein to the distal end of the discal cell, measured along the fourth longitudinal vein.

The type has been deposited in the U.S. National Museum (USNM 65448).

Genus *Heleomyza* Fallén

Musca Linnaeus, 1761, p. 439 (part).
Heleomyza Fallén, 1810, p. 19.
Helomyza Fallén, 1820, p. 3 (part).—Meigen, 1830, p. 47 (part).—Zetterstedt, 1838, p. 764 (part); 1847, p. 2430 (part).—Czerny, 1924, p. 146; 1927a, p. 42.
Leria Robineau-Desvoidy, 1830, p. 653 (part).—Schiner, 1864, p. 28 (part).—Rondani, 1867, p. 124 (part).—Pandellé, 1901, p. 344 (part).—Aldrich and Darlington, 1908, p. 77 (part).—Collin, 1943, p. 248.
Blephariptera Macquart, 1835, p. 412 (part).
Blepharoptera Macquart, Loew, 1859, p. 57 (part).

This genus is distinguishable from all others except *Trichochlamys* by the combination of two or more pairs of approximately equal prosternal bristles and anterior fronto-orbital bristles equal in height to the posterior bristles. *Trichochlamys* has hairs on the dorsum of the scutellum, whereas in *Heleomyza* this area is bare. Other characters found in *Heleomyza* are: oral vibrissae strong; dorsocentral bristles 1+3; scutellum with 2 pairs of lateral bristles; middle tibia with 1 dorsal preapical bristle and several ventral apical bristles.

Key to the Species of *Heleomyza*

1. Pteropleuron bare (rarely 1 or 2 hairs present) 2
   Pteropleuron haired in anterior half . . . . . **difficilis,** new species
2. Three or more sternopleural bristles; hind basitarsus of male shorter than following segment. . . . . **brachypterna** (Loew)
   One or two sternopleural bristles; hind basitarsus of male not shorter than following segment. 3
3. Mesopleuron bare except sometimes short hairs or setae near propleuron (very rarely a single seta along middle of posterior margin) 4
   Mesopleuron with bristles, hairs, or setae in areas other than near propleuron . 5
4. Wings clouded with brown along anterior crossvein; abdomen grayish brown. **nebulosa** (Coquillett)
   Wings not clouded along crossveins; abdomen usually yellowish orange to reddish brown . . . . . **serrata** (Linnaeus)
5. Mesopleuron with bristles, hairs, or setae restricted to middle of posterior margin; 1 or 2 sternopleural bristles. 6
   Mesopleuron with hairs or setae in areas other than near middle of posterior margin; 1 sternopleural bristle. 7
6. One sternopleural bristle; mesopleuron with 1 to 3 bristles or hairs near middle of posterior margin 8
   Two sternopleural bristles; mesopleuron with several setae near middle of posterior margin. . . . . **bisetata** (Garrett)
7. Setae of mesopleuron restricted to lower hind corner . . **genalis** (Coquillett)
   Mesopleuron extensively covered with short hairs or setae. **pleuralis** (Becker)
8. Distal portion of epiphallic process of male at least twice as broad as the base. **czernyi** Collart
   Distal portion of epiphallic process of male less than twice as broad as the base . . . . . **tristissima** (Garrett)

Heleomyza serrata (Linnaeus)

FIGURE 89

Musca serrata Linnaeus, 1761, p. 455.
Heleomyza serrata (Linnaeus) Fallén, 1810, p. 19.
Helomyza serrata (Linnaeus), Fallén, 1820, p. 4 (part).—Zetterstedt, 1838, p. 766; 1847, p. 2450.—Czerny, 1924, p. 147; 1927a, p. 44.
Helomyza fuscana Meigen, 1838, p. 369.
Helomyza geniculata Zetterstedt, 1847, p. 2451 (part).
Leria serrata (Linnaeus), Schiner, 1864, p. 29.—Rondani, 1867, p. 125.—Pandellé, 1901, p. 346.—Collin, 1943, p. 249.
Leria serrata var. *nigricana* Garrett, 1922, p. 176.
Leris serrata var. *vinus* Garrett, 1922, p. 177.
Helomyza americana Garrett, 1925a, p. 3.

This species is very common in collections. The bare mesopleuron, the absence of clouding along the anterior crossvein of the wing, and the presence of less than three pairs of sternopleural bristles will distinguish this species from others in the genus.

MALE AND FEMALE.—Front yellowish orange, darker above; upper half of fronto-orbital plates, ocellar triangle, vertex, and upper back of head ash gray; face, cheeks, and lower back of head yellow to

yellowish orange; antennae with segments 1 and 2 yellowish orange, segment 3 becoming dark brown distally; aristae minutely pubescent; a single irregular row of buccal setae; cheek-eye ratio from 0.50 to 0.67.

Thorax rather uniformly ash gray, with evidence of 3 brownish vittae on mesonotum; mesopleuron bare, except for several setae in anterior corner near propleuron, and very rarely a tiny seta along middle of posterior margin; sternopleuron with 1 strong bristle and several small setae near the bristle and longer hairs ventrally between the coxae; several (usually 3 to 5) pairs of prosternal bristles.

Legs yellowish orange shading to dark brown or black on last 3 or 4 tarsal segments; hind basitarsus of male longer than the following segment.

Wings hyaline with faint brownish tinge, but no distinct infuscations; costal spines strong.

Abdomen yellow to reddish brown (see "Remarks" below).

LENGTH.—3.0–5.0 mm.

DISTRIBUTION.—Alaska, Yukon Territory, British Columbia, Washington, Oregon, California, Idaho, Utah, Wyoming, Montana, South Dakota, Minnesota, Iowa, Wisconsin, Michigan, Indiana, Tennessee, Kentucky, Virginia, West Virginia, Pennsylvania, New York, New Hampshire, Massachusetts, Quebec; collected throughout the year, usually more common in spring and early summer.

BIOLOGY.—*H. serrata* (Linnaeus) has been reared from birds' nests (Jussell, 1905; Waterston, 1910), and I have collected it in traps baited with excrement. Townsend (1893) recorded the species from dung and fungi. Cole and Lovett (1921) found the larvae in fungi and "hen manure."

REMARKS.—Garrett's variety *nigricana* is apparently based upon a single specimen. I would hesitate to designate a subspecies in such a case. Garrett's description of the variety *vinus* indicates that he considered it a seasonal variant, not a subspecies in the usual sense. In a large series collected at the same time and place, one may find considerable variation in coloration of the specimens; it seems unwise, therefore, to designate subspecies on this basis.

Heleomyza genalis (Coquillett)

FIGURE 90

Leria genalis Coquillett, 1910a, p. 130.—Czerny, 1924, p. 160.

I have examined the type female (No. 13104) in the U.S. National Museum; I also obtained a male specimen from the Garrett collection. The species resembles *Heleomyza serrata* (Linnaeus) except as follows: mesonotum uniformly blackish, without evidence of vittae; abdomen

dark brown to blackish; mesopleuron with several small setae in lower hind corner.

DISTRIBUTION.—British Columbia; June.

Heleomyza tristissima (Garrett)

FIGURE 91

Leria tristissima Garrett, 1921, p. 122.
Helomyza tristissima (Garrett), Czerny, 1924, p. 154.

MALE AND FEMALE.—Entire body, except head, rather uniformly dark grayish brown to black; head similar to *H. serrata* (Linnaeus), sometimes 1 or 2 pairs of secondary oral vibrissae in addition to the stronger, primary pair; thoracic chaetotaxy similar to *H. serrata* (Linnaeus), except mesopleuron with 1–3 bristles near middle of posterior margin.

LENGTH.—3.0–5.0 mm.

DISTRIBUTION.—Described from a male collected at St. Anthony, Newfoundland, May 4; all other records from Alaska (April and May).

BIOLOGY.—I have collected adults in traps baited with excrement.

REMARKS.—Garrett's unpublished notes indicate that he suspected that this species might be synonymous with *H. modesta* Meigen of Europe. I have examined European specimens of the latter species and find them indistinguishable from *H. tristissima* (Garrett) and *H. czernyi* Collart, except that the male terminalia are very different in each of the three species.

Heleomyza czernyi Collart

Helomyza czernyi Collart, 1933, p. 402.

This species may be distinguished with certainty only by the male terminalia. Collart's original description includes an excellent illustration of the terminalia of this species, as well as of *H. modesta* Meigen. The epiphallic processes are broad distally, as in *H. modesta* Meigen, but there are stout spines present on the medial surfaces of these processes in *H. czernyi* Collart, whereas no such spines occur in *H. modesta* Meigen.

I have examined a male and a female of this species from Greenland in the U.S. National Museum. They were incorrectly identified by Aldrich as *H. modesta* Meigen. The specimens agree with Collart's original description, except that the legs do not seem as dark as described, and both specimens have a seta above the oral vibrissae. Collart used the absence of such setae in *czernyi* to separate it from *modesta* in a key to the species of *Heleomyza*, but I do not feel that this is a reliable character for use in species discrimination.

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Heleomyza pleuralis (Becker)

FIGURE 92

Blepharoptera pleuralis Becker, 1907, p. 3.
Helomyza pleuralis (Becker), Czerny, 1924, p. 153; 1927a, p. 42.
Leria pleuralis Coquillett, 1910a, p. 130. New synonymy.
Amoebaleria pleuralis (Coquillett), Czerny, 1924, p. 132.

The presence of hairs over the entire mesopleuron (except the anterior corner) and the absence of hairs on the pteropleuron distinguish this species from all others in the genus *Heleomyza*.

MALE AND FEMALE.—Head similar to *H. serrata* (Linnaeus); thorax somewhat darker than *H. serrata* (Linnaeus) and less evidence of mesonotal vittae; mesopleuron pilose except for anterior corner; one sternopleural bristle; entire sternopleuron pilose, the hairs becoming much longer ventrally between the coxae; abdomen ash gray to brown, becoming yellowish apically; wings and legs as in *H. serrata* (Linnaeus), except legs are darker.

LENGTH.—3.0–5.0 mm.

DISTRIBUTION.—Alaska, British Columbia, New Mexico, Labrador; March–August.

BIOLOGY.—I have collected this species in traps baited with excrement.

REMARKS.—A single male specimen was sent to me by Dr. Fritz Peus, Zoologisches Museum der Humboldt-Universität, Berlin, with the information that it is the only specimen labelled *pleuralis* in the Becker collection and is possibly the type of this species. It was the opinion of Dr. Peus that the labels were in the handwriting of Becker. This specimen agreed with the types of *Leria pleuralis* Coquillett (USNM 13099), which I have also examined. This synonymy was also recognized by Steyskal, as indicated by a label accompanying Coquillett's types.

Abnormal chaetotaxy was observed in several specimens of this species. On a specimen from Healy, Alaska, there is 1 small pteropleural seta on one side and 2 such setae on the other side. Specimens in the Garrett collection show such variations as an additional fronto-orbital bristle on one side, an additional dorsocentral bristle on one or both sides, and 1 or 2 small setae between the lateral scutellar bristles.

Heleomyza bisetata (Garrett)

FIGURE 93

Amoebaleria bisetata Garrett, 1922, p. 175.—Czerny, 1927b, p. 39.

The presence of 2 sternopleural bristles and several setae along the middle of the posterior margin of the mesopleuron will distinguish this species from others in the genus *Heleomyza*.

Male.—Front reddish orange, darker towards vertex, remainder of head yellowish orange, except frontal plates, ocellar triangle, and upper back of head dusted with gray; arista dark brown, minutely pubescent; anterior and posterior fronto-orbital bristles approximately equal; oral vibrissae strong; a second, weaker oral vibrissa located below the primary one on each side; buccal setae in 2 irregular rows; cheek-eye ratio 0.45 to 0.50.

Thorax reddish orange, mesonotum sometimes brownish with a gray pollinosity; mesonotum with evidence of a narrow median vitta and lateral vittae through the dorsocentrals; mesopleuron with several tiny setae and a larger hair in the anterior corner near the propleural bristles, and several (about 5 to 7) setae near the middle of the posterior margin; 2 strong sternopleural bristles, with about 4 or 5 small hairs or setae anterior to the bristles, and the usual long hairs ventrally between the coxae; remainder of pleura bare.

Legs yellowish orange to reddish orange, slightly darker distally; fore and hind basitarsi with a small ventral tooth at the distal end; hind basitarsi thickened and equal in length to the following segment.

Abdomen reddish brown, with faint grayish pollinosity.

Female.—Similar to male, except basitarsi lack the tooth; the hind basitarsus is slightly longer than the following segment and is not thickened.

Length.—4.0–6.0 mm.

Distribution.—Alaska, British Columbia, Manitoba, Michigan, Virginia, Maryland; March–July.

Remarks.—I have examined the type male of this species, which is in the Garrett collection. A similar male specimen in the U.S. National Museum is labelled "*Leria spinigerellus* Mall., Type." The label is in pencil, and I am not sure that my spelling of the species name is correct; it appears to be only a manuscript name.

Czerny's (1924) description of the European *Heleomyza dupliciseta* (Strobl) agrees rather closely with specimens of *H. bisetata* (Garrett); however, I examined a male and a female of *H. dupliciseta* (Strobl), sent to me by Dr. Willi Hennig, and found that the shapes of the surstyli of the male terminalia are different in the two species.

Heleomyza brachypterna (Loew)

Figure 94

Blepharoptera brachypterna Loew, 1873, p. 49.
Blepharoptera latens Aldrich, 1896, p. 188.
Leria latens (Aldrich), Aldrich and Darlington, 1908, p. 85.
Leria caccabata Tucker, 1909, p. 301; 1911, p. 106.
Helomyza brachypterna (Loew), Czerny, 1924, p. 150; 1927a, p. 43.
Leria serrataria Garrett, 1924, p. 26.—Czerny, 1927b, p. 41.

This species is very similar to *H. serrata* (Linnaeus), except as follows: usually a second pair of oral vibrissae; 2 or 3 irregular rows of buccal setae; at least 3 sternopleural bristles; male hind basitarsus thickened and shorter than the following segment. The structure of the male terminalia also distinguishes the two species from each other.

LENGTH.—3.5–5.5 mm.

DISTRIBUTION.—Alaska, British Columbia, Colorado, Minnesota, Iowa, Wisconsin, Michigan, Indiana, Kansas, Missouri, Arkansas, Tennessee, Kentucky, West Virginia, Virginia, Maryland, Pennsylvania, New York; collected from March to October and from caves during December.

BIOLOGY.—Larvae of this species from various birds' nests have been reared (Blair, 1931; Collin, 1939).

Heleomyza nebulosa (Coquillett)

FIGURES 95, 96

Leria nebulosa Coquillett, 1910a, p. 129.—Czerny, 1924, p. 159.

I have examined the type (No. 13098), a female, in the U.S. National Museum. It resembles *H. serrata* (Linnaeus) very closely except as follows: 4 to 5 rows of buccal setae; legs reddish brown, femora grayish; wings clouded with brown in region of anterior crossvein; posterior crossvein dark, but not conspicuously clouded; abdomen dark grayish brown.

I obtained a male specimen from the Garrett collection. It was collected on snow, Sulfur Mountain, Banff, Alberta, 29 Mar. 1909; this is the type locality. No other records of the species are known to me.

Heleomyza difficilis, new species

This species is described from 2 males loaned me by the U.S. National Museum and a single female from the American Museum of Natural History. The haired pteropleuron will distinguish it from other species of *Heleomyza*.

MALE AND FEMALE.—Head similar to *H. nebulosa* (Coquillett); antennae dark brown; cheek-eye ratio about 0.5; remainder of body rather uniformly ash gray, except terminalia and legs are slightly yellowed; a faint brown median vitta lies between the dorsocentrals, and the brownish patches at the bases of the dorsocentrals may give the impression of 2 lateral vittae; anterior corner and posterior half of mesopleuron covered with hairs; anterior portion of pteropleuron and entire sternopleuron similarly covered with hairs; 1 sternopleural bristle; wings hyaline, anterior crossvein clouded (more so in the female specimen than in the 2 males).

LENGTH.—3.0–4.0 mm.

Types.—Holotype male and 1 paratype male, both from McKinley Park, Alaska, collected by F. Morand (no date); allotype from Cape Prince of Wales, Alaska, 27 June 1926. The holotype and allotype have been deposited in the U.S. National Museum (USNM 65449) and the paratype in the American Museum of Natural History.

Distribution.—Alaska, Northwest Territories, Quebec, Labrador; June–August. (The Canadian specimens were examined and the additional distribution records added after the original description had been prepared and types designated.)

Remarks.—A study of chaetotaxy alone would seem to ally this species with *Trichochlamys borealis* Czerny, because of the presence of mesopleural and pteropleural hairs. It is therefore surprising that the male terminalia are very similar to *Heleomyza nebulosa* (Coquillett), which in all other respects is a typical *Heleomyza* and has both the mesopleuron and pteropleuron bare. Because these terminalia are relatively complex in structure, it would be difficult to justify placing the two species in different genera on the theory that the similarity of terminalia was the result of convergent evolution. It is more reasonable to assume that *H. difficilis*, new species, and *H. nebulosa* (Coquillett) are closely related and that the former evolved a distinct thoracic chaetotaxy while evolution of the terminalia lagged. Mesopleural hairs are already known to occur in several species of *Heleomyza*, and pteropleural hairs have been observed occasionally in specimens of a species in which that sclerite is ordinarily bare (see *H. pleuralis* (Becker), p. 592). Thus the differences in pilosity of the pleural sclerites in this genus probably do not represent such wide evolutionary gaps as is indicated in certain other groups.

Genus *Trichochlamys* Czerny

Trichochlamys Czerny, 1924, p. 155; 1927a, p. 45.

This genus is distinguished from *Heleomyza* by the presence of hairs on the dorsum of the scutellum and on the pteropleura (pteropleural hairs are also present in *H. difficilis*, new species). *Heleomyza* and *Trichochlamys* are distinguishable from other related genera by having 2 or more pairs of prosternal bristles and the anterior frontoorbital bristles about equal in length to the posterior bristles. As discussed under "*H. difficilis*, new species," (p. 594), the presence or absence of pteropleural hairs does not appear to be a character of generic rank in this group; likewise, the presence or absence of hairs on the dorsum of the scutellum is probably not a sound basis for splitting genera. However, I think it best to retain genus rank for *Trichochlamys* until male specimens are available for study; the question of its relation to *Heleomyza* may then be reconsidered.

Trichochlamys borealis Czerny

Trichochlamys borealis Czerny, 1924, p. 155; 1927a, p. 45.

I have examined 2 females of this species in the collection of the U.S. National Museum. The species was described by Czerny from a single female specimen.

FEMALE.—Front and base of antennae reddish orange, third antennal segment becoming brownish; aristae dark brown to black, minutely pubescent; ocellar triangle and back of head gray; face and cheeks brownish yellow; anterior and posterior fronto-orbital bristles approximately equal; front with dense setae; 2 or 3 oral vibrissae; setae covering all but upper anterior part of cheeks; cheek-eye ratio 0.6.

Thorax ash gray, with humeri yellowish; brownish patches at bases of dorsocentrals and an irregular broad brown vitta between the dorsocentrals; sides of scutellum with brownish vittae covered with long hairs; scutellum with longitudinal depression in midline; propleuron, mesopleuron, sternopleuron, and anterior half of pteropleuron covered with dense hairs; 1 sternopleural bristle.

Legs with femora grayish, becoming yellowish brown distally; middle tibia with several ventral apical bristles and the usual dorsal preapical bristle.

Wings with brownish tinge; costal bristles relatively short.

Abdomen dark gray.

LENGTH.—7.0 mm.

DISTRIBUTION.—Copper [Medny] Island, of the Commander [Komandorski] Islands, in the Bering Strait; May.

Doubtful Species

The following species have been cited from North America, but I am not familiar with the characters of these species and have been unable to place them in the present study:

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