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BIOLOGICAL SURVEY OF DOMINICA <sup>1</sup>

9. The Trichoptera (Caddisflies) of the Lesser Antilles

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The Trichoptera or caddisflies are one of the panorpoid orders of insects closely related to the Mecoptera and Lepidoptera. The adults are quite mothlike in appearance, but their wings are generally covered with hairs rather than scales as in the Lepidoptera. They are holometabolous with their larval and pupal stages aquatic or, in a few cases, subaquatic or terrestrial. The larvae are most frequently noticed because of their habit of constructing some sort of shelter, which in certain families is a basically tubular case that encloses most of the body and that is carried around by the larvae as they wander over the substrate. The larvae of other families construct silken retreats that are fixed to the substrate and that serve to trap food particles from the flowing water.

The trichopterous fauna of the Lesser Antilles has been almost completely ignored in the past by systematists. *Polycentropus insularis* Banks, 1938, from Grenada, is the only species described from these

<sup>1</sup> See list at end of paper. Other faunal studies in this series will appear in "Smithsonian Contributions to Zoology." A companion series on the flora appears in "Contributions from the United States National Herbarium" and "Smithsonian Contributions to Botany."

islands, and the only other record that has been found is for *Leptonema albovirens* (Walker) from St. Vincent (Mosely, 1933). Including these two old records with the results of the present study, we now know 3 species from Guadeloupe, 36 from Dominica, 11 from St. Lucia, 1 from St. Vincent, and 12 from Grenada. These numbers may be compared with those reported for the Greater Antilles (Flint, 1968a): 24 on Cuba, 18 on Hispaniola, 39 on Jamaica, and 35 on Puerto Rico.

ACKNOWLEDGMENTS.—The accumulation of the vast majority of the material on which this paper is based was made possible by the support of J. Bruce Bredin and John D. Archbold to whom I am most indebted. The following people all made collections, including some Trichoptera, on the island of Dominica during the course of the Bredin-Archbold-Smithsonian survey: D. F. Bray, H. H. Hobbs, H. Robinson, O. S. Flint, T. J. Spilman, P. J. Spangler, W. W. Wirth, J. F. Gates Clarke, D. M. Anderson, D. R. Davis, R. J. Gagne, A. B. Gurney, and E. L. Todd.

My trip to Dominica, St. Lucia, and Grenada in 1963, which resulted in the only material available from the latter two islands, was made possible by grant J-481 from the American Philosophical Society. I wish to acknowledge the help received on St. Lucia from Jason Cadet in the field and from Harold F. C. Simmons in making the necessary arrangements.

I am indebted to André D. Pizzini for the figures of the cases and habitus drawings of the larvae.

DISTRIBUTION.—One of the problems frequently faced by insect zoogeographers is the one caused by lack of adequate collecting. This results in species with enigmatic relationships because the related species have not been collected or in misleading distribution because the range is only partially known. Enough has become known, however, about the Caribbean Trichoptera in recent years so that certain general patterns can be discerned. In the following paragraphs I will attempt to point out what these patterns seem to be for the Trichoptera, with the clear understanding that additional collecting will undoubtedly require changes in certain particulars.

The majority of the Trichoptera found on the Antilles appear to be limited to these islands and, in fact, endemic to a specific island. Of the total of 45 species that are found on the Lesser Antilles, only 6 are known from the mainland as well; an additional 13 species are also found on two or more Antillean islands, leaving 26 which are known from only one Lesser Antillean island.

There seem to be three basic patterns of distribution evident in the Lesser Antillean Trichoptera. The first (map 1) is shown by *Oxyethira janella* Denning, *O. tega* Flint, *O. cirrifera* Flint, *Neotrichia*



MAP 1.—Probable distribution of *Oxyethira janella* Denning (x=records).



MAP 2.—Probable distribution of *Leptonema albovirens* (Walker) (x=records).

*iridescens* Flint, *Ochrotrichia spinosissima* Flint, and *Oecetis pratti* Denning. These are distributed over the Greater and Lesser Antillean islands and may also be found on some of the adjacent mainland areas. The second pattern (map 2) is shown by *Wormaldia planae* Ross, *Chimarra caribea*, new species, *Leptonema albovirens* (Walker), *Leucotrichia sarita* Ross, and *Oxyethira azteca* (Mosely). This pattern shows a rather wide mainland distribution, generally from Mexico to Trinidad, and includes Grenada and, in the case of *L. albovirens*, St. Vincent also. The third pattern is shown by the remainder of the species that are endemic to one or more of the Lesser Antillean islands.

Although the origin of the Lesser Antillean fauna is not absolutely clear, there does seem to be overwhelming evidence that there is a major difference in the composition of the Trichoptera fauna of the Greater and Lesser Antilles in spite of a few elements in common (those representatives of "pattern 1"). The following genera or groups of species are all found on the Greater Antilles but are lacking on the Lesser: *Atopsyche*, *Cariboptila*, *Campsiophora*, *Chimarra* (*Curgia*), the *Polycentropus nigriceps* group, *Antillopsyche*, the *Smicridea comma* group, *Hydropsyche*, *Macronema*, *Leptocella*, *Marilia*, and the *Phylloicus cubana* group. The alternative of genera or species groups present on the Lesser Antilles but not on the Greater is also true: *Protoptila*, *Polyplectropus*, the *Chimarra caribea* group, *Zumatrichia*, *Bredinia*, the *Smicridea nigripennis* group, *Atanatolica*, *Brachysetodes*, and the *Phylloicus lituratus* group.

There is only a little evidence concerning the actual source for the colonization of the Lesser Antilles. In the majority of cases the genera or species groups are found throughout South and Central America, but for unknown reasons they have managed to colonize only one group of islands or the other. In a few cases, however (the *Chimarra caribea* group, *Atanatolica*, *Brachysetodes*, and the *Phylloicus lituratus* group), all the related species are found in South America and southern Central America. In these cases at least, their ancestors probably came from northern South America. In fact, the second distribution pattern (Grenada and adjacent mainland) may well represent an incipient stage in the introduction of species into the Lesser Antilles from adjacent South America.

TAXONOMY.—The following keys to families were published in Flint (1964b) and were modified from Ross (1944). Designed for use with the Antillean fauna only, they use obvious external characters whenever possible. No specific determination should ever be considered definite until the genitalia have been compared with, and found identical to, the figures for the species under consideration. The families Rhyacophilidae and Odontoceridae have not been taken on the Lesser Antilles, but they are included in the keys because of their presence on the Greater Antilles.

## Key to Families

## LARVAE

1. Pro-, meso-, and metanotum covered by sclerotized plates . . . . . 2
- Meso- and metanotum either membranous or only partially covered . . . . . 3
2. Abdomen with many branched gills . . . . . HYDROPSYCHIDAE
- Abdomen without gills . . . . . HYDROPTILIDAE
3. Anal proleg projecting ventrad at right angles to the body axis; inhabiting a case made of sand grains in the shape of a turtle's shell . GLOSSOSOMATIDAE
- Anal proleg extending in axis of body, or fused to last segment; either free-living, or in a differently shaped case . . . . . 4
4. Anal proleg extending freely from the abdomen; either free-living, or in a fixed silken retreat . . . . . 5
- Anal proleg fused to apex of abdomen, claw only free; in a freely movable house . . . . . 7
5. Ninth abdominal tergum with a sclerite; free-living . . . RHYACOPHILIDAE
- Ninth segment membranous dorsally; in a fixed retreat . . . . . 6
6. Labrum membranous, with anterior margin expanded laterally (T-shaped).  
PHILOPOTAMIDAE
- Labrum sclerotized, roughly semicircular . . . . . PSYCHOMYIIDAE
7. Labrum with a transverse row of about 20 setae dorsally; in a flat case of leaf fragments . . . . . CALAMOCERATIDAE
- Labrum with about 6 erect setae dorsally . . . . . 8
8. Anal claw with a series of teeth, comblike; case coiled like a snail shell . . .  
HELICOPSYCHIDAE
- Anal claw with a single tooth; case tubular . . . . . 9
9. Antenna about 8 times as long as broad, arising near base of mandibles . .  
LEPTOCERIDAE
- Antenna practically invisible, barely longer than broad . . ODONTOCERIDAE

## PUPAE

1. Apex of abdomen with projecting, finger-like processes . . . . . 5
- Apex of abdomen without long processes, with only the lobes containing developing genitalia . . . . . 2
2. Mandibles with inner margin smooth . . . . . HYDROPTILIDAE
- Mandibles with teeth or large serrations on inner margin . . . . . 3
3. Mandibles with serrations along inner margin . . . . . RHYACOPHILIDAE
- Mandible with 1 or 2 large teeth in addition to serrations . . . . . 4
4. Mandible with a single large tooth on inner margin . . GLOSSOSOMATIDAE
- Mandible with 2 teeth on inner margin . . . . . PHILOPOTAMIDAE
5. Third and/or fourth abdominal segments bearing hook-plates posteriorly . .  
HYDROPSYCHIDAE
- Only the fifth segment bearing a hook-plate posteriorly . . . . . 6
6. Seventh segment without hook-plates anteriorly . . . . . 7
- Seventh segment with hook-plates anteriorly . . . . . 8
7. Apical processes tipped with hairs as long as processes . HELICOPSYCHIDAE
- Apical processes either without hairs or they are much shorter than processes . . . . . LEPTOCERIDAE
8. Lateral line of setae lacking on abdomen . . . . . PSYCHOMYIIDAE
- Lateral line of setae well developed . . . . . 9
9. Dorsum of abdomen with transverse brushes of setae . . CALAMOCERATIDAE
- Dorsum of abdomen without heavy brushes of setae . . . ODONTOCERIDAE

## ADULTS

- |  |                 |
|--|-----------------|
| 1. Mesoscutellum with posterior portion forming a triangular, flat area with a vertical posterior margin; forewing length 4 mm or less . . . . . | HYDROPTILIDAE   |
| Mesoscutellum rounded, without vertical margins; forewing length 3 mm or more . . . . .  | 2               |
| 2. Ocelli present . . . . .  | 3               |
| Ocelli absent . . . . .  | 5               |
| 3. Maxillary palpi with fifth segment 2 or 3 times as long as fourth . . . . .   |                 |
|  | PHILOPOTAMIDAE  |
| Maxillary palpi with fifth segment barely longer than fourth . . . . .   | 4               |
| 4. Foretibia with apical spur prominent . . . . .  | RHYACOPHILIDAE  |
| Foretibia with apical spur absent or hairlike . . . . .  | GLOSSOSOMATIDAE |
| 5. Midtibia with preapical spur . . . . .  | 6               |
| Midtibia without preapical spur . . . . .  | 9               |
| 6. Terminal segment of maxillary palpi elongate, and generally with suture-like cross striae . . . . .   | 7               |
| Terminal segment of palpi about same length as preceding segment, without cross striae . . . . .   | 8               |
| 7. Mesoscutum with a pair of small setal warts; foretibia often with a preapical spur . . . . .  | PSYCHOMYIDAE    |
| Mesoscutum without setal warts; foretibia never with a preapical spur . . . . .  |                 |
|  | HYDROPSYCHIDAE  |
| 8. Antennae much longer than wings . . . . .   | LEPTOCERIDAE    |
| Antennae about length of forewings . . . . .   | HELICOPSYCHIDAE |
| 9. Mesoscutellum small and rectangular . . . . .   | CALAMOCERATIDAE |
| Mesoscutellum large and domelike . . . . .   | ODONTOCERIDAE   |

## Family GLOSSOSOMATIDAE

Although the family is found over most of the world, the Protoptilinae, to which all the antillean species belong, is exclusively of New World distribution. The two genera known from the Greater Antilles seem to belong to a different section of the subfamily from where *Protoptila* belongs.

The larvae of the family all construct cases of small sand grains shaped like a turtle's shell. At pupation the ventral strap is cut away and the domelike dorsal covering is firmly anchored to the substrate, usually a rock, and a separate silken inner cocoon is spun to enclose the pupa.

Genus *Protoptila* Banks

*Protoptila* Banks, 1904, p. 215. [Type-species: *Beraea? maculata* Hagen, 1861, by original designation.]

The genus *Protoptila*, which contains many species and is found throughout the New World, is here recorded from the Antilles for the first time.

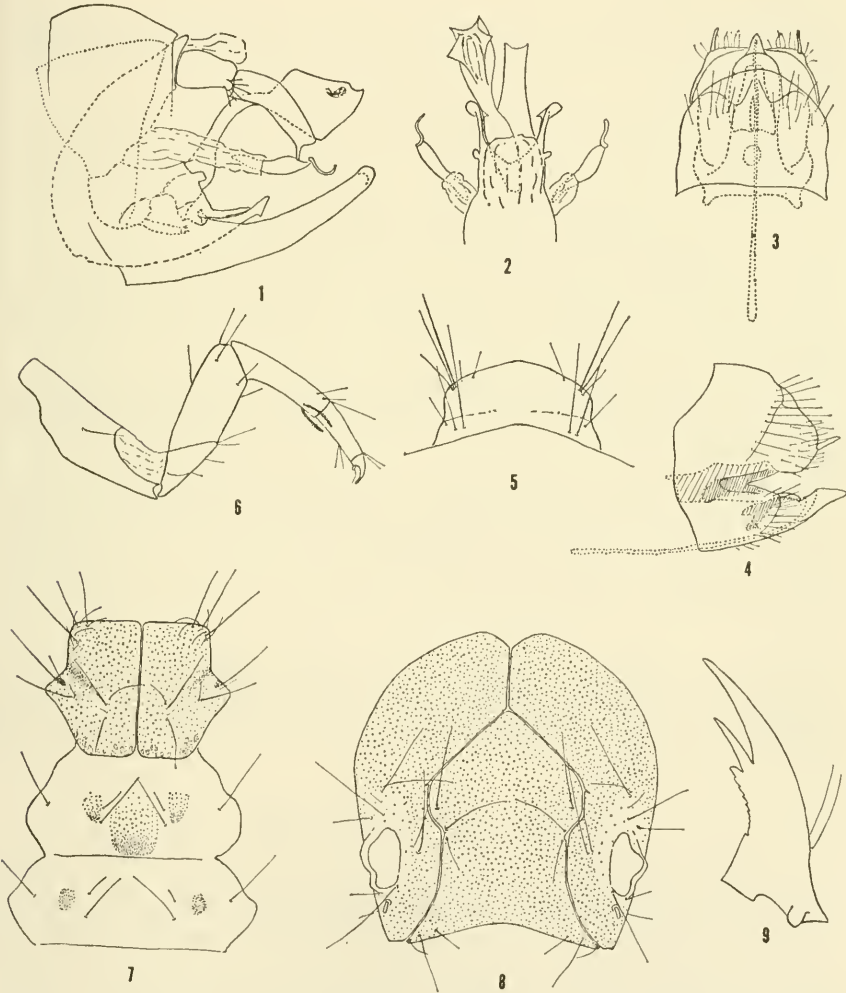
Preliminary descriptions of the larvae have been given by Ross (1944) and Flint (1963). The immature stages of the species described herein agree structurally with the other known species of the genus.

*Protophila dominicensis*, new species

## FIGURES 1-9

This species is a member of the *maculata* group, closest to *P. resolda* Mosely. From this species it differs in the nondivergent apices of the ninth sternum, the shape of the apical portion of the tenth tergite, and the very different aedeagus.

ADULT.—Length of forewing 3 mm. Color brown; legs paler, forewing with intermingled brown and gold hairs, a pale line at anasta-



FIGURES 1-9.—*Protophila dominicensis*, new species: 1, male genitalia, lateral; 2, male genitalia, dorsal; 3, female genitalia, ventral; 4, female genitalia, lateral; 5, pupal labrum, dorsal; 6, larval foreleg, posterior; 7, larval thorax, dorsal; 8, larval head, anterior; 9, pupal mandible, anterior.

mosis. Male genitalia: eighth sternum elongate, tapering, tip slightly bifid; ninth sternum flattened, scooplike, tip bifid; lateral arms of tenth tergum rectangular, with a sharp apicomeral tooth; lateral process of aedeagus with a curled apical spine; aedeagus with dorsomesal lobe, basal complex, narrow neck, and greatly enlarged apex. Female genitalia: eighth sternum with rounded ventrolateral lobes; internal plate rectangular in ventral view with a circular mesal opening, apically with a smaller ventral plate, a long internal whip attached to apex.

LARVA.—Length to 4 mm. Sclerites brown, head yellowish around eyes. Prosternum with a pair of broad plates filling the venter. Meso- and metasterna with narrow sclerites along posterior margins. All legs very similar; mid- and hindlegs with ventroapical seta of tibia nonfimbriate. Abdominal segments 1–6 with 1 pair, segments 7–8 with 2 pairs of dorsal setae; segments 1–8 with a lateral seta; segment 1 with 2 pairs, segments 2–9 with 1 pair of ventral setae. Ninth tergite with 2 pairs of long setae. Anal claw with 3 pairs of accessory teeth.

PUPA.—Length 3 mm. Mandibles and labrum as in figures 5, 9. Face with 3 pairs of setae. Abdomen with hook-plates anteriorly on segments 2–8 (2 and 8 lightly sclerotized and may be lacking), posteriorly on 4.

CASE.—Length 4 mm, width 2 mm. Made of small sand grains in typical shape. Irregular respiratory openings dorsally at anterior and posterior ends.

MATERIAL.—Holotype, pharate male: Dominica, Morne Nicholls, 9 Nov. 1964, P. J. Spangler, USNM Type 69879. Allotype, female: Fond Figues, 6 Apr. 1964, O. S. Flint, Jr. Paratypes: same data as holotype, 1 ♀; same data as allotype, 1 ♀; Clarke Hall, 11–20 Feb. 1965, W. W. Wirth, 1 ♀. Other: same data as holotype, 7 larvae, 1 prepupa, 6 pupae; Laudat, 20 Nov. 1964, P. J. Spangler, 1 larva.

BIOLOGY.—This species has been encountered only a few times on the island of Dominica. The larvae were found in clear, forested streams about 5 yards wide, where they were attached to gravel and rocks on the bottom.

### Family PHILOPOTAMIDAE

The philopotamids are nearly ubiquitous wherever there is flowing water in most of the regions of the world. Many of the genera, including *Wormaldia*, are more or less limited to the cooler, spring-fed streams in mountainous regions, whereas others, especially *Chimarra*, are more diverse in the regions of larger, warmer, but still rapidly flowing, lowland rivers.

The larvae construct long, tubular, silken shelters attached to the underside of a rock or stick, where the flow of water will keep the



shelter distended. The pupae are enclosed in a rather loose, domed shelter of sand and silk.

### Key to Genera

#### LARVAE

- Frontoclypeus with anterior margin evenly convex . . . . . *Wormaldia*  
 Frontoclypeus with anterior margin asymmetrically emarginate . . . *Chimarra*

#### PUPAE

- Mandible broad, subapical teeth close together, often arising from a single projection . . . . . *Chimarra*  
 Mandible narrower, teeth well separated, never arising from a single projection  
*Wormaldia*

#### ADULTS

- Front tibia with 1 apical spur . . . . . *Chimarra*  
 Front tibia with 2 apical spurs . . . . . *Wormaldia*

### Genus *Wormaldia* McLachlan

*Wormaldia* McLachlan, 1865, p. 140. [Type-species: *Hydropsyche occipitalis* Pictet, 1834, designated by Ross, 1949.]

There are species placed in the genus *Wormaldia* from all regions of the world save the Australian; however, the genus seems to be most diverse in the Northern Hemisphere. This is the first record of the genus from the West Indies.

Larvae and pupae of the genus were described by Ross (1944), Lepneva (1964), and others.

### *Wormaldia planae* Ross and King

FIGURES 10, 11

*Wormaldia planae* Ross and King, 1956, p. 64.

This species was described from Mexico, but I have seen examples from Panama, Colombia, and Trinidad, as well as these recorded here. It is thus a circum-caribbean species, and it may also be expected in the Andean region further south.

ADULT.—Length of forewing 4 mm. Color brown, legs slightly paler. Male genitalia: no sternal processes; eighth tergum with a U-shaped dorsomesal excision, flanked by a pair of knoblike protuberances; tenth tergum narrow, with apex enlarged in lateral aspect, dorsally with an expansion and a blunt tooth laterally, then narrowing to a subapical constriction, and a sharp apicolateral tooth; cercus reaching posteriad to subapical constriction of tenth tergum; clasper with basal segment short and broad, apical segment about as long as basal segment, somewhat narrowed, with a dense apicomeral patch of black spines; aedeagus with internal sclerotizations in the form of long

lateral rods, a domelike basal hood, and an internal complex at midlength.

LARVA AND PUPA.—UNKNOWN.

MATERIAL.—Grenada, 2 miles west of Lake Grand Etang, 4–8 Aug. 1963, O.S. Flint, Jr., 4♂.

BIOLOGY.—The specimens were taken at an ultraviolet light placed beside a small tumbling, mountain brook.

### Genus *Chimarra* Stephens

*Chimarra* Stephens, 1829, p. 318. [Type-species: *Phryganea marginata* Linnaeus, 1767, by monotypy.]

This is a very large genus with species found on every region of the earth. One or more species have been found on all the Antillean islands.

The larvae have been described many times. They live in silken tubes on the undersurface of rocks in fast water.

#### Key to Species

##### LARVAE

Anterior margin of frontoclypeus with a central tooth . . . . . *C. dominicana*  
 Frontoclypeus without a small central tooth . . . . . *C. antilliana*

##### PUPAE

Mandibles with 2 separate subapical teeth . . . . . *C. dominicana*  
 Mandibles with 2 teeth arising from a common projection . . . . . *C. antilliana*

##### ADULTS

1. Clasper of male with a long apicomesal projection; M in hindwing with only 2 branches . . . . . *C. dominicana*  
     Claspers without a long apicomesal projection; M with 3 branches . . . . . 2
2. Clasper considerably enlarged basally; female with an elongate internal, ventral sclerite . . . . . *C. caribea*  
     Clasper barely broader basally; female without an elongate ventral sclerite. . . . . *C. antilliana*

### *Chimarra dominicana*, new species

#### FIGURES 12–17

This species is apparently related to *C. puertoricensis* Flint. It differs in the ornamentation of the eighth tergum, the presence of

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FIGURES 10–26.—*Wormaldia planae* Ross and King, male genitalia: 10, lateral; 11, dorsal. *Chimarra dominicana*, new species: 12, male genitalia, dorsal; 13, male genitalia, lateral; 14, aedeagus, lateral; 15, pupal mandible, anterior; 16, apex of larval frontoclypeus and mandibles, dorsal; 17, female genitalia, lateral. *C. caribea*, new species: 18, clasper, posteroventral; 19, male genitalia, lateral; 20, aedeagus, lateral; 21, female genitalia lateral. *C. antilliana*, new species: 22, apex of larval frontoclypeus and mandibles, dorsal; 23, pupal mandible anterior; 24, male genitalia, lateral; 25, clasper, posteroventral; 26, female genitalia, lateral.



two apical teeth on the ventral half of the tenth tergum, and the long apicomeral process of the clasper.

The larvae and pupae are attributed to this species on circumstantial evidence. Adults of two species of *Chimarra* have been taken on Dominica and the adults and larvae of *C. antilliana* have been definitely associated by means of metamorphotypes. By elimination, therefore, the larvae herein described must be those of *C. dominicana*.

**ADULT.**—Length of forewing 4 mm. Color fuscus, coxae and femora slightly paler. Vein M in hindwing with 2 branches. Male genitalia: eighth tergum with a broad mesal excision, lateral angles of which are developed into elongate points; ninth sternum with a short, terete apicomeral process; tenth tergum divided mesally, each side divided again into dorsal and ventral lobes; dorsal lobe rodlike, ventral lobe widened apically with two apicolateral teeth; cercus elongate; clasper slender and elongate, with a long apicomeral process; aedeagus (partially everted) with a pair of small dark apicoventral spines, and a longer pair of spines, a basal ring and rod with a pair of lateral wings. Female genitalia: eighth segment without anterolateral processes; posterior margin with a rounded lateral lobe bearing three large setae, ventral surface truncate; ninth tergum with a short anteroventral process, and a pair of dorsoapical lobes; bursa copulatrix consisting of several elongate sclerotized straps.

**LARVA.**—Length to 8 mm. Sclerites pale yellowish brown, posterior margin of pronotum black. Anterior margin of frontoclypeus with a slightly asymmetrical emargination that bears a short, pointed process centrally. Left mandible with a short pointed molar tooth, right mandible with a small molar area.

**PUPA.**—Length 5 mm. Mandibles with inner margin serrulate, with 2 large teeth. Apex of abdomen with a few bristly hairs.

**MATERIAL.**—Holotype, male: Dominica, .4 miles east Pont Casse, 6 May 1964, O. S. Flint, Jr., USNM type 69880. Allotype, female: 2.2 miles east of Pont Casse, 11 May 1964, O. S. Flint, Jr. Paratypes: Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 1♂4♀; same, but 8 Apr. 1964, 3♀; same, but 23 Apr. 1964, 1♂1♀; same, but 17 June 1964, 1♀; Pont Casse, .4 miles east, 21 Apr. 1964, O. S. Flint, Jr., 2♀; same, but 27 Apr. 1964, 5♂1♀; same, but 6 May 1964, 1♂5♀; same, but 23 June 1964, 2♀; Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr., 1♀; same, but 12 May 1964, 1♀; same, but 18 May 1964, 1♀; same, but 11 June 1964, 1♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 1♂; same, but 14 Apr. 1964, 1♀; Pont Casse, 27–30 Nov. 1964, P. J. Spangler, 1♀. Other: D'leau Gommier, 27 Apr. 1964, O. S. Flint, Jr., 4 larvae, 2 prepupae, 1 pupa.

**BIOLOGY.**—This species has been taken at elevations of around 2000 feet near Pont Casse and on the central divide. Larvae believed to be of this species were taken in a small, rapid stream on the underside of rocks in the bottom gravel.

*Chimarra antilliana*, new species

FIGURES 22-26

This species is clearly related to the following new species as is shown by the structure of the tenth tergum and aedeagus. It may be recognized by the more elongate, narrower clasper, which bears subapically a thin mesal shelf.

**ADULT.**—Length of forewing 4–5.5 mm. Color fuscus; coxae and femora pale brown. Vein M in hindwing with 3 branches. Male genitalia: eighth tergum unmodified; ninth sternum with a short terete apicomeral process; tenth tergum with a dorsomesal flaplike process, lateral lobe with a long straplike apicoventral process and a short apicodorsal one; cercus short, rounded; clasper elongate, straight, and barely widened basally in lateral aspect; in ventral aspect, bowed outwardly, with a narrow shelflike mesal projection subapically; aedeagus with 2 internal spines, a scabrous pouch with a darkened rounded lobe, and basal rod and ring. Female genitalia: eighth segment completely divided dorsomesally, with anterolateral processes, posterior margin with a few large setae; ninth tergum with long anterolateral processes; bursa copulatrix consisting of a heavily sclerotized ring basally, and apically of a nearly vertical plate capped dorsally by a hoodlike structure.

**LARVAE.**—Length to 9 mm. Sclerites yellowish brown, posterior margin of pronotum black. Anterior margin of frontoclypeus asymmetrically emarginate. Left mandible with enlarged molar area and blunt tooth, right mandible with arcuate molar area and basal tooth.

**PUPA.**—Length 4–5-mm. Mandibles with inner margin serrulate, with a large subapical, bifid tooth.

**MATERIAL.**—Holotype, male: Dominica, Mannett Gutter, near Clarke Hall, 4 April 1964, O. S. Flint, Jr. USNM Type 69881. Allotype, female: same data. Paratypes: same data, 4♂; same, but 10 Mar. 1965, W. W. Wirth, 1♂; Clarke Hall, 11–20 Jan. 1965, W. W. Wirth, 1♂; same, but 18–19 Jan. 1965, J. F. G. Clarke, 2♀; same, but 27 Jan. 1965, 1♀; same, but 1–10 Feb. 1965, W. W. Wirth, 1♂; same, but 10 Feb. 1965, J. F. G. Clarke, 1♂; same, but 11–20 Feb. 1965, W. W. Wirth, 1♀; same, but 21–28 Feb. 1965, 1♂; same, but 21–31 Mar. 1965, 3♂ 4♀; same, but 31 Mar. 1965, D. R. Davis, 1♂; same, but 1 June 1964, O. S. Flint, Jr., 1♂; same, but 9 June 1964, 1♀; same, but 3–8 Oct. 1964, P. J. Spangler, 1♀; same, but 1–7 Dec. 1964, 1♂ 5♀; Fond Figue, 23 Jan. 1965, W. W. Wirth, 1♀; same, but 9–13 Mar. 1965, 17♂ 16♀; same, but 16–17 Mar. 1964, D. F. Bray, 2♂ 5♀; same, but 6 Apr. 1964, O. S. Flint, Jr., 60♂ 63♀; same, but 7 May 1964, 7♂, 44♀; same, but 1 May 1965, D. R. Davis, 1♂ 2♀; same, but 10 June 1964, O. S. Flint, Jr., 42♂ 221♀; same, but 1 Dec. 1964, P. J. Spangler, 1♀; Pagua Bay, 19 Nov. 1964, P. J. Spangler, 1♂; Cabrit Swamp, 3 Nov. 1964, P. J. Spangler, 1♀; Clarke Hall, 1 mile east, 4 Apr. 1965, D. R. Davis, 13♂ 2♀; same, but 19 Apr. 1965, 5♂ 2♀; same, but 22 May 1965, 4♂; Layou Valley (upper bridge), 22–25 July 1963, O. S. Flint, Jr., 8♂; Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 1♂; Mahaut, Oct. 1966, E. L. Todd,

1 ♂; Syndicate Estate, 5 Mar. 1964, D. F. Bray, 1 ♀; Pont Casse, 12 Jan. 1965, J. F. G. Clarke, 1 ♀; Pont Casse, 2.5 miles north, 8 Apr. 1965, D. R. Davis, 8 ♀; Pont Casse, 3.5 miles north, 5 Dec. 1964, P. J. Spangler, 2 ♂ 104 ♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 5 ♂ 1 ♀; same, but 2 May 1964, 7 ♂ 2 ♀; same, but 7 May 1964, 4 ♂ 3 ♀; same, but 11 May 1964, 1 ♂ 4 ♀; same, but 6 June 1964, 8 ♂ 1 ♀; same, but 19 June 1964, 2 ♀; Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr., 1 ♀; same, but 10 May 1964, 4 ♂ 5 ♀; same, but 12 May 1964, 3 ♂ 13 ♀; same, but 18 May 1964, 2 ♀; same, but 11 June 1964, 1 ♂ 1 ♀; Pont Casse, .4 mile east, 27 Apr. 1964, O. S. Flint, Jr., 1 ♀; Pont Casse, .5 mile south, 8 Apr. 1964, O. S. Flint, Jr., 3 ♂ 3 ♀; same, but 11 Apr. 1964, 2 ♂ 3 ♀; same, but 17 June 1964, 2 ♀; same, but 22–24 July 1963, 16 ♂ 3 ♀; Pont Casse, 1.6 miles west, 28 Apr. 1964, O. S. Flint, Jr., 3 ♂; same, but 16 June 1964, 1 ♂ 4 ♀; Pont Casse, 3 miles east, 13–16 Oct. 1966, A. B. Gurney, 1 ♀; same, but 23 Oct. 1966, E. L. Todd, 1 ♂ 9 ♀; same, but 26 Oct. 1966, 1 ♀; La Ronde River, 15 Feb. 1964, H. Robinson, 1 ♀; Trafalgar, 21 May 1965, D. R. Davis, 2 ♂ 1 ♀; La Plaine, 23 Nov. 1964, P. J. Spangler, 1 ♀. ST. LUCIA: Vergallier River near Marquis, 31 July 1963, Flint and Cadet, 2 ♀; same, but 2 Aug. 1963, 1 ♀; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 21 ♂ 15 ♀. Other: DOMINICA: Roseau River, swift water, 16 June 1911, 12 larvae; Springfield River, Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 8 larvae, 3 prepupae, 2 pupae, 1 ♂ 1 ♀ metamorphotypes; Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., 5 larvae; same, but 15 June 1964, 1 pupa, 1 ♂ metamorphotype; Pont Casse, .5 mile south, 22–24 July 1963, O. S. Flint, Jr., 1 larva, 1 prepupa, 3 pupae; Rosalie, 30 Nov. 1964, P. J. Spangler, 1 larva, 2 prepupae; Belfast River, .75 mile above mouth, 31 Jan. 1964, H. H. Hobbs, Jr., 11 larvae; Batali River, north of Salisbury, 21 Feb. 1964, R. Zusi and H. H. Hobbs, Jr., 1 larva; Espagnole River, cascades on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 1 larva; Fond Figes, 1 Dec. 1964, P. J. Spangler, 2 larvae, 3 pupae, 3 ♂ metamorphotypes; Deux Branches, 30 Nov. 1964, P. J. Spangler, 2 larvae, 1 ♀ metamorphotype; Pagua Bay, 19 Nov. 1964, P. J. Spangler, 2 larvae. ST. LUCIA: Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 8 larvae, 1 prepupa, 1 pupa, 3 ♂ metamorphotypes; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 12 larvae, 2 pupae, 1 ♀ metamorphotype.

**BIOLOGY.**—This species is one of the most frequently encountered Trichoptera on Dominica and St. Lucia. It has been taken in the larger lowland rivers and the small tumbling mountain brooks. The immature stages were taken under stones in the fast water of riffles and cascades.

*Chimarra caribea*, new species

FIGURES 18–21

This species appears to be the same as the one I have from the island of Trinidad and to be extremely close to *C. duckworthi* Flint from Costa Rica. The differences from the latter species lie in the narrower lateral lobes of the tenth tergites and the slightly more elongate clasper with a prominent thumblike apicomeral lobe in *C. caribea*. Additional material from Venezuela and Colombia may show these differences to be clinal, but for the present I consider them specifically distinct. *Chimarra antilliana* is also related, but very distinct in the shape of both the clasper and the tenth tergum.

ADULT.—Length of forewing 4.5–5 mm. Color fuscus; coxae and femora yellowish brown. Vein M of hindwings 3 branched. Male genitalia: ninth sternum with an elongate, terete, apicomesal process; tenth tergum with a dorsomesal flaplike lobe, lateral lobe with a darkened slightly protruding area at midlength bearing sensillae, ventrally with a pair of straplike sclerites articulating beneath aedeagus; clasper elongate, enlarged basoventrally, apex enlarged, curved mesally, with a thumblike, subapical projection; aedeagus with a spine-like apicoventral lip, a scabrous sac with darkened pouch, two spines, and ring and rod. Female genitalia: eighth segment divided dorsomesally, with anterolateral processes, posterior margin with a few enlarged setae; ninth tergum with very long anterolateral processes; bursa copulatrix with a basal ring, elongate ventral plates, and a dorsal hoodlike structure.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: Grenada, 2 miles west of Lake Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., USNM Type 69882. Allotype, female: same data. Paratypes: same data, 14 ♂ 3 ♀. Other: Trinidad, Simla, Arima Valley, 9–12 Feb. 1966, S. S. and W. D. Duckworth, 6 ♂; same, but 13–19 Feb. 1966, 11 ♂; same, but 20–26 Feb. 1966, 6 ♂.

BIOLOGY.—The adults were collected on Grenada beside a small (3 feet wide by 3–6 inches deep) tumbling, mountain brook. It is assumed that the larvae were living in the same stream although none were found.

### Family PSYCHOMYIIDAE

The psychomyiids are found throughout the world. Although most species breed in flowing water, there are a number that breed in lentic situations. The genera *Xiphocentron*, *Cernotina*, and *Polycentropus* are found throughout the Antilles although the species of the latter genus on the Greater Antilles are not closely related to the Lesser Antillean species. The West Indian endemic genus *Antillopsyche* is limited to the Greater Antilles, but the widespread genus *Polyplectropus* has not been found on these islands.

The immature stages of most genera make flimsy silken nets to trap their prey although certain others make long silken tubes affixed to the substrate. The pupae are generally sheltered in a domelike case of silk and sand.

### Key to Genera

#### LARVAE

1. Tibia and tarsus fused; a broad flat process extending anteriorly from the mesopleuron . . . . . **Xiphocentron**
- Tibia and tarsus not fused; no process from mesopleuron . . . . . 2
2. Mandibles with dorsal row of teeth overhanging ventral row . . . . . 3
- Mandibles with dorsal row not overhanging ventral row . . . **Polycentropus**

3. Head with dark muscle scars; anal claw with large ventral teeth.

**Polypectropus**

Head uniformly pale; anal claw without ventral teeth . . . . . **Cernotina**

PUPAE

1. Tip of mandible hooked; apical process with 4 setae . . . . . **Xiphocentron**

Tip of mandible not hooked; apical process with many setae . . . . . 2

2. Apical process with about 10 setae; gills absent . . . . . **Cernotina**

Apical process with many more than 10 setae; gills present . . . **Polycentropus**

ADULTS

1. Foreleg with preapical spur . . . . . 2

Foreleg without preapical spur . . . . . 3

2. Hindwing with  $R_2$  and  $R_3$  fused to wing margin . . . . . **Polypectropus**

Hindwing with  $R_2$  separating from  $R_3$  before wing margin . . . **Polycentropus**

3. Anterior scutal warts of mesonotum delimited by a distinct lateral suture;

general color black . . . . . **Xiphocentron**

Anterior scutal warts without lateral sutures; general color yellowish.

**Cernotina**

### Genus *Xiphocentron* Brauer

*Xiphocentron* Brauer, 1870, p. 66. [Type-species: *Xiphocentron bilimeki* Brauer, 1870, by monotypy.]

Species of the genus are found from southwestern United States south through South America. All the Antillean islands intensively collected for Trichoptera have proven to support one or two species.

The immature stages were described by Edwards (1961) and Flint (1964b). The adults of the genus are generally diurnal and rarely attracted to lights, which accounts in part for their scarcity in collections.

#### Key to Species

ADULTS

Color totally black . . . . . **X. fuscum**

Color black, with a line of white hairs along the posterior margin of the forewings.

**X. albolineatum**

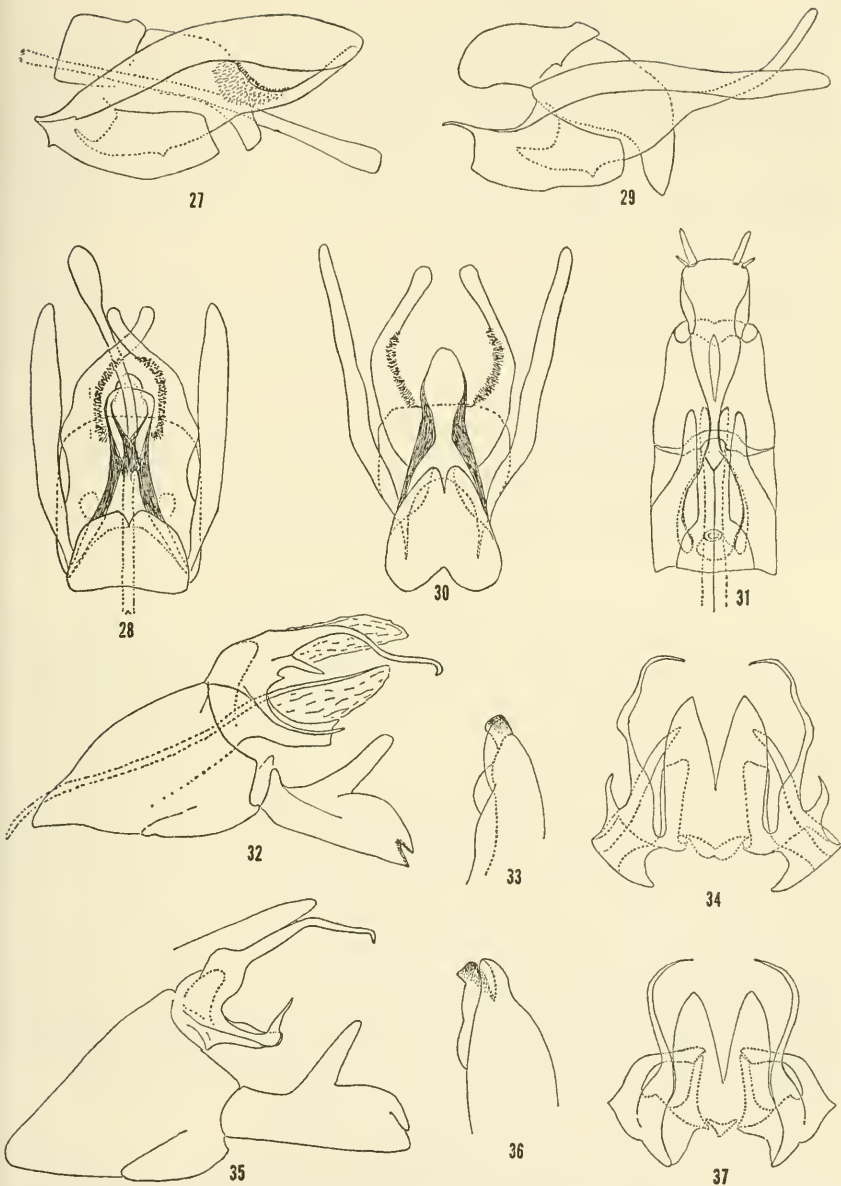
#### *Xiphocentron fuscum*, new species

FIGURES 27, 28

The species seems to be closest to *X. borinquensis* Flint from Puerto Rico. From this it differs in the apically widened cerci, much shortened anterior process of the ninth sternum, and differently shaped mesal lobes of the ninth tergum.

ADULT.—Length of forewing 3.4–4 mm. Color fuscus, coxae and femora pale brown, hairs on face ventrad of antennae pale brown. Apical spur of hindleg in male about  $\frac{1}{2}$  length of basal tarsal segment. Male genitalia: ninth sternum with anterolateral process short and blunt, posterior margin truncate; ninth tergum rectangular in lateral aspect, posterior margin with a V-shaped mesal incision; tenth





FIGURES 27-37.—*Xiphocentron fuscum*, new species, male genitalia: 27, lateral; 28, dorsal. *X. albolineatum*, new species, male genitalia: 29, lateral; 30, dorsal. *Cernotina lutea*, new species: 31, female genitalia, ventral; 32, male genitalia, lateral; 33, apex of clasper, ventral; 34, male tenth terga and cerci, dorsal. *C. cadeti*, new species, male: 35, genitalia, lateral; 36, tip of clasper, ventral; 37, tenth terga and cerci, dorsal.

tergum sclerotized laterally, tip decurved; cercus about 10 times as long as broad, widened subapically; clasper with apical portion narrow and sharply curved dorsomesally, mesally with many dark spicules; aedeagus very long, slightly enlarged apically. Female genitalia: eighth segment divided dorsally with long anterolateral processes; ninth segment long and slender with long anterolateral processes; apex of tenth segment with a pair of slender papillae.

LARVA AND PUPA.—See *Xiphocentron* species.

MATERIAL.—Holotype, male: Dominica, Brantridge, 9 May 1964, O. S. Flint, Jr., USNM type 69883. Allotype, female: same data. Paratypes: same data, 5 ♂; same, but 30 April 1964, 12 ♂; Pont Casse, .4 miles east, 7–8 May 1964, O. S. Flint, Jr., 19 ♂; Pont Casse, 2.5 miles east, 16 Jan. 1965, W. W. Wirth, 1 ♂; Pont Casse, 1.5 miles north, 12 Feb. 1965, W. W. Wirth, 1 ♂.

BIOLOGY.—Apparently this species is limited to the higher elevations on the island of Dominica. I have swept them in numbers from rocks in nearly dry streambeds around Pont Casse.

#### *Xiphocentron albolineatum*, new species

FIGURES 29, 30

This is a species closely related to the preceding, from which it differs in possessing a line of white hairs along the posterior margin of the forewings and mesally on the head. The male genitalia differ most noticeably in the narrower clasper and the more elongate dorsomesal lobes of the ninth tergum.

ADULT.—Length of forewing 3–4 mm. Color fuscus, coxae and femora slightly paler, posterior margin of forewing, pro- and mesonota, and head mesally with a band of whitish hairs. Apical spur of hind tibia of male about  $\frac{1}{2}$  as long as basal tarsal segment. Male genitalia: ninth sternum with anterolateral process long and attenuate; ninth tergum rounded basally, with dorsomesal lobes slightly elongate; tenth tergum with tip sharply decurved; cercus slender, narrowing apically, about 12 times as long as broad; apex of clasper slender, sharply curved dorsomesad, mesal surface with elongate spiculate patch. Female genitalia: identical to that of preceding species.

LARVA AND PUPA.—See *Xiphocentron* species.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.7 miles east, 12 March 1965, W. W. Wirth, USNM type 69884. Allotype, female: near Clarke Hall, 13 Feb. 1964, D. F. Bray. Paratypes: Pont Casse, 12 Oct. 1964, P. J. Spangler, 1 ♀; Mannett Gutter, 7 March 1965, W. W. Wirth, 1 ♀.

BIOLOGY.—This species is known only from Dominica but appears to be more widespread on the island than the preceding. It undoubtedly has a slightly different habitat preference, which unfortunately is unknown.

*Xiphocentron* species

I list here the immature stages of this genus that I have collected on the Lesser Antillean islands. Characters have not been found that will serve to separate the larvae of the various species; therefore, they are all listed together and described as a unit.

LARVA.—Length to 8 mm. Sclerites pale yellow, oral margin of head capsule darker. Structure apparently identical to other described species.

PUPA.—Unknown.

CASE.—A long silken tube attached to the substrate, generally a rock, often in great numbers crisscrossing the rocks both above and below the water line.

MATERIAL.—Dominica, Pont Casse, .5 miles south, 22-24 July 1963, O. S. Flint, Jr., 4 larvae; same, but 15 June 1964, 1 larva. Springfield Estate, .5 miles east, 21 July 1963, O. S. Flint, Jr., 1 larva. Pont Casse, 2.2 miles east, 15 June 1964, O. S. Flint, Jr., 2 larvae. Fond Figue, 6 April 1964, O. S. Flint, Jr., 2 larvae. Mannett Gutter, 23 April 1964, O. S. Flint, Jr., 2 larvae. St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, 2 larvae.

Genus *Cernotina* Ross

*Cernotina* Ross, 1938, p. 136. [Type-species: *Cernotina calcea* Ross, 1938, by original designation.]

The genus is widely distributed in North and Central America and in the Greater Antilles.

The immature stages of the genus still have not definitely been correlated with the adult. It seems probable, however, that the larvae and pupae described by Flint (1964b) from Puerto Rico as an unknown Polycentropodinae belong to a species of this genus.

## Key to Species

## ADULTS

Ventrolateral lobe of cercus of male with tip bent sharply dorsomesad . . . . . *C. cadeti*  
 Ventrolateral lobe of cercus spinelike . . . . . *C. lutea*

*Cernotina lutea* new species

## FIGURES 31-34

*Cernotina lutea* is a member of the *calcea* section of the genus closest to *C. ohio* Ross. From this species it differs in the elongate mesal lobe and in the long ventrolateral spines of the cerci.

ADULT.—Length of forewing 3.5-4 mm. Color yellowish brown, a slightly paler band of hairs mesally on head and thorax. Male genitalia: ninth segment expanded basoventrally; tenth tergites elongate, conical,

and semimembranous; cercus developed dorsally into a long slender, mesally curving process that bears on outer surface near base a short tooth and ventrolaterally a long curving spine; mesoventrally developed into an elongate quadrate plate; clasper with prominent dorsal arm, tip bifid; aedeagus semimembranous, with a heavily sclerotized dorsomesal rod. Female genitalia: lateral lobes of eighth sternum elongate and slender; dorsally with a transverse sclerite between ninth and tenth segments; bursa copulatrix with an elongate ventral plate and a ringlike sclerite between dorsolateral rods.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr., USNM Type 69885. Allotype, female: same data. Paratypes: same, but 10 May 1964, 1 ♀; Pont Casse, .4 miles east, 15 June 1964, O. S. Flint, Jr., 1 ♀; same, but 23 June 1964, 2 ♂ 1 ♀; Brantridge, 30 April 1964, O. S. Flint, Jr., 1 ♀; Cabrit Swamp, 23 Feb. 1965, W. W. Wirth, 1 ♂.

BIOLOGY.—The adults have generally been taken near small streams at higher elevations on the island of Dominica. Presumably the larvae will be found in these streams. The one specimen from Cabrit Swamp probably represents an individual that wandered considerably from its breeding site.

*Cernotina cadeti*, new species

FIGURES 35-37

As to be expected, this species is clearly related to the preceding. It may be recognized by the lack of external teeth, by the more sharply angulate ventral spine of the cerci, and by the more mesally displaced dorsal plate at the tip of the clasper.

ADULT.—Length of forewing 3 mm. Color in alcohol, uniformly pale brown. Male genitalia: ninth segment considerably expanded basoventrally; tenth tergites conical, semimembranous; cercus developed into a long curving dorsal process and a ventrolateral spine whose tip is sharply angulate dorsomesad; mesoventral process elongate, rod-like; clasper with a dorsal arm; tip bifid, with dorsal plate displaced mesally; aedeagus semimembranous, with a long dorsomesal sclerite.

LARVA AND PUPA.—Unknown.

MATERIAL.—Holotype, male: St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, USNM Type 69886.

BIOLOGY.—The specimen was taken at a light near a slowly flowing stream about a yard wide, in which the larva probably developed.

Genus *Polyplectropus* Ulmer

*Polyplectropus* Ulmer, 1905, p. 103. [Type-species: *Polyplectropus flavicornis* Ulmer, 1905, by monotypy.]

*Ecnomodes* Ulmer, 1911, p. 17. [New synonymy. Type-species: *Ecnomodes buchwaldi* Ulmer, 1911, by monotypy.]

*Cordillopsyche* Banks, 1913, p. 238. [Type-species: *Cordillopsyche costalis* Banks, 1913, by monotypy.]

*Ecnomodellina* Ulmer, 1962, p. 5. [Replacement name for *Ecnomodes* Ulmer 1911. New synonymy.]

Genus C Flint, 1964a, p. 476.

Species from tropical America, Africa, and the Orient have been placed in this genus; however, I expect that many of those from the Old World are not truly congeneric. On the basis of adult morphology, the genus is close to *Polycentropus*; indeed, most North American workers have not recognized the two as distinct.

The adults of this genus may be recognized by the fusion of  $R_2$  and  $R_3$  in the hindwing and generally by the division of the clasper in the male into distinct dorsolateral and ventromesal lobes. The larvae have the mandibles with the dorsal row of teeth overhanging the ventral row, the tibia and tarsus of the fore- and midlegs have a row of enlarged and generally black setae on the posterior face, and the anal claw bears several long teeth ventrally.

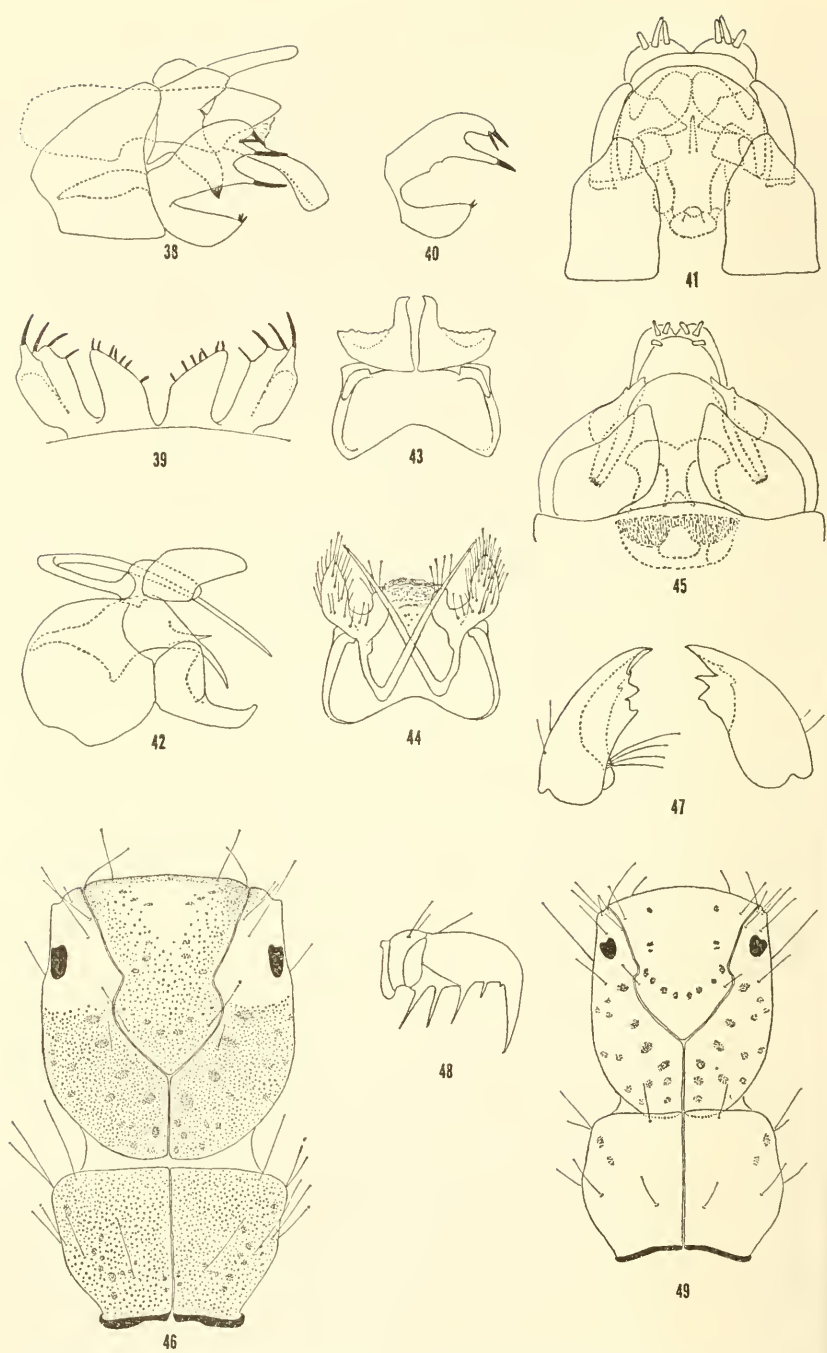
I have already synonymized the genus *Cordillopsyche* (Flint, 1967), and am here synonymizing *Ecnomodellina* (= *Ecnomodes*) Ulmer with *Polyplectropus* Ulmer. The original description of *E. buchwaldi* leaves little doubt that it is a typical species of *Polyplectropus*. The following New World species, mostly described in *Polycentropus*, must be transferred to *Polyplectropus* (all new combinations): *Ecnomodes buchwaldi* Ulmer, *Polycentropus charlesi* Ross, *P. santiago* Ross, *P. thilus* Denning, *P. alleni* Yamamoto, *P. altmani* Yam., *P. deltoides* Yam., *P. elongatus* Yam., *P. laminatus* Yam., *P. robacki* Yam., *P. recurvatus* Yam.

#### *Polyplectropus bredini*, new species

FIGURES 38-41, 47-49

This species seems quite unrelated to any other known species although there may be a slight relationship to *P. charlesi* (Ross). From this species it is easily distinguished by the more distinctly bipartite clasper that bears large black spines. The species is named for Mr. J. Bruce Bredin, a cosponsor of the Dominica Survey.

The relationship of the island populations is very close, but slight differences do exist. The males from St. Lucia have only three dark setae on the dorsal lobe of the clasper; the other dark seta on the Dominican specimens is pale. The Grenadan male (fig. 40) also has only three dark setae, but the ventralmost one is on an elongate process. Considering, the overall similarity however, I am considering these all one species.



FIGURES 38-49.—*Polyplectropus bredini*, new species: 38, male genitalia, lateral; 39, claspers, ventral; 40, clasper of Grenadan specimen, lateral; 41, female genitalia, ventral. *Polycentropus insularis* Banks: 42, male genitalia, lateral; 43, male genitalia, ventral; 44, tentin terga and cerci, dorsal; 45, female genitalia, ventral; 46, larval head and pronotum, dorsal. *Polyplectropus bredini*, new species, larva: 47, mandibles, dorsal; 48, anal claw, lateral; 49, head and pronotum, dorsal.

**ADULT.**—Length of forewing 5–5.5 mm. Color light brown, with whiter hairs middorsally, anterior margin of forewing dark brown. Male genitalia: ninth sternum moderately rounded basally; tenth tergites developed as long terete processes; cercus with a rounded dorsolateral lobe, posteroventrally developed into a sharp point; clasper divided into a thin, concave upper lobe bearing 4 short, broad, black setae, generally on elongate bases; basal lobe scooplike with a distal row of short dark setae; aedeagus with apicoventral portion developed into an elongate, narrow, hoodlike process. Female genitalia: lateral lobes of eighth sternum broad; subgenital plate produced and rounded apically; bursa copulatrix with a complex of sclerites apically, and a donut-shaped mesal structure.

**LARVA.**—Length to 8 mm. Head and pronotum pale brown with conspicuous dark muscle scars. Labrum, maxillolabium, and legs as illustrated by Flint (1964a, fig. 4). Mandibles with dorsal row of teeth overhanging ventral row. Basal segment of anal proleg with a few short setae mesally; claw with 3 long and 1 short ventral teeth, apex curved at right angles.

**PUPA.**—Unknown.

**MATERIAL.**—Holotype, male: Dominica, Pont Casse, 1.3 miles east, 29 Apr. 1964, O. S. Flint, Jr. USNM Type 69887. Allotype, female: Syndicate Estate, 5 March 1964, D. F. Bray. Paratypes: same as holotype, but 11 June 1964, 1 ♂; same, but 12 May 1964, 1 ♂; Fond Figuees, 13 March 1965, W. W. Wirth, 1 ♂; D'leau Gommier, 24 Feb. 1965, J. F. G. Clarke, 5 ♀. Other: Grenada, 2 miles west Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., 1 ♂. St. Lucia, Cul de Sac River, at mile post 9, 29 July 1963, Flint and Cadet, 1 ♂; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 1 ♂, 8 larvae.

**BIOLOGY.**—The adults generally have been collected near small streams. The larvae were taken on St. Lucia in a stream only a few feet wide by several inches deep. They were found under rocks near the head or tail ends of pools in the stream.

### Genus *Polycentropus* Curtis

*Polycentropus* Curtis, 1835, pl. 544. [Type-species: *Polycentropus irroratus* Curtis, 1835, by original designation.]

*Polycentropus*, as it is presently recognized by most North American workers, is found over most of the world; however, it seems to be best developed in the Northern Hemisphere. There is at least one species on all the Antillean islands.

The larvae of the genus are well known and described. They build various types of silken trap nets.

*Polycentropus insularis* Banks

FIGURES 42-46

*Polycentropus insularis* Banks, 1938, p. 302.—Fischer, 1962, p. 83.—Flint, 1967, p. 6.

*Polycentropus insularis* was described from Grenada, but the specimens collected on Dominica do not seem to differ significantly from the type. The species is rather distantly related to the other species of Antillean *Polycentropus*. From these it may be recognized by the lack of dorsomesal process on the clasper and the elongate ventromesal lip of the aedeagus.

ADULT.—Length of forewing 7-8 mm. Brown, body and wings flecked with spots of golden hair. Male genitalia: ninth segment rounded in lateral aspect; cercus divided into a dorsolateral ovate lobe bearing a smaller mesal lobe, and a long, angled, pointed process; clasper with a rounded dorsolateral lobe, and an elongate ventromesal section; aedeagus with a long pointed ventromesal lip. Female genitalia: lateral lobes slightly elongate, directed apicomesally; subgenital plate rounded apically; bursa copulatrix complex, with a heavily sclerotized basal plate and lateral supports.

LARVA.—Length to 12 mm. Sclerites pale brownish, muscle scars conspicuously darker, head irregularly clouded with darker brown. Structure typical of other West Indian species.

PUPA.—Unknown.

MATERIAL.—Holotype, male: Grenada, Grand Etang, Sept. 1910, Allen and Brues, collection MCZ. Other: Dominica, Pont Casse, .5 miles south, 22-24 July 1963, O. S. Flint, Jr., 1 ♂, 1 larva; Pont Casse, .4 miles east, 21 April 1964, O. S. Flint, Jr., 1 ♀; same, but 27 April 1964, 1 ♂; same, but 6 May 1964, 3 ♀; same, but 16 May 1964, 1 ♀; same, but 12 June 1964, 1 larva; same, but 23 June 1964, 1 ♂; Pont Casse, 1 mile east, T. M. and J. F. G. Clarke, 2 ♂; Pont Casse, 1.3 miles east, 29 April 1964, O. S. Flint, Jr., 1 ♀; same, but 10 May 1964, 1 ♀; same, but 18 May 1964, 1 ♀; same, but 26 May 1964, 1 ♂; same, but 11 June 1964, 1 ♂ 1 ♀; Pont Casse, 2.2 miles east, 1 May 1964, O. S. Flint, Jr., 1 ♂; Pont Casse, 3 miles east, 15 Oct. 1966, E. L. Todd, 1 ♀; Sylvania Estate, 28 Jan. 1965, T. M. and J. F. G. Clarke, 1 ♀; Boeri Lake, 22 Feb. 1964, D. F. Bray, 2 ♂; Freshwater Lake, 13 Oct. 1964, P. J. Spangler, 1 larva.

BIOLOGY.—The species has been taken only at higher elevations on the islands. Larvae were found sparingly in small streams. The two adults taken at Boeri Lake and the larva from Freshwater Lake indicate that the species may breed in high elevation lakes as well.

## Family HYDROPSYCHIDAE

The Hydropsychidae are a very common and widely distributed family, breeding in flowing waters throughout the world. Representatives of two subfamilies, the Macronematinae and Hydropsychinae,



have been found on the Antilles. *Leptonema* and *Smicridea*, respectively, are the representatives throughout the Antilles, but *Macronema* and *Hydropsyche* are found only on the Greater Antilles.

The larvae construct a complex silken trap-net to strain their food from the water. The trap-net is attached to a tubular retreat in some crevice of the substrate. At pupation time a domelike shelter is constructed of silk with included sand or organic matter.

### Key to Genera

#### LARVAE

Gills consisting of a long central stalk giving rise to many lateral filaments. . . . . *Leptonema*  
 Gills branching into filaments near base . . . . . *Smicridea*

#### PUPAE

Hook-plate present posteriorly on segment 3 only . . . . . *Leptonema*  
 Hook-plates present posteriorly on segments 3 and 4 . . . . . *Smicridea*

#### ADULTS

Antennae at least twice as long as wing; large and pale green . . . . . *Leptonema*  
 Antennae subequal to forewings; small and dark . . . . . *Smicridea*

### Genus *Smicridea* McLachlan

*Smicridea* McLachlan, 1871, p. 134. [Type-species: *Smicridca fasciatella* McLachlan, 1871, by designation of Milne, 1936.]

*Smicridea* is a genus of many species found from the southwestern United States to the southern tip of South America and Australia. All of the Antillean islands support at least one species. The larvae and pupae have been described on several occasions (Ross 1944, Flint 1964b).

### Key to Species

#### PUPAE

Hook-plate 3P equidimensional with 3 long hooks . . . . . *S. cariba*  
 Hook-plate 3P nearly twice as wide as long, with 5 hooks . . . . . *S. simmonsii*

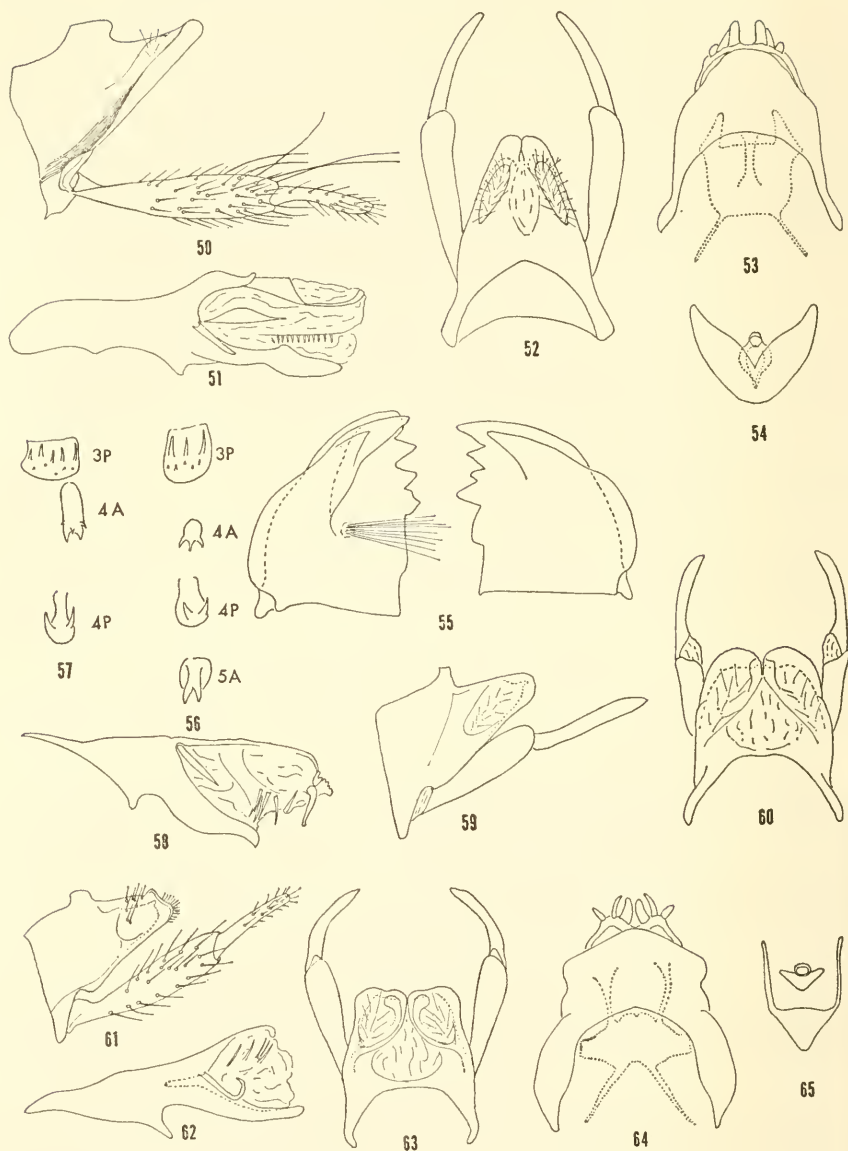
#### ADULTS

1. Forewing black with 2 transverse bands of white setae . . . . . 2  
    Forewing uniformly grayish . . . . . *S. grenadensis*
2. Tenth tergite short and broad, aedeagus without lateral plate . . . *S. simmonsii*  
    Tenth tergite long and narrow, aedeagus with lateral plate . . . *S. cariba*

### *Smicridea cariba*, new species

#### FIGURES 50-56

This species, found on Dominica, is most closely related to the following species from St. Lucia. It differs strikingly in the structure of the tenth tergite and aedeagus.



FIGURES 50-65.—*Smicridea caribea*, new species: 50, male genitalia, lateral; 51, aedeagus, lateral; 52, male genitalia, dorsal; 53, female genitalia, dorsal; 54, bursa copulatrix, dorsal; 55, larval mandibles, dorsal; 56, pupal hook-plates, dorsal. *S. simmonsii*, new species: 57, pupal hook-plates, dorsal; 58, aedeagus, lateral; 59, male genitalia, lateral; 60, male genitalia, dorsal. *S. grenadensis*, new species: 61, male genitalia, lateral; 62, aedeagus, lateral; 63, male genitalia, dorsal; 64, female genitalia, dorsal; 65, bursa copulatrix, dorsal.

ADULT.—Length of forewing 4–5 mm. Color fuscus, leg bases slightly paler, forewing with a transverse band of iridescent white hair at level of anastomosis and another halfway to wing base, apical fringe white. Sixth and seventh segments of male with internal reticulate sacs. Male genitalia: ninth segment with anterior margin angulate at middle; tenth tergite elongate, rounded apically, with lateral margin heavily sclerotized; clasper widening uniformly to apex of basal segment, apical segment terete; aedeagus large and complex, apicoventrally heavily sclerotized and scooplike, a ventrally directed spine laterally at midlength, a short dorsal hood, a flat lateral plate in apical membrane that bears 2 rows of short spines and an apicodorsal angulate rod. Female genitalia: lobes of eighth sternum slightly longer than broad, evenly rounded apically; ninth segment without clasper groove or receptacle, with anterolateral angle greatly enlarged; internal plate with a quadrate central section bearing short apical arms and a pair of long basal arms; bursa copulatrix with a central ring and broad basolateral wing-like supports.

LARVA.—Length to 7 mm. Sclerites brownish. Each gill on basal abdominal segments with 3–4 filaments. Abdomen with many short, broad, black setae.

PUPA.—Length 4–5 mm. Right mandible with 3 inner teeth, left with 4. Hook-plates anteriorly on segments 2–8, posteriorly on 3 and 4; posterior plates about equidimensional, anterior plates with 2–3 teeth, apex of posterior plates considerably elevated above body. Apical processes widely separated, with a brush of setae on apical third.

MATERIAL.—Holotype, male: Dominica, Pont Casse, 2.2 miles east, 2 May 1964, O. S. Flint, Jr., USNM Type 69388. Allotype, female: same data. Paratypes: same data, 8♂ 4♀; same, but 14 April 1964, 1♂; same, but 1 May 1964, 7♂ 3♀; same, but 7 May 1964, 1♂ 5♀; same, but 11 May 1964, 1♂; same, but 21 May 1964, 1♀; Pont Casse, 1.3 miles east, 10 May 1964, O. S. Flint, Jr., 2♂ 1♀; same, but 12 May 1964, 6♂ 1♀; same, but 18 May 1964, 1♀; same, but 11 June 1964, 1♀; Pont Casse, .4 miles east, 21 April 1964, O. S. Flint, Jr., 1♂; same, but 27 April 1964, 2♂; same, but 6 May 1964, 4♂ 1♀; same, but 7 May 1964, 1♂; same, but 15 June 1964, 1♂; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 2♂ 1♀; Sylvania, 9 Feb. 1964, D. F. Bray, 1♂; Trafalgar Falls, 15 March 1964, O. S. Flint, Jr., 1♂ 1♀; Fond Figes, 23 Jan. 1965, W. W. Wirth, 1♀; D'leau Gommier, 15 Feb. 1965, W. W. Wirth, 1♂. Other: Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., 8 larvae; Pont Casse, .4 miles east, 20 May 1964, O. S. Flint, Jr., 2 larvae; same, but 12 June 1964, 8 larvae; same, but 25 June 1964, 3 larvae, 1 prepupa, 1 pupa; Pont Casse, .5 miles south, 22–24 July 1963, O. S. Flint, Jr., 36 larvae, 2 prepupae, 16 pupae, 2♀ metamorphotypes; same, but 15 June 1964, 6 larvae, 4 pupae, 1♀ metamorphotype; D'leau Gommier, 27 April 1964, O. S. Flint, Jr., 5 larvae, 1 pupa; Springfield Estate, 20–26 July 1963, O. S. Flint, Jr., 1 larva, 1 pupa; Roseau River, swift water, 16 June 1911, 5 larvae; Espagnole River, cascades on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 1 larva; Boeri Lake, outlet, 10 Nov. 1964, P. J. Spangler, 4 larvae.

BIOLOGY.—The species is most abundant around the small, tumbling mountain brooks; however, the collection of larvae in the Roseau River suggests that they breed sparingly in the large lowland rivers as well.

*Smicridea simmonsii*, new species

FIGURES 57-60

This species appears to be most closely related on the basis of male genitalia to *S. grenadensis*, although in coloration it is apparently the same as *S. cariba*. From *S. grenadensis* it may be separated by the more evenly rounded apices of the tenth tergites, by the straight lateral process of the aedeagus, and by the very long apical segment of the clasper,

ADULT.—Length of body 4.5 mm, forewing probably about 5 mm. Wing dark with a transverse white band at region of anastomosis, apparently some white obliquely along the base of Cu. Sixth and seventh abdominal segments of male with internal reticulate sacs. Male genitalia: ninth segment with a pronounced dorsolateral angle; tenth tergite short, broad, apex rounded; basal segment of clasper short, apical segment subequal in length; aedeagus with well-developed ventral scoop, lateral spine straight, no lateral plate, dorsal hood semimembranous, membranous portion with about 6 pairs of long spines, apex with a crenulate crescentic hood above an elongate U-shaped sclerite.

LARVA.—Length to 7 mm. No differences found from the larva of *cariba*.

PUPA.—Length 4.5 mm. As in *S. cariba*, except hook-plate 3P almost twice as wide as long and with 5 hooks.

MATERIAL.—Holotype, pharate male: St. Lucia, Vergallier River, near Marquis, 31 July 1963, Flint and Cadet, USNM Type 69889. Other: same data, 22 larvae, 1 pupa; Grand Riviere du Mabouya, 29 July 1963, Flint and Cadet, 1 larva; Cul de Sac River at mile post 9, 29 July 1963, Flint and Cadet, 2 larvae, 1 prepupa, 1 pupa; R. Galet, south of Dennery, 1 Aug. 1963, Flint and Cadet, 32 larvae, 1 prepupa, 3 pupae.

BIOLOGY.—The larvae of this species are most abundant in the small clear streams on the island of St. Lucia, but they are also found in the larger rivers in smaller numbers.

*Smicridea grenadensis*, new species

FIGURES 61-65

This species, known only from Grenada, is most closely related to *S. simmonsii* of St. Lucia; however, it is nearly unicolorous, and and in the male the tenth tergite bears a distinct anteapical bulge,

the basal segment of the clasper is longer, and the lateral spine of the aedeagus is hooked.

**ADULT.**—Length of forewing 4–4.5 mm. Color uniform grayish brown. Males with two pairs of ovoid internal sacs in abdominal segments 6 and 7. Male genitalia: ninth segment with pronounced dorsolateral angle; tenth tergite short, blunt, with anteapical dorsal bump; clasper with apical segment about half as long as basal segment; aedeagus with a strong ventral scoop, lateral spine hook-shaped, membranous portion with about 6 pairs of long spines. Female genitalia: lobes of eighth sternum slightly longer than broad, produced apicomesally; ninth segment without clasper groove or receptacle, greatly produced anterolaterally; internal plate with central part narrowly quadrangular, with long posterior and anterior arms, anterior pair arising mesally; bursa copulatrix with a central heart-shaped plate with a central hole, lateral supports U-shaped.

**LARVA AND PUPA.**—UNKNOWN.

**MATERIAL.**—Holotype, male: Grenada, 2 miles west Lake Grand Etang, 4–8 Aug. 1963, O. S. Flint, Jr., USNM Type 69890. Allotype, female: same data.

**BIOLOGY.**—The adults were taken beside a small tumbling mountain brook in which the larvae are probably to be found.

### Genus *Leptonema* Guerin

*Leptonema* Guerin, 1843, p. 396. [Type-species: *Leptonema pallidum* Guerin, 1843, by monotypy.]

This is a genus of many species throughout the American tropics and Africa. Species are known from Cuba and Puerto Rico on the Greater Antilles.

The larvae have been described previously (Flint, 1964b).

#### Key to Species

##### LARVAE

- Coxa of foreleg with anteroapical process short and with setae on anterior margin . . . . . **L. archboldi**  
 Coxa of foreleg with process longer but without setae . . . . . **L. albivirens**

##### ADULTS

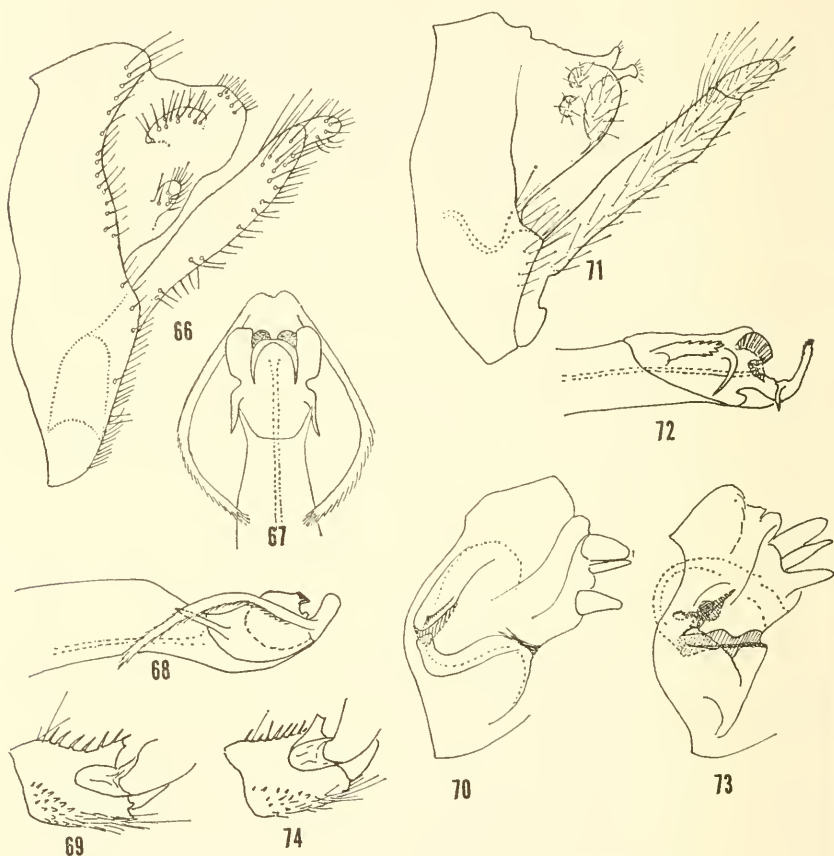
- Males with a very long, basally directed process from apex of aedeagus; females with a shallow groove laterally on 9th segment . . . . . **L. archboldi**  
 Males with a short lateroventrally directed process from apex of aedeagus; females with a deep, complex lateral groove on 9th segment . . . **L. albivirens**

### *Leptonema archboldi*, new species

#### FIGURES 66–70

This species is very distinct, not being closely related to any described species. It probably belongs to the stigmatosum section of the

genus, from which it may be separated by the lack of the spot of dark hair on the forewing and the longer apical and shorter lateral processes of the aedeagus. I take pleasure in naming this species for Mr. John D. Archbold, one of the sponsors of this survey.



FIGURES 66-74.—*Leptonema archboldi*, new species: 66, male genitalia, lateral; 67, tip of aedeagus, dorsal; 68, tip of aedeagus, lateral; 69, larval coxa, dorsal; 70, female genitalia, lateral. *L. albovirens* (Walker): 71, male genitalia, lateral; 72, tip of aedeagus, lateral; 73, female genitalia, lateral; 74, larval coxa, dorsal.

ADULT.—Length of forewing: male 12-13 mm, female 14-15 mm. Color pale green when alive, becoming brownish after death. Female with a yellow cellule on 1A of hindwing. Male genitalia: ninth segment narrow, slightly produced dorsomesally; tenth tergite broadly triangular, with a produced hirsute knob near ventral angle, and a setose patch dorsally; clasper long and slender, without basomesal process, basal segment with rows of spinelike setae apicomesally,

apical segment short with many spinelike setae mesally; aedeagus angled near base, with a long, basally directed, fimbriate process arising apically, a short fimbriate process subapically, and a dorso-mesal stub arising from a semicircular basal structure. Female genitalia: lobes of eighth sternum about  $\frac{2}{3}$  as broad as long; ninth segment with clasper receptacle shallow, entered from above, a narrow groove on surface ventrad to receptacle; with an indistinct angulate plate internally whose attachment to posterior margin of ninth segment is heavily sclerotized.

LARVA.—Length to 20 mm. Head and pronotum dark reddish brown, meso- and metanota paler, pale around eyes and on posterior of head. Anteroapical process of forecoxa short, with setae on anterior margin. Body covered densely with broad, erect, or decumbent, black setae.

PUPA.—Unknown.

MATERIAL.—Holotype, male: Dominica, Pont Casse, .5 miles south, 22-24 July 1963, O. S. Flint, Jr., USNM Type 69891. Allotype, female: Pont Casse, 2.2 miles east, 2 May 1964, O. S. Flint, Jr. Paratypes: same data as holotype, but 8 April 1964, 1♂1♀; same, but 23 April 1964, 1♀; same data as allotype, but 14 April 1964, 1♂3♀; same, but 1 May 1964, 1♀; same, but 7 May 1964, 1♀; same, but 11 May 1964, 2♀; same, but 21 May 1964, 2♀; Pont Casse, 3 miles east, 26 Oct. 1966, E. L. Todd, 2♀; Pont Casse, 1.3 miles east, 18 May 1964, O. S. Flint, Jr. 1♀; Pont Casse, .4 miles east, 27 April 1964, O. S. Flint, Jr., 1♀; Boeri Lake, 10 May 1964, P. J. Spangler, 1♀; Pont Casse, 2.5 miles north, 8 April 1965, D. R. Davis, 3♀. Other: Pont Casse, .5 miles south, 22-24 July 1963, O. S. Flint, Jr., 1 larva; same, but 16 Feb. 1964, H. H. Hobbs, Jr., 1 larva; Pont Casse, 2.2 miles east, 3 May 1964, O. S. Flint, Jr., many larvae, 2 prepupae; same, but 15 June 1964, 1 larva, 1 prepupa; Espagnole River, Cascade on Mt. Diablotin, east of Syndicate Estate, 26 Jan. 1964, H. H. Hobbs, Jr., 3 larvae; Morne Nicholls, 9 Nov. 1964, P. J. Spangler, 2 larvae.

BIOLOGY.—This species seems to be restricted to the fast waters of small highland streams, and it may also breed around the rocky margins of Boeri Lake. The larvae make typical trap-nets and sand-enclosed retreats. Pupation takes place in a silk and sand cocoon attached tightly to a rock in the substrate.

### *Leptonema albovirens* (Walker)

FIGURES 71-74

*Macronema albovirens* Walker, 1852, p. 76.

*Leptonema albovirens* (Walker).—Mosely, 1933, p. 45.—Fischer, 1963, p. 166.

The species is known from the extreme northeast of Mexico throughout Central America, across northern South America to Trinidad, and north in the Lesser Antilles to Grenada and St. Vincent. I give only a few more pertinent references to this species; a complete bibliography is to be found in Fischer (1963).

The species is related to *L. dissimile* Mosely, from which it differs in the much shorter apical process of the aedeagus. The following descriptions are based on Grenadan specimens.

ADULT.—Length of forewing: male 11 mm, female 12–14 mm. Color pale green. Female with a yellowish cellule on vein 1A in hindwing. Male genitalia: ninth segment narrow, posterior margin angulate above base of clasper; tenth tergite trianguloid in lateral view, with an apical setate patch, dorsoapically with 2 short processes; clasper long and slender, no mesobasal lobe; basal and apical segments with patches of short spinelike setae mesoapically; aedeagus with apex bearing 2 pairs of fimbriate processes, a ventrally directed process basad of gonopore, and a posteriorly directed fimbriate process appressed to side of aedeagus. Female genitalia: lobes of eighth sternum about  $\frac{3}{4}$  as broad as long; ninth segment with a shallow pouchlike dorsally directed receptacle and a lateral groove with a heavily sclerotized ventral margin leading to a rounded internal plate.

LARVA.—Length to 17 mm. Head and thoracic notae brown, paler around eyes and posteriorly on head. Process anteroapically on forecoxae arising from inner margin, with setal row passing anteriorly of it. Abdomen covered very densely with erect or decumbent broad, black setae.

PUPA.—Unknown.

MATERIAL.—Grenada, Lake Grand Etang, 4–6 Aug. 1963, O. S. Flint, Jr., 2 ♀. Lake Grand Etang, 2 miles west, 4–8 Aug. 1963, O. S. Flint, Jr., 1 ♂ 2 ♀, 2 larvae. Great River, Balthazar, 8 Aug. 1963, O. S. Flint, Jr., many larvae. St. Vincent, 2 ♂ 1 ♀ recorded by Mosely, 1933, p. 47 and verified by Kimmins (pers. comm.).

BIOLOGY.—The larvae have been taken in both a small tumbling mountain brook and a riffle in a large lowland river. Both, however, are clear and rapid with a bottom of rocks and gravel.

### Family HYDROPTILIDAE

This family contains the smallest species of the order. Most of the adults are only a millimeter or two long with the largest reaching about five millimeters. The Lesser Antilles contain at least 23 species in 8 genera, or 50 percent of the total species in the order from these islands.

The larvae undergo hypermetamorphosis in which the first four instars are slender, bear long setae, are free living, and are brief in duration. In the fifth instar, the larvae construct their cases and undergo the greater part of their growth, often changing their shape radically.



Since the cases show good generic differences—except between *Leucotrichia* and *Zumatrichia*, and between *Hydroptila* and *Ochrotrichia*—they are more useful in the placement of the pupal stage than the pupae themselves, which are only slightly different. In the majority of the genera it is impossible to key the immature stages to species. The larvae and pupae of *Bredinia* are unknown.

### Key to Genera

#### LARVAE AND CASES

1. Larvae with abdominal terga bearing sclerites; case flattened and tightly appressed to substrate, never movable . . . . . 2  
Larvae with a sclerite on ninth tergum only; case variously shaped, but carried by larva and attached at pupation . . . . . 4
2. Abdominal segments 3-6 greatly enlarged; case ovoid, domed, with openings at both ends . . . . . 3  
No abdominal segment enlarged; case nearly circular, flat, with marginal openings . . . . . *Alisotrichia*
3. Ninth tergum with short, enlarged setae . . . . . *Zumatrichia*  
Ninth tergum with only normal hairlike setae . . . . . *Leucotrichia*
4. Mid- and hindlegs about 3 times as long as forelegs; case silken, anterior end cylindrical, becoming enlarged and compressed posteriorly . . . *Oxyethira*  
All legs of about same length; case generally with some sand or organic matter, differently shaped . . . . . 5
5. Anal prolegs projecting freely from abdomen; case tubular, made of sand . . . . . *Neotrichia*  
Anal prolegs fused to end of abdomen; case compressed . . . . . 6
6. Metanotum with anterolateral angle enlarged . . . . . *Ochrotrichia*  
Metanotum with anterolateral angle not enlarged . . . . . *Hydroptila*

#### ADULTS

1. Ocelli present . . . . . 2  
Ocelli absent . . . . . *Hydroptila*
2. Mesoscutellum with a transverse suture between lateral angles . . . . 3  
Mesoscutellum entire . . . . . 9
3. Foretibia with an apical spur . . . . . 4  
Foretibia without an apical spur . . . . . 6
4. Males with basal antennal segment enlarged, covering face, with 2 ocelli . . . . . *Zumatrichia*  
Basal antennal segment unmodified, with 3 ocelli . . . . . 5
5. Forewing fuscus, with linear, bright green marks . . . . . *Leucotrichia*  
Forewing fuscus, sometimes with silvery-gray blotches  
*Ochrotrichia (Metrichia)*
6. Midtibia with a preapical spur . . . . . 7  
Midtibia without a preapical spur . . . . . 8
7. Male genitalia not greatly modified, claspers large and easily recognizable as such . . . . . *Ochrotrichia (O.)*  
Male genitalia greatly modified, claspers small and often difficult to homologize . . . . . *Alisotrichia*

8. Male with basal antennal segment enlarged, covering face, 2 ocelli . . . . . **Alisotrichia**  
 Male with antennae unmodified, 3 ocelli . . . . . **Bredinia**
9. Hindtibia with only a preapical spur . . . . . **Neotrichia**  
 Hindtibia with 2 preapical spurs . . . . . 10
10. Metascutellum narrow, almost quadrangular . . . . . **Alisotrichia**  
 Metascutellum wider, distinctly triangular . . . . . **Oxyethira**

### Genus *Zumatrichia* Mosely

*Zumatrichia* Mosely, 1937, p. 187. [Type-species: *Zumatrichia filosa* Mosely, 1937, by original designation.]

The genus has heretofore been known only from several Mexican species. The genus is closely related to *Leucotrichia*, but the males differ greatly in the modified basal antennal segment, in the possession of only two ocelli, and in a different style genitalia.

The immature stages of the genus are herein described for the first time, and as expected they show a close relationship to those of *Leucotrichia*. The larvae of *Zumatrichia* are distinguished by the short, broad, setae on the eighth and ninth terga.

#### Key to Species

##### ADULTS

Color gray, mottled with grayish green; forewing of male unmodified.

***Z. antillensis***

Color, brown; forewing of male with a basal patch of modified setae.

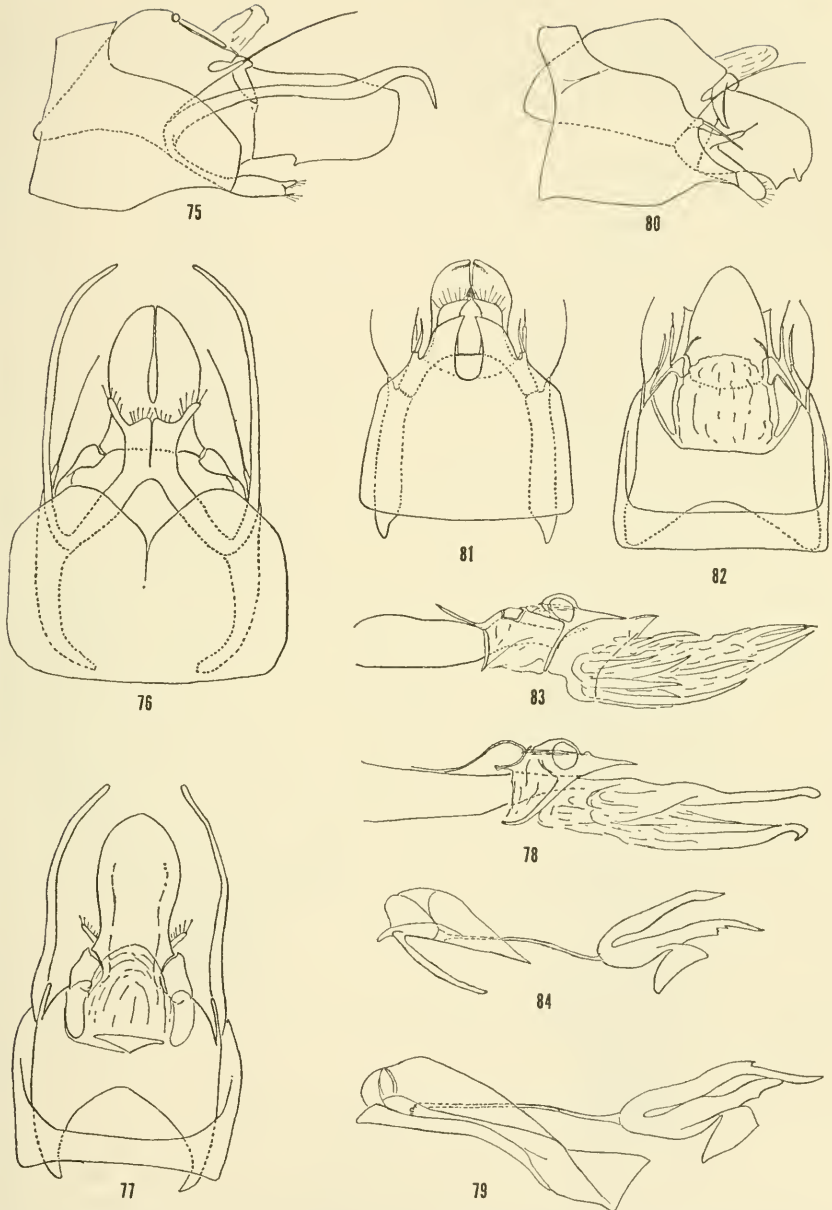
***Z. anomaloptera***

#### *Zumatrichia antillensis*, new species

FIGURES 75-79, 86, 99-103

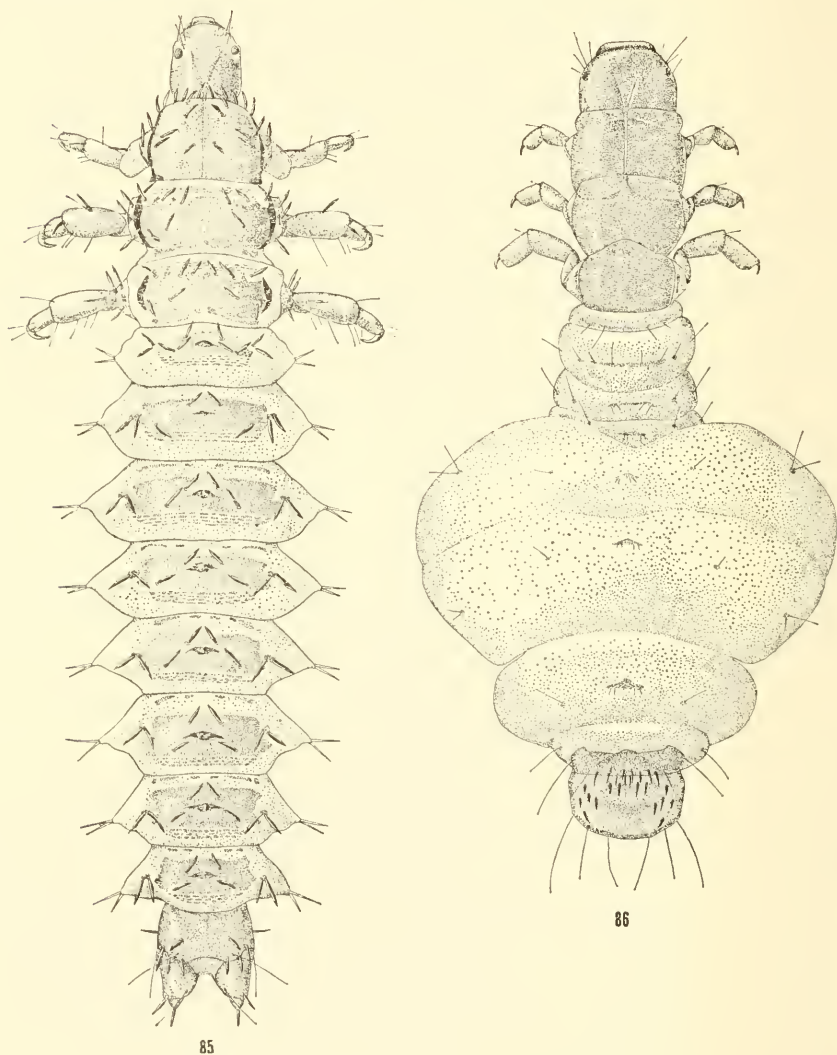
This species has been the most commonly encountered trichopteran on the island of Dominica, and it has also been taken on Guadeloupe, St. Lucia, and Grenada. It is related to *Z. galtena* Mosely from Mexico but is distinguished by the dorsal process of the clasper not being digitate apically and by the long hooked ventral process of the aedeagus.

**ADULT.**—Length of forewing 3 mm. Color intermingled patches of gray and gray green. Male genitalia: eight sternum with ventrolateral angles slightly produced; ninth segment with anterolateral angles produced as narrow lobes; cercus, rodlike, with a single long apical seta; clasper with a long basodorsal process, slightly sinuate apically; ventral portion with a slender apicolateral lobe; tenth tergum divided into platelike lateral lobes, rounded apically, with a midventral tooth; aedeagus with a middorsal process apically, a pair of lateral spines, and a pair of appressed, hooked, ventral processes; a complex



FIGURES 75-84.—*Zumatrichia antilliensis*, new species, male: 75, genitalia, lateral; 76, genitalia, ventral; 77, genitalia, dorsal; 78, aedeagus, lateral; 79, female, bursa copulatrix, lateral. *Z. anomaloptera*, new species, male: 80, genitalia, lateral; 81, genitalia, ventral; 82, genitalia, dorsal; 83, aedeagus, lateral; 84, female, bursa copulatrix, lateral.

at midlength and a basal loop. Female genitalia: eight and ninth segments weakly sclerotized, with short anterolateral rods; bursa copulatrix with basal group attached to apical group by a slender rod, apical group with long lateral supports.



FIGURES 85-86.—*Alisotrichia* species 2: 85, larva, dorsal. *Zumatrichia antilliensis*, new species: 86, larva, dorsal.

LARVA.—Length to 3 mm. Head, thorax slender, abdominal segments 5-7 greatly distended at maturity. Sclerites pale brown, marked with fuscus. Head unmodified. Legs short and broad; all pairs very similar in structure. Meso- and metanota divided mesally.