

THE NORTH AMERICAN SPECIES OF PARASITIC TWO-
WINGED FLIES BELONGING TO THE GENUS PHO-
ROCERA AND ALLIED GENERA.

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INTRODUCTION.

The present paper is an attempt to classify a difficult group of parasitic flies, species of which are very often reared in economic work and sent to the United States National Museum for identification. The only comprehensive work on the group hitherto published was by the late D. W. Coquillett¹; he placed the species known to him, 39 in number, in the genera *Phorocera*, *Euphorocera*, and *Exorista*. The writers have excluded a few of his species, made synonyms of a few, rearranged the genera to conform as conservatively as possible with more recent ideas in nomenclature, and have described 41 new species, while recognizing 40 previously described North American species with a new description of each.

The group of genera under discussion offers as a whole the following characters:

Eyes hairy; ocellar bristles present and directed obliquely forward; rows of frontal bristles extending downward at least to the base of the third antennal joint; antennae elongate, reaching at least three-fourths of the distance from their origin to the edge of the mouth; sides of face bare, at least on lower half; face receding; vibrissae at or close to edge of mouth and not noticeably approximated to each other; palpi present and well developed; proboscis short and fleshy. Thorax with well-developed chaetotaxy; anterior acrostichals always distinct, one pair just in front of the suture ex-

¹ Technical Bulletin No. 7, Division of Entomology, U. S. Department of Agriculture, 1897, pp. 91-105.

cept in some specimens of the subgenus *Phorocera*; pteropleural bristle small or absent. Abdomen black or gray, never metallic green, with macrochaetae but never with more than three pairs on middle of second tergite. Wings with normal venation, first posterior cell (apical) open, rarely closed in margin, ending considerably before apex of wing; last section of fifth vein never half as long as preceding; veins bare except base of third.

Absence of peculiar characters may be said to distinguish this group; if we add to it a similar series not very well separated in which the eyes are bare, the combination will comprise a vast central mass of the family Tachinidae in the wide sense, from which other genera or groups of genera seem to radiate in all directions by the development of peculiar characters. Naturally this central mass is the difficult part of the family, the outlying groups having their special characteristics which have greatly facilitated their classification.

We have included a number of tropical species, although our work must be very incomplete in that direction. We have not attempted the profitless task of discussing the probable identity of those species of earlier writers that we can not recognize, preferring to leave them to be elucidated from the types at some future time. Van der Wulp's *Biologia* types are in the British Museum, and those of Bigot are in the collection of J. E. Collin, of Newmarket, England; it is only a question of time until these are studied by a competent authority, and this will for the first time put the tropical North American fauna upon a sound basis.

Many new and unpublished rearing records have been added, and scattered ones have been gathered together; thus the economic aspect of the group has been appreciably clarified, although much remains to be done in the biological study of it. The criticism may be made that our classification does not sufficiently reflect the biological characters that have been made known in the last ten or fifteen years. We have given serious consideration to this anticipated objection. It is a difficult matter to assign taxonomic values to internal characters, and especially to physiological peculiarities. We should feel under greater obligations to attempt the task, if it were not for the fact that in 85 per cent of our species nothing whatever is known about these characters.

TABLE OF GENERA.

1. Facial ridges with stout bristles at least up to middle.....	2
Facial ridges bristly at most only on lower third, rarely with weak bristles or hairs above this.....	6
2. Penultimate joint of arista at least three times as long as thick.....	5
Penultimate joint of arista hardly longer than thick (<i>Phorocera</i> Robi- neau-Desvoidy).	3

3. (Subgenera of *Phorocera*) Inner forceps of male united into a broad, long organ, which is suddenly constricted into a short beak at tip; female with fifth sternite developed into stout plates, between which lies a very minute piercer.....Subgenus *Phorocera* Robineau-Desvoidy.
 Inner forceps of male united into a slender beak or hook; female without large sternal plates and piercer, distinguished by elongated abdominal segments or by an appendage or distinct fold at bend of fourth vein (*Euphorocera*, *Neophorocera*, *Euphoroceropsis*).
 Subgenus *Parasetigena* Brauer and Bergenstamm.
 Inner forceps of male separated as usual; female not with large sternal plates, elongated abdomen, or appendage at bend of fourth vein..... 4
4. Abdomen in both sexes very wide and deep, almost globose; unless contracted in drying the fourth segment closing in a slit above the genital opening.
 Subgenus *Patelloa* Townsend.
 Abdomen in both sexes of ordinary form.....Subgenus *Neopales* Coquillett.
5. Front with an extra row of bristles, 3 to 6 in number, outside the usual row on each side.....*Madremyia* Townsend.
 Front without additional bristles, face less receding than usual.
Murdockiana Townsend.
6. Second antennal joint nearly as long as third.....*Nemorilla* Rondani.
 Second antennal joint much shorter than third (*Zenillia* Robineau-Desvoidy) 7
7. (Subgenera of *Zenillia*.) Abdomen in both sexes very wide and deep, almost globose; fourth segment unless contracted in drying closing in a slit above genital opening.....Subgenus *Eusisyropa* Townsend.
 Abdomen of ordinary form..... 8
8. Discal macrochaetae usually absent, when present never arranged in pairs; abdominal hairs always erect, often approaching macrochaetae in size; cheeks narrow.....Subgenus *Parexorista* Brauer and Bergenstamm.
 Discal macrochaetae present or absent, but if present always arranged in pairs; abdominal hairs usually depressed..... 9
9. Penultimate joint of arista usually elongate, discal macrochaetae always present; black subshining species with black palpi.
 Subgenus *Phryxe* Robineau-Desvoidy.
 Penultimate joint of arista always short; discal macrochaetae present or absent.....Subgenus *Zenillia* Robineau-Desvoidy.

LIST OF SPECIES.

- | | |
|--|--|
| Genus <i>Nemorilla</i> Rondani. | Genus <i>Zenillia</i> Robineau-Desvoidy— |
| <i>maculosa</i> Meigen (<i>pyste</i> | Continued. |
| Walker). | Subgenus <i>Zenillia</i> —Continued. |
| <i>parva</i> Coquillett. | <i>coquilletti</i> , new species. |
| <i>insolens</i> , new species. | <i>lobeliae</i> Coquillett. |
| Genus <i>Zenillia</i> Robineau-Desvoidy. | <i>valens</i> , new species. |
| Subgenus <i>Zenillia</i> . | <i>eudryae</i> Townsend. |
| <i>amplexa</i> Coquillett. | <i>coerulea</i> , new species. |
| <i>protuberans</i> , new species. | <i>formosa</i> , new species. |
| <i>helvina</i> Coquillett. | <i>inflatalpispis</i> , new species. |
| <i>ochracea</i> Van der Wulp. | <i>polita</i> Coquillett. |
| <i>marginata</i> , new species. | <i>setinervis</i> Coquillett. |
| <i>angustivitta</i> , new species. | |

Genus *Zenillia* Robineau-Desvoidy—
Continued.

Subgenus *Phryxæ* Robineau-Des-
voidy.

vulgaris Fallén.

caesar Aldrich (*nigripalpis*
Townsend, preoccupied).

crassiseta, new species.

trisetosa Coquillett.

submissa, new species.

Subgenus *Parexorista* Brauer and
Bergensstamm.

cheloniae Rondani.

reclinata, new species.

curriei Coquillett.

affinis Fallén.

confinis Fallén.

fronto Coquillett.

Subgenus *Eusisyropa* Townsend.

blanda, Osten Sacken.

blanda virilis, new subspecies.

blandita Coquillett.

ceratomiae Coquillett.

fulilis Osten Sacken.

Genus *Phorocera* Robineau-Desvoidy—

Subgenus *Phorocera*.

slossonae Townsend.

Subgenus *Parascitigena* Brauer
and Bergensstamm.

alba Townsend.

virilis, new species.

cocciphila, new species.

divisa, new species.

tachinomoides Townsend.

complicata, new species.

claripennis Macquart.

ainaris Smith.

floridensis Townsend.

tessellata Brauer and Bergen-
stamm.

hamata, new species.

imitator, new species.

Genus *Phorocera* Robineau-Desvoidy—
Continued.

Subgenus *Parascitigena* Brauer
and Bergensstamm—Continued.

indivisa, new species.

coccyx, new species.

subnitens, new species.

sulcata, new species.

Subgenus *Patelloa* Townsend.

leucaniae Coquillett.

fulviceps Van der Wulp.

facialis Coquillett.

meracanthæ Greene.

specularis, new species.

pachyppyga, new species.

setifrons, new species.

silvatica, new species.

pluriseriata, new species.

fuscimacula, new species.

reinhardi, new species.

Subgenus *Neopales* Coquillett.

noctuiiformis Smith.

tortricis Coquillett.

erecta Coquillett.

constocki Williston.

texana, new species.

flavicauda Van der Wulp.

parviteres, new species.

sternalis, new species.

incrassata Smith.

xanthura, new species.

tenuiseta, new species.

unipilum, new species.

marginalis, new species.

halisidotæ, new species.

festinans, new species.

levis, new species.

signata, new species.

Genus *Madremyia* Townsend.

saundersii Williston.

Genus *Murdockiana* Townsend.

gelida Coquillett.

SYSTEMATIC DESCRIPTIONS.

Genus **NEMORILLA** Rondani.

Nemorilla RONDANI, Dipt. Ital. Prod., vol. 1, 1856, p. 66. Type designated.

Tachina maculosa Meigen.—BRAUER and BERGENSTAMM, Zweifl. Kais.

Mus., pt. 5, 1891, p. 328; pt. 6, 1893, p. 113.

Exorista part COQUILLET, Revis. Tachin., 1897, p. 91.

TABLE OF SPECIES.

1. Mid tibiae with only one bristle on the outer front side near the middle ----- 2
 Mid tibiae with two or more bristles on the outer front side near the middle; bucca one-seventh the eye height-----*insolens*, new species.
2. Four dorsocentral and two sternopleural macrochaetae; abdomen with discal macrochaetae (*pyste* Walker)-----*maculosa* Meigen.
 Three dorsocentral and three sternopleural macrochaetae; abdomen destitute of discal macrochaetae-----*parva* Coquillett.

NEMORILLA MACULOSA Meigen.

Tachina maculosa MEIGEN, Syst. Besch. Zweifl. Ins., vol. 4, 1824, p. 265.

Nemorilla maculosa RONDANI, Dipt. Ital. Prod., vol. 3, 1859, p. 101.—

BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, pl. 1, fig. 12; pt. 5, 1891, p. 328.

Tachina pyste WALKER, List. Dipt. Ins., vol. 4, 1849, p. 754.

Tachina (Exorista) phycitae LEBARON, Sec. Rept. State Ent. Ill., 1872, p. 123.

Exorista scudderi WILLISTON, in Scudder's Butterflies of New England, vol. 3, 1889, p. 1921.

Exorista pyste COQUILLET, Revision Tachin., 1897, p. 93.—GREENE, Proc.

U. S. Nat. Mus., vol. 60, 1922, p. 11, fig. 34, puparium.—REINHARD, Ent. News, vol. 30, 1919, p. 281.

Front of male 0.205, 0.228, 0.238, and in the female 0.314, 0.309, 0.306 the head width; face and front silvery, the latter often tinged with golden; facial ridges bristly on the lowest third; bucca about one-sixth the eye height; antennae shorter than face, the third joint in both sexes not over one and a half times the second; arista thickened on the basal third, the penultimate joint short; palpi usually yellow, often brown or black in male. Thorax black, gray pollinose with three to five black vittae, when three are present the middle one is twice as wide as the others; four dorsocentral macrochaetae; scutellum black, sometimes the tip yellowish, bearing three long and one shorter apical pair of bristles. Sternopleura with two strong bristles. Abdomen black, gray pollinose, sometimes the sides of the intermediate segments yellowish and often the tip of the fourth segment in the female reddish yellow. Discal macrochaetae present on all segments but the first, abdominal hairs suberect in male, depressed in female. Legs long in the male, shorter in the female: mid tibiae with one long bristle on the front side near the middle: hind tibiae ciliate. Wings hyaline, third vein with two bristles at its base. Hypopygium blackish, inner forceps black, slender and slightly hooked at their apex, in profile the outer edge is straight, sparsely haired; outer forceps brown, thicker than the inner ones and terminating in a blunt point.

Length 5 to 8 mm.

Redescribed from a long series of both sexes, from New England and Idaho to Cuba, the Virgin Islands, and Arizona. Three males

and two females from Europe, determined by Professor Bezzi, agree in genitalia and all other characters with the darker of the North American specimens. The species has a voluminous literature in Europe, and has been reared many times in the United States, always from larvae of moths and butterflies. It is also recorded from Canada.

The species lays macrotype eggs on the host.

NEMORILLA PARVA Coquillett.

Exorista parva COQUILLET, Revis. Tachin., 1897, p. 100.

Third antennal joint of female scarcely twice the length of second; no discal macrochaetae; mid tibiae bearing one bristle on outside near middle; palpi yellow.

Female.—Front 0.292 the head width, the sides bearing only a few short hairs; face and front gray pollinose; bucca one-seventh the eye height; third joint of antennae hardly twice the length of the second; penultimate joint of the arista short; facial ridges bristly on the lowest fourth; palpi yellow. Thorax black, gray pollinose, marked with three black vittae, the middle one twice as wide as either of the others; three dorsocentral macrochaetae present; scutellum gray, bearing two long and an intermediate short pair of marginal bristles; sternopleura with three bristles. Abdomen destitute of discal macrochaetae, black, gray pollinose with numerous reflecting black spots. Mid tibiae bearing one bristle on the outside near the middle; hind tibiae outwardly subciliate.

Length 4 mm.

The single specimen is labeled "Colo. 1793" and was received from C. F. Baker. No additional material has come to light in 25 years.

Type.—Female, Cat. No. 3600, U.S.N.M.

NEMORILLA INSOLENS, new species.

Second antennal joint nearly as long as the third; three sternopleural and three dorsocentral macrochaetae; two midtibial bristles.

Front of male very narrow, 0.138, 0.119, 0.105 and in the female 0.353, 0.300, 0.324 the head width; head bulging below, face and front gray pruinose; facial ridges bristly on the lowest fourth; bucca one-fifth the eye height; parafacial at narrowest part scarcely the width of the third antennal joint; antennae yellow, sometimes blackish at apex, about three-quarters the length of face, third joint in both sexes slightly longer than the second, arista thickened on the basal fourth, the penultimate joint short. Thorax black, gray pollinose, indistinctly vittate, with three dorsocentral macrochaetae. Scutellum black with three pairs of long marginal bristles. Sternopleura sparsely haired in female, densely so in male and bearing three bristles. Abdomen black, gray pollinose, no distinct pattern in female,

in the male the apices of the intermediate segments are polished black. Discal macrochaetae arranged in pairs, abdominal hairs subdepressed in female, erect in male and nearly as long as the macrochaetae. Mid tibiae with two bristles on the outer front side near the middle; hind tibiae subciliate at most. Third vein with two bristles at its base. Hypopygium apparently the same as in *maculosa*.

Length 5 to 8 m.

Type.—Male, Cat. No. 25693, U.S.N.M.

Described from six specimens of both sexes collected at Melrose Highlands, Massachusetts, May and June, 1918.

Genus ZENILLIA Robineau-Desvoidy.

Zenillia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 152. Type, *Musca libatrix* Panzer, originally included, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, 1863, p. 471.

Phryxe ROBINEAU-DESVOIDY, Myodaires, 1830, p. 158. Type, *Tachina vulgaris* Fallén, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, 1863, p. 329; on page 358 of the same work he makes *Phryxe athaliae*, an included species, a synonym of *vulgaris*, which was not included.

Carcelia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 176. Type, *bombylans*, new species, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, 1863, p. 220. Macquart, in Hist. Nat. Dipt., vol. 2, 1835, p. 108, had made *bombylans* a synonym of *Tachina gnava* Meigen, and this disposition of it has been generally followed since.

Aptomyia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 184 (*Aptomya*). Type, *Tachina confinis* Fallén, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, 1863, p. 459. On page 460 he makes *zonata* (male) and *servillei* (female), both included species, synonyms of *confinis*, which was not included. Coquillett, Type-Species, 1910, p. 509, takes *zonata* as type, regarding it as a synonym of *confinis*.

Hubneria ROBINEAU-DESVOIDY, Annales Soc. Ent. France, 1847, p. 601. Type, *Tachina affinis* Fallén, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, 1863, p. 279. On the same page he makes his *nigripes*, new species, originally included, a synonym of *affinis*, not included.

Chaetolyga RONDANI, Dipt. Ital. Prod., vol. 1, 1856, p. 66 (*Chetoliga*). Type, designated, *Tachina gnava* Meigen.

Blepharidea RONDANI, Dipt. Ital. Prod., vol. 1, 1856, p. 67. Type designated, *Tachina vulgaris* Fallén.

Parexorista BRAUER AND BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 87. Type (sole species), *Exorista cheloniae* Rondani.

Myæxorista BRAUER AND BERGENSTAMM, Zweifl. Kais. Mus., pt. 5, 1891, p. 331. Type, *Musca libatrix* Panzer, by designation of the authors in Verh. Zool. Bot. Ges. Wien, vol. 43, 1893, p. 479.

Eusisyropa TOWNSEND, Smiths, Misc. Colls., vol. 51, 1908, p. 97. Type designated, *Exorista blanda* Osten Sacken.

Oæxorista TOWNSEND, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 165. Type designated, *Exorista eudryae* Townsend (in Proc. Biol. Soc. Wash., vol. 28, 1915, p. 21, the type material is renamed *Oæxorista thompsoni*, new species, in the belief that it was wrongly identified in 1912).

Euexorista TOWNSEND, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 166. Type designated, *Exorista futilis* Osten Sacken.

Chroysomasicera TOWNSEND, Journ. N. Y. Ent. Soc., vol. 23, 1915, p. 230.

Type designated, *borealis*, new species.

Chrysoexorista TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 435.

Type designated, *viridis*, new species.

The type species of all the above genera have been examined, and protracted effort has been given to the task of finding satisfactory generic characters to separate them, but with little success. Realizing that several of them have been regarded by the later authorities of Europe as valid for that continent, we have earnestly endeavored to retain such, especially *Phryxæ* and *Carcelia*. It seems to us, however, that the external characters show such complete gradation in North American species that we can not discover natural lines of division of more than subgeneric rank, as indicated in our table of genera. Generic characters should be those of more ancient origin, externally recognizable, and should exist in both sexes, although they be supplemented by others which do not meet these requirements. Whether a species lays large or small eggs we can not consider of generic importance, as the complex reproductive modifications which are so striking in the great Tachinid group seem to us of very recent development here, and not correlated with any distinct characters in other parts.

We are dealing here with the immense central mass of the family, in which large genera may naturally be expected. There is a wealth of specific characters. A policy of splitting which would logically terminate in a genus for every species is in the end ruinous to the taxonomic scheme, as it eliminates the genus as a category and necessitates the recognition of some substitute, as the supergenus or the tribe. This might not be a serious matter if the genus were not by convention a part of the scientific name, for which we can not substitute anything else.

The species known to Coquillett at the time of his Revision in 1897 were placed by him in *Exorista*. This genus had but one species when erected, *Musca larvarum* Linnaeus, which thus must be the type of the genus, and which Coquillett placed in his *Tachina*. The type of *Tachina* is *Musca grossa* Linnaeus, a widely different species, which is also the type of the later genus *Echinomyia*. *Tachina* therefore should replace *Echinomyia*, *Exorista* should replace *Tachina* in Coquillett's sense, and another name be selected for what Coquillett called *Exorista*. For this last vacancy we select *Zenillia* Robineau-Desvoidy, which has not only as early a date as any in our list of synonyms, but has page precedence over *Phryxæ*, *Carcelia*, and *Aplomyia*, of the same date. Coquillett himself proposed these changes for *Tachina* and *Exorista* in his Type-Species paper of 1910.

Our grouping is considerably modified from that of Coquillett, Revision, 1897, since, as will appear from the appended list, we have

excluded a considerable portion of his material; it differs also from that of his Type Species paper of 1910, in which he divided the group in the European manner, following Professor Bezzi's Palae-arctic Catalogue. Doctor Townsend has never published a synopsis of the group now under consideration, but it is apparent from his papers that he would recognize a large number of genera.

The latest European treatment is by Baer,² whose table can be reduced for the present group to the following:

- | | |
|---|------------|
| 1. Hind tibiae ciliated on outer side, at least in male, with regular comb-like curved bristles, among which one or two sometimes stand out larger----- | Carcellia. |
| Hind tibiae with unequal bristles, bare or less regularly bristled----- | 2 |
| 2. Apical scutellars erect and decussate; claws in both sexes short----- | Phryxe. |
| Apical scutellars generally curved backward, decussate or convergent; sometimes feebly developed; rarely erect, and then the male has long claws ----- | 3 |
| 3. Facial ridges with somewhat regularly arranged bristles above the vibrissae to the middle of the eye height; claws of male elongate---- | Zenillia. |
| Facial ridges with only a few rapidly decreasing bristles above the vibrissae; bucca not over one-fourth the eyeheight----- | Exorista. |

The first character of this table is perhaps the most difficult of all to apply to the North American material. It is better developed in males than females, and there are numerous intermediate species. We are unable to see more than a specific character in the apical scutellars, and the length of the claws in the male seems of even less importance, as it is confined to one sex.

We are unable to make an abridgement of Brauer and Bergentamm's tables³ which will show their disposition of this group. Whatever merit these authors possess is not to be found in their construction of analytical tables. It would seem that in the course of their work they modified their tables a little at a time, until in their final form they are very complicated and confusing.

The type species of *Zenillia*, *libatrix* Panzer, does not occur in North America. It has yellow pollen dorsally on head, thorax, and abdomen, about as in our *helvina* Coquillett, with which it also agrees in having three sternopleurals, four dorsocentrals, two bristles on the front side of the middle tibia, etc.; but differs in having large discals on the second and third segments (*helvina* has small on the third only), and especially in having the facial ridges bristly almost to the middle, so as to come rather close to *Phorocera* in this character. The bristles, however, are weak, hardly more than hairs, and do not extend quite so high as in *Phorocera*.

² Die Tachinen als Schmarotzer der schädlichen Insekten. Beiheft Ztschr. f. angewandte Ent., p. 75, 1921.

³ Zweiflügler des kaiserlichen Museums zu Wien, parts 4 and 6, 1889 and 1893.

Townsend observed in 1911⁴ that there are a great variety of reproductive habits "in specimens which possess the external characters ordinarily considered as defining the genus *Exorista*." Inasmuch as the reproductive habits are known in only about 15 per cent of our species, it is naturally impossible to make much of an attempt to correlate them with adult characters, and we think it impracticable—for the present at least—to establish any sort of taxonomic groups upon them. At the same time we find these characters in the family of extreme scientific interest and often of great biologic and economic importance; and we welcome all additions to a knowledge of them. The following notes are from Pantel, Neilsen, Townsend, and Baer.

Libatrix and *futilis* deposit microtype eggs on foliage, which are intended to be eaten by the host.

Affinis deposits eggs that are ready to hatch, upon the host.

Vulgaris deposits newly hatched larvæ upon the host.

Cheloniæ deposits thin-shelled, stalked eggs upon hairy caterpillars.

LIST OF SPECIES INCLUDED IN EXORISTA BY COQUILLETT BUT NOT HERE INCLUDED IN ZENILLIA.

aerata Coquillett, Revision, 1897, p. 100, is a synonym of *Doryphorophaga doryphoræ*, from the type.

dorsalis Coquillett, Canad. Ent., vol. 30, 1898, p. 236, is also a *Doryphorophaga*; *Parkeriellus flavipalpis* H. E. Smith, Proc. Ent. Soc. Wash., vol. 18, 1916, p. 96, is either the female of this or of a very closely related species.⁵

dubia Fallén, of Europe and North America belongs to the genus *Lypsa* Robineau-Desvoidy, 1830, and is considered to be synonymous with *silvatica*, the type. *Aporomyia* Rondani, 1859, has the same type. The genus is perfectly valid, distinguished by having a very large pteropleural bristle, which seems to have escaped notice in publications.

isæ Coquillett, Revision, 1897, p. 96, belongs to *Pseudeuanta*, and is a synonym of *johnsoni* Townsend (Aldrich, Insecutor Ins. Menst., vol. 9, 1921, p. 88).

ordinaria Van der Wulp, as identified by Coquillett. The National Museum now contains under Coquillett's label only three males from Allende, Mexico; they have no ocellars and should be referred to another genus. Coquillett identified for the senior writer many years ago a female which has since proved to be *Doryphorophaga dorsalis*. The true *ordinaria* of Van der Wulp can hardly be identified without an examination of the type.

parva Coquillett, Revision, 1897, p. 100, is a *Nemorilla*.

petiolata Coquillett, Revision, 1897, p. 98, is a dwarfed male of *Phorcera claripennis* Macquart.

spinipennis Coquillett, Revision, 1897, p. 95, is a synonym of *Exoristoides slossonæ* Coquillett, Revision, 1897, p. 91. The large pteropleural bristle, strangely overlooked by describers, is the important character in this genus.

⁴ Proc. Ent. Soc. Wash., vol. 13, p. 165.

⁵ The females of *Doryphorophaga* as far as known all have a striking character which makes them very easy to distinguish: on the middle coxæ is a dense tuft of recurved, stubby bristles forming almost a solid mass bending back over the coxæ. These spines have remained unnoticed by describers; they probably serve to hold the host during larviposition, as ventral abdominal spines do in many other species.

TABLE OF SPECIES OF ZENILLIA.

1. Abdomen bearing true discal macrochaetae.....	15
Abdomen destitute of true discal macrochaetae.....	2
2. Palpi yellow.....	5
Palpi black.....	3
3. Thorax bearing three dorsocentral and three sternopleural macrochaetae; mid tibiae with one bristle on the outside near the middle (if with two or more see No. 8).....	<i>coquilletti</i> , new species.
Thorax bearing four dorsocentral macrochaetae.....	4
4. With four sternopleural bristles; anal segment of the abdomen shining black.....	<i>confinis</i> Fallén.
With three sternopleural bristles; anal segment of the abdomen gray or yellowish pollinose.....	<i>futilis</i> Osten Sacken.
5. Mid tibiae with two or more stout bristles on the outer front side near the middle.....	11
Mid tibiae with but one stout bristle on the outer front side near the middle.....	6
6. Third vein with but a few bristles at its base.....	7
Third vein bristly to the small cross vein; abdomen black, shiny, the base of intermediate segments gray pollinose.....	<i>setinervis</i> Coquillett.
7. Abdomen black and shiny; basal fourth of segments two and three thinly gray pollinose at most.....	<i>polita</i> Coquillett.
Abdomen black or brown, gray pollinose.....	8
8. Bucca one-eighth or more eyeheight.....	10
Bucca not over one-twelfth eyeheight; the two uppermost frontal bristles reclinate (if with three reclinate frontal bristles see No. 22).....	9
9. Marginal macrochaetae of the abdomen not distinctly separated from the erect hairs of the dorsum; third antennal joint of the male two and one-half times the second; first to fourth abdominal segments with yellow ground color on sides, which is not covered by the thin pollen.....	<i>protuberans</i> , new species.
Marginal macrochaetae of the abdomen distinct from the erect hairs of the dorsum; third antennal joint of the male at least three times the second; if the sides of the abdomen are yellow it is largely concealed by the dense pollen.....	<i>amplexa</i> Coquillett.
10. The anterior stout reclinate bristle of the front is only one-third from the inner vertical to the antennal insertion. Male without orbitals.	<i>ceratomiae</i> Coquillett.
Palpi in male densely clothed with long black hairs; male with orbitals, both sexes with a stout reclinate bristle halfway between antennal insertion and inner vertical; front and face light golden pollinose; thorax and abdomen thinly gray pollinose (<i>Eumasicera coccidella</i> Townsend).....	<i>Sturmia sternalis</i> Coquillett.*
11. With three sternopleural bristles.....	12
With four sternopleural bristles; facial ridges bristly about one-half way.....	<i>lobeliac</i> Coquillett.
12. Second antennal joint less than one-half as long as the third.....	13
Second antennal joint about one-half as long as the third; abdominal hairs erect on the intermediate segments.....	<i>coerulea</i> , new species.

*The male was described as the female by Coquillett (Revis., 1897, p. 109); Townsend described the female (Annals Ent. Soc. Amer., vol. 2, 1909, p. 249); the synonymy was indicated by Thompson (Psyche, vol. 17, 1910, p. 211). Some of the specimens have the eyes somewhat hairy, so we insert it in the table to avoid mistakes.

13. Bucca one-sixth the eye height..... 14
 Bucca one-twelfth the eye height; third antennal joint of the female at least three times the length of the second; the two uppermost frontal bristles strong and reclinate; thorax and abdomen black, gray pollinose.....*formosa*, new species.
14. Male with dense patches of fine hair on the hind tergite of the abdomen near the middle below; female with depressed hairs on the third tergite above.....*eudryae* Townsend.
 Male without such patches of hair, female with erect hairs on the middle of the third abdominal segment (if with linear bucca and swollen palpi, see *inflatalpalpis*).....*valens*, new species.
15. Palpi yellow..... 21
 Palpi black..... 16
16. Mid tibiae with two or more bristles on the outer front side near the middle..... 17
 Mid tibiae with one bristle on the outer front side near the middle (*nigripalpis* Townsend preoccupied).....*caesar* Aldrich.
17. Costal spine short, scarcely distinguishable from the adjacent bristles... 18
 Costal spine long; abdomen black, subshining; bucca one-third the eye-height; three dorsocentral macrochaetae.....*trisetosa* Coquillett.
18. With three sternopleural bristles; usually four dorsocentral macrochaetae present..... 19
 With four sternopleural bristles; eyes thinly hairy; front of male very narrow, 0.147 the head width.....*submissa*, new species.
19. Scutellum yellowish..... 20
 Scutellum black; front at vertex in both sexes less than eye width (*nigripalpis* Townsend preoccupied).....*caesar* Aldrich.
20. Front at vertex about two-fifths the head width; silvery pollinose, somewhat blackish at vertex; penultimate joint of the arista usually twice as long as broad.....*vulgaris* Fallén.
 Front at vertex much narrower; golden pollinose, the penultimate joint of the arista short.....*crassiseta*, new species.
21. Mid tibiae with two or more bristles on the outer front side near the middle..... 29
 Mid tibiae with but one bristle on the outer front side near the middle..... 22
22. Head, thorax, and abdomen yellow pollinose..... 26
 Head, thorax, and abdomen black, gray pollinose..... 24
23. Omitted.
24. Abdominal hairs depressed; bucca one-eighth or less the eye height... 25
 Abdominal hairs erect; bucca one-fifth the eye height.....*fronto* Coquillett.
25. With two sternopleural bristles (rarely a weak third sternopleural bristle present).....*blanda* Osten Sacken.
 With three stout sternopleural bristles; apical scutellar bristles directed backward.....*blandita* Coquillett.
26. With three dorsocentral macrochaetae and two or three sternopleural ones..... 28
 With four dorsocentral macrochaetae and three sternopleural ones; bucca one-fifth the eye height..... 27

27. Front prominent; second and third abdominal segments satiny golden pollinose, the posterior fourth sharply divided, dull black and entirely free from pollen.....ochracea Van der Wulp.
Front not prominent; second and third abdominal segments golden pollinose with shiny black hind edges which blend partially with the golden.....marginata, new species.
28. With two sternopleural bristles; fourth segment of the abdomen destitute of macrochaetae; apices of the intermediate segments of the abdomen concolorous.....angustivitta, new species.
With three sternopleural macrochaetae; fourth segment of the abdomen with two rows of macrochaetae; apices of the intermediate segments of the abdomen black.....marginata, new species.
29. Head, thorax, and abdomen black, gray pollinose..... 30
Head, thorax, and abdomen yellowish pollinose; second segment of the abdomen often destitute of discal macrochaetae.....helvina Coquillett.
30. With four dorsocentral macrochaetae..... 32
With three dorsocentral macrochaetae and three sternopleurals..... 31
31. Males without orbital bristles; third joint of the antennae in the male two and one-fourth, in the female about twice the length of the second; mid tibiae with three or more bristles on the outer front side near the middle; discal macrochaetae not arranged in pairs.....affinis Fallén.
Males with orbitals; third joint of the antennae in both sexes about four times the second; mid tibiae usually with but two long bristles on the outer front side near the middle.....curriei Coquillett.
32. With two sternopleural bristles..... 34
With three sternopleural bristles..... 33
33. Palpi swollen; abdominal hairs depressed; second antennal joint not especially elongated.....inflatipalpis, new species.
Palpi normal; abdominal hairs erect; second antennal joint elongated.
coerulea, new species.
34. Abdomen covered with a thin bluish white pollen, narrow apical margins of the second and third segments shining black, their bases gray pollinose; body and legs blackish, the tibiae often brownish; face silvery; when viewed from behind the inner forceps are widely separated.
reclinata, new species.
Abdomen, including the hind margins, covered with yellowish gray pollen; body and legs brownish; face gray pruinose; when viewed from behind the inner forceps are closely approximated.
cheloniae Rondani.

Subgenus ZENILIA.

ZENILIA AMPLEXA Coquillett.

Exorista amplexa COQUILLET, Revis. Tachin., 1897, p. 97.*Exorista griseomicans* VAN DER WULP, Coquillett, Revis. Tachin., p. 98.*Exorista flavirostris* VAN DER WULP, Coquillett, Revis. Tachin., p. 100.*Sisyropa hemerocampae* TOWNSEND, Annals Ent. Soc. Amer., vol. 2, 1909, p. 248.

Front in both sexes variable, in the male from 0.192 to 0.210 and in the female 0.200 to 0.245 of the head width; front and face silvery pollinose, never with a strong yellowish cast; the sides of

former bearing a few indistinct hairs; usually the front and face are of equal width but sometimes the face is slightly wider; in profile the front at base of antennae projects forward about one-fourth to one-third of the eye width. Facial ridges bristly on the lowest fifth; bucca one-twelfth the eye height; antennae black or yellow, nearly as long as face, the third joint in both sexes three to four and one-half times the second, arista thickened on the basal fifth and in some specimens on the basal third, the penultimate joint short. Thorax black, gray pollinose, with four black vittae; dorsocentral macrochaetae variable, usually with four, sometimes with three and occasionally with three on one side and four on the other; scutellum black at base, usually gray pollinose although quite often yellowish, bearing three or four pairs of long marginal bristles besides the apical pair which are directed backward and usually cruciate; sternopleural bristles variable, usually two long and a vestigial one, sometimes three and very often their development is so variable as to exclude their use as a specific character; pteropleural bristles about the size of the sternopleural ones. Abdomen variable, may be either black, gray pollinose, or entirely yellow, excepting a narrow black vitta on the dorsum, between these two extremes there are many other shades. No discal macrochaetae present, first and second segments bear one pair each of median marginal macrochaetae, third with a marginal row and the fourth wholly covered with bristles two-thirds as long as the macrochaetae of the third segment; abdominal hairs usually subdepressed, sometimes quite erect, but if so they are short and inconspicuous. Legs brown or black; usually the tibiae somewhat brownish; mid tibiae with one bristle on the outer front side near the middle; hind tibiae short-ciliate with one longer bristle near the middle, this longer bristle is variable in length although always longer than the surrounding ones. Third vein with two bristles at its base.

Length 8 to 10 mm.

Redescribed from many specimens from New England, Pennsylvania, District of Columbia, Mississippi, Florida, Texas, and Western United States and Canada.

Type.—Cat. No. 3596, U.S.N.M., from Mount Washington, New Hampshire.

The species, as may be seen from the description, is very variable. Many specimens of the various forms have been examined and we are unable to find any good character to separate them. Certain specimens from the Southern States are more yellowish and while the black forms seem typical of the Northern States they are not without exception. In the few specimens in which the genitalia have been studied, we have found them quite alike in structure.

ZENILLIA PROTUBERANS, new species.

Front in male 0.256–0.245 of the head width; face and front silvery pruinose, the sides of the latter bearing a few inconspicuous hairs; facial ridges hairy on the lowest third or less; bucca one-twelfth the eye height; palpi yellow; antennae shorter than face, the third joint two and one-half times the second; arista thickened on the basal third, the penultimate joint short. Thorax black, grayish pollinose, bearing four black vittae; four dorsocentral macrochaetae; scutellum black at base, the apex yellowish and bearing three long and one shorter apical pair of bristles. Sternopleura with two bristles. Abdomen mostly yellow excepting a black vitta on the dorsum and a similar one on the venter; no true discal macrochaetae present, although the abdominal hairs are long and erect and almost attain the size of macrochaetae. Legs brown, mid tibiae bearing one bristle on the outer front side near the middle; hind tibiae short ciliate. Wings normal, the third vein bearing two bristles at its base. The puparium of this species has the anal stigmata protruding and is in this respect similar to *Zenillia cheloniae* Rondani.

Length 8 to 9 mm.

Described from two male specimens reared at the gypsy moth laboratory, from *Malacosoma disstria* Huebner. Material collected at Rockingham, Vermont, June 21, 1915, by J. J. Culver, the flies issuing July 23–25, 1915.

Type.—Male, Cat. No. 25699 U.S.N.M.

ZENILLIA HELVINA Coquillett.

Exorista helvina COQUILLET, Revis. Tachin., 1897, p. 96.—JOHNSON, Cat. Ins. New Jersey, 1899, p. 672; ed. 2, 1909, p. 780.—SLOSSON, Ent. News, vol. 9, 1898, p. 252.—TOTHILL, Canad. Ent., vol. 45, 1913, p. 71.

Thorax and abdomen golden pollinose; discal macrochaetae usually confined to the third segment; mid tibiae with two bristles.

Front of male 0.264–0.296 and in the female 0.320–0.340–0.333 of the head width; face and front usually yellowish pollinose, the former sometimes silvery, face wider than front; bucca one-fifth the eye height; palpi yellow, normal; facial ridges hairy on lowest fourth; antennae nearly as long as face, the third joint in male four and one-half and in the female three and one-half times the second; arista gradually tapering from base to apex, penultimate joint short. Thorax black, yellowish pollinose marked with four black vittae and bearing usually four dorsocentral macrochaetae, sometimes three; sternopleura with three bristles; scutellum yellow pollinose bearing four long pairs of marginal bristles, the apical being of the same size as the other three; also a strong pair on disk. Abdomen wholly yellow pollinose, the apex of segments two, three and four sometimes blackish, but there is no definite line of demarcation; discal macro-

chaetae usually present on the third segment although sometimes reduced to erect bristly hairs; in some specimens discal bristles are present on both of the intermediate segments. Legs usually black, the tibiae sometimes yellow; mid tibiae with two strong bristles on the outer front side near the middle; hind tibiae coarsely ciliate, with two or more longer bristles. Third vein with three or four bristles at its base. Hypopygium black, inner forceps long, curving inwardly and tapering to a fine point, outer forceps shorter, about three-fourths the length of the inner ones, slender and tapering as the others.

Redescribed from several specimens of both sexes: the type is from White Mountains, N. H. (Morrisson); one from Crawford's and three from Franconia, N. H. (Mrs. Slosson); one White Mountains, New Hampshire, and one Spot Pond, Massachusetts (Townsend); one Seattle, Washington (Aldrich). There is also a series in the gypsy moth laboratory, Melrose Highlands, Massachusetts. Johnson lists it from New Jersey. The only rearing record is reported by Tothill, the host being *Amphidasia cognataria* Guenée, at Coldstream, British Columbia.

Type.—Male, Cat. No. 3624, U.S.N.M.

ZENILLIA OCHRACEA Van der Wulp.

Exorista ochracea VAN DER WULP, Biologia Centrali-Americana, Diptera, vol. 2, 1890, p. 63.

Chrysomasicra borealis TOWNSEND, Journ. New York Ent. Soc., vol. 23, 1915, p. 230.

Thorax and abdomen golden pollinose, the latter with the apical margins of last three segments polished black; mid tibiae with one bristle on the outer front side near the middle.

Front of male 0.280 and in the female 0.326 of the head width; front mostly golden pollinose, the face less so, silvery in some specimens; facial ridges bristly on the lowest third; bucca one-fifth the eye height; face wider than front; antennae nearly as long as face, third joint in male five times the second and in the female slightly less; arista gradually tapering from base to apex, the penultimate joint short. Thorax yellowish pollinose marked with four fine black vittae; four dorsocentral macrochaetae; scutellum yellowish bearing two or three pairs of long bristles besides the very short fine pair of apical ones which are cruciate and turned upward. Sternopleura with three bristles. Abdomen with weak discal bristles on the second segment and stronger ones on the third, the fourth segment has a marginal and submarginal row of macrochaetae, first segment black, remaining ones yellow pollinose except on apical fourth which is opaque black, sharply contrasting. Legs black; mid tibiae bearing but one bristle on the front side near the middle; hind tibiae weakly

ciliate with one longer bristle. Front pulvilli twice the length of those of the hind tarsi.

Redescribed from eight specimens: the type of *ChrysoASICERA borealis*, which is a male taken at "Top of Las Vegas Range, New Mexico, June 28" (Cockerell); one female, allotype of the same, Las Vegas Hot Springs, New Mexico, August 9 (Barber); one female, Mexico City (Roberto Müller); five females, Hell Canyon, Manzano National Forest, New Mexico, September 19, 1916, on foliage of oak (Townsend). The last are considerably smaller than the rest. The allotype bears Coquillett's identification as *ochracea* Van der Wulp, which in this case seems considerably more certain than in most of Wulp's species. Cockerell noted "In life brilliant golden shot with green," and Wulp records a similar observation about the green tinge by H. H. Smith, who collected his material.

The type of *ochracea* is in the British Museum; that of *borealis* is Cat. No. 19613, U.S.N.M.

ZENILLIA MARGINATA, new species.

? *Chrysoexorista viridis angustifrons* TOWNSEND, Bull. Amer. Mus. Nat. Hist., vol. 35, 1916, p. 21.

Thorax and abdomen wholly golden pollinose; with three sternopleural bristles; fourth segment of the abdomen with two rows of macrochaetae; apices of the intermediate segments black.

Front of female 0.28 of the head width; front golden pollinose the face slightly less so, sides of the former sparsely haired; facial ridges bristly on the lowest fifth; bucca grayish pruinose with yellowish tinge, about one-sixth the eye height; palpi yellow; antennae nearly as long as face, the third joint three times the length of second, arista thickened on the basal third, penultimate joint short. Thorax black, yellowish pollinose bearing four black vittae; three or four dorsocentral macrochaetae present; scutellum yellowish with three long and one shorter pair of apical bristles. Sternopleura with three bristles. First segment of the abdomen black, intermediate segments golden pollinose, their narrow apical margins polished black; fourth segment wholly golden pollinose; venter black, gray pollinose. Discal and marginal macrochaetae present on all segments but the first, which has only the marginals. Legs black; mid tibiae bearing one stout bristle on the outside near the middle; hind tibiae evenly ciliate with one longer bristle. Anterior portion of the wings brownish; third vein with two bristles at its base.

Length 7 mm.

Described from one female collected at Boulder, Colorado, October 13, 1917 (Cockerell). Another female probably belonging to the species is from Cornelia, Georgia, under Codling Moth band (*Car-*

pocapsa pomonella Linnaeus) August 30, 1921 (E. R. Van Leeuwen); it has four dorsocentrals, and the abdomen is a little less golden.

We have seen only males of Townsend's *angustifrons*; they are from Brazil and Bolivia, and have the black posterior bands of the second and third abdominal segments wider, but otherwise are hardly distinguishable. Females from South America would probably settle the question. The South American species is known to vary in the number of dorsocentrals.

Type.—Female, Cat. No. 25700, U.S.N.M.

ZENILLIA ANGUSTIVITA, new species.

Thorax and abdomen wholly golden pollinose; with two sternopleural bristles; fourth segment of the abdomen destitute of macrochaetae.

Front at vertex 0.28 of the head width, much wider at antennae; front golden, the face white pollinose; frontal vitta narrower than one parafrontal; facial ridges bristly on the lowest fourth; bucca about one-fifth the eye height and clothed with dense fine white hairs; the lower border bearing two or three strong black hairs below the vibrissae; palpi pale yellow bearing but a few black hairs; antennae nearly as long as the face, the third joint two and one-fourth times the second; arista thickened on the basal third, the penultimate joint shorter than long. Thorax black, deep yellow pollinose with four black vittae, the outer ones broken at the suture; three dorsocentral macrochaetae; scutellum concolorous, bearing three long pairs of marginal and a backward-turning pair of apical bristles; sternopleura with two bristles. Abdomen red in ground color throughout except for a trace of a median dorsal dark vitta; marginal macrochaetae on the first segment, discals and marginals on the intermediate ones; the fourth bearing several irregular rows of bristles one-half the length of the macrochaetae of the third segment. Fourth segment of the abdomen as long as the third, yellowish, the pollen golden. Coxae and femora yellow, tibiae brown and tarsi black; mid tibiae with one bristle on the front side near the middle; hind tibiae coarsely ciliate, with one or two longer bristles. Third vein with two or three bristles at its base.

Length 8 mm.

Described from one female collected at Staten Island, New York.

Type.—Female, Cat. No. 25701, U.S.N.M.

ZENILLIA COQUILLETTI, new species.

Exorista angustata VAN DER WULP, Coquillett, Revis. Tachin., 1897, p. 99.

Front of male 0.32 of the head width, white pruinose, the sides sparsely haired and bearing a few longer bristles outside the frontal

row; face silvery pollinose; bucca one-fifth the eye height; palpi black at base, the extreme tips yellow; facial ridges bristly on the lowest fourth; antennae nearly as long as the face, the third joint three and one-half times the second, arista thickened on basal third, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae and bearing three dorsocentral macrochaetae; scutellum black, gray pollinose with three marginal pairs and an apical pair of bristles. Sternopleura with three bristles; pteropleural bristle quite well developed, nearly as long as those of the sternopleura. Abdomen destitute of discal bristles; first segment black; second and third black at apex, the remainder gray pollinose; fourth segment shining black, except at sides; marginal macrochaetae stout, the first two segments with one pair, third with marginal row, the fourth bristly on the apical half; abdominal hairs depressed; mid tibiae with one stout bristle on the outer front side near the middle; hind tibiae subciliate at most. Third vein with two or three bristles at its base.

Length 10 mm.

One male, from Texas (Belfrage).

Type.—Male, Cat. No. 25702, U.S.N.M.

ZENILIA LOBELIAE Coquillett.

Exorista lobeliae COQUILLET, Revis. Tachin., 1897, p. 97.—BRIMLEY, Ent. News, vol. 33, 1922, p. 22.—REINHARD, Ent. News, vol. 32, 1921, p. 72.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, 1922, p. 11, fig. 18 (puparium).

Facial ridges bristly on the lowest half; four sternopleural bristles are present; palpi yellow; mid tibiae with two bristles on the outer front side near middle.

Front in male 0.27 (one specimen), in female 0.33 to 0.36 (in three) of the head width; face and front silvery pollinose, the sides of latter sparsely covered with short hairs; bucca about one-sixth the eye height; facial ridges usually bristly on the lower half although sometimes only on one side; both ridges are always ciliate on more than the lowest third; antennae nearly as long as the face, the third joint four times as long as the second; arista thickened on the basal three-sevenths, the penultimate joint short; palpi yellow. Thorax gray pollinose marked with four black vittae and bearing four dorsocentral macrochaetae; scutellum black, gray pollinose and yellowish at the tip, with two long pairs of marginal bristles and a short pair between them; the apical pair decussate, of moderate size, the disk with one pair of bristles and numerous spiny erect hairs. Sternopleura with four distinct bristles. Abdomen destitute of discal macrochaetae, although the third segment sometimes has a few stout bristles which approach macrochaetae in size; black, gray pollinose on the last three

segments excepting the narrow, ill-defined apices, which are black. Mid tibiae with two bristles on the outer front side near the middle; hind tibiae outwardly ciliate. Third vein with two bristles at base.

Length 5.5 to 8 mm.

Redescribed from the type series of one male and six females (not two males and five females as given by Coquillett); the type and one other female are from Virginia, and were reared by Koebele from *Acronycta hamamelis* Guenée, emerging August 8, 1882; one male and three females are from Maryland, reared from an *Acronycta* on oak, July 28 and 31, 1882; one female without locality was reared from *Acronycta lobeliae* Guenée, April 21, 1885. The specimen reared from *Orgyia*, mentioned by Coquillett, is not now in the Museum or has been placed elsewhere. One much larger female from Virginia (Dyar) was reared from *Acronycta*; and one female without rearing record is from Lafayette, Indiana (Aldrich). Reared from *Alabama argillacea* Huebner at College Station, Texas, by Reinhard.

The species is intermediate between *Phorocera* and *Zenillia* in the bristles of the facials, hence has been referred to in both tables; it is also intermediate between those species with discals and those without, making it difficult to place satisfactorily in the table of species. The Indiana specimen has a pair of distinct discals on the third segment.

Type.—Female, Cat. No. 3595, U.S.N.M.

ZENILLIA VALENS, new species.

Front in male 0.25 to 0.27 of the head width (in three), parafrontals from the vertex with uniform yellowish pollen, parafacials paler yellow; frontal bristles about 10, only the upper one reclinate, and it is much stouter than several next in front of it; lowest frontals reaching level of base of third joint, facial ridges with feeble bristles ascending to middle of third antennal joint; antennae black, third joint two and a half times the second, not quite reaching the vibrissae. Palpi yellow, arista thickened on basal two-fifths. Thorax gray pollinose with the usual changeable stripes indistinct. Dorsocentrals 4, sternopleurals 3; scutellum with three lateral (the middle one small) and a small pair of apicals. Abdomen with rather thin gray pollen extending to the hind margins of the segments, showing a changeable median dark stripe; second and third segments with large erect scattered hairs which almost approach the size of discal bristles; fourth segment with the same kind of hairs and some undoubted discal bristles; genitalia small, the inner forceps separate, thick, minutely hooked at apex on front side, outer forceps shorter, less thick, with several minute retrorse hooklets on front near apex. Legs black, mid tibiae with two or three bristles on outer front side, hind tibiae ciliated on outer side, with one

larger bristle about middle. Wings subhyaline, fourth vein obliquely curved without fold, ending considerably before apex; third vein with one or two setules at base.

Length 10 to 10.5 mm.

Described from three males; one Holland Hills, Long Island, New York, emerged from puparium June 4, 1911; one Pennyquid Barrens, New York, July 8, 1920 (American Museum of Natural History); one Germantown, Pennsylvania (Harbeck), September 24, 1905.

Type.—Male, Cat. No. 25703, U.S.N.M., from Holland Hills, New York.

The type has the puparium attached, which is identical with that of *lobeliae*, as figured by Greene.⁷ The latter, however, is a much smaller species with depressed hair on the second and third abdominal segments.

ZENILIA EUDRYAE Townsend.

Exorista eudryae TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, 1892, p. 287.—COQUILLETT, Revis. Tachin., 1897, p. 100.—TOWNSEND, Annals Ent. Soc. Amer., vol. 8, 1914, p. 89; Proc. Biol. Soc. Wash., vol. 28, 1917, p. 21.—TOTHILL, Canad. Ent., vol. 45, 1913, p. 70.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, 1922, p. 11, fig. 27 (puparium).

Oæxorista thompsoni TOWNSEND, Proc. Ent. Soc. Wash., vol. 14, p. 165.

Only the uppermost pair of frontal bristles reclinate; thorax and abdomen usually with a bluish tinge; hind tibiae thickly ciliate; bucca one-sixth the eye height.

Front of male from 0.20 to 0.25, and in the female from 0.30 to 0.33 of the head width; face and front silvery, the latter with vitta as wide as either parafrontal; facial ridges bristly on the lowest third (if bristly one-half way up, see *lobeliae*), bucca one-sixth the eye height; palpi yellow, thickly beset with short black hairs which are longer at base; third joint of antennae of female scarcely three times as long as the second, but little longer in the male; arista thickened at base the penultimate joint short. Thorax black, with a bluish tinge and lightly sprinkled with gray pollen; five narrow black vittae, the outer ones interrupted at the suture; four dorso-central macrochaetae; scutellum at the tip somewhat yellowish, the disk covered with erect hairs and bearing three or four pairs of long marginal bristles besides the shorter apical pair. Sternopleura thickly clothed with fine hairs and bearing three bristles. Abdomen black, faintly grayish pollinose with distinct bluish tinge, destitute of discal macrochaetae, the first and second segments with one pair each of median marginal macrochaetae, the third a marginal row and the fourth a marginal and submarginal row; third abdominal seg-

⁷ Proc. U. S. Nat. Mus., 1921, vol. 60, art. 10, fig. 18.

ment of male with a small dense patch of hairs underneath on each side, a good character. Mid tibiae bearing two bristles on the outer front side near the middle; hind tibiae densely ciliate with or without one longer bristle. Third vein with two bristles near its base.

Length 8 to 10 mm.

Redescribed from the following material:

(1) A female from Ithaca, New York, out of the type lot, bred by Prof. J. H. Comstock from *Eudryas* (now called *Euthisanotia*) species. This specimen was donated to the Museum by W. R. Walton, who obtained it from Cornell University.

(2) A female from Dayton, Ohio, reared from *Euthisanotia unio* Huebner by Dr. H. S. Jewett. This specimen bears Coquillett's label as *Exorista eudryae*; Townsend erected for it the genus *Oxexorista* in 1912, referring to *eudryae* as the type of this genus but having this specimen in view. Later (1917) believing it misidentified he proposed for the specimen without description the specific name *thompsoni* (Type No. 19136, U.S.N.M.), and proposed to change the genotype of *Oxexorista* from *eudryae* to *thompsoni*. We fail to find after prolonged comparisons that this specimen is a different species from the remainder of the series.

(3) A male labeled "Bred from *Eudryas grata* from Saunders," no locality (Riley collection). This was selected by Townsend as the true *eudryae* when he separated *thompsoni*, and it is without doubt that species, although we believe his *thompsoni* is also.

(4) A large male from Kaslo, British Columbia (Currie), which was compared with the type for us by Prof. P. B. Lawson at the University of Kansas. The type has been examined by the senior author, but not with reference to certain characters found afterwards. Professor Lawson kindly made the desired comparison; this was before we had discovered the type-lot specimen in the Walton collection, which confirmed his conclusion.

(5) Two specimens reared at North East, Pennsylvania, from *Euthisanotia grata* Fabricius by D. Iseley. One reared from the same host at Raleigh, North Carolina, collector not known. Two from the gypsy moth laboratory, one reared from *Alypia octomaculata* Fabricius in Massachusetts. One bred from *Acronycta* species at St. Louis, Missouri, by C. V. Riley. One from Plummer Island, Maryland (Shannon, 1913).

The species has been reported from New Jersey (Smith Cat.); Axton, New York (McGillivray and Houghton); Kansas (F. H. Snow); Ottawa, Canada (Gibson); North Carolina (Brimley); Quebec, Canada (Winn and Beaulieu); Connecticut (Britton). Brimley reared it from *Euthisanotia grata* Fabricius and *unio* Huebner and from *Estigmene acraea* Drury. Tothill reared it from *Euthisanotia grata* Fabricius at Ottawa. Unpublished records on speci-

mens identified in the Museum include rearing from *Automeris io* Fabricius at Wallingford, Connecticut, by B. A. Porter.

Type.—In the University of Kansas.

ZENILLIA COERULEA, new species.

Front of male at vertex 0.27 of the head width (the same in two specimens); the sides of front bearing a few inconspicuous hairs, as wide as the vitta; frontal bristles reach the third antennal joint, the two uppermost stout and reclinate; inner and outer vertical bristles well developed; face and front silvery; facial ridges bristly on the lowest fourth; bucca one-eighth the eye height, sparsely haired excepting the stout bristles of the lower border; palpi normal, yellow, thickly clothed with fine black hairs; antennae five-sixths the length of face, second joint elongate, the third hardly twice the length of the second, arista slightly thickened on the basal third, the penultimate joint short. Thorax black, subshining, thinly gray pollinose marked with four black vittae; four dorsocentral macrochaetae; scutellum black, gray pollinose bearing three long pairs of marginal bristles and a large cruciate apical pair; the disk is covered with numerous, short erect hairs and bears a pair of widely separated bristles smaller than the apical ones. Sternopleura with three bristles. Abdomen black, gray pollinose, all of the first, narrow apical margins of the second and third and the tip of the fourth segments shining black. No true discal macrochaetae, although the abdominal hairs are rather long and erect, the first segment has one pair, second segment with two or three pairs of stout marginal macrochaetae, the third with a marginal row and the fourth wholly covered. Legs black, mid tibiae with two or more bristles on the outside near the middle; hind tibiae with bristles of uneven length and not at all comblike. Wings hyaline; apical cell widely open, bend of last section of fourth vein a little rounded, third vein with two bristles at its base.

Length 10 to 12 mm.

Described from four female specimens reared at the Gypsy Moth Laboratory from *Cimex americana* Leach. Material collected July, 1919, at Auburn, Massachusetts, by William Eels, the Tachinids issuing June 29 and July 12, 1920.

Type.—Cat. No. 25704, U.S.N.M.

ZENILLIA FORMOSA, new species.

Front of male 0.23 to 0.26 and in the female 0.30 to 0.33 of the head width; the sides gray pruinose, sparsely haired; frontal bristles reach the base of the third antennal joint, the two uppermost ones stout and reclinate, the penultimate one longest; inner vertical strong, the outer one vestigial in the male; face silvery

pruinose, facial ridges bristly on the lowest fourth; bucca one-twelfth the eye height, bearing only a few hairs besides the stout bristles of the lower border; palpi yellow, quite thickly clothed with fine black hairs; antennae nearly as long as the face, the third joint of male nearly four times and in the female at least three times the length of the second, arista slightly thickened on the basal third, the penultimate joint short. Thorax black, gray pollinose marked with four black vittae, the outer ones broken at the suture; four dorsocentral macrochaetae; scutellum yellowish with the pollen grayish, bearing three pairs (sometimes four) of long marginal bristles besides the large backward directed, apical pair; in most specimens the apical pair are cruciate, although they are not so in one instance. Sternopleura clothed with fine long hairs and bearing three stout bristles. Abdomen stout, the first segment black, the remaining ones black, gray pollinose the apical portions of these segments less pollinose and often blackish, the fourth segment at apex at least is subshining, black; sides of the intermediate segments sometimes slightly yellowish; abdomen never with a bluish tinge. No discal macrochaetae on the abdominal segments. First and second segment have one pair each of median marginal macrochaetae; third with a marginal row of uncommonly stout ones, the fourth quite thickly covered with shorter bristles and bearing two irregular rows of macrochaetae on the apical half; abdominal hairs subdepressed. Venter of the third abdominal segment of male destitute of a small patch of hairs. Legs black; mid tibiae bearing two or more bristles on the outer side near the middle; hind tibiae densely ciliate.

Length 10 to 12 mm.

Described from 12 specimens of both sexes; two were reared from *Automeris io* Fabricius at West Medford, Massachusetts, issuing May 31, 1895; four were reared from *Agrotis ypsilon* Rottensburg, in Missouri by C. V. Riley; the others from Lehigh Gap, Pennsylvania (Greene); Melrose Highlands, Massachusetts (Townsend); Glen Echo, Maryland (Aldrich); Lafayette, Indiana (Aldrich); and White Mountains, New Mexico (Townsend).

Mr. E. G. Reinhard has contributed two additional female specimens, reared by him from *Automeris io* Fabricius at Woodstock, Maryland.

Type.—Male, Cat. No. 25705, U.S.N.M., from West Medford, Massachusetts.

ZENILLIA INFLATIPALPIS, new species.

With discal macrochaetae; palpi swollen; three sternopleural bristles; four dorsocentral bristles.

Front of female 0.27 of the head width at vertex; at epistoma the eyes are separated by 0.45 of the head width, much less than usual;

front and face silvery, the sides of former sparsely haired; frontal bristles reach the base of third antennal joint, the two uppermost ones stout and reclinate; face and front nearly of equal width, bucca one-twelfth the eye height; facial ridges bristly on the lowest fourth; palpi yellow, swollen at tip and sparsely haired; antennae nearly as long as face, the third joint two and one-fourth times the second; arista tapering from base to apex, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae and bearing four dorsocentral macrochaetae. Scutellum black, gray pollinose, the tip yellowish, bearing three long and one shorter apical pair of marginal bristles. Sternopleura with three bristles. Abdomen with discal and marginal bristles, the fourth segment, excepting the extreme base, with stout bristles all over; first segment wholly black, the remaining ones gray pollinose at base. Legs black; mid tibiae bearing two bristles on the outside near the middle; hind tibiae ciliate, with two or three longer bristles. Wing venation as usual, excepting that the last section of the fourth vein is strongly arcuate; third vein with two bristles at its base.

Length 10 mm.

Described from one female specimen collected at Great Falls, Virginia.

Type.—Female, Cat. No. 25706, U.S.N.M.

A second female, collected at Lafayette, Indiana, September 14, 1917 (Aldrich), differs in only one character; it has no discal macrochaetae on the abdomen. The width of the front is the same. The correspondence is so complete that we feel compelled to regard the species as the same.

ZENILLIA POLITA Coquillett.

Exorista polita COQUILLET, Revis. Tachin., 1897, p. 99.

Abdomen black and shining; basal fourth of segments two and three thinly gray pollinose at most; closely related to *Zenillia setinervis*, but does not have the third vein bristly to the small cross-vein.

Front in male 0.257 of the head width; face and front silvery pruinose, the latter darker above, thickly clothed with fine bristly hairs; three reclinate bristles on each side above; bucca one-eighth the eye height; facial ridges bristly on the lowest fourth; antennae as long as face, the third joint about five times the length of second; arista slender, hardly thickened on the basal fourth; penultimate joint short; palpi yellow. Thorax bearing four dorsocentral macrochaetae, thinly whitish pollinose with four black vittae; scutellum bearing three long pairs of marginal and a shorter, cruciate apical pair of bristles; sternopleura with three bristles. Abdomen destitute of discal macrochaetae, black, shining, with a bluish tinge,

the narrow bases of the intermediate segments white pollinose; abdominal hairs rather long and suberect. Mid tibiae bearing one bristle on the front side near the middle; hind tibiae ciliate.

Length 7 mm.

Redescribed from the type, a male collected October 17, 1896, by G. R. Pilate, Tifton, Georgia. Apparently no other specimens have been found.

Type.—Cat. No. 3598, U.S.N.M.

ZENILLIA SETINERVIS Coquillett.

Exorista setinervis COQUILLET, Proc. Ent. Soc. Wash., vol. 12, 1910, p. 129.

Third vein bristly to the small crossvein; abdomen black, shiny, the base of the intermediate segments gray pollinose; palpi yellow; mid tibiae with one bristle on the outer side near middle.

Front in male 0.230 and in the female 0.268 of the head width; face and front silvery pollinose, the latter clothed with short bristly hairs; bucca one-sixth the eye height; antennae as long as face, the third joint in the male five times and in the female four times the second, the arista thickened on the basal one-fifth; facial ridges bristly on the lowest one-third. Thorax black, gray pollinose marked with four black vittae; three dorsocentral macrochaetae present and two sternopleural bristles; scutellum with three pairs of marginal bristles and a very short pair of apical ones. Abdomen black and polished, excepting the narrow bases of the second and third segments which are bluish white pruinose. No discal macrochaetae present. Mid tibiae bearing a single bristle on the outside near the middle; hind tibiae not ciliate. Pulvilli brown, long in male, short in female.

Length 6 mm.

Redescribed from the type, a male from Clarksburg, Tennessee (Morgan), and a female from Raleigh, North Carolina (Sherman).

Type.—Male, Cat. No. 13097, U.S.N.M.

Subgenus PHRYXE.

ZENILLIA VULGARIS Fallén.

Tachina vulgaris FALLÉN, Kongl., Svenska Vetensk. Akad. Handl., vol. 31, 1810, p. 275; Dipt. Sueciae, Muscides, 1820, p. 62.—ZETTERSTEDT, Ins. Lapponica, 1838, p. 644; Dipt. Scandinaviae, vol. 3, 1844, p. 1139.

Phryxe athaliae and 21 other species, ROBINEAU DESVOIDY, Myodaires, 1830, pp. 159–170; more than 200 additional specific names with "description" in Dipt. des Environs de Paris, vol. 1, 1863, pp. 329–458. According to Professor Bezzi, Katalog der palaearkt. Dipt., vol. 3, 1908, there are in these two works no fewer than 245 synonyms of *Phryxe vulgaris*.

Exorista vulgaris MEIGEN, Syst. Besch., vol. 7, 1838, p. 255.—COQUILLET, Revis. Tachin., 1897, p. 93.—TOTHILL, Canad. Ent., vol. 45, 1913, p. 71.

- Exorista hirsuta* OSTEN SACKEN, *Canad. Ent.*, vol. 19, 1887, p. 163.—
 WILLISTON, in *Scudder's Butterflies of New England*, vol. 3, 1889, p. 1919,
 pl. 89, figs. 13-15.—TOWNSEND, *Psyche*, vol. 6, 1893, p. 467.
Blepharidea vulgaris RONDANI, *Dipt. Ital. Prodromus*, vol. 1, 1856, p. 67.—
 BRAUER and BERGENSTAMM, *Zweifel. Kais. Mus. Wien*, pt. 4, 1889, p. 88,
 pl. 2, fig. 18; pt. 5, 1891, p. 338; pt. 6, 1893, pp. 114, 117.

Front in both sexes wider than one eye; scutellum at least at tip yellow; palpi black; mid tibiae with two bristles on the front side near the middle.

Front of male 0.40 to 0.41 (three specimens) and in the female the same (three specimens) of the head width; front and face silvery, the vertex blackish; bucca one-fourth the eye height; facial ridges with delicate bristles on the lowest third usually, sometimes reaching halfway; frontal bristles strong, descending on sides of face nearly halfway to the vibrissae; antennae five-sixths the length of face, the third joint in male four and in the female two and one-fourth to three times the second; arista strongly thickened to the middle; the penultimate joint decidedly elongate in most males, hardly at all in most females and a few males. Thorax black, gray pollinose, bearing usually four dorsocentral macrochaetae, sometimes three; scutellum black at base the broad apex usually and the tip always yellowish, bearing three long pairs and a shorter upturned pair of apical bristles. Sternopleura with three bristles. Abdomen black, subshining, the bases of last three segments gray pollinose, sometimes the fourth segment wholly shining black. Discal macrochaetae present on the intermediate segments, the fourth with three or four rows. Mid tibiae always with two and sometimes three, bristles on the outside near the middle; hind tibiae subciliate, the bristles of uneven length. Third vein with two or three bristles at base. Hypopygium black, both pairs of forceps short and about the same length, the inner ones fused together on their basal two-thirds and each tapering to a fine point, outer forceps thick, each nearly equal to the width of the inner pair and ending in a blunt point; base of outer forceps yellowish; inner forceps densely hairy on the outer sides.

Length 7 to 9 mm.

Redescribed from a very long series of North American specimens and a few from Europe, the latter determined by Professor Bezzi, Brunetti, and Brauer and Bergenstamm. The North American material is mostly from New England, but there are also specimens from New York, Idaho, Washington, and British Columbia. The type of *hirsuta* is in the Museum of Comparative Zoology, Cambridge, Mass., and has been examined by the junior author. It was bred from *Pieris rapae* Linnaeus by Lintner, presumably in New York. Coquillett had already made out the synonymy from the description. Townsend reported *hirsuta* reared from *Pyrausta penitalis* Grote by Forbes in Illinois. Tothill mentioned *Tortrix* (*Harmo-*

loga fumiferana Clemens as a common host in Canada. At the gypsy moth laboratory it has been reared again from *Pieris ropae* Linnaeus.

ZENILLIA CAESAR Aldrich.

Exorista nigripalpis TOWNSEND, Psyche, vol 7, 1896, p. 330, not of Macquart, 1846.—COQUILLET, Revis. Tachin., 1897, p. 93.—GIBSON, Rept. Ent. Soc. Ont., for 1918, p. 117.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, p. 11, 1922 (puparium).

Exorista caesar ALDRICH, Canad. Ent., vol. 48, 1916, p. 20.—CAESAR, 46th Rept. Ent. Soc. Ont., 1916, p. 173.

Front of male 0.27 to 0.29 (in three) and in the female 0.31 to 0.33 (in three) of the head width; front and face silvery pollinose; the former blackish at vertex; bucca one-sixth the eye height; facial ridges bristly on the lowest third; antennae variable in length, sometimes reaching the oral margin but usually about five-sixths the length of face; third joint in male varying from two to three and in the female from one and one-third to two and three-quarters times the second; arista thickened on the basal third the penultimate joint usually elongate. While this character is not a constant one it will hold true in the majority of forms. Thorax black, thinly gray pollinose bearing four dorsocentral macrochaetae; scutellum black with three long and one short apical pair of bristles, the latter pair curving backward; sternopleura with three bristles. Abdomen black, somewhat shiny, the bases of the last three segments lightly gray pollinose, the fourth nearly always shining black; discal macrochaetae present on the intermediate segments, the fourth wholly bristly excepting the base; abdominal hairs suberect in male, depressed in the female. Mid tibiae with one or two bristles on the outside near middle; hind tibiae ciliate with one longer bristle. Third vein with one or two bristles at base. Hypopygium black, inner forceps decidedly longer than the outer ones, in profile they are rounded outwardly at base, concave near the middle and then curving inward and ending in a slender point; outer sides sparsely haired; outer forceps shorter, about three-fourths as long as the inner ones terminating in a blunt point, their base yellowish.

Redescribed from a long series of specimens; three paratypes of *caesar*, reared from *Cacoecia argyrospila* Walker at Simcoe, Ontario, by Prof. Lawson Caesar; a series reared at Canyon City, Colorado, by J. B. Gill, from the same host; one from *Loxostege sticticalis* Linnaeus at Greely, Colorado, by A. E. Mallory; several from *Pyrausta nubilalis* Huebner at West Medford and neighboring places in Massachusetts; several reared from *Crambus trisectus* Walker at Lafayette, Indiana, by W. H. Larrimer; collected specimens from New England; Tennessee Pass, Colorado; Koehler, New Mexico.

Caesar reports it an abundant parasite of *Cacoecia* in Ontario; in Walton's unpublished index it is recorded from *Cacoecia argyrospila* Walker at Wenatchee, Wash., reared by Newcomer.

The type of *nigripalpis* is in the University of Kansas, where it was examined by the senior author.

Paratype (of *caesar*).—Male, Cat. No. 25694, U.S.N.M.

ZENILLIA CRASSISETA, new species.

Front in both sexes golden pollinose; palpi black; scutellum yellowish; front in both sexes at vertex less than the eye width.

Front of male 0.23 and 0.26 and in the female 0.30 the head width, golden pollinose in both sexes, the vertex rarely blackish; frontal vitta narrower than the parafrontals; frontal bristles reach below the base of third antennal joint, the two uppermost reclinate in the male, three in the female; parafacials silvery; facial ridges bristly on the lowest fourth; bucca one-seventh the eye height; third antennal joint in the male hardly three times and in the female two and one-fourth times the second, arista very slender, hardly at all thickened on the basal fifth, the penultimate joint short (in one specimen somewhat elongate). Thorax black, dusted lightly with yellowish pollen and marked with four black vittae; four dorsocentral macrochaetae; scutellum black at base, yellowish at the tip, bearing three long pairs of marginal and a shorter upturned pair of apical ones, the pair next the apicals very long, stout at base, reaching to the third abdominal segment. Sternopleura with three bristles. Abdomen black, the hind margins of segments two and three, a median stripe on the second, and the apical half of the fourth polished black. Discal macrochaetae present on the intermediate segments, the fourth with two or three rows, those on the apical half strongest; marginal bristles long and stout at base; abdominal hairs erect in the male, depressed in female. Mid tibiae with two bristles on the outer front side near middle; hind tibiae unevenly ciliate. Last section of fourth vein arcuate on the basal three-fourths; third vein with two bristles at its base.

Length 7 to 8 mm.

Described from four specimens, two of each sex collected at Lafayette, Indiana, and North Andover, Massachusetts.

Type.—Male, Cat. No. 25695, U.S.N.M., from Lafayette, Indiana.

ZENILLIA TRISSETOSA Coquillett.

Exorista trisetosa COQUILLET, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 110.

Distinguished from all others of this group by the presence of a long costal spine.

Front of male 0.34 (in two) and in the female 0.35 (in two) of the head width; parafrontals black when viewed from in front,

thinly gray pollinose from the side; frontal bristles in a single row extending below the level of the arista, facial ridges bristly on the lowest fourth or third; face gray pruinose below the row of frontals; palpi black; bucca one-third the eye height; shining black below the impression; antennae slightly shorter than face, the third joint hardly twice the length of the second, arista thickened on more than basal half, penultimate joint slightly elongate. Thorax black, lightly dusted with a bluish gray pollen bearing three dorsocentral macrochaetae; scutellum black with three pairs of long lateral and one rather long apical pair of bristles; sternopleura with three bristles. Abdomen black, subshining, first segment wholly black, the remaining ones whitish pollinose at their base; one pair of weak marginal macrochaetae on the first segment, the second with one pair each of median discal and marginal, the third with one pair median discals and a marginal row and the fourth wholly covered with macrochaetae. Legs black, bristly, mid tibiae with two or three stout bristles on the outer front side; hind tibiae with many bristles of different length—not ciliate. Wings hyaline, costal spine strong, the third vein slightly sinuate, widening the apical cell beyond its middle, and bearing three or four bristles at its base.

Length 5 to 8 mm.

Redescribed from the type series of seven males and a female, collected at Moscow and Lewiston, Idaho (Aldrich); and from six additional specimens from Ormsby County, Nevada (Baker); Colorado (Baker); Koehler, New Mexico (Walton); Fern Rock, Pennsylvania (Harbeck); Longmont, Colorado.

In Walton's manuscript list the species is recorded as having been reared from *Nephelodes emmedonia* Cramer at Rapatee, Illinois, by Hugo Kahl; Walton identified the specimen for the Illinois Natural History Survey.

Type.—Male, Cat. No. 6212, from Moscow, Idaho.

ZENILLIA SUBMISSA, new species.

The narrow front, thinly hairy eyes and the infuscated crossvein serve to separate this species from the others.

Front of male unusually narrow, 0.147 of the head width; when viewed from the front the face at the vibrissae is much wider than the front at the base of antennae, at least five times the width of the front at that point; face and front gray pruinose, the frontal bristles long, reaching below the base of the third antennal joint; eyes faintly hairy; facial ridges bristly on the lowest fourth; bucca one-tenth the eye height; palpi black; antennae slightly shorter than the face, the third joint two and one-fourth times the second, arista thickened on the basal third, the penultimate joint somewhat elon-

gated. Thorax black, gray pollinose, marked with four black vittae; three dorsocentral macrochaetae; scutellum black with three pairs of marginal bristles besides the shorter upright pair of apical ones; sternopleura with four bristles. Abdomen black, gray pollinose without pattern; first segment with one pair median marginals, second with one pair each of median discal and marginal, third with one ciliate at most. Wings hyaline, the small crossvein clouded with rows on the apical half which are three-fourths as long as the macrochaetae of the third segment. Legs black, mid tibiae with two bristles on the outer front side near the middle; hind tibiae subciliate at most. Wings hyaline, the small crossvein clouded with brown, apical cell almost closed, ending nearer the wing tip than in most of the other species of this group; third vein with two or three bristles at its base.

Length 7 mm.

Described from one male specimen collected at Koehler, New Mexico, by W. R. Walton, August 14, 1913.

Type.—Male, Cat. No. 25696, United States National Museum.

Subgenus PAREXORISTA.

ZENILLIA CHELONIAE Rondani.

Exorista cheloniae RONDANI, Prod. Dipt. Ital., vol. 3, 1859, p. 120.—COQUILLET, Revis. Tachin., 1897, p. 92.—TOTHILL, Can. Ent., vol. 45, 1913, p. 70.—GIBSON, Ann. Rept. Ent. Soc. Ont., 1911, p. 117.

Paraxorista cheloniae TOWNSEND, Proc. Ent. Soc. Wash., vol. 13, 1911, p. 165; and vol. 18, 1916, p. 19.—HOWARD and FISKE, Bull. 91, Bur. Ent., 1911, p. 297.

Abdomen brownish or black, sprinkled lightly with gray pollen and without sheen; legs usually brownish; face gray pruinose.

Front of male 0.25 to 0.28 (in three), in the female 0.30 to 0.38 (in three) of the head width; face and front gray pruinose, blackish at vertex; the sides of same with many fine hairs; parafacial somewhat narrower than the parafrontal and at the narrowest part barely the width of the third antennal joint; bucca linear, one-twelfth the eye height; facial ridges bristly on the lowest fourth; palpi yellow; third joint of antennae in both sexes two and one-half to three times the length of the second; arista thickened on the basal fifth, the penultimate joint short. Thorax black, gray pollinose marked with four or five black vittae and bearing four dorsocentral macrochaetae; scutellum yellowish with four pairs of marginal bristles all of about the same size; sternopleura thickly clothed with fine hairs, and bearing two bristles. Abdomen brown or blackish (sometimes the sides of intermediate segments yellow) gray pollinose and without sheen. Discal macrochaetae present of various sizes but not arranged in pairs, blending with the erect

abdominal hairs. Legs brownish, mid tibiae bearing two bristles on the front side near the middle; hind tibiae ciliate with one large bristle at middle of row. Hypopygium brownish to black, inner and outer forceps long and of even length, the former straight, parallel, except at the apex where they diverge somewhat. When viewed from behind the inner forceps appear fused for two-thirds their length.

Length 8 to 10 mm.

Redescribed from a large series; one European specimen determined by Brauer and Bergenstamm as *Parexorista cheloniae*; many reared at the gypsy moth laboratory, Melrose Highlands, Massachusetts, from *Malacosoma americana* Fabricius; two Soldier's Summit, Utah (Aldrich): Tempe, Arizona (Caffrey); Linnieville, Maryland (Shannon). It appears that some of Coquillett's material was transferred to other species after 1897, as we do not find all his localities in the collection, nor specimens connected with the hosts he mentioned. Tothill records it from *Apantesis ornata* Packard at Kaslo, British Columbia; *Malacosoma disstria* Huebner at Fredericton, New Brunswick, and at Ottawa; and from *Phragmatobia assimilans* Walker at Hymera, Ontario.

Coquillett added a note in his manuscripts that the species was reared from *Cacoecia argyrospila* Walker at Canyon City, Colorado, by J. B. Gill; and Walton's manuscript list of Tachinid hosts records it from *Turuptiana permaculata* Packard at Fort Collins, Colorado, by Professor Gillette.

The biology of the species is somewhat confused. Howard and Fiske state that it attacks the brown tail moth in Europe, but not in the United States; and even imported strains adopt the habit of the American in this regard, which they suggest results from crossing. Townsend quotes Pantel that the fly lays a pediceled egg, upon the host, containing an incubated larva; but adds that in his own work at the gypsy moth laboratory the eggs were unincubated. The fact that the American specimens do not attack the brown tail moth, he says, proves them a distinct species, even though no anatomical characters have been found.

ZENILIA RECLINATA, new species.

Front of male 0.22 to 0.25 (in three) and in the female 0.28 to 0.30 (in three) of the head width; silvery, blackish at vertex, the sides clothed with numerous short black hairs; parafacials silvery, at the narrowest part less than the width of the third antennal joint; palpi yellow; bucca linear, about one-twelfth the eye height; facial ridges bristly on the lowest fourth; antennae somewhat shorter than face, the third joint in both sexes two and one-half times the second, arista

thickened on the basal fifth, the penultimate joint short. Thorax black, thinly whitish pollinose, marked with four or five black vittae and bearing four dorsocentral macrochaetae; scutellum yellowish with four pairs of marginal bristles of about the same length. Sternopleura with two bristles. Abdomen black polished (sometimes the sides of the intermediate segments yellowish) thinly white pollinose, the apical margins very narrowly shining black. Discal macrochaetae present especially on the third segment, abdominal hairs large and erect. Legs black except the tibiae, which are yellowish; mid tibiae bearing two bristles on the outer front side near the middle; hind tibiae ciliate. Hypopygium black, somewhat brownish, inner forceps curved inwardly and tapering to a fine point; outer forceps stouter, decidedly shorter and of a somewhat reddish tinge. When viewed from behind the inner forceps are distinctly separated

Length 8 to 10 mm.

Described from a long series of specimens of both sexes; most of them fall into two series, of which the first is from New England, and has been bred commonly from *Estigmene acraea* Drury. The second series was collected in New Mexico by Townsend in 1916, at Indian Spring, and at Hell Canyon, Manzano National Forest. Other specimens are from Tempe, Arizona (Wildermuth), Great Falls, Virginia (Townsend), and from Hymers, Ontario, reared from *Phragmatobia assimilians*, var. *franconica* Slosson (H. Dawson).

Type.—Male, Cat. No. 25697, U.S.N.M., from Hell Canyon, New Mexico.

ZENILLIA CURRIEI Coquillett.

Exorista curriei COQUILLET, Revis, Tachin., 1897, p. 94.

Three dorsocentrals; discals present; orbital bristles present in the male.

Front of male 0.37 to 0.38 (three specimens) and in the female 0.35 to 0.37 (two specimens) of the head width; silvery in most specimens but often blackish at vertex, the sides sparsely haired; front somewhat prominent; orbital bristles present in both sexes; parafacials silvery pollinose, at their narrowest part about equal to the width of the third antennal joint; bucca one-seventh the eye height; palpi yellow, the base often infuscated; facial ridges bristly on lowest third, sometimes nearly half way. Antennae as long as the face, the third joint in both sexes four and one-half times the second, its apex slightly angulated and prominent above; arista thickened on the basal fourth, the penultimate joint short. Thorax gray pollinose, with three dorsocentral macrochaetae and marked with four black vittae; scutellum black except the extreme tip

which is often yellowish, bearing three long and one somewhat shorter cruciate pair of apical bristles. Sternopleura with three bristles. Abdomen black, subshining; the last three segments thinly gray pollinose except on the apices; discal macrochaetae present on the intermediate segments, fourth segment bare at base, the apical three-fourths bearing three rows of bristles; dorsal abdominal hairs erect in the male, depressed in the female. Mid tibiae usually with two bristles on the outer front side near the middle, sometimes a third one is present; hind tibiae with irregularly placed bristles of uneven length. Third vein with two bristles at its base.

Length 5 to 8 mm.

Redescribed from the type, a male from University, North Dakota, (Currie) and 18 other specimens: Dallas, Texas, and Milwaukee, Wisconsin (collector unknown); Polk County, Wisconsin (Baker); Big Stone City, South Dakota; New Ulm, Minnesota; Lake Metigoshe, Turtle Mountains, North Dakota; Moscow, Juliaetta, and Lawyer's Canyon, Idaho. All collected by the senior author except as noted.

Type.—Male, Cat. No. 3752, U.S.N.M.

ZENILLIA AFFINIS Fallén.

Tachina affinis FALLÉN, Kongl. Svensk. Vet. Akad., vol. 31, 1810, and Muscides, 1820, p. 28.—MEIGEN, Syst. Besch., vol. 4, 1824, p. 327.—ZETTERSTEDT, Dipt. Scand., vol. 3, 1844, p. 1106.

Exorista polychaeta MACQUART, Annales Soc. Ent. France, vol. 7, 1849, p. 380.

Exorista affinis MEIGEN, Syst. Besch., vol. 7, 1838, p. 255.—COQUILLETT, Revis. Tachin., 1897, p. 94.—ADAMS, in Williston's Manual of N. A. Dipt., 1908, p. 358, fig.—TOTHILL, Canad. Ent., vol. 45, 1913, p. 70.

Fourth segment of abdomen polished black, wholly bristly; mid tibiae usually with three or more bristles on the outside near middle; male without orbital bristles.

Front of male 0.26 to 0.27 (in three), and in the female 0.31 to 0.32 (in three) of the head width; face and front silvery pollinose, the latter blackish at vertex; head only a little longer at the base of the antennae than at the vibrissae; parafacial at narrowest part one-half as wide as the third antennal joint; facial ridges bristly on the lowest fourth or rarely third; frontals extending to arista, the upper three or even four reclinate; bucca one-sixth the eye height; palpi yellow; antennae shorter than face, the third joint in male two and one-fourth and in the female about twice the length of the second; arista thickened on the basal fifth, the penultimate joint short. Thorax and abdomen black, subshining, thinly gray pollinose, the former indistinctly vittate, bearing three dorsocentral macrochaetae; scutellum yellow except the narrow basal margin, bearing three pairs of long marginal bristles and a stout apical pair. Sternopleura

with three bristles. Abdomen with discal and marginal macrochaetae, the abdominal hairs long and erect, fourth segment thickly clothed all over with long bristles. When viewed in certain lights the sides and bases of the last three segments reflect gray pollinose. Mid tibiae with three or more strong bristles on the outer side near the middle; hind tibiae with many irregularly placed bristles of uneven length. Hypopygium black, the inner forceps somewhat longer than the outer ones, straight, hairy on the outside, and tapering to a fine point, superficially examined they seemed fused together.

Length 5 to 9 mm.

Redescribed from several European specimens, one determined by Brauer and Bergenstamm as *Parexorista polychaeta* Macquart; also from a larger series from New England (Webber), and other specimens from Beaver Creek, Montana (Hunter); Marshall Pass and Tennessee Pass, Colorado (Aldrich), altitudes 10,856 and 10,290 feet respectively; Emigration Canyon, Utah, altitude 6,500 feet (Aldrich), Oxford, Idaho (Aldrich). Coquillett reports it from Toronto, Canada, Tothill from Ottawa, Canada, and Washburn includes it in his Minnesota list. It has been reared from *Arctia*, species (Coquillett), and from *Phragmatobia fuliginosa* Linnaeus (Tothill). Bezzi gives the extensive European bibliography and some European hosts in the Palearctic Catalogue (vol. 3, p. 239).

ZENILLIA CONFINIS Fallén.

Tachina confinis FALLÉN, Muscides, 1820, p. 32.—MEIGEN, Syst. Besch., vol. 4, 1824, p. 274.—ZETTERSTEDT, Ins. Lapp., 1838, p. 644, and Dipt. Scand., vol. 3, 1844, p. 1140.

Exorista confinis RONDANI, Dipt. Ital. Prod., vol. 3, 1859, p. 143.—COQUILLET, Revis. Tachin., 1897, p. 97.—REINHARD, Ent. News, vol. 32, 1921, p. 72.—GREENE, Proc. U. S. Nat. Mus., vol. 60, p. 11, fig. 21 (puparium).

Tachina theclarum SCUDDER, Canad. Ent., vol. 19, 1887, p. 166.

Exorista theclarum WILLISTON, in Scudder's Butterflies of New England, vol. 3, p. 1920.

Exorista chrysophani TOWNSEND, Ent. News, vol. 2, 1891, p. 197.

With four sternopleural bristles, penultimate joint of the arista usually longer than broad; no discal bristles; abdomen from base of third segment shining black; palpi black; mid tibiae with two bristles.

Front in male 0.25 to 0.26 (in three), in the female 0.30 to 0.36 (in three) of the head width; face and front silvery pollinose, the latter somewhat blackish; bucca one-sixth or less the eye height; third joint of antennae in the male five and in the female three times as long as the second; penultimate joint of the arista longer than broad (in some specimens not a good character); facial ridges bristly one-third way up and sometimes halfway; palpi black. Thorax black, gray

pollinose; four dorsocentral macrochaetae present; scutellum black at base but in most part yellowish bearing two long and one shorter pairs of marginal bristles and a pair of large apicals; disk densely covered with long fine erect hairs; four sternopleural bristles present. Abdomen black; in the male the second and third segments are often reddish at the sides, the second is thinly pruinose, and the third is polished black except a narrow silvery band at extreme base; in the female the abdomen is wholly black, the second and third segments broadly silvery pollinose at base, shining on about the apical half; in both sexes the fourth segment is wholly shining. Abdominal hairs erect, no discal bristles. Mid tibiae bear two and usually three strong bristles on the outside near the middle; hind tibiae ciliate. Third vein bearing two bristles at its base. Hypopygium black, inner forceps shorter than the outer ones, bearing a few fine hairs on the outer side; when viewed in profile they are decidedly concave on the hind edge, the tips pointing backward; outer forceps nearly straight, ending in a blunt point.

Length 5 to 7 mm.

Redescribed from many specimens: two cotypes of *Exorista theclarum* (Cat. No. 1421); numerous specimens from New England, and the vicinity of Washington, D. C.; Alameda, Santa Clara, and La Jolla, California; Mount Moscow, Idaho (Aldrich); Rio Tularosa, New Mexico (Townsend); Botfly Canyon, Pima Mountains, Arizona (Townsend). The European specimens determined by Brauer and Bergenstamm, mentioned by Coquillett as the basis of his determination, are not now in the National Museum. Among other localities in literature are Iowa (Townsend), Kansas (F. H. Snow), and Montreal (Winn and Beaulieu). Coquillett reported the species breeding on *Gloveria howardi* Dyar and *Brephidium exile* Boisduval and his manuscripts add *Heodes thoe* Boisduval at Ottawa, Canada, by Jas. Fletcher, and *Lycaena melissa* at Fort Collins, Colorado, by C. P. Gillette. Cockerell has bred it from *Bryshidium exile* Boisduval in the Mesilla Valley, New Mexico; Scudder reported it from *Strymon calanus* Huebner without locality; Reinhard reared it from *Strymon melinus* Huebner in Texas; Bezzi has given the European bibliography, including 14 synonyms by Desvoidy and some host records, in the Palaearctic Catalogue (vol. 3, p. 241).

ZENILLIA FRONTO Coquillett.

Exorista fronto COQUILLETT, Revis. Tachin., 1897, p. 96.

Front of male 0.309 of the head width, the sides of same gray pruinose, thickly beset with short black hairs, front rather prominent at base of antennae; face gray pruinose, the ridges weakly bristly nearly one-half way; bucca one-fifth the eye height; palpi yellow; antennae black, as long as the face, the third joint of male

six times as long as the second, arista thickened on the basal two-fifths, penultimate joint short. Thorax black, gray pollinose, marked with four black vittae; four dorsocentral macrochaetae; scutellum black, with three long and one short apical pair of bristles. Sternopleura with three bristles. Abdomen black, subshining, the bases of the last three segments gray pollinose; discal macrochaetae present on the last three segments, the abdominal hairs rather long and erect. Legs black, the mid tibiae with one bristle on the outer front side near the middle; hind tibiae weakly ciliate. Wings with a light tinge of brown throughout, deeper at the base and along the costa.

Length 7mm.

Described from a single male specimen, Mount Washington, New Hampshire (Mrs. Slosson).

Type.—Male, Cat. No. 3753, U.S.N.M.

Subgenus EUSISYROPA.

ZENILLIA BLANDA Osten Sacken.

Exorista blanda OSTEN SACKEN, *Canad. Ent.*, vol. 19, 1887, p. 162.—WILLISTON, in *Scudder's Butterflies of New England*, vol. 3, p. 1918, pl. 89, fig. 11. *Exorista blanda proserpina* WILLISTON, in *Scudders's Butterflies of New England*, vol. 3, p. 1919.

Exorista hypenae COQUILLET MS., *Howard, Bull.* 7, new ser., *Bur. Ent.*, 1897, p. 47.—HAWLEY, *Memoir* 15, *Cornell Univ. Expt. Sta.*, 1918, p. 196.

Eusisyropa blanda TOWNSEND, *Smiths. Misc. Colls.*, No. 1803, 1908, p. 97.

Exorista boarmiae COQUILLET, *Revis. Tachin.*, 1897, p. 95.—HOWARD and FISKE, *Bull.* 91, *Bur. Ent.*, 1911, p. 145.—BRIMLEY, *Ent. News*, vol. 33, 1922, p. 22.—GREENE, *Proc. U. S. Nat. Mus.*, vol. 60, Art. 10, p. 11, fig. 25 (puparium).

This variable species has discal macrochaetae, and a single bristle on the outer front side of the middle tibia; it has either three or four dorsocentrals; two sternopleurals or two and a small below; femora either reddish-yellow or black; apical scutellars turned either upward or backward.

The typical form was described as *boarmiae*, new species by Coquillett in his revision; but his *blanda* also comes within the limits of variation of the species.

In this complex group one set of males are readily distinguishable, but we can not separate the corresponding females: hence we let this form stand as a subspecies. Prolonged effort has not resulted in the separation of any other forms by constant characters, however slight.

TABLE OF SUBSPECIES—MALES.

Abdomen with the pollen of the third and fourth tergites continuing on the venter; inner forceps rather thick apically, the last fifth bent at an oblique angle, the back with long hair to the bend; femora black or yellow.

blanda Osten Sacken.

Abdomen with the third and fourth tergites shining brown or black on the venter, contrasting with the pollinose second; inner forceps more slender apically, almost straight, with a minute tooth in front at apex, hairy only about two-thirds of their length; femora black-----virilis, new subspecies.

ZENILLIA BLANDA BLANDA Osten Sacken.

Front variable in both sexes, in male from 0.19 to 0.27, and in the female 0.245 to 0.32 of the head width; front, face, and posterior orbit silvery white pollinose; sides of front sparsely clothed with indistinct short hairs; the frontal bristles reach well down nearly opposite the base of third antennal joint, the two uppermost ones stout and reclinate; facial ridges bristly on the lowest fourth, bucca linear, about one-tenth the eye height; palpi nearly always yellow, sometimes slightly reddish, clothed thickly with short black hairs; probosis yellow; antennae yellowish, as long as the face, the third joint in both sexes from three and one-half to four and one-half times the second; arista gradually tapering from base to apex, penultimate joint short. Thorax black, gray pollinose, marked with four black vittae, the outer ones broken at the suture; dorsocentral macrochaetae variable, in the type specimen there are four, but in many specimens which are certainly this species there are but three, occasionally a specimen will be found with four on one side and three on the other; scutellum grayish, bearing two long and two short pairs of marginal bristles, the apical pair curving upward or backward; there is also a weak pair on disk. Sternopleura gray pollinose, clothed with fine black hairs and bearing two stout and unusually a vestigial third bristle, quite often there are but two and sometimes three quite well developed ones on one side and but two on the other. Abdomen thick, the fourth segment shorter than the third, blunt, closing in a slit behind in the female in the lower end of which the genital organs are placed; black, the first segment wholly so, the second and third gray pollinose at base their apices blackish, fourth segment slightly yellowish, sometimes grayish pollinose. First segment with marginal macrochaetae, second with marginal and a median pair of discals; third with one pair of median discals and a marginal row, the fourth with two rows, one on the apical half and the other at the extreme apex; abdominal hairs depressed. Legs yellow, femora often black, tarsi blackish, mid tibiae with one bristle on the outer front side near the middle; hind tibiae weakly ciliate, with one longer bristle near the middle. Wings hyaline, the third vein with two bristles at its base.

Length 4 to 8 mm.

Redescribed from many specimens of both sexes, including several long series that were reared. The type of *blanda*. locality not given. is in the Museum of Comparative Zoology, Cambridge, Massachusetts.

and has been examined by the junior author; it is the same form as the type of *boarmiae*, which is in the National Museum (type No. 3591). The specimen referred to in literature as *Exorista hypenae* Coquillett, but never described, is in the collection, and also belongs to the typical form of *blanda*. Over 100 specimens reared from *Cacoccia cerasivorana* Fitch and *fervidana* Clemens at the gypsy moth laboratory agree in having four dorsocentrals and the apical scutellars turned up; this agreement would suggest a subspecific form, but other specimens have one or both of the characters so that it is impossible to define a group of any rank. In the series referred to, three-fourths of the specimens have two sternopleurals and a vestigial third, but the last-named one is absent on one side only in the other fourth. Fifteen specimens bred from *Cingilia catenaria* Drury at the gypsy moth laboratory show the following differences in chaetotaxy:

Six specimens have three dorsocentrals, two sternopleurals, apical scutellars turned back.

Two specimens have three dorsocentrals, two sternopleurals, apical scutellars turned up.

Four specimens have four dorsocentrals, three sternopleurals, apical scutellars turned up.

Two specimens with four dorsocentrals, three sternopleurals, apical scutellars turned back.

One specimen with three dorsocentrals on one side, four on the other, three sternopleurals, apical scutellars turned up.

The species seems hardly less abundant southward than in New England. Specimens in the collection are from New Jersey, New York, Maryland, Virginia, Kansas, Arkansas, New Mexico, Arizona, Florida, Cuba, and Peru.

The breeding records additional to those mentioned are all from Lepidoptera, as follows:

Vanessa cardui Linnaeus, no locality (type).

Isturgia truncataria Walker, bred by John B. Smith at Cotuit, Massachusetts, emerged September 12, 1883. Coquillett (Revis. p. 13), erroneously gives the host as *Boarmia pampinaria*, from which he named the supposed new species *boarmiae*. Obviously this specimen should be the type of *boarmiae*, and we have so labeled it.

Alabama argillacea Huebner, Mississippi, Townsend, (Musc. Flies, 1908, p. 99) (this specimen was erroneously labeled as type of *boarmiae*, but was not originally included).

Hypena humuli Harris, no locality, Howard (Bull. 7, n. ser., Bur. Ent., p. 47) (type of *hypenae* Coquillett MS).

Thanaos brizo Boisduval and LeConte, no locality. Williston. in Scudder's Butterflies of New England (vol. 3, 1889, p. 1918) (type of *proserpina*, n. var.).

Loxostege similalis Guenée, Camden, Arkansas, Coquillett, Revis. p. 13.

Euclea delphinii Boisduval (as *cippus* Cramer), Virginia, Coquillett, Revision, p. 13.

Acrobasis comptoniella Hulst, Center Harbor, New Hampshire, by Dyar (Coquillett MS notes).

Dichogamma redtenbacheri Lederer and *bergii* Möschler, Palm Beach, Florida, by Dyar (Coquillett MS notes).

Proteopteryx bolliana Slingerland, Monticello, Florida (Walton MS).

Plathypena scabra Fabricius, North Carolina (unpublished).

Cacoccia argyrosphila Walker, Canyon City, Colorado (Walton MS).

Autographa brassicae Riley, Santiago de las Vegas, Cuba (unpublished).

ZENILLIA BLANDA VIRILIS, new subspecies.

Front of male 0.19 to 0.24 (in three) of the head-width; the nine males examined all agree in having three dorsocentrals and two sternopleurals, apical scutellars variable but not decidedly upturned. It is probable that more material will extend the range of variation in this form. Distinguished in the male by having the posterior half of the venter shining instead of pollinose, a very distinct character.

Described from nine male specimens; one from Rye, New York, bred from *Papaipema harrisii* Grote by Henry Bird; two from gypsy moth laboratory, one of them reared from *Ennomos subsignarius* Huebner; two, numbers attached and evidently bred specimens, but the data not now obtainable; one, Lawrence, Kansas (Aldrich); two, gypsy moth laboratory, Massachusetts; one, Dist. Federal Mexico (L. Conrad).

One female from Lawrence, Kansas, taken at about the same time and place as one of the males, may belong here. It has three orbitals on each side, which is probably a mere abnormality. The venter is wholly pollinose.

Type.—Male, Cat. No. 25698, U.S.N.M., from Rye, New York.

ZENILLIA BLANDITA Coquillett.

Exorista blandita COQUILLET, Revis. Tachin., 1897, p. 96.

Front of male 0.21 and in the female 0.25 to 0.29 (in three) of the head width; the sides silvery pollinose, sparsely haired; frontal vitta as wide as either parafrontal, two uppermost frontals reclinate, face silvery, facial ridges bristly on the lowest fourth or third, bucca one-seventh the eye height, nearly destitute of hairs excepting those of the lower border, antennae as long as the face, the third joint in

both sexes four and one-half times the second, arista a little thickened on basal third, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae and bearing four dorso-central macrochaetae; scutellum black at base, gray pollinose, the tip yellowish, bearing three long pairs of marginal and a shorter backward turning pair of apical ones. Sternopleura with three strong bristles. Abdomen thick, the fourth segment short, and deep; abdominal color black, gray pollinose, especially so at base of segments two and three, fourth segment somewhat yellowish in some specimens, gray pollinose in most. Discal macrochaetae on the intermediate segments or at least the third, two rows on the fourth, one at the apical half, the other a weaker row at the apex; abdominal hairs depressed. Legs black, sometimes brownish, mid tibiae with one strong bristle on the outer side near the middle: hind tibiae ciliate, with one longer bristle. Third vein with four or five bristles at its base.

Length 10 to 12 mm.

Redescribed from the type and several specimens of each sex, the material from New England and Washington, D. C., the latter bred from *Sarothripus revayanus* Scopoli (Walton MS).

Type.—Female, Cat. No. 3592, U.S.N.M., from Franconia, New Hampshire.

ZENILLIA CERATOMIAE Coquillett.

Exorista ceratomiae COQUILLET, Revis. Tachin., 1897, p. 101.—REINHARD, Ent. News, vol. 32, 1921, p. 72.

Front of male 0.27 to 0.30 (in three), of female 0.33 to 0.36 (in three) of the head width; front and face silvery pollinose, the former bearing many short inconspicuous hairs; front in both sexes higher and more convex in profile than in the nearest relatives: frontal bristles reach the third antennae joint, the two uppermost ones stout and reclinate; facial ridges bristly on the lowest fourth, sometimes one-third of the way; palpi yellow with black hairs, not particularly dense; bucca one-sixth the eye height, bearing but a few fine hairs on the lower half besides the stout black bristles on the lower border; antennae nearly as long as the face, first and second joint yellowish, the third blackish, about four and one-half times the second in the male, somewhat shorter in the female; arista considerably thickened on the basal third, the penultimate joint short. Thorax black, thickly gray pollinose, marked with four black vittae, the outer ones broken at the suture; four dorso-central macrochaetae; scutellum thickly gray pollinose with four pairs of marginal bristles; in the female the apical pair are sometimes absent, all bristles are directed backward; sternopleura gray pollinose, thickly clothed with fine hairs, and with three stout bristles. Abdomen, excepting the

dorsum of the first segment, which is black, thickly gray pollinose on basal two-thirds of each segment, the apical third with thin brown pollen; thick, the fourth segment shorter than the third and somewhat wedge-shaped. Venter usually gray pollinose. No discal macrochaetae; first segment with one short median pair, sometimes vestigial, second with one pair, third with marginal row, the fourth with two rows, one uncommonly large and stout at the middle, the other much smaller at the extreme apex. Abdominal hairs depressed. Legs black; mid tibiae with one bristle on the outer front side near the middle; hind tibiae evenly ciliate with sometimes a longer bristle near the middle. Wings hyaline, the apical cell open, third vein bearing two or three bristle at its base.

Length 5.5 to 8 mm.*

The type material now in the United States National Museum includes two specimens reared from *Pempelia*, species at Fort Worth, Texas; one from *Omphalocera cariosa* Lederer at Oswego, Kansas; and from a pyralid at Cadet, Missouri. Another specimen was reared from *Lagoa crispata* Packard at McMeekin, Florida; one from *Loxostege similalis* Guenée by E. G. Kelly at Waurika, Oklahoma. There are four collected specimens from Plano, Texas (Tucker); one from Columbus, Texas (Riley collection); and one from Plummer Island, Maryland (Shannon).

Coquillett reported specimens reared from *Ceratonia undulosa* Walker at St. Louis, Missouri, by Riley. Reinhard has reared the species from *Loxostege similalis* Guenée at Laredo and College Station, Texas.

Type.—Male, Cat. No. 3601, U.S.N.M., from Fort Worth, Texas.

ZENILLIA FUTILIS Osten Sacken.

Exorista futilis OSTEN SACKEN, *Canad. Ent.*, vol. 19, 1887, p. 161.—COQUILLET, *Revis. Tachin.*, 1897, p. 98.—WILLISTON, in *Scudder's Butterflies of New England*, vol. 3, 1889, p. 1917, pl. 89, fig. 10.—TOTHILL, *Canad. Ent.*, vol. 45, 1913, p. 71.—GREENE, *Proc. U. S. Nat. Mus.*, vol. 60, art. 10, 1922, p. 11, fig. (puparium).

Euexorista futilis TOWNSEND, *Proc. Ent. Soc. Wash.*, vol. 14, 1912, p. 166.

Readily separated from all others of this group by the dark reflecting spots on the parafacials just below the frontal bristles.

Front of male 0.263–0.274–0.288 and in the female 0.285–0.307–0.333 of the head width; face and front yellowish pollinose; the former with a dark brown reflecting spot just below the lowest frontal bristles; facial ridges bristly on the lowest fourth; bucca about one-sixth the eye height; palpi black; third joint of the antennae in the male three and one-half and in the female two and one-fourth times the second, arista thickened on the basal fifth, the penultimate joint short. Thorax black, gray pollinose bearing four dorsocentral macro-

chaetae; scutellum black with three long and one shorter apical pair of marginal bristles; sternopleura with three bristles. Abdomen black, gray pollinose, the anal segment yellowish, destitute of discal bristles on the intermediate segments. Mid tibiae with two bristles on the outer front side near the middle; hind tibiae unevenly ciliate. Hypopygium black, gray pollinose, the inner forceps stout, slightly curved inward, shiny black, and densely clothed with long fine hairs; outer forceps about the same length, very slender and tapering to a fine point.

Length 9 to 11 mm.

Redescribed from numerous specimens: Two without locality but with printed name labels are probably from the lot mentioned by Williston; one without locality was submitted to Brauer and Bergenstamm and identified by them as *Parexorista futilis* Osten Sacken; four are from Oregon (Koebele); one without locality was bred from *Vanessa atalanta* Linnaeus (Riley collection); one from Salem, Massachusetts, was reared from *Pyrausta nubilalis* Huebner (Craig); a series at the gypsy moth laboratory were reared from *Ennomos subsignarius* Huebner; other specimens unreared are from Indiana (Aldrich), Massachusetts (Webber), New York, and Kaslo, B. C. (Currie). The type in the Museum of Comparative Zoology at Cambridge has been examined by the junior author; it has no locality, but was reared from *Vanessa atalanta* Linnaeus.

The species has been reported from New Jersey (Smith Catalogue, both editions); Ottawa, Canada (Gibson, Rept. Ent. Soc. Ont.); Connecticut (Britton, Check list). Coquillett reported it as reared from *Malacosoma thoracica* Stretch in California, and in a manuscript note he added *Malacosoma disstria* Huebner at Albany, New York, by Lintner. Tothill reared it from *Isia isabella* Smith and Abbot at Ottawa, Canada.

Townsend has called attention to the fact that this species lays microtype eggs on foliage, which are swallowed by its host.

Genus PHOROCERA Robineau-Desvoidy.

Phorocera ROBINEAU-DESVOIDY, Myodaires, 1830, p. 131. Type designated by Robineau, Dipt. Env. Paris, vol. 1, 1863, p. 509, as *Tachina assimilis* Fallén; this was not originally included, but on the same page Robineau makes his *agilis*, originally included, a synonym of *assimilis*.

Pales ROBINEAU-DESVOIDY, Myodaires, 1830, p. 154 (not Meigen, 1800, not available but still preoccupying the name). Type, *strenua* Robineau-Desvoidy, by designation of Robineau, Dipt. Env. Paris, vol. 1, 1863, p. 519 (= *Tachina processionea* Ratzeberg).

Chaetogena RONDANI, Prod. Dipt. Ital., vol. 1, 1856, p. 68. Type designated, *Tachina assimilis* Fallén.

Scotia ROBINEAU-DESVOIDY, Dipt. Env. Paris, vol. 1, 1863, p. 255. Type designated, *placida* Robineau-Desvoidy (= *Tachina grandis* Zetterstedt).

- Tritochaeta* BRAUER and BERGENSTAMM, Zweifl. Kais. Mus. Wien, pt. 4, 1889, p. 92; pt. 5, 1891, pp. 338, 401; pt. 6, 1893, p. 118. Type and sole species, *prosopoides*, new (= *Tachina pullata* Meigen).
- Setigena* BRAUER and BERGENSTAMM, Zweifl. Kais. Mus. Wien., pt. 4, 1889, p. 94, emendation of *Chaetogena* Rondani, *vox hybrida*.
- Parasetigena* BRAUER and BERGENSTAMM, Zweifl. Kais. Mus. Wien., pt. 5, 1891, p. 339, no species; pt. 6, 1893, p. 120, sole species, *Chaetogena seyregata* Rondani.
- Tetragrapha* BRAUER and BERGENSTAMM, Zweifl. Kais. Mus. Wien, pt. 5, 1891, p. 351; pt. 6, 1893, p. 124. Sole species, *tessellata*, new.
- Euphorocera* TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, 1892, p. 112. Sole species, *tachinomoides* Townsend.
- Neopales* COQUILLETT, Proc. U. S. Nat. Mus., vol. 37, 1910, p. 575, new name for *Pales* Robineau-Desvoidy, preoccupied.
- Neophorocera* TOWNSEND, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 162. Type designated, *Phorocera edwardsii* Williston (= *Phorocera claripennis* Macquart).
- Patelloa* TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 619. Type designated, *Phorocera leucaniae* Coquillett.
- Phyllophorocera* TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 621. Type designated, *Phorocera sternalis* Coquillett.
- Euphoroceropsis* TOWNSEND, Proc. Biol. Soc. Wash., vol. 30, 1917, p. 49. Type designated, *alba* Townsend.
- Neoscotia* TOWNSEND, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 579. New name for *Scotia* preoccupied.
- Eutritochaeta* TOWNSEND, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 580. Type designated, *carpocapsae*, new (= *Neopales noctuiformis* Smith).

In arranging the above synonymy we have examined all the type species involved. In the European literature there may be other synonyms, but if so we have not seen the type species.

Named specimens of both sexes of *Phorocera* (*Parasetigena*) *tachinomoides* and *claripennis* were sent to the eminent European authority Dr. J. Villeneuve, with the request that he place them in their proper genus. He placed them in *Stomatomyia* Brauer and Bergenstamm. But the type species of this genus, *filipalpis* Rondani, has reduced palpi and the hind crossvein drawn in from the margin so that the last segment of the fifth vein is almost as long as the preceding, characters which we regard as generic. Townsend has placed *Stomatomyia*, along with his own *Plagiprospherysa* (which we consider a synonym of it), in the family Dexiidæ. We agree with Doctor Villeneuve, except that we make a somewhat closer generic division here. The case will serve to illustrate the unsettled state of the classification in this group.

As indicated in the table of genera, the genus is here regarded as containing four groups of subgeneric rank; these with their respective synonyms are as follows:

1. *Phorocera*.

Chaetogena.

Setigena (emendation).

2. *Parasetigena*.*Scotia* (preoccupied).*Euphorocera*.*Tetragrapha*.*Neophorocera*.*Euphoroceropsis*.*Neoscotia*.3. *Patelloa*.4. *Neopales*.*Pales* (preoccupied).*Phyllophorocera*.*Tritochaeta*.*Entritochaeta*.

SPECIES TRANSFERRED TO OTHER GENERA.

Doryphorae Riley goes in *Doryphorophaga* Townsend.

Macra Van der Wulp, of Coquillett's Revision, has been described by Townsend as *Pelecotheca panamensis*, new genus and species,⁸ but not from the material Coquillett had. The species lacks the acrostichals immediately before the suture, and is related to *Pseudcuantha* (*Macquartia* of Coquillett).

Parva Bigot, of Coquillett's Revision, was described by Coquillett himself afterwards as a new species, *erecta*.⁹

Rufilabris Van der Wulp, of Coquillett's Revision, has been described by Townsend as *Eupelecotheca celer*, new genus and species¹⁰; this genus is hardly distinct from *Pelecotheca*, erected in the same place for *macra*. In *rufilabris*, *parva*, and *macra* the identity of the original species remains uncertain.

Saundersii Williston, see *Madremyia*.

The reproductive habits of *assimilis* are unknown, but the European *caesifrons*, regarded as hardly more than a variety, deposits macrotype eggs. The American *claripennis* and *tachinomoides* have the same habit. *Leucaniae* lays microtype eggs on foliage.

TABLE OF SPECIES OF PHOROCERA.

1. Abdomen with discal macrochaetae or strong erect discal bristles on at least the third and fourth abdominal segments.....	20
Abdomen without discal macrochaetae or strong discal bristles on the intermediate segments.....	2
2. Mid tibiae with at least two stout bristles on the outer front side near the middle.....	8
Mid tibiae with but one stout bristle on the outer front side near the middle.....	3
3. Four dorsocentral macrochaetae.....	4
Three dorsocentral macrochaetae; three sternopleural; abdomen globose.....	<i>leucaniae</i> Coquillett.
4. With apical scutellars upturned.....	5
With apical scutellars turned backward.....	<i>complicata</i> , new species.
5. With only one recurved upper bristle in each frontal row.....	<i>marginalis</i> , new species.
With two recurved upper frontals in the row.....	6

⁸ *Insector Ins. Menst.*, vol. 6, 1918, p. 168.⁹ *Proc. U. S. Nat. Mus.*, vol. 23, 1902, p. 112.¹⁰ *Insector Ins. Menst.*, vol. 6, 1918, p. 169.

6. Fourth abdominal segment with dense, deep-yellow pollen; male with ordinary hair on front and ocellar triangle-----*parviteres*, new species.
Fourth abdominal segment gray or only a little yellow-pollinose; male with dense erect hair on parafrontals and ocellar triangle----- 7
7. Scutellum reddish except base; fourth abdominal segment with gray pollen-----*halisidotae*, new species.
Scutellum at most with slight indications of red at tip; fourth abdominal segment with yellowish pollen-----*flavicauda* Van der Wulp.
8. Abdominal hairs depressed (or if erect very short)----- 12
Abdominal hairs erect; facial ridges bristly slightly over one-half way; third antennal joint long and unusually wide to the apex----- 9
Abdominal hairs erect on the second segment, depressed on the third; third antennal joint of normal shape; abdomen mostly shining black.
subnitens, new species.
9. With two sternopleurals-----*tortricis* Coquillett.
With three or four sternopleurals----- 10
10. Bend of fourth vein rectangular, apical cell almost closed in the margin; third vein with six hairs at base-----*hamata*, new species.
Bend of fourth vein obtuse and broadly rounded; apical cell more widely open; third vein with two or three hairs at base (if with four sternopleurals see *Zenillia lobeliae* Coquillett)----- 11
11. Antennae black, abdomen of usual form-----*noctuiformis* Smith.
Antennae broadly reddish, abdomen thick at apex in profile.
pachypyga, new species.
12. Hind tibiae unevenly ciliate on the outer side, with several longer bristles; bucca one-fifth the eye height; bend of fourth vein generally with a distinct fold----- 13
Hind tibiae evenly ciliated, with at most one longer bristle; bucca one-fourth the eye height; face conspicuously receding; frontal bristles overlapping those of the facial ridges; front pulvilli in male about equal to the last three tarsal segments; third vein with only 3 hairs at base-----*imitator*, new species.
13. Third antennal joint very long and very wide to the apex in both sexes----- 14¹¹
Third antennal joint usually of moderate length, if long then it is not uncommonly wide----- 16
14. Usually two sternopleurals; inner forceps of the male united into a small central organ, slender at the tip, its basal part provided with a dense brush of hairs behind, which curve downward-----*einariis* Smith.
Three sternopleurals; male forceps without brush----- 15
15. Abdomen of male strikingly elongated; inner forceps united into a slender and curved beak, its base suddenly widening into a portion which is deeply grooved behind, the groove full of dense, soft, pale hairs-----*coccyx*, new species.
Abdomen of male not elongated; inner forceps united into a rather straight beak, which is deeply grooved behind on the apical half; and turned forward at the tip-----*sulcata*, new species.

¹¹ *Alba* would run to this number. It is known only from a damaged female which has unusually dense, white pollen, and an elongated abdomen. See description. Locality, Tampico, Mexico. (Townsend, Proc. Biol. Soc. Wash., vol. 30, 1917, p. 50.)

16. Abdomen with second to fourth segments shining on the posterior third or more ----- 17
 Abdomen with second to fourth segments pollinose or subpollinose to the hind edge; males with a tuft of dense long hair before the middle coxae ----- 18
17. Basal joints of antennae reddish; venter pollinose in part; male with only the usual hair before the middle coxae ----- *claripennis* Macquart.
 Whole antennae black, slender and elongate; venter shining black (male unknown) ----- *indivisa*, new species.
18. Palpi black on basal half; abdomen broadly red on sides of first, second and third segments, leaving only a median stripe black; the united inner forceps form a slender curved process, flat behind at middle, keeled basally and slightly hooked at tip.
tessellata Brauer and Bergenstamm.
 Palpi yellow ----- 19
19. Parafrontals golden yellow; male genitalia small; base of the united inner forceps flat behind ----- *floridensis* Townsend.
 Parafrontals white or pale yellow; large species with large genitalia, the base of the united inner forceps round, keeled behind.
tachinomoides Townsend.
20. Sides of the face below the lowest frontals bare or with a few hairs directed upward ----- 23
 Sides of the face below the lowest frontals with a few hairs directed downward and extending as far as the middle of the third antennal joint ----- 21
21. Abdominal hairs not bristly in median region although somewhat erect; small crossvein not infuscated ----- 22
 Abdominal hairs erect, long and bristly, apical cell open; bucca one-third the eye height; small crossvein infuscated ----- *specularis*, new species.
22. Apical cell closed; bucca one-half the eye height ----- *facialis* Coquillett.
 Apical cell open; bucca one-fourth the eye height ----- *meracanthae* Greene.
23. Palpi yellow ----- 27
 Palpi black (in *tortricis* the apical half or less is sometimes yellow) -- 24
24. Mid tibiae with one bristle on the outer front side near the middle; arista thickened on the basal third ----- 25
 Mid tibiae with two bristles on the outer front side near the middle, the upper one a little smaller; two or three sternopleural bristles; arista slender, hardly thickened basally ----- *tortricis* Coquillett.
 Mid tibiae with at least two stout bristles on the outer front side near the middle; four sternopleural bristles; arista thickened to the middle; third antennal joint in the male unusually thickened and convex on the outer edge ----- *sternalis* Coquillett.
25. With four sternopleural bristles; abdominal hairs depressed; thorax and abdomen gray pollinose ----- *erecta* Coquillett.
 With three sternopleural bristles ----- 26
26. Mesonotum gray pollinose, with the usual stripes; abdomen gray pollinose on the first three segments, yellow on the fourth.
xanthura, new species.
 Mesonotum and abdomen shining black ----- *unipilum*, new species.
27. Mid tibiae with one bristle on the outer front side near the middle --- 33
 Mid tibiae with at least two stout bristles on the outer front side near the middle ----- 28
28. Sides of front outside of the front bristles bearing many long hairs -- 30
 Sides of front outside of the frontal bristles bearing only short hairs -- 29

29. Parafacial at narrowest wider than the rather narrow third antennal joint (compare *reinhardi*, new species)-----*silvatica*, new species.
Parafacial at narrowest about equal to the decidedly widened third antennal joint-----*slossonae* Townsend.
Parafacial at narrowest only half the width of the third antennal joint, which is of ordinary form-----*tenuiseta*, new species.
30. Parafacial at narrowest wider than third antennal joint----- 31
Parafacial at narrowest narrower than third antennal joint----- 32
31. Front unusually broad, the vertex of the male 0.38, of the female 0.37 to 0.43 of the head width-----*setifrons*, new species.
Front of ordinary width, vertex of male 0.22, of female 0.34 the head width; third antennal joint broadly red at base----*silvatica*, new species.
32. Male with dense and striking brush of long black hairs on base of inner forceps-----*pluriseriata*, new species.
Male with only a few scattering long hairs on base of inner forceps.
 * *fuscimacula*, new species.
33. Three posterior dorsocentral bristles----- 38
Four posterior dorsocentral bristles----- 34
34. Sides of front with numerous bristles outside the frontal row; first and second and at least the base of the third antennal joint reddish---- 37
Sides of front outside the frontals without bristles----- 35
35. Fourth abdominal segment densely deep yellow pollinose, contrasting strongly with the two preceding segments-----*signata*, new species.
Fourth abdominal segment with pollen of same color as on preceding segments ----- 36
36. Intermediate abdominal segments each with two pairs of discal macrochaetae -----*incrassata* Smith.
Intermediate abdominal segments each with but a single pair of discal macrochaetae-----*festinans*, new species.
37. Abdomen black, the last three segments gray pollinose on the basal three-quarters, in striking contrast to the black apices, with a definite line of demarcation-----*comstocki* Williston.
Abdomen black, thickly covered with gray pollen, with no distinct pattern; anal segment wholly gray pollinose----- *texana*, new species.
38. Three sternopleural bristles----- 39
Two sternopleural bristles-----*levis*, new species
39. Sides of front outside the frontal bristles destitute of long hairs; anal segment yellowish pollinose; mid tibiae with one long bristle on the outer front side near the middle-----*leucaniae* Coquillett
Sides of front outside of the frontal bristles bearing long hairs.
 fulviceps Van der Wulp.

Subgenus PHOROCERA.

PHOROCERA SLOSSONAE Townsend.

?*Phorocera cinerica* VAN DER WULF, Biologia, Dipt., vol. 2, 1890, p. 81.
Euphorocera cinerica COQUILLET, Bull. 7, Tech. ser., Div. Ent., 1897, p. 102.
Phorocera slossonae TOWNSEND, Smiths. Misc. Colls., vol. 51, No. 1803, 1908, p. 108, new name, for Coquillett's specimen, believed misidentified.

Male.—Front rather wide, light gray pollinose, the frontal stripe broad, the single row of bristles diverging below and extending as far as the arista; ocellar bristles normal, parafacials rather wide, the facial ridges with bristles almost to the level of the frontals;

antennae black, the third joint three times the second; arista thickened on basal half, its penultimate joint twice as long as wide; palpi rather long and slender, yellow; probocis short; bucca (below the eye) more than one-third of the eye height.

Thorax black with gray pollen forming the usual changeable stripes. Posterior dorsocentral bristles 3 with sometimes a small fourth one; sternopleurals 3; scutellum with 3 lateral bristles the apical pair very slender, hair-like.



FIG. 1.—*PHOROCERA SLOSSONAE* TOWNSEND, MALE GENITALIA, MUCH ENLARGED. (DRAWN BY CHAS. T. GREENE.)

Abdomen with dense gray pollen forming a changeable pattern, the hind margins of the segments more or less shining; discal macrochaetae on the second, third, and fourth segments; a large marginal pair on the first segment; genital segments black [genitalia, fig. 1], the inner forceps united to form a boat-shaped structure with a decided keel behind and suddenly narrowing apically into a slightly curved beak; the outer forceps broad and shining, closely appressed to the under surface of the second genital segment, and tapering

rapidly to a hairy slender tip; fifth sternite with a deep narrow cleft, the two plates rather large and prominent without any striking hairs or bristles.

Legs black, middle tibia with three bristles on the front side; the claws and pulvilli elongated, especially on the front feet.

Wings hyaline, costa without spines, third vein with two or three hairs at base.

Female.—Front somewhat wider, claws and pulvilli short. Wing wider in proportion. Fourth segment of abdomen with numerous bristles on the sides and below. The abdomen is provided with a short, flat, curved piercer lying between two rather large and prominent plates.

Length 8 mm.

Described from four specimens: one male (figured), "Maryland, near Plummer Island" (W. L. McAtee); one male and one female on same pin. West Hills, Long Island (W. T. Davis); one female, Franconia, New Hampshire (Mrs. A. T. Slossen), type of *Euphorocera slossonae*.

Type.—Female, Cat. No. 10912, U.S.N.M.

A male of *Phorocera assimilis* Fallén, the type species of the genus, is in the United States National Museum, determined many years ago by Brauer and Bergenstamm. The very striking male genitalia agree remarkably with those of our males, and it seemed for some time that the species were the same. Further examination led to the conclusion that the American form has a more shining abdomen and much longer hair on the sides of the united inner forceps. There can be no question that they belong to the same genus in the narrowest possible conception of the term.

The only known species in North America with closely similar genitalia is *Pseudotachinomyia webberi* Smith, which has bare eyes.

Subgenus PARASETIGENA.

Since the males of this group admit of much more satisfactory analysis than the rest of our material, it is believed that a supplementary table of them will greatly assist other workers. The genitalic and other characters used here are quite striking in life, but difficult to figure. The subgenus is primarily distinguished by the union of the inner forceps into a single more or less beak-like organ and the reduction of the outer forceps to a plate-like form, broad and rounded, somewhat like the form which they have in Sarcophaga. Most of the species have the abdomen elongate in the male, or even in both sexes; some have a fold at the bend of the fourth vein which at a certain angle looks like a continuation of the vein; in most species the third vein is bristly halfway to the cross-

vein; none have discal abdominal bristles; all have four dorso-centrals.

The following table contains three species—*virilis*, *cocciphila* and *divisa*—which are not included in the preceding general table of *Phorocera*, they having been obtained after it was completed.

TABLE OF SPECIES. MALES.

1. Pollen of abdomen confined to dorsal surface except anteriorly, the third and fourth tergites shining below and showing a sharp line of division at the side: bristles of mid coxae and region just anterior very numerous, forming a dense recurved bunch-----	2
Pollen of the dorsum of third and fourth abdominal segments continuing toward the middle line below without a sharp break at the side: mid coxae and adjacent region without unusual number of bristles-----	4
2. Palpi strongly infuscated at base, second antennal joint black. <i>tessellata</i> Brauer and Bergenstamm.	
Palpi yellow at base, second antennal joint reddish-yellow-----	3
3. Pollen of front and face golden, pollen of fourth abdominal segment covering much more than half its upper surface-----	<i>floridensis</i> Townsend.
Pollen of front and face white, pollen of fourth abdominal segment covering less than half-----	<i>tachinomoides</i> Townsend.
4. With a distinct fold at bend of fourth vein-----	5
Without fold at bend of fourth vein-----	9
5. Pollen on basal portion of third segment undivided-----	6
Pollen on basal portion of third segment divided by a median black stripe-----	7
6. Antennae wholly black; palpi dark at base; abdomen with narrow silvery bands at base of segments 2, 3, and 4, the remainder of the segments subshining (female*only known)-----	<i>indivisa</i> , new species.
Antennae with second segment red; palpi wholly yellow; abdominal segments 2, 3, and 4 with anterior half pollinose-----	<i>claripennis</i> Macquart.
7. The frontal bristles weak; the two upper reclinate much smaller than the arista; the united inner forceps flat and broad at base, suddenly narrowed into a slender beak-----	<i>hamata</i> , new species.
The frontals large and strong; the united inner forceps tapering uniformly into a rather long nearly straight process-----	8
8. Second abdominal segment with long erect bristly hairs along the median region; small slender species-----	<i>subnitens</i> , new species.
Second abdominal segment with hairs barely longer than on the third segment; robust tropical species-----	<i>divisa</i> , new species.
9. Sternopleurals 2-----	10
Sternopleurals 3-----	12
10. The united inner forceps bearing a dense tuft of crinkly hairs bent forward-----	11
The united inner forceps with only a fringe of minute brownish hairs around a central shining, bare plate-----	<i>complicata</i> , new species.
11. The tuft on the united inner forceps begins at the extreme base. <i>cocciphila</i> , new species.	
The tuft on the united inner forceps begins considerably beyond the extreme base; beak very small-----	<i>einariis</i> Smith.

12. The united inner forceps provided with dense, even, erect, short hair on the back to the very tip, which is blunted and bent back. imitator, new species.
- The united inner forceps short and bent forward at tip----- 13
13. The united inner forceps forming a curved tip like a cuckoo's beak, the base with a ridge on each side and a dense mass of short yellow hair in the inclosed groove-----cocyx, new species.
- The united inner forceps not with such structure----- 14
14. The united inner forceps straight almost to the tip, deeply grooved behind near the tip-----sulcata, new species.
- The united inner forceps strongly curved forward from about the middle-----virilis, new species.
- Alba* Townsend is known only from the female and can be traced only to couplet 12 in this table. *Indivisa*, although the male is not known, appears to run satisfactorily to its place in couplet 6.

PHOROCERA VIRILIS, new species.

Male.—Front 0.29 of the headwidth; pollen of head rather uniform pale golden-yellow; frontal bristles about 10 in number, the two uppermost moderately strong and reclinate, those below much smaller except the lower ones, the row extending slightly below the arista; parafrontals rather densely covered with short, black hairs; antennae black, the third joint hardly four times the second, rather wide at apex; the arista slender, much longer than the third joint, its penultimate joint distinct but short; facial ridges with stout bristles reaching to the level of the arista; parafacials at narrowest about one-half the width of the third antennal joint; palpi yellow on the apical half, blackish basally; proboscis small; bucca about one-sixth the eye-height; back of head with dense whitish beard. Thorax yellowish cinereous, the four usual dorsal stripes narrow, when viewed from behind, and a median one somewhat distinct which reaches to the scutellum; posterior dorsocentrals 4; anterior dorsocentrals 3; sternopleurals 3; scutellum with three lateral pairs of bristles and an apical decussate pair, about as large as the middle lateral; also with a distinct pair of discals of about the same size. Abdomen with yellowish pollen on the basal part of segments two, three, and four, which extends underneath but changes to white in that region; the first and second segments with only a small pair of median marginals on each, the third with a very stout row; when viewed from behind, there is a median, dark stripe which is fusiform on the second segment, very narrow on the third and wide on the fourth, where it blends with the apical, shining half; the second and third segments have about the posterior half shining but vary in different angles of view. Genitalia small, brownish-black; the united inner forceps narrowing to a beak, which is strongly curved forward; the outer forceps flat, broadly rounded toward the apex, where they are as wide as near the base, considerably shorter than

the beak. Legs black; outer side of front femur cinereous, the front tibia longer than the front tarsus to the base of the claws (in the proportion of 47 to 41); all the pulvilli very long, the front ones as long as the last three tarsal joints; middle tibia with two bristles on the outer front side, but the upper one quite small, only half the lower; middle coxae and the space just anterior with only a few bristles. Wing hyaline; fourth vein without perceptible fold at the bend; third vein with six to eight bristles.

Length 12 mm.

Described from one male, Washington, D. C., August 15, 1923 (Aldrich), taken on honey dew on the tulip tree.

Type.—Male, Cat. No. 26781, U.S.N.M.

PHOROCERA COCCIPHILA, new species.

Male.—Front 0.28 of the head width (average of five: 0.26, 0.21, 0.28, 0.28, 0.30), pale yellow, the parafacials with silvery pollen; frontal bristles about ten, the two uppermost strong and reclinate, the remainder smaller, except one striking pair at the level of the antennal insertion; the lowest frontal bristles a little below the arista. Antennæ black, third joint moderately broad, about three and one-half times the second; arista slender to the base and rather long, its penultimate joint distinct, from one to two times as long as thick; bucca about one-sixth the eye height; palpi yellow on apical half or more, the base blackish; proboscis short; back of head with dense, pale beard, more yellowish above. Thorax yellowish, cinereous, with rather narrow, dark stripes when viewed from behind, the median one very indistinct; posterior dorsocentrals 4; anterior dorsocentrals 3; sternopleurals 2 (in all the six specimens). Scutellum with three pairs of marginals, a pair of apicals which are about three-fourths as long as the adjacent marginals, and a pair of smaller discals. Abdomen with yellowish, cinereous pollen becoming whiter below, the first segment with a pair of rather strong median marginals, wholly black in color except on the ventral side where there is a long, triangular spot of pollen; second and third segments with rather narrow, shining black border, the second with a single pair of large, spine-like marginals, the third with a row still larger; fourth segment with the basal yellowish pollen broadly but vaguely divided in the middle by the shining black color which covers the whole apex, the pollen of the third segment is entirely unmarked by a median, darker stripe; that of the second segment has a faint trace on the anterior half; the fifth sternite stands out quite prominently, the two side pieces erect and parallel, each with a protuberance projecting toward the middle line where they meet. Genitalia small, brown, the inner forceps having a roundish, rather flat base, covered with erect, crinkly hair bent considerably forward,

and terminating in a narrow, slender, small beak; the outer forceps are reduced to small plates but rather noticeable, the front edge of each is developed into two small, hairy prolongations; the penis is thick and strongly chitinized. Legs black; front femora cinereous on outer side, the front tibia of the same length as its tarsus to the base of the claws, although to the naked eye the tarsus looks slightly longer; all the pulvilli much elongated, the front ones most as long as the last three tarsal joints. Wings hyaline, but somewhat infuscated along the veins anteriorly; fourth vein without perceptible fold at the bend; third vein with six or eight hairs at base.

Length from 11.5 to 12.1 mm.

Female.—Width of front 0.30 of the head width, almost the same as in the male, but widening more uniformly from the vertex; pollen of front yellow, except along the orbit where it is white, which color continues down around the eye below; the third antennal joint decidedly wide toward the apex, twice the width of parafacials; palpi but little infuscated at base; pulvilli and claws small.

Length 10.2 mm.

Described from five males and one female, Washington, D. C., August 15, 1923, on honeydew secreted by large scale insects on tulip tree (Aldrich).

Type.—Male; allotype, female, Cat. No. 26782, U.S.N.M.

PHOROCERA DIVISA, new species.

Male.—Front 0.29 of the headwidth by micrometer at the narrowest point; front at parafacials with white but hardly silvery pollen; frontal bristles about nine in the row, the two uppermost strong and reclinate, a slight break between them and the remainder, the lowest extending considerably below the arista. Antennae black, the third joint about four times the second, not perceptibly widened, slightly concave on the front side; arista only a little longer than the third antennal joint, decidedly thickened on the basal half, its penultimate joint small; facial ridges with strong bristles overlapping the frontals; parafacials at narrowest fully as wide as third antennal joint; palpi yellow, slightly infuscated at base; proboscis short and small; bucca about one-fifth the eye-height; back of head with bushy, white hair. Thorax cinereous, with the usual four black stripes, when viewed from behind; posterior dorsocentrals 4; anterior dorsocentrals 3; sternopleurals 3; the sternopleura just before the middle coxae with somewhat bushy, long bristles irregularly placed in several rows, but not so stout as in *floridensis*, *cubensis*, and *tachinomoides*. Scutellum uniformly pollinose, the disk covered with short, stubby, suberect hairs, among which there are no bristles; there are three marginal bristles and a small apical pair, the last

about half as long as the adjacent marginal. Abdomen with white pollen which covers more than half of the second and third segments above; on the fourth segment it is very dense on the basal two-fifths but stops suddenly at the side, the remainder of the segment above, and the whole of it below, shining black; second and third segments without a trace of discal bristles, bearing a distinct median stripe of black, narrower on the third; the hair of the second and third segments, when viewed in profile, is depressed; first abdominal segment with a distinct pair of median marginals. Genitalia black, rather small, the united inner forceps gradually narrowed into a sharp beak which is a very little curved; these forceps form a somewhat boat-like structure, convex below, both transversely and longitudinally and bearing numerous small, erect, brown hairs. Legs black; the front femora cinereous on the outer side; all the tarsi shorter than their tibiae (front tibia and tarsus in the proportion of 46 to 36, measuring to the base of the claws); front pulvilli longer than the last joint of the tarsus. Wings hyaline, rather narrow; fourth vein with a distinct fold at the bend; third vein with four or five hairs at base.

Length 11.2 mm.

Described from one male, Mayaguez, Porto Rico, June 20, 1914, R. H. Zwalenburg, collector.

Type.—Male, Cat. No. 26783, U. S. N. M.

PHOROCERA TACHINOMOIDES Townsend.

Euphorocera tachinomoides TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, 1892, p. 112.

Tricholyga, species, and *Euphorocera*, species, TOWNSEND, Annals Ent. Soc. Amer., vol. 4, 1911, pp. 131 and 328 (internal organs).

Euphorocera peruviana and *minor* TOWNSEND, Proc. Ent. Soc. Wash., vol. 13, 1911, p. 53, without description; Proc. U. S. Nat. Mus., vol. 43, 1912, p. 303.

Male.—(paratype of *peruviana*.) Front 0.26 of head width (two specimens, 0.25 and 0.27) pollen light yellow, still paler and approximating silver on the parafacials; orbitals distinct, the frontal rows of bristles meeting the stout bristles of the facial ridges; first two joints of antennae reddish brown, the third black; palpi yellow, slender; bucca one-fifth the eye height. Thorax densely gray pollinose; when viewed from behind there are four darker stripes, the inner ones stopping far before the scutellum; pleurae heavily pollinose, with a small pteropleural bristle; usually three sternopleurals, but sometimes two; four posterior dorsocentrals; just in front of the middle coxae at the median line are two continuous tufts of very striking long bristles which lie very close together and are curved backward. Abdomen strikingly elongate with reddish sides; the

gray pollen dense on the basal portion of the segments, divided by a rather distinct narrow median line on the second and third segments and partially divided on each side of this by a prolongation forward of the more shining posterior margin; fourth segment with dense pollen which is merely notched a little behind in the middle; first and second segments each with a single smallish pair of marginals; third segment with a row of eight; fourth segment with two discal bristles back of the middle and a marginal row which passes into a cluster below on each side of the genitalia; the two genital segments are reddish-brown without distinct bristles; the inner forceps are united into a somewhat conical, long, black, hook-like organ distinctly hairy on the sides and behind, resembling the one found in *Tachinomyia robusta*. The outer forceps are modified into flat yellowish plates with rounded hairy, blackish tips. The fifth sternite is deeply cleft, but bears only a few small hairs on the outer side of the lobes. Legs black, the middle tibiae with two or more long bristles on the front side; all the claws and pulvilli much elongated. Wings subhyaline, narrow at tip; hind cross-vein oblique; bend of fourth vein rectangular and with a very distinct fold but not a continuation of a vein; first posterior cell ending far before the apex. Third vein with several bristles at the base, extending about half way to the small cross vein.

Female.—Width of front 0.34 of head width (two specimens 0.35 and 0.325). Abdomen with hardly any trace of a median stripe, the hind edges of segments 2, 3, and 4, shining black. The fourth segment with numerous spiny bristles especially below.

Length of male, 6 to 13 mm.; of female, 5 to 9.5 mm. Both sexes normally approximate the maximum of these figures, the smaller specimens having been reared in cages with insufficient food.

Type.—Male, from Las Cruces, New Mexico, deposited in the University of Kansas; examined by the senior author.

Other material examined: Type (Cat. No. 15141) and 7 other specimens of *peruviana*, from Peru (Townsend); type (Cat. No. 15142) and 2 other females of *minor*, from Peru (Townsend); more than 50 specimens from Tempe, Ariz., reared from *Malacosoma americanum* Fabricius, many dwarfed (Caffrey); 3 from Texas. collector unknown; 1 Rio Urique, Chihuahua, Mexico (Townsend).

In its more northern distribution this species overlaps *claripennis*, from which it is readily distinguished in the male by the tufts of bristles in front of the middle coxae. This character occurs in a series of southern forms, however, and reference to the male genitalia is necessary to separate these readily. The elongation of the abdomen in the male, also occurring in several species, is best developed in the largest specimens, and becomes practically imperceptible in the small ones.

PHOROCERA COMPLICATA, new species.

Male.—Front 0.27 of the head width; rather dark gray above, becoming lighter anteriorly, the parafacial grayish white, the uppermost two frontal bristles very strong and directed backward; in front of these a considerable break with only one small pair, the lowest frontals just meet the large bristles which ascend the facial ridges. Antennae long, the third joint a little wider than usual, four times the second; the arista long and thin, a little thickened on the basal third; bucca one-sixth the eye height; palpi yellow; proboscis very small. Thorax gray pollinose, the dorsum slightly stained in the specimen so that the stripes, if present, are not visible: four dorso-centrals; two sternopleurals; one small pteropleural; the mesopleura has along the hind edge uncommonly dense black hair, especially above and there are four very stout bristles before the suture; the sternopleurae before the middle coxae have only a few ordinary bristles. Abdomen not elongate, black with some reddish reflections along the sides; the basal half or more of the last three segments thinly gray pollinose, the pollen gradually fading out posteriorly; first and second abdominal segments with one pair of medium marginals, the third segment with about a dozen marginals; the hind segment on its apical half with numerous erect spines; the median bristles of the second and third segments are subdepressed, but as is often the case, a few near the median line on the second segment are erect. Genital segments minute, brownish black, the inner forceps united to form a very curious and unique organ; its basal part is in the form of two large plates joining at an angle on the median line like a roof and ending with a slight notch which is fringed with dense upright yellowish hairs near the median line, changing to black hairs of a simpler character which follow along the outer margin: inside the end of the structure thus far described there is a concave, shining, brown surface, fringed behind by the yellow hairs just mentioned; at the front edge this surface is drawn out into a very minute, slender, shining beak. The outer forceps are developed into shining yellowish-red plates with long hairs at the front edge; fifth sternite deeply cleft, the lobes not very distinctly visible.

Legs black, the middle tibia with a single bristle on the outer side, the hind tibia with a rather even row of coarse cilia interrupted by one larger about the middle; on the inner hind side the hind tibia just below the middle has an uncommonly long spiny bristle which if bent down would reach the apex.

Wing subhyaline, narrow apically; the fourth vein slightly curved backward so that the bend is nearer the hind margin than usual; it is rectangular but rounded and the first posterior cell is widely open before the apex; third vein with five or six hairs at the base reaching almost half-way to the small cross-vein.

Length 10 mm.

Described from four male specimens: one from Higuito, San Mateo, Costa Rica (Pablo Schild); three Alajuelo, Panama, April 7, 1911 (August Busck).

Type.—Male, Cat. No. 25707, U.S.N.M., from Higuito.

PHOROCERA CLARIPENNIS Macquart.

Phorocera claripennis MACQUART, Dipt. Exot., Suppl., vol. 3, 1849, p. 209.

Eurygaster septentrionalis WALKER, in Lord's Naturalist in Vancouver Island, vol. 2, 1866, p. 339.

Phorocera edwardsii WILLISTON, in Scudder's Butterflies of New England, vol. 3, 1889, p. 1921.

Phorocera lophyri TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, 1892, p. 112.

Euphorocera claripennis COQUILLETT, Tech. Bull. No. 7, Div. of Ent., 1897, p. 102.—HOWARD, Ins. Book, 1902, p. 88, fig.

Exorista petiolata COQUILLETT, Tech. Bull. No. 7, Div. of Ent., 1897, p. 98.

Podotachina vibrissata BRAUER and BERGENSTAMM, Zweifl. Kaiserl. Mus. Wien, pt. 5, 1891, p. 351.

Neophorocera edwardsii TOWNSEND, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 163.

Male.—Front of male 0.30 of headwidth (average of four, 0.30, 0.30, 0.30, 0.29), usually silvery but often yellowish near vertex; face silvery, the sides at narrowest part as wide as third antennal joint; facial ridges bristly nearly to the base of antennae; bucca one-fifth the eye height; palpi yellow, very slender, bearing many fine long black hairs; antennae black, often somewhat yellow basally, as long as the face, the third joint five times the second; arista thickened on the basal three-sevenths, penultimate joint short. Thorax black, gray pollinose marked with four black vittae, sometimes there are five vittae posterior of the suture; four dorsocentral macrochaetae; scutellum grayish, often yellowish, bearing three pairs of long and a shorter apical pair of marginal bristles; disk usually bare. Sterno-pleura with three bristles. Abdomen normal, first segment black, the remaining segments shining black except the wide basal margins, which are gray; sides of the second and the apex of the fourth segment sometimes brownish. No discal macrochaetae on the intermediate segments; marginal macrochaetae on the first three, the fourth with two or three rows on the apical half to three-quarters; bristly hairs of the abdomen usually depressed; rarely erect. Legs black, mid tibiae with two or more (usually three) bristles on the outer front side near the middle; hind tibiae subciliate at most. Wings hyaline, the fourth vein usually with an appendage or distinct fold at its bend, third vein with four to six bristles at its base. Genital segments black; the united inner forceps broad at base, suddenly narrowing to a slender curved tip and with fine black hair behind, but not in tufts; outer forceps short, scarcely half as long as the inner ones, in the form of broad, shining plates, which end in a rounded, blunt point.

Female.—Front 0.36 the headwidth (average of four, 0.35, 0.35, 0.35, 0.38); third antennal joint three times the second. The shining black apical half of each abdominal segment, contrasting with the forceps short, scarcely half as long as the inner ones, in the form of the second and third segments of the abdomen, are quite characteristic.

Length of male. 4.5 to 9 mm.; of female, slightly less.

Redescribed from a long series of both sexes from all parts of the United States, from Chihuahua, Mexico; others have reported it in Canada from Vancouver Island to Ottawa and Eastern Canada.

One male from Old Crow, Alaska-Yukon boundary, above the Arctic Circle (J. M. Jessup, 1912).

The type male of *Podotachina vibrissata* Brauer and Bergestamm was examined by the senior author, December, 1923.

Next to *Winthemia quadripustulata* Fabricius, this is probably the most abundant Tachinid encountered in economic entomology. The rearing records even in 1897 made a long list in Coquillett's Revision, but that was only a beginning; at the present time with the data in the United States National Museum and in some branches of the Bureau of Entomology it would not be difficult to list 100 rearings, on at least 40 or 50 hosts. As a complete list of Tachinid rearing records is likely to be published in the future we omit these to save space. It usually attacks Lepidoptera, but occasionally sawfly and beetle larvae.

PHOROCERA EINARIS Smith.

Phorocera einaris SMITH, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 119.

Neopales einaris BRITTON, Check-List of Insects of Connecticut, 1920, p. 193 (occurrence in Connecticut).

Phorocera einaris BRIMLEY, Ent. News, vol. 33, 1922, p. 25 (occurrence in North Carolina).

Front of male 0.290—0.266 and in the female 0.316, 0.307, 0.313 the head width, yellowish gray pollinose, front in male projecting about two-thirds, in the female about one-half the eye width when viewed from the side; three uppermost frontal bristles stout and reclinate; facial ridges bristly two-thirds of the way, sometimes slightly more; sides of face gray pruinose, about one-fifth the width of the median depression; bucca one-fifth the eye height; palpi yellow; antennae black, as long as the face, the third joint in both sexes five times the length of second, arista thickened on basal fourth, the penultimate joint short. Thorax gray pollinose bearing four dorso-central macrochaetae; scutellum gray pollinose bearing four long pairs of marginal bristles, the disk also bears a strong pair of bristles. Sternopleura usually with two bristles, sometimes with three. Abdomen destitute of discal bristles, first and second seg-

ments with marginal, the third with a row, the fourth with two rows and many shorter bristles on the apical two-thirds; abdominal hairs depressed; first segment black, second and third black at base, the apices gray pollinose, fourth segment shining black except at sides. Legs black, mid tibiae with two bristles on the outside near the middle; hind tibiae sub-ciliate. Wings hyaline, apical cell open, bend of fourth vein with indistinct fold, third vein with four or five bristles at its base. Hypopygium at times quite conspicuous, inner forceps fused together, thickened for about four-fifths their length and then tapering abruptly to a fine hook-like point; on the outer side of the thickened portion of the forceps there is a conspicuous tuft of fine hairs; outer forceps aborted.

Length 10 to 12 mm.

Redescribed from the type series of ripe males and females from Melrose Highlands, Mass., Plummer Island, Maryland, and Tampico, Mexico; also from thirteen additional specimens of both sexes, from Pennsylvania, Maryland, Virginia, Florida, South Carolina, and Costa Rica. It will probably be very difficult to separate females of *imitator* and *coccyæ* from this.

Type.—Male, Cat. No. 14697, U.S.N.M., from Melrose Highlands.

PHOROCERA FLORIDENSIS, Townsend.

Euphorocera floridensis TOWNSEND, Ent. News, vol. 27, 1916, p. 217.

Male.—"Differs from *E. tachinomoides* as follows: Parafrontals and parafacials deep golden, also orbits; abdomen without any red on sides, the posterior black of the intermediate segments produced forward in a triangle on each side to near front margin, heavy on second segment, these forming with the median vitta a black trident on each segment. Length, 11.5 mm.; of wing, 8 mm." (Townsend). Front 0.24 to 0.27 of the head width, third antennal joint two and one-half times the second; thorax with four black vittae not interrupted at the suture; a very distinct tuft of long bristles before the middle coxae, curving backward; abdomen elongate, without discals, fourth segment red or black at apex, with two rows of bristles, one on the apical half, the other at tip. Hypopygium rather small, the united inner forceps much as in *claripennis*, but not so suddenly narrowed into the apical process, more gradually tapering; outer forceps forming flat plates as in related species.

Female.—Front 0.34 of head width. Abdominal pattern as in the male, which readily separates it from *claripennis*, in which the pattern is in transverse bands. The same character separates it almost as well from *tachinomoides*, in which, however, there is a trace of the "tridents" of Townsend's description.

Redescribed from the type and eight other males, and one female. The type is from Gainesville, Florida, reared from *Anticarsia gemmatilis* Huebner by J. R. Watson; two males and the female were reared at New Bern, North Carolina, from *Plathypena scabra* Fabricius (Chittenden No. 6067); one male from Bentonville, Arkansas, bred from *Saperda*, species (Quaintance No. 16398) by A. J. Ackerman; one male from Columbia, South Carolina, reared from *Laphygma frugiperda* Abbot and Smith by Ph. Luginbill (Columbia No. 20-1061); one male from College Park, Maryland, reared from the same host; two males from San Rafael, Peru, and one from Miami, Florida (C. H. T. Townsend); one male from Higuito, San Mateo, Costa Rica (Pablo Schild).

Type.—Male, Cat. No. 20127, U.S.N.M.

PHOROCERA TESSELLATA Brauer and Bergenstamm.

Tetragrapha tessellata BRAUER and BERGENSTAMM, Zweifl. Kais. Mus. Wien, pt. 5, 1891, p. 351; pt. 6, 1893, p. 124.

Male.—Front 0.24 of the head width (average of five, 0.23, 0.24, 0.24, 0.24, 0.25); parafrontals with yellow pollen; parafacials but little paler; frontal bristles just meeting the large bristles of the facial ridges; antennae black; tip of second joint slightly reddish, the third joint rather long and slender, about three times the second; arista thickened on the basal two-fifths; bucca about one-sixth the eye height; palpi yellow; proboscis small. Thorax with the usual rather dense yellowish gray pollen, four black stripes very distinctly visible on the dorsum when viewed from behind: dorsocentrals 4, sternopleurals 3, scutellum distinctly yellow at tip; the sternopleurae near where they join each other on the middle line bear large clusters of long, curved black bristles bending backward, these join with a few of similar size and shape on the middle coxae to form a single or slightly divided tuft which is very conspicuous and occurs in males of several species related to this one. Abdomen broadly yellow beginning on the first segment and extending continuously to the last third of the third segment, only a broad stripe in the middle black in ground color, the yellow gray pollen of these segments is confined mostly to the area next to the middle stripe and to the lateral margin; fourth segment with dense whitish pollen on the anterior half, divided on the median line by a very distinct shining black stripe, posterior half of the segment shining black; discal bristles absent on the last segment; first and second each with one pair of median marginal bristles; third segment with a marginal row of about eight; fourth segment with numerous bristles and bristly hairs on the apical half. Genital segments blackish, the united inner forceps forming a long slender process, curved at tip, flat behind except near the base where it is rounded and kneeled; outer forceps modified into flat reddish

plates which bear a palpus-like prolongation at the front edge; fifth sternite deeply incised, its sides parallel, with a few hairs on the edges; fourth sternite visible in a V shape, its base concealed, its apex slightly bent down so as to be rather prominent. Legs black; middle tibiae with two bristles on the front side, hind tibiae with an uneven series on outer side; all the claws and pulvilli moderately elongated, the anterior ones most. Wings hyaline, rather narrow at tip, the fourth vein bent sharply at a right angle and provided with a distinct fold; first posterior cell rather widely open very far before the apex; third vein with five or six bristles at base.

Length 9 mm.

Described from 5 males, three labeled "E. E. A. Cuba, 8129"; one Havana, Cuba (C. F. Baker); one Mariel, Cuba (Palmer and Riley).

Type.—Male, Cat. No. 25709, U.S.N.M., from the lot first mentioned.

PHOROCERA HAMATA, new species.

Male.—Front at narrowest 0.31 of the head width. The parafrontals gray pollinose with rather long hairs outside the usual frontal bristles, the latter extending below the arista almost to the uppermost bristles of the facial ridges; antennae black, slightly brownish at base; the third joint four times the second and unusually broad at the apex. The arista thickened almost half way; palpi small, yellow; proboscis short, black. Thorax gray pollinose with the usual four stripes when viewed from behind; anterior acrostichals three pairs, posterior dorsocentrals 4; sternopleurals 3; pteropleural wanting. Abdomen quite blackish, subshining, but the basis of the first and third joints with gray pollen, which is much more conspicuous in some lights than others; there is a distinct median dark stripe. The hairs of the second and third segments are erect but not bristly. The first and second segments have a pair of smallish median marginals, the third segments a row; the fourth segment a mixture of erect bristles and hairs. The genital segments are small, reddish-brown, hairy but not bristly; the inner forceps are united into a flat, tapering piece which ends in a very slender median rather straight process, slightly bent up apically. This structure is very much like that of *claripennis* but is not so hairy on the basal part. The fifth sternite is deeply cleft and the sides of the cleft are parallel or even convergent for some distance; the lateral plates of the segment are shining black and bear a few long hairs on the outer margin. Legs black; the middle tibia with two bristles on the outer front side; claws and pulvilli all about equally long. Wing hyaline; the third vein a little bent forward at the extreme apex; the fourth vein with a slight fold at the bend which is quite square.

Length 7.5 mm.

Described from two males: one from New Haven, Connecticut, reared from the sawfly *Diprion simile* Hartig by W. E. Britton, July 19, 1915; the other "reared from several pupae under bark" by A. J. Conradi, at Clemson, South Carolina.

Type.—Male, Cat. No. 25710, U.S.N.M., from New Haven, Conn.

Although the genitalia are almost identical with those of *claripennis*, the antennae are much broader, the abdomen darker and the abdominal hairs more erect than in that species. There are other minor differences.

PHOROCERA IMITATOR, new species.

Male.—Front 0.28 of head width, yellowish pollinose with short hairs outside the frontal rows, the latter fully meeting the rows of strong cilia on the facial ridges. Antennae brownish black, the third joint very long, fully four times the second, slightly widening to the apex; arista slender, very slightly thickened on the basal fourth; bucca one-fourth the eye height; palpi long, yellow, proboscis fleshy. Thorax yellowish gray pollinose, the usual dark stripes rather narrow when viewed from behind; dorsocentrals four, sternopleurals three, one rather stout pteropleural. Abdomen broad, not elongate; the intermediate segments almost entirely pollinose, only the hind edge of the third subshining, the fourth segment mostly pollinose but more shining in certain lights; first segment without marginals, second segment with one large pair, the third segment with a row of eight, of which the median two pairs are very stout; fourth segment with dense, erect, spiny hairs mixed with bristles which also extend below on the hind edge. Genital segments small, brown, the united inner forceps forming a slender flattish tapering organ, grooved behind except at base, its tip forming a small knob which is bent a little backward, the whole hind side up to the knob covered with erect but not very dense black hair; on each side of the organ along its middle is a series of stiff spines directed toward the base about as long as the hairs. This structure as a whole is entirely different from any others examined by us; fifth sternite deeply incised, the lobes thickened along the inner side, with a few hairs on the outer. Legs black, the middle tibiae with two bristles on the outer front side, the hind tibia on the outer side with a uniform row of about 24 straight bristles interrupted in the middle by one bristle nearly twice as long. Wing hyaline, the fourth vein bent almost at a right angle and with a very slight fold, the apical cell rather widely open.

Length 12.5 mm.

One specimen Lyme, Connecticut, September 4, 1909 (Champlain Coll.).

Type.—Male, Cat. No. 25711, U.S.N.M.

Without examining the genitalia the species might be mistaken for the more common *ainaris*, but is separable by having much more uniform ciliation of the hind tibiae, and especially by the presence of numerous bristles in the male along the middle line of the venter, which are absent in males of *ainaris*.

PHOROCERA INDIVISA, new species.

Female only.—Front 0.35 of the head width (average of three 0.34, 0.34, 0.36), the pollen yellowish at vertex, whitish silvery the rest of the way to the mouth; frontal bristles 6 to 8, the two uppermost reclinate, the lowest attaining the level of the base of the third joint, hardly meeting the strong bristles of the facial ridges; antennae wholly black, slender, third joint almost reaching the vibrissae, second joint almost half the third; palpi yellow, the base slightly infuscated; bucca one-sixth the eye height. Thorax as in *claripennis*, but the scutellar hairs upright and stout, and the apical scutellars erect and strongly decussate; dorsocentrals 4, sternopleurals 3. Abdomen almost wholly shining black; a narrow undivided silvery band at base of second, third, and fourth segments; no discals except on fourth segment. Legs black, mid tibiae with two or three bristles on outer front side, hind tibiae with uneven bristles on outer side. Wing subhyaline, fourth vein with square, angular bend and distinct fold beyond; fourth vein ending farther before the apex than usual; costal spine distinct; third vein at base with six to eight setules reaching nearly to cross vein.

Length 5 to 6 mm.

Three females, College Station, Texas, September 20 and October 1, 1921 (H. J. Reinhard).

Type.—Female, Cat. No. 25708, U.S.N.M.

PHOROCERA COCCYX, new species.

Male.—Front 0.29 of the head width, the sides with yellow pollen, the parafacials also yellow, paler below; the frontal bristles considerably overlapping the large bristles of the facial ridges. Antennae black, third joint very large and wide, gradually wider toward the tip, fully four times as long as the third; arista long and slender, the basal third slightly thickened; palpi yellow; proboscis small. Thorax with yellowish gray pollen; the dorsum with the usual dark stripes; four dorsocentrals, three sternopleurals; pteropleura with one small bristle. Abdomen slightly elongated, without discals; the hairs depressed on the second and third segments; the basal half or more of each of the last three segments with white pollen, the apical parts subshining, or in an oblique light, brown pollinose. Genital segments blackish, the united inner forceps forming a slender curved beak which is suddenly widened toward the base so that the basal

half is much deeper in profile; it is deeply grooved behind, the groove filled with dense yellow hairs which extend out on the hind or upper side of the beak; the sides of the basal portion have long hairs extending backward and upward. This organ in profile has some resemblance to the head of the cuckoo (inverted), which suggested the name. The outer forceps developed into shining flat plates, as usual in this group, but larger and more conspicuous, with hairs to the apex and on the front edge. Penis larger than in most of the species; fifth sternite deeply cleft, its sides almost parallel, the lobes with numerous hairs along the edge and outer side. Legs black, the middle tibia with two large bristles on the outer front side and with an uncommonly distinct and sharp-edged ridge down the extensor side; hind tibia with sparse and uneven bristles on the outer side. Claws and pulvilli all greatly elongated. Wing subhyaline, bend of fourth vein a little oblique, with very slight fold; third vein with about five or six bristles at base.

Length 13 mm.

Described from three males, Falls Church, Virginia, August 30 (N. Banks, Coll.); Green County, New York, September 10; and Monticello, Indiana, July 24, 1885, reared from *Sibine stimulca* Clemens by John Smith.

Type.—Male, Cat. No. 25712, U.S.N.M., from Falls Church, Virginia.

PHOROCERA SUBNITENS, new species.

Male.—Front 0.26 of head with; the parafacials black and subshining as far as the second large reclinate frontal bristle, with silvery or whitish pollen from there to the mouth; the frontal bristles just meet the smallish bristles of the facial ridges; antennae black, the third joint slender, three times the second; arista enlarged on the basal third; bucca one-fifth the eye-height; palpi yellow, somewhat infuscated at the base; proboscis small. Dorsum of thorax almost entirely shining black in most lights, still from behind there is some pollen visible dividing the black portion into stripes; four dorso-centrals; three sternopleurals; the middle coxae have some uncommonly long bristles curved backward, a few of them rather wavy at the tips; the sternopleurae just before these coxae bear some long hairs which are not very stout. Abdomen mostly shining or subshining, black, the silvery pollen of segments 1, 2, and 3 divided by shining black stripes down the middle and even to the sides is of less extent than usual; discal bristles absent; the hairs of the second segment very distinctly erect and quite long, especially upon and adjacent to the black median stripe on the third segment; all the hairs of the third segment are very distinctly depressed; first and second segments each with a single pair of median marginal bristles; third

segment with a row of eight; fourth segment on apical half with less numerous bristly hairs than usual in this group. Genital segments entirely black; the united forceps forming a sharp regularly tapering organ which is a little concave behind to the middle but on the basal part decidedly convex and is covered on the entire posterior side with soft dark hair; outer forceps as usual in this group modified into flat, shining plates, which at the tip are somewhat drawn out to form a palpus-like organ. Legs black; middle tibia with two bristles on the outer front side; hind tibia with an uneven row on the outer side. Wing sub-hyaline; bend of fourth vein rather far from the margin and with a long distinct fold; the bend is rectangular and the apical cell is narrowly open at some distance before the apex; base of third vein with about five bristles.

Length 6 mm.

One male; Dead Run, Fairfax County, Virginia, August 27, 1914 (R. C. Shannon).

Type.—Male, Cat. No. 25713, U.S.N.M.

PHOROCERA SULCATA, new species.

Male.—Front 0.29 of the head width; the sides with yellowish gray pollen, paler on the sides of the face; frontal bristles 8 or 9, fully meeting the ascending large bristles of the facial ridges, one or two small bristles outside of the frontal rows. Antennae long, blackish, the third joint about four times the second, wide at the tip; arista thickened on the basal third; parafacials considerably narrower than the third antennal joint; bucca not over one-fifth the eye height; palpi yellow on the apical third, becoming blackish basally; proboscis small and short. Thorax gray, pollinose, slightly yellowish on the dorsum which has the usual dark stripes when viewed from behind; dorsocentrals 4, sternopleurals 3, small fourth is present on one side and slightly indicated on the other; pteropleural with one small bristle. Abdomen wholly black in ground color with silvery pollen on the second and third segments except their apices, which in some lights are subshining; the fourth segment is shining on at least the apical half; first segment with a small pair of median marginals, second segment with a large pair; third segment with a marginal row of about ten; fourth segment with spiny erect hairs becoming bristly toward the apex. Genital segments black, the united inner forceps forming a narrow slender straight organ which does not taper much until at extreme tip which is curved forward on the back; it is deeply grooved behind on the apical half, the basal half being filled out and slightly ridged on the median line; the outer forceps form shining, reddish-brown plates which are blackened and bristly at the tip; the penis is larger than in related forms; fifth sternite shining, black,

deeply cleft, the sides projecting toward each other some distance from the base. Legs black, middle tibia with two bristles on the outer front side; hind tibia with an uneven row of bristles on the outer side. Wings hyaline with fourth vein bent at a right angle, and with a very slight fold; the apical cell rather widely open; third vein with seven bristles at base reaching half way to the small crossvein.

Length 9 mm.

One male, Billy Island, Okefenokee, Georgia, June, 1912 (Cornell University Expedition).

Type.—Male, Cat. No. 25714, U.S.N.M.

Subgenus PATELLOA.

PHOROCERA LEUCANIAE Coquillett.

Phorocera leucaniae COQUILLET, Revis. Tachin., 1897, p. 104.

Patelloa leucaniae TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 619.

Front of male 0.260 and in the female 0.30 (average of three, 0.30, 0.29, 0.32) the head width; parafrontals yellowish pollinose, the frontal bristles in a single row descending to the arista, two uppermost ones stout and reclinate, the sides clothed with fine inconspicuous hairs: face slightly yellowish pollinose, ridges bristly four-fifths of the way up; bucca one-fourth the eye height: palpi and proboscis yellow: antennae black nearly as long as the face, the third joint in both sexes four times the length of the second; arista thickened on the basal fourth, penultimate joint short. Thorax gray pollinose, marked with four black vittae and bearing three dorsocentral macrochaetae; scutellum grayish pollinose with four pairs of marginal bristles, the apical pair directed backward, there is also one pair on disk. Sternopleurae with three bristles. Abdomen thick, the fourth segment wedge-shaped, wholly covered with gray pollen, anal segment yellowish pollinose, sometimes a yellowish spot on the sides of the intermediate segments; first two segments usually bear a pair each of marginal macrochaetae, sometimes a pair of weak discals on the second; third with a marginal row and with or without discals, fourth with two rows one half-way the other at apex; bristly hairs of the abdomen depressed in both sexes. Legs brownish black, tibiae often brown, mid tibiae bearing a single bristle on the outer front side near the middle, hind tibiae outwardly ciliate with one longer bristle. Wing hyaline, apical cell open, fourth vein strongly areuate beyond the bend, base of third vein with two bristles. Ovipositor concealed usually, but when visible it has no strongly chitinized process.

Length 10 to 11 mm.

Redescribed from the type specimens, from District of Columbia, Tennessee, and Kentucky, bred from *Cirphis unipuncta* Haworth

and *Loxostege similalis* Guenée; and two additional from Pennsylvania and Tennessee. It has been reported from New Brunswick by Tothill, reared from *Euproctis chryssorrhæa* Linnæus; from Quebec by Chagnon and by Winn and Beaulieu, from New Jersey by Johnson and Daecke, Kansas by Tucker, Connecticut by Britton, and from North Carolina by Brimley.

Type.—Female, Cat. No. 3604, U.S.N.M.

PHOROCERA FULVICEPS Van der Wulp.

Phorocera fulviceps VAN DER WULP, *Biologia*, Diptera, vol. 2, 1890, p. 80.

Two male cotypes received by courtesy of the British Museum, are very close to *leucaniæ* Coquillett. The latter, however, has no discals, but occasionally one or two poorly developed, while the latter has a pair on each of the intermediate segments (one bristle is absent on the third segment in one specimen): in the male there is also a difference in the length of the hairs on the front, these being long and erect in *fulviceps*.

Length.—9 mm.

Two males, Omilteme in Guerrero, Mexico, collected by H. H. Smith.

Cotypes.—Males, U.S.N.M. Cat. No. 23961.

PHOROCERA FACIALIS Coquillett.

Phorocera facialis COQUILLET, *Revis. Tachin.*, 1897, p. 105.

Sides of face below the frontals bristly for some distance; apical cell closed, bucca one-half the eye height.

Front of male 0.307—0.313 and in the female 0.425 the head width, the sides dull gray pruinose bearing several stout bristles outside of the frontal row; sides of face below the lowest frontals bristly one-third of the way to the vibrissæ; sides of face gray pruinose, the ridges bristly nearly to the base of antennæ; bucca one-half the eye height; palpi yellow; antennæ as long as the face, the first and second joints usually yellowish, sometimes the third also, third joint in both sexes six times the length of second, arista thickened on the basal third, the penultimate joint short. Thorax gray pollinose, marked with four black vittæ; four dorso-central macrochaetæ; scutellum black, always yellowish at apex, bearing four pairs of marginal bristles. Sternopleura with three bristles. Abdomen wholly gray pollinose with dark reflecting spots, sometimes the sides of intermediate segments are yellowish. First segment with marginals, the remaining ones with discal and marginal macrochaetæ, the abdominal hairs depressed; female without piercing ovipositor. Legs black; mid tibiae with two or more bristles on the outer front side near the middle; hind tibiae subciliate. Wings hyaline, apical cell closed, fourth vein beyond the bend slightly arcuate; third vein with two or three bristles at its base.

Length 7 to 10 mm.

Redescribed from the type and allotype, a specimen of each sex collected April 30, 1895, at San Diego, Texas (E. A. Schwarz). In the United States National Museum collection there are two males, Tempe, Arizona, April 5, 1914 (D. J. Caffrey); one male, Pecos, New Mexico (Cockerell).

Type.—Cat No. 3606, U.S.N.M.

PHOROCERA MERACANTHAE Greene.

Phorocera meracanthae GREENE, Proc. Ent. Soc. Wash., vol 23, 1921, p. 126; Proc. U. S. Nat. Mus., vol. 60, art 10, 1922, p. 11, fig. 23, (puparium).

Sides of the face below the frontals bristly for some distance; apical cell open; bucca one-fourth the eye height.

Front of male 0.206 and in the female 0.32 (average of three 0.30, 0.33, 0.34.) of the head width; gray pruinose, the sides of face below the lowest frontals bristly one-third of the way to the vibrissae; no long bristles outside the frontal row; face gray pruinose the ridges bristly nearly to the base of antennae; bucca about one-fourth the eye height; palpi yellow; antennae black, as long as the face, the third joint six times the second in the male and five times in the female; arista very long and tapering, the penultimate joint short. Thorax black, gray pollinose marked with four black vittae; four dorsocentral macrochaetae; scutellum black, grayish pollinose, yellowish at the apex in some specimens and bearing four pairs of marginal bristles. Sternopleura with three bristles. Abdomen black, subshining, narrow basal portions of segments two to four gray pollinose; in certain lights this pollinose area broadens out considerably on the sides and venter; the dorsum and sides of the fourth segment shining black on the apical half. All of the segments excepting the first bear discal macrochaetae; abdominal hairs depressed. Legs black, mid tibiae with one or two bristles on the outer front side near the middle, in most specimens there are two, one long and one short; hind tibiae subciliate at most with coarse bristles of uneven length. Wings hyaline, apical cell open, the third vein bearing one or two bristles at its base.

Puparium with protruding stigmata.

Length 8 to 10 mm.

Described from six specimens; one male, Myersville, Maryland, June 4, 1914, bred from *Meracantha contracta* Beauvais. Five females from the United States National Museum collection, labeled as follows: Beltsville, Maryland, July 9, 1916; Mount Vernon, Virginia, July 4, 1917 (W. L. McAtee); Hell Canyon, Manzano National Forest, New Mexico, 7,200 feet, September 18, 1916 (C. H. T. Townsend).

Type.—Male, Cat. No. 24147, U.S.N.M.

PHOROCERA SPECULARIS, new species.

One of the three species of this genus in which the parafacials are bristly below the frontals and readily separated from the others by the dark reflecting spot below each of the lowest frontal bristles.

Front of male 0.290 and in the female 0.333—0.366 of the head width, gray pruinose with a yellowish cast, subshining in the male, less so in the female; vertex somewhat blackish; sides of face below the lowest frontals bristly for some distance, the parafacials silvery with a dark reflecting spot; bucca about one-third the eye height, in some specimens slightly more; palpi yellow; antennae black, nearly as long as the face, the third joint in male five and in the female four times the length of the second; arista thickened on the basal third, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae; four dorsocentrals; scutellum black, gray pollinose, often yellowish at tip, bearing three long lateral and one shorter cruciate apical pair of bristles; there are also a widely separated pair on the disk. Sternopleura with three bristles. Abdomen thickened, black, subshining, the base and sides of each segment but the first gray pollinose; venter wholly gray pollinose. One pair of median marginal macrochaetae on the first segment, second with one pair median discal and marginal, the third with one pair discal and a marginal row, the fourth with two rows of macrochaetae on the apical half and at the apex of segment; abdominal hairs erect and conspicuous, especially so in the male. Legs blackish, mid tibiae with two or more bristles on the outer side near the middle; hind tibiae not ciliate. Wings hyaline, the anterior crossvein strongly infuscated; apical cell open, the third vein bearing two or three bristles at base.

Length 8 to 10 mm.

Described from five specimens. Two males, Hell Canyon, New Mexico, Manzano National Forest, Sept. 19, 1916 (C. H. T. Townsend); one male, labelled "Mts. near Claremont, Cal., Baker, 77—Hilton"; two females from Juliaetta, Idaho (Aldrich) and Hood River, Oregon, October 8, 1917 (F. R. Cole).

Type.—Male, Cat. No. 25715, U.S.N.M., from Hell Canyon.

PHOROCERA PACHYPYGA, new species.

?*Phorocera leucantiae* TOTHILL, *Canad. Ent.*, vol. 45, 1913, p. 73.

Front of male 0.236 and in the female 0.292 the head width; lightly yellowish pollinose, the sides clothed with many fine hairs much shorter than the frontal bristles which extend below the arista; face silvery pruinose with a yellowish tinge, ridges bristly four-fifths of the way to the antennae; bucca at least one-third the eye height; palpi yellow; antennae brown, shorter than face, in most specimens reaching two-thirds of the way to the vibrissae, third joint in both sexes three and one-half times the second, arista thick-

ened on one-fourth its length, the penultimate joint short. Thorax grayish, marked with four black vittae and bearing three dorso-central bristles, scutellum grayish at base, the broad apex yellow bearing three long pairs and a shorter, usually cruciate apical pair of marginal bristles; there are also a pair on disk.

Sternopleura with three bristles. Abdomen thick, the fourth segment globose, grayish pollinose, no distinct pattern, the fourth segment black or grayish, sides of second and third segment faintly reddish; abdominal hairs erect in male, subdepressed in the female, first segment with one pair marginals, second with one pair median marginals and seldom any discals (never any arranged in pairs) third usually with one or more pairs of discal (sometimes wanting) and a marginal row, the fourth with two rows of macrochaetae on the apical half and at the extreme apex. Legs black or brownish, mid tibiae with two or more bristles on the outer front side near the middle, hind tibiae sub-ciliate at most. Wings hyaline, apical cell open, fourth vein beyond the bend not especially arcuate; the third vein bearing two or three bristles at its base. Hypopygium concealed, the inner forceps are somewhat longer than the outer ones, curving slightly inward, the outer side of both pair are clothed with short hairs.

Length 8 to 10 mm.

Described from a large series of both sexes collected at Lunenburg, Massachusetts, May, 1914 (R. T. Webber); one male, Juliaetta, Idaho (Aldrich); one male, Cincinnati, Ohio, April 7, 1900; one female, Germantown, Pennsylvania, April 28, 1906; one male, Caroline, New York, April 11, 1917 (S. H. Emerson); two males, Heckton Mills, Pennsylvania, May 8, June, 1909 (W. R. Walton); one male Pittsburgh, Pennsylvania (G. A. Ehrman); one male, Plummer Island, Maryland, May 10, 1916 (W. L. McAtee); one female, Kansas City, Missouri, April 21, 1899.

This species is an important parasite of the brown tail moth, *Euproctis chrysorrhoea* Linnaeus in New England and is probably the species referred to by J. D. Tothill, above cited, as having this host.

Type.—Male, Cat. No. 25716. U.S.N.M., from Lunenburg, Massachusetts.

PHOROCERA SETIFRONS, new species.

Front in male 0.42 and in the female 0.47 and 0.43 the head width, silvery, the sides with many stout bristles outside the frontal row; head of male triangular, the front in profile projecting forward a distance equal to the eye width, in female not so strongly produced; face silvery, at their narrowest part nearly one-half as wide as the median depression; facial ridges bristly four-fifths of the way to antennae with many long closely set bristles; bucca nearly one-third the eye height; palpi yellow; antennae slightly shorter

than the face, the third joint in both sexes four times the length of second, arista thickened on the basal fifth, the penultimate joint short. Thorax gray pollinose, marked with four black vittae and bearing three dorsocentral macrochaetae; scutellum grayish with three or four pairs of long marginal bristles. Sternopleura with three bristles. Abdomen black, grayish pollinose, the abdominal hairs long and erect and readily confused with the macrochaetae. Legs black, mid tibiae with two bristles on the outer front side near the middle; hind tibiae ciliate with one or two longer bristles. Wings hyaline, apical cell open, the third vein with two or three bristles at base.

Length 10 to 11 mm.

Described from one male and two female specimens collected by Frederick Knab, May 1907, at Oxbow, Saskatchewan.

Type.—Cat No. 25717, U.S.N.M.

PHOROCERA SILVATICA, new species.

Front of male 0.23 and in the female 0.35 the head width, silvery pollinose; little if any blackish pollen at vertex (in female the sides of front are silvery pollinose with a yellowish tinge, and are clothed with many long fine hairs outside the frontal row); parafacials silvery pollinose; in the male at narrowest part about one-third the width of the median depression; bucca one-third the eye height; palpi yellow; antennae five-sixths the length of face, black, the third joint largely reddish, in the male four times the second, arista tapering gradually to apex, penultimate joint short. Thorax grayish marked with four black vittae and bearing three dorsocentral macrochaetae; scutellum black, only the tip yellowish, with four pairs of marginal and one pair of discal bristles. Sternopleura with three bristles. Abdomen thick, black, sprinkled with grayish pollen, the abdominal hairs sub-erect at most and distinct from the macrochaetae; first segment with one pair of marginals, intermediate segments with two or three pairs of discals besides the marginals, and the fourth wholly covered with macrochaetae. Legs black; mid tibiae with two bristles on the outer front side near the middle; hind tibiae subciliate at most; front pulvilli less than twice the length of the hind ones. Wings hyaline, apical cell open the length of the small cross vein, costal spine small but distinct, third vein at base bearing two or three bristles. Hypopygium blackish, the inner forceps slightly swollen at base and about three-fourths the length of the outer ones, clothed on the outer side with fine short hairs. The fifth sternite is noticeably lobe like.

Length 10 mm.

Described from a male and female specimen taken at Cranbrook, British Columbia, May 11-12, 1919, by C. Garrett. The species is closely related to *fuscimacula*, but differs mainly as follows: width

of head at vibrissae greater; bucca wider; face at narrowest part wider; front at vertex wholly silvery pollinose; hind tibiae subciliate at most, etc.

Type.—Male, Cat. No. 25718, U.S.N.M.

PHOROCERA PLURISERIATA, new species.

Front of male 0.300 of head width, silvery, the vitta equally as wide as either parafrontal; frontal bristles arranged in several irregular rows, the two uppermost bristles of the inner row being stout and reclinate, face silvery, the sides at narrowest part one-third the width of the median depression; bristles of the facialia in a single row; bucca one-fifth the eye height; eyes thickly hairy; palpi yellow; antennae nearly as long as face, the third joint five times the length of the second, arista thickened on the basal three-sevenths, penultimate joint short. Thorax grayish, pollinose, marked with four black vittae bearing three dorsocentral macrochaetae; scutellum black on the basal fourth, the apex yellowish with three long and one short cruciate pair of marginal bristles; disk thickly beset with fine long hairs, excepting at its apex which is bare, no bristles. Abdomen black, gray pollinose, especially so at the base of segments, first segment with marginals, the remaining ones with both discal and marginal macrochaetae. Femora and tarsi black, the tibiae brownish; mid tibiae bearing two bristles on the outer front side near the middle; hind tibiae ciliate with one longer bristle near middle; front pulvilli twice as long as those of the hind tarsi. Wings hyaline, apical cell open about one-half the length of the small cross vein, costal spine short and of the same length as the adjacent bristles, third vein with two bristles at its base. Hypopygium blackish, the inner forceps with a slight swelling at base and about the same length as the outer ones, the former near the base, with a striking tuft of long black hairs three times the length of the forceps.

Length 10 mm.

Described from one male specimen collected at Grizzly Peak, Berkeley Hills, California, received in exchange from the Academy of Natural Sciences, Philadelphia.

Type.—Male, Cat. No. 25719, U.S.N.M.

PHOROCERA FUSCIMACULA, new species.

Front of male 0.28–0.30 the head width; parafrontals at vertex and nearly to the base of antennae subshining blackish; the frontal bristles reach below the arista, in the male they are in several irregular rows, in female there is but a single row of stout bristles with smaller ones outside; bucca one-fourth the eye height; parafacials silvery, with dark reflecting spot above, at their narrowest part (in male) about one-fourth the width of the median depression; facialia

bristly almost to the arista; antennae black, the third joint of male slightly over four and in the female about four times the length of second, arista thickened on the basal third and tapering abruptly, the penultimate joint short. Thorax gray pollinose, marked with four black vittae and bearing three dorsocentral macrochaetae; scutellum yellowish with four pairs of marginal bristles, the apical ones horizontal. Sternopleura with three bristles. Abdomen thick, black, sprinkled with gray pollen, the abdominal hairs depressed in female, suberect in male but in nowise confused with the macrochaetae; first segment with one pair of marginals, second and third segments with two or three irregular pairs discals and the usual marginals, the fourth wholly covered with macrochaetae. Legs black, the tibiae somewhat brownish, mid tibiae with two bristles on the outer front side near the middle; hind tibiae ciliate, with several large bristles near the middle. Wings hyaline, apical cell narrowly open about one-half the length of the small cross vein, fourth vein beyond the bend strongly arcuate, third vein bearing two bristles at base. Hypopygium inconspicuous, black; inner forceps with a conspicuous hump at base, which bears a few strikingly long hairs directed forward, surpassing the forceps in length.

Length 10 mm.

Described from two males and four females, reared from *Telea polyphemus* Cramer and *Hemerocampa vetusta* Boisduval at Watsonville, Calif., by E. O. Essig, April 1920; and one female, San Diego, California (Aldrich).

Type.—Cat. No. 25720, U.S.N.M.

PHOROCERA REINHARDI, new species.

Female.—Front 0.34 to 0.37 of the head width (in two); frontal row of bristles reaching to arista, the uppermost two or three reclinate; parafrontals and parafacials wider than the average, white but not silvery, facial ridges with strong bristles reaching almost to the arista; antennae black, second joint with dense spiny bristles, third almost four times the second, reaching nearly to the vibrissae; palpi yellow, with long and rather abundant black hairs; bucca two-fifths the eye height. Thorax gray with the usual stripes; dorso-centrals 3, sternopleurals 3; scutellum yellowish at tip, with three marginals and a slender but long apical pair. Abdomen thick in profile, subglobose, of characteristic *Patelloa* shape, and with changeable gray tessellations above, the apices of the segments hardly more shining; second and third segments with small discals, the hairs erect or nearly so; first and second segments with one pair of marginals. Third segment with a stout row, of which the median ones are submarginal; fourth segment with a discal row about equal to the preceding and smaller marginals. Legs black; middle tibiae with three bristles on outer front side; hind tibiae subciliate with two longer bristles. Wings hyaline; third vein with 2-3 hairs at

base; bend of fourth vein oblique, the last section perfectly straight to the costa, not concave.

Length 8.5 mm.

Described from two females, Agricultural College, Michigan, April 21, 1922 (L. G. Gentner); received from H. J. Reinhard.

Type.—Female, Cat. No. 25721, U.S.N.M.

The species resembles *leucaniae* but has three bristles on the outer front side of the middle tibiae instead of only one. In *silvatica*, of which the female is unknown, the discals are larger and the front more prominent and yellowish.

Subgenus NEOPALES.

PHOROCERA NOCTUIFORMIS Smith.

Neopales noctuiformis SMITH, Psyche, vol. 22, 1915, p. 267.

Eutritochaeta carpocapsae TOWNSEND, Proc. U. S. Nat. Mus., vol. 56, 1919, p. 580.

Front of male 0.298 of the head width, the sides gray pollinose with a yellowish tinge, bearing outside of the frontal bristles a row of shorter ones which are sometimes weak; sides of face gray pollinose, at narrowest part less than one-third the median depression; palpi yellow or brownish, facial ridges bristly one-half to three-fourths of the way; bucca one-fifth the eye height; antennae as long as face, second joint very short; the third joint six times the length of second in the type; arista thickened on the basal three-sevenths, the penultimate joint short. Thorax grayish, marked with five indistinct vittae; four dorsocentral macrochaetae; scutellum black, the tip yellow bearing three long and one shorter apical pair of bristles. Sternopleura usually with three bristles. Abdomen black, last three segments grayish pollinose on their basal two-thirds; first two segments with one pair each of median marginal, third with a marginal row and the fourth with macrochaetae on the apical two-thirds; abdominal hairs erect and conspicuous. Legs black, the mid tibiae with two or more bristles on the outer front side near the middle; hind tibiae subciliate. Wings hyaline, apical cell open, the third vein with two or three bristles at its base.

Puparium with protruding stigmata.

Length 6 to 8 mm.

Paratypes at the Boston Society of Natural History, Boston, Massachusetts, and at the Museum of Comparative Zoology, Cambridge, Massachusetts, examined by the junior author. The type specimen was reared from an unknown noctuid larva taken at Revere, Massachusetts; the other specimens were collected at North Andover, Mass.; Sugar Island and Orrs Island, Maine.

Type.—Cat. No. 19237, U.S.N.M.

The types of *Eutritochaeta carpocapsae* (Cat. No. 22243) are a male and a female, reared by F. L. Wellman, at Bentonville, Arkan-

sas, from a cocoon of the codling moth, *Carpocapsa pomonella* Linnaeus.

PHOROCERA TORTRICIS Coquillett.

Phorocera tortricis COQUILLET, Revis. Tachin., 1897, p. 103.—NICOLAY, Ent. News, vol. 30, 1919, p. 279.—BRIMLEY, Ent. News, vol. 33, 1922, p. 25.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, 1922, p. 11, fig. 75 (puparium).

Neopales tortricis JOHNSON, Psyche, vol 23, 1916, p. 81.—WEISS, Ent. News, vol. 28, 1917, p. 220.—BRITTON, Check-list Ins. Conn., 1920, p. 193.

Front in the male 0.26 (average of three, 0.270, 0.250, 0.238) and in the female 0.288 of the head width; face and front gray pruinose, the sides of the former at narrowest part one-fifth the width of median depression; facialia bristly three-fifths of the way or more; inner eye margins concave; eyes thickly hairy; bucca one-tenth the eye-height; palpi usually yellow, often brown and sometimes black; antennae nearly as long as face, second joint elongate, the third joint in male four and one-half and in the female two and one-half times the length of second; arista thickened on the basal third, the penultimate joint short. Thorax thinly gray pollinose, marked with three broad black vittae; four dorsocentral macrochaetae; scutellum yellow, except at base, bearing four pairs of long marginal bristles. Sternopleura with two bristles usually, sometimes three. Abdomen black, subshining, the last three segments lightly gray pollinose on the basal half, often the gray pollen of the second segment is confined to the basal fourth; sides of first three segments sometimes reddish; discal macrochaetae absent in the male, usually present on the intermediate segments of the female; abdominal hairs either erect or depressed (erect in the type). Legs black; mid tibiae with two bristles on the outer front side near the middle; hind tibiae evenly ciliate. Wings hyaline, apical cell open, the third vein with two or three bristles at its base.

Length 6 to 9 mm.

Redescribed from the type and numerous other specimens of both sexes: Missouri (type, C. V. Riley); Michigan (Gillette); Milwaukee, Wisconsin; Lafayette, Indiana (Aldrich); Melrose Highlands, Massachusetts (Webber); Koehler (Walton) and Indian Spring (Townsend) in New Mexico; Plano, Texas (E. S. Tucker); Opelousas, Louisiana (Pilate). It has been reported also from Vermont, New Jersey, and Connecticut.

Rearing records: from *Mineola indiginella* Zeller in Missouri (Riley, type); from a tortricid in Michigan (Gillette, paratype); from *Cacoecia cerasivorana* Fitch (in Massachusetts by Webber, from Vermont by Johnson); from *Peronea minuta* in New Jersey (Weiss); from *Cacoecia argyrospila* Walker in Arkansas (Isely, unpublished).

Type.—Male, Cat. No. 3603, U.S.N.M.

PHOROCERA ERECTA Coquillett.

Phorocera parva BIGOT, Coquillett, Revis. Tachin., 1897, p. 103.

Phorocera erecta COQUILLET, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 112.—GIBSON, Rept. Ent. Soc. Ontario, 1918 (1919), p. 117.—BRITTON, Check-List Ins. Conn., 1920, p. 193.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, 1922, p. 11, fig. 52 (puparium).

Exorista loxostegeae REINHARD, Annals Ent. Soc. Amer., vol. 14, 1921 (1922), p. 331.

Front of male 0.29 (average of three 0.27, 0.30, 0.29) and in the female 0.32 (average of three 0.34, 0.33, 0.30) the head width; silvery pruinose, slightly blackish at vertex; the sides destitute of macrochaetae outside of the frontal row; frontal vitta about as wide as either parafrontal; facial ridges bristly about seven-eighths of the way sometimes much less so; face silvery pruinose, the sides at the narrowest part one-fifth the width of the median depression; buccal one-fifth or less of the eye height; palpi black; antennae black, nearly as long as the face, the third joint in male six and in the female about four times the length of second, arista thickened on the basal third, the penultimate joint about as broad as long. Thorax black, gray pollinose, marked with five black vittae, the middle one very narrow, the outer ones broken at the suture; four dorsocentral macrochaetae; scutellum black, often yellowish at the tip, bearing two long and one short pairs of marginal bristles, and a pair of erect apicals. Sternopleura with four bristles. Abdomen black, the bases of the last three segments thinly gray pollinose, the pollen often extending nearly to the apex, sometimes the sides of the intermediate segments reddish. First segment with one pair of median marginals, the second with one pair discal and one pair median marginals, the third with discal and a marginal row, the fourth with upright bristles and two rows of macrochaetae, one at the apical half and the other at the extreme apex, abdominal hairs depressed. Legs black, mid tibiae with one bristle on the outer front side near the middle; hind tibiae ciliate, with one longer bristle. Wings hyaline, apical cell open, third veing bearing one or two bristles at its base.

Length 6 to 8 mm.

Redescribed from the type specimen and thirteen others, of both sexes, including a set of four paratypes of *loxostegeae* presented to the Museum by Mr. Reinhard. The type is a female, and there is a male bearing the same Bureau of Entomology number, 439L; they were reared from *Loxostege similalis* Guenée from Camden, Arkansas.

Other specimens are from Los Angeles, California (Coquillett) (presumably a paratype); Harrison, Idaho (Aldrich); Victoria, Texas, bred from *Loxostege similalis* Guenée (McCarthy); Kennewick, Washington, bred from leaf roller (Newcomer); Mountain Grove, Missouri (Somes); Wichita, Florida "parasite of *Epicauta* (?) on beet." Reinhard reared his material from *Loxostege similalis* Guenée. The species has also been identified by the senior author in material

not now in the Museum as follows: Reared from *Desmia funeralis* Huebner by B. A. Porter at Wallingford, Connecticut; reared from *Pyrausta nubilalis* Huebner by S. C. Vinal at West Medford, Massachusetts, and by D. J. Caffrey at Cambridge, Massachusetts.

Type.—Female, Cat. No. 6215, U.S.N.M.

PHOROCERA COMSTOCKI Williston.

Phorocera comstocki WILLISTON, in Scudder's Butterflies of New England, vol. 3, 1889, p. 1922.—COQUILLET, Revis. Tachin., 1897, p. 104.—TOWNSEND, Psyche, vol. 6, 1893, p. 467.—BRIMLEY, Ent. News, vol. 33, 1922, p. 25.

Front of male 0.39 (average of three, 0.38, 0.39, 0.39) and in the female 0.39 (average of three, 0.38, 0.39, 0.41) of the head width; parafrontals silvery, the upper two stout, strongly reclinate frontal bristles are distinctly outside the row; in the male there is one row, in the female two irregular rows of bristles outside the frontals; the median vitta is narrow, less than one-third the width of front; face silvery pruinose, the sides below the frontals bare; facial ridges bristly nearly to the base of antennae, bucca one-sixth the eye height; palpi yellow; antennae as long as face, the first two joints and the basal half of third, reddish; third joint of male five times the second, in the female somewhat shorter, arista thickened on the basal third, sometimes nearly half way, the penultimate joint about as long as broad. thorax gray pollinose, marked with four black vittae; four dorsocentral macrochaetae; scutellum grayish pollinose, the tip yellowish, bearing three pairs of strong marginal bristles and a weak pair of apical ones; there are also a weak pair on disk. Sternopleura with three bristles, the lower large. Abdomen black, the last three segments gray on their basal three-fourths and in striking contrast with the black apices, which have a rather definite line of demarcation; discal and marginal macrochaetae present on all segments but the first, which bears one pair of marginals. Legs black, mid tibiae with one bristle on the outer front side near the middle, hind tibiae ciliate with one large below middle. Wings hyaline, although the veins are very brownish; apical cell narrowly open; the third vein with two bristles at its base.

Length 8 to 10 mm.

Redescribed from nine specimens of both sexes in the National Museum, all of which were reared from *Megathymus yuccae* Boisduval and LeConte from South Carolina; the years of emergence were 1874, 1877 and 1892. Two of the lots at least (the later ones) were sent in by Dr. J. H. Mellichamp of Bluffton, S. C. Williston described two specimens from Riley, mentioning the same host; so it is practically certain that the types were from one of the two earlier lots above mentioned. None of our specimens are labeled as types, but there is one type at the Museum of Comparative Zoology, Cambridge, Massachusetts, which has been examined by the junior author.

The species has been reared from *Lophyrus*, species and *Pyrausta penitalis* Grote by Forbes (Townsend); and from *Cossula magnifica* Strecker (Brimley); localities Illinois and North Carolina.

PHOROCERA TEXANA, new species.

Essentially the same as *Phorocera comstocki*, except that the abdomen is black, thickly covered with gray pollen and devoid of definite pattern; the fourth segment is entirely gray pollinose. The front in the male is somewhat narrower, about 0.36 the head width (average of three, 0.36, 0.35, and 0.375); in one female 0.37.

Described from eight males and two females, bred in three lots from *Melitara* species in *Opuntia*; five were reared at Victoria, Texas, by J. D. Mitchell, one at Corpus Christi, Texas, by F. C. Pratt, and four at Uvalde, Texas, by J. C. Hamlin. Emergence in October and November.

Type.—Male, Cat. No. 25722, U.S.N.M., from Victoria, Texas.

PHOROCERA FLAVICAUDA Van der Wulp.

Phorocera flavicauda VAN DER WULP, Biologia Centrali-Americana, Diptera, vol. 2, 1890, p. 83.

Front of male 0.314 of the head width, golden pollinose, the sides with many fine black hairs, face golden pollinose, the ridges bristly nearly to the base of antennae; bucca about one-fifth the eye height; palpi yellow; antennae blackish, as long as the face; the third joint of male six times the length of second, arista thickened on the basal fourth, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae; four dorsocentral macrochaetae; scutellum black, gray pollinose, sometimes slightly reddish at tip, bearing three long and one shorter upturned pair of apical bristles; sternopleura with four bristles. Abdomen black, gray pollinose, the anal segment yellowish; no discal macrochaetae present; first and second segment with one pair each of median marginal bristles, the third with a marginal row and the fourth thickly beset with bristles of various lengths, one row in particular near the apex of segment being nearly as long as the macrochaetae of the third segment; abdominal hairs suberect. Legs black, mid tibiae bearing one long and one short bristle on the outer side near the middle; hind tibiae ciliate with one longer bristle. Wings hyaline, the apical cell open; third vein with two bristles at its base.

Length 10 mm.

Redescribed from a male specimen, labeled "Guanajuato, Mexico." Other specimens determined by Coquillett as this species show considerable variation. A female, from Louisiana, agrees quite well in main part, but has the sides of front bare outside of the frontal row. The antennae are shorter than face, third antennal joint four times the second, front 0.340 of the head width, ovipositor visible and shows

a strongly chitinized process. One male from Mexico has the anal segment black, the front wide in the male 0.362 of the head width and the sides of the second abdominal segment reddish; in still another specimen from California, a male, the anal segment is black, face and front silvery, the latter 0.300 of the head width and the sides and a good part of the dorsum of the second and third abdominal segments reddish. Identification from Van der Wulp's description is not at all satisfactory but until more material is available, the specimens had better remain under this name.

Type.—In British Museum.

PHOROCERA PARVITERES, new species.

Front 0.27–0.30 in male (in three), 0.32 in female (one) of the head width; front rather short and horizontal in male but not strongly protuberant at the antennae. Parafrontals and parafacials light golden pollinose, the former without unusually dense erect hair; the sparse frontal rows reaching about to arista, with two recurved above; parafacial at narrowest half as wide as third antennal joint. Antennae black, third joint long, six times the second in the male, five times in the female, arista thickened on basal third; palpi yellow. Thorax gray pollinose with the usual black stripes, four dorsocentrals, generally four sternopleurals, but the lower two small and sometimes only one of them developed and that but slightly; scutellum with three marginal, a pair of erect decussate apicals, and a pair discal. Abdomen gray, second and third segments rather uniformly colored but with a median black line, no discals even on the fourth segment, which has contrasting yellow pollen, but still showing the median line. Abdominal hairs erect on median line on second segment, elsewhere depressed. In certain lights the second and third segments show a broad darker area each side. Genitalia of male small.

Legs black, mid tibiae with one bristle on outer front side, hind tibiae with a poorly developed row. Pulvilli in male as long as last tarsal joint, half as long in female. Wings hyaline, third vein with 2–3 hairs at base, curve of fourth vein nearly a right angle but rounded, concave toward tip, the apical cell disproportionately wide at the bend. The third costal segment (beyond the auxiliary) equals the fifth.

Length 5.5 to 6.5 mm.

Described from five males and one female, College Station, Texas, September 21, to October 9, 1920 (H. J. Reinhard).

Type.—Male, Cat. No. 25723, U.S.N.M.

The species is much like *flavicauda* Van der Wulp, as identified by Coquillett in a Mexican specimen in the United States National Museum; but the latter has a wider front (0.33 in the male), which has dense erect hairs. It also has a well-ciliated hind tibia and other small differences.

PHOROCERA STERNALIS Coquillett.

Phorocera sternalis COQUILLET, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 112.

Phyllophorocera sternalis TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 621.

Front of male 0.320 and in the female 0.326–0.361 of the head width, sides gray pruinose clothed with bristly hairs outside the frontal row; face gray pruinose the ridges bristly on their basal three-fourths, bucca one-fifth or less the eye height clothed with long black hairs in the male, less so in the female; antennae as long as the face; third joint in male broad, convex in front, six times the second; in the female plain, three times the second; arista thickened nearly to the middle, the penultimate joint about as long as broad, in some specimens slightly elongate. Thorax gray pollinose, marked with four black vittae, four dorsocentral macrochaetae, scutellum black at base, the apex broadly yellow, bearing three long and one short apical pair of marginal bristles. Sternopleura with four bristles. Abdomen black, shiny, the basal portions of the second, third, and fourth segments gray pollinose; all of the segments with marginal and the last three with discal macrochaetae. Legs black; mid tibiae bearing two or more bristles on the outer front side near the middle; hind tibiae coarsely subciliate at most (there is no even fringe of bristles). Wings hyaline, the apical cell open, third vein with two bristles at base.

Length 7 to 8 mm.

Redescribed from the type male from Franconia, N. H. (Mrs. Slosson); one female from East Eddington, Maine (Hough); and one female from Moscow, Idaho (Aldrich).

Type.—Male, Cat. No. 6214, U.S.N.M.

PHOROCERA INCRASSATA Smith.

Phorocera incrassatus SMITH, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 121.

Front in female 0.312 of the head width, head nearly one and one-half times as broad as long, parafrontals and parafacials yellowish gray pollinose, facial ridges bristly a little over half way; sides of face below the frontals bare; bucca one-fifth the eye height; palpi yellow; antennae not quite as long as the face, the third joint four times the second, arista thickened on the basal three-sevenths. Thorax black, lightly gray pollinose with a yellowish tinge, marked with four black vittae; four dorsocentral macrochaetae; scutellum black, slightly yellow at tip, with three pairs of long marginal bristles besides the shorter apical pair. Sternopleura with three bristles. Abdomen black, the base of segments gray pollinose, abdominal hairs depressed, first segment with a pair of marginal macrochaetae, second with two pairs of discal and one pair median marginal, third with two pairs discal and a marginal row, the fourth with macrochaetae on the apical two-thirds. Legs brownish black,

mid tibiae with two bristles on the outer front side near the middle, hind tibiae thinly ciliate. Wings hyaline, apical cell open, the third vein bearing two or three bristles at its base.

Length 7 mm.

Described from one female specimen collected at Moscow, Idaho (Aldrich).

Type.—Male, Cat. No. 14698, U.S.N.M.

PHOROCERA XANTHURA, new species.

Male.—Eyes not very densely hairy. Front 0.33 of head width; the parafrontals blackish above, yellow pollinose below; parafacials also yellow pollinose; the frontal bristles extending to the arista; facial ridges with rather weak bristles which do not ascend quite to the level of the frontals. Antennae black, the fourth joint four times the second and rather wide through its whole length; arista thickened on the basal third; bucca more than one-fourth the eye-height; palpi black; proboscis small. Dorsum of thorax with the usual gray pollen showing four black stripes when viewed from behind; four dorsocentrals; three sternopleurals; the sternopleurae with only a few bristles below near the median line. Abdomen rather curved downward apically; the second and third segments gray pollinose with changeable pattern; the fourth segment with dense and almost uniform yellow pollen. Genital segments small, brownish-black; the inner forceps divided, straight, slender, the outer forceps of the same length, rather stout at base, slender at tip, gently curved. Fifth sternite deeply cleft, the lobes bearing only a few hairs. Legs black, middle tibia with only one smallish bristle on the front side; hind tibia with a row of very small bristles on the outer side interrupted by one larger at the middle. Wings hyaline: bend of fourth vein decidedly oblique, not at all rectangular, the apical cell narrowly open at a distance before the apex, equal to a little more than one-half the length of the hind crossvein; third vein with two bristles at base.

Length 6 mm.

One male, Nashville, Tennessee, reared from *Papaipema nitela* Guenée (W. H. Larrimer).

Type.—Male, Cat. No. 25724, U.S.N.M.

PHOROCERA TENUSETA, new species.

Female.—Front 0.31–0.34 (in three) of the head width. The head when viewed from in front noticeably wider than high; frontals with light yellow pollen which becomes white on the parafacials; the frontal bristles extending almost to the tip of the second antennal joint, only the uppermost one reclinate; several long erect hairs adjacent to orbitals; bristles of the facial ridges becoming weak above, and in two of the specimens ending a little lower than most *Phoroceras*, at about the middle of the third antennal joint; antennae

black, second joint reddish at apex, the third two and a half times the second; arista thickened on the basal third; bucca about one-sixth the eye height; palpi yellow, proboscis small. Thorax with thin gray pollen, the usual dark stripes rather narrow. Scutellum yellow at tip and with spiny erect bristles; four dorsocentrals; three sternopleural bristles. Abdomen rather uniformly covered with yellowish gray pollen, with a faint median dark line, the apices of the segments not shining; discal bristles present but rather small especially on the second segment; fourth segment with unusually large discals and the usual erect large hairs; a small, blunt, shining black ovipositor is just visible. Legs black; middle tibia with two bristles on outer side; hind tibia with a more uniform row than usual on the outer side interrupted by one larger. Wing hyaline, the fourth vein bent almost at a right angle; first posterior cell rather widely open a little before the tip of the wing; third vein with three or four hairs at the base.

Length 6.5 mm.

Described from three females. Two are labeled "Victoria, B. C." "Larvae received from G. DeBlois Green, from cocoon probably of an arctian." The third specimen Royal Oak, British Columbia, August 29 (J. D. Tothill).

Type.—Female, Cat. No. 25725, U.S.N.M., from Victoria. The paratypes are deposited in the Canadian National collection.

PHOROCERA UNIPILUM, new species.

Head, thorax and abdomen shining black; facialia bristly on the basal two-thirds; second antennal joint noticeably elongate.

Front of male 0.294 of the head width, parafrontals shining black, frontal bristles descend below the arista and meet those of the facialia, which are bristly about two-thirds of the way; parafacial silvery; bucca one-fifth the eye height; palpi black; antennae black, as long as the face; the second joint elongate, third about five times the length of second; arista thickened on the basal three-sevenths, penultimate joint short. Thorax black, shiny, indistinctly vittate, bearing four dorsocentral macrochaetae; scutellum black, shining, with two long and two short pairs of marginal bristles. Sternopleura with three bristles. Abdomen black, shining, only a faint trace of gray pollen at the base and sides of segments; venter thinly gray pollinose; first segment with one pair of marginal, the remaining ones with both discal and marginal macrochaetae; abdominal hairs suberect; legs black, mid tibiae with one bristle on the outer side near the middle; hind tibiae ciliate. Wings hyaline, apical cell open, the third vein with one or two bristles at its base.

Length 6 mm.

Described from one male specimen taken August 1, 1917, at Hood River, Oregon.

Type.—Male, Cat. No. 25726, U.S.N.M.

PHOROCERA MARGINALIS, new species.

Front of male, 0.315, and in the female, 0.333 and 0.342 of the head width, golden pollinose, the face and front nearly of equal width; parafacials and bucca silvery, the latter one-sixth the eye height; palpi yellow; eyes faintly hairy; facialia bristly on the basal three-fourths and just reaching the lowest frontals; antennae nearly as long as the face, third joint in male about seven times the length of the second, in the female slightly less; arista thickened on the basal third, the penultimate joint short. Thorax densely yellowish pollinose, marked with four black vittae, the outer ones broken at the suture and twice as broad as the inner ones, which are very narrow, though distinct; four dorsocentral macrochaetae; scutellum thick, yellowish pollinose, with three long lateral and one shorter upturned apical pair of bristles. Sternopleura with two strong bristles and two much weaker ones (hardly more than hairs). Abdomen destitute of discal macrochaetae. first and second segments bearing marginal macrochaetae, the third with a row, the fourth in female with a double row, one on the apical three-fourths and the other at apex; in the male the fourth segment has but a single row at its apex, the basal two-thirds being bare of macrochaetae; first segment black, the remaining ones yellowish pollinose excepting the apices of the second and third, which are black; fourth segment wholly yellowish pollinose. Legs black, mid tibiae with one bristle on the outer front side near the middle; hind tibiae weakly ciliate. Wings hyaline, apical cell narrowly open or closed; third vein with two or three bristles at its base.

Length 6 to 7 mm.

Described from one male and two females reared by C. L. Scott, from *Macaria punctolineata* Packard, Brownsville, Texas.

Type.—Male, Cat. No. 25727, U.S.N.M.

PHOROCERA HALISIDOTAE, new species.

Front of male 0.300 and in the female 0.360 of the head width; front golden pollinose, the face silvery; facial ridges bristly nearly to the base of antennae; bucca one-fifth the eye height; palpi yellow; antennae black, as long as face, third joint in male six times and in the female five times the length of second; arista thickened on the basal fourth, the penultimate joint short. Thorax black, gray pollinose, marked with four black vittae; four dorsocentral macrochaetae present; scutellum broadly yellow, bearing three long marginal and one short upturned apical pair of bristles. Sternopleura with four bristles. Abdomen black, first segment entirely so, the remaining ones gray pollinose on their basal half; apex of the fourth segment black. No discal macrochaetae, second segment with one pair me-

dian marginals, third with a marginal row and the fourth wholly covered on the apical half; abdominal hairs suberect in the male, less so in the female. Legs black, mid tibiae bearing one bristle on the outer front side near the middle; hind tibiae ciliate. Wings hyaline, apical cell closed, the third vein with two bristles at its base.

Length 6 to 8 mm.

Described from three males and three females reared from *Halis-dota maculata* Harris, at Priest Lake, Idaho, August, 1901, by C. V. Piper.

Type.—Male, Cat. No. 25728, U.S.N.M.

PHOROCERA FESTINANS, new species.

Front in male 0.285 of the head width; face and front yellowish pollinose, the parafacial at its narrowest part being narrower than the third antennal joint; facial ridges bristly two-thirds of the way; bucca one-sixth the eye height; palpi pale yellow; antennae black, as long as the face, the third joint seven times as long as the second, arista thickened about half way, the penultimate joint short. Thorax black, thickly covered with yellow pollen and marked with five narrow but distinct black vittae; four dorsocentral macrochaetae; scutellum entirely yellow pollinose, the disk clothed with many small erect hairs which are much longer near the apex, and bearing three pairs of long marginal bristles, no apical ones present. Sternopleura with three bristles. Abdomen black, thickly yellowish pollinose, the first segment and narrow apical margins of the second and third segments on their sides, black; the venter and a narrow vitta on the dorsum of second and third segments are also black. First segment with marginal, the remaining ones with marginal and discal macrochaetae; fourth segment has two or three rows on the apical half. Legs black, mid tibiae with one long bristle on the outer side near the middle; hind tibiae ciliate, with one longer bristle. Wings hyaline, the apical cell open close to wing-tip, third vein bearing two bristles at its base. Hypopygium prominent, shining black.

The female differs as follows: Front 0.314 of the head width; face at its narrowest part about equal to the width of the third antennal joint; facial ridges bristly one-half way; bucca one-fifth the eye height; palpi deep yellow; third joint of the antennae three times the length of the second, arista thickened on the basal half; thorax black, gray pollinose tinged with yellow. Abdomen somewhat thickened, the fourth segment wedge-shaped.

Length 6 mm.

Described from a male and two females collected in Hell Canyon, in Manzano National Forest, New Mexico, by Dr. C. H. T. Townsend, September 19, 1916.

Type.—Male, Cat. No. 25729, U.S.N.M.

PHOROCERA LEVIS, new species.

Front prominent below, 0.29 of the head width in the male, 0.30 in the female (one of each); male with well-developed orbitals as in the female; the two uppermost frontals recurved, lower end of row reaching third antennal joint; frontal stripe narrower than parafacial, the latter and the parafacial rather wide and deep golden pollinose, almost orange in the male; facial depression gray; palpi yellow; facial ridges bristly almost to the arista. Antennae black, five-sixths the length of the face, third joint rather narrow, nearly three times the second, arista thickened on basal third, penultimate joint short; bucca one-fourth the eye height. Thorax black, gray pollinose, with four narrow black vittae; three dorsocentrals, two sternopleurals; scutellum in both sexes with only three marginals, the middle swollen, there being no small apicals in either sex. Abdomen black, with thin yellowish-gray pollen which is slightly tessellated in the male; first and second segments with a pair of median marginals, second and third with a pair of discals, abdominal hairs depressed, still a few median ones suberect in male. Posterior half of abdominal segments subshining in male, less so in female. Forceps of male slender, inner and outer of same length and all fitting closely together although separate. Legs black, mid tibiae with one bristle at middle on outer front side; hind tibiae with a scattered row of bristles on outer side, one larger at middle. Wings hyaline, fourth vein with unusually oblique bend, especially in male; third vein with about three hairs at base.

Length 6-7 mm.

Described from one male, Wenonah, New Jersey, May 15, 1910, and from one female, Sidney, Nebr., June 29, 1915 (A. K. Fisher).

Type.—Male, Cat. No. 25730, U.S.N.M.

PHOROCERA SIGNATA, new species.

Front of male 0.33 of the head width (the same in two), of female 0.31 to 0.36 (in three), gray at vertex, the pollen becoming decidedly yellow at middle of parafrontals and continuing in this color down the parafacials. Frontal bristles about nine, the posterior two reclinate the anterior reaching to base of third antennal joint and almost connecting with the well-developed row on the facial ridge; antennae reddish, third joint black reaching almost to arista, third joint about three times the second; arista thickened on basal two-fifths. Palpi yellow. Thorax grayish pollinose, with indistinct darker stripes. Dorsocentrals 4, stenopleurals 3. Scutellum with three lateral and a small pair of apicals, the last slightly upturned, also a small discal pair. Abdomen black with subshining changeable spots in the gray pollen. A discal pair of bristles present on second and third segments in the type and most of the other specimens but absent on the second in one male and on both in the other.

Fourth segment wholly deep yellow pollinose in striking contrast to the remainder. Genitalia rather large, outer forceps bare, gently curved, as long as the inner which seem united and are slender. Fifth sternite deeply notched but plain in structure. Legs varying from black to reddish; mid tibia with one bristle on outer front side, hind tibia ciliated with one larger at middle. Male pulvilli short. Wings subhyaline; fourth vein with a slightly rounded, oblique bend and no fold, ending not far before the tip of wing. Third vein with two or three setules at base.

Length 5.5 to 8 mm.

Described from two males and seven females, all reared from *Cossula magnifica* Strecker at Greenville, South Carolina, by Carl Heinrich; emerged from June 2 to July 12, 1913.

Type.—Female Cat. No. 25731, U.S.N.M.

Genus MADREMYIA Townsend.

Madremyia TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 622. Type and sole species, *Madremyia parva* Townsend (equals *Phorocera saundersii* Williston).

MADREMYIA SAUNDERSII Williston.

Phorocera saundersii WILLISTON, in Scudder's Butterflies of New England, vol. 3, 1889, p. 1922.—COQUILLETT, Revis. Tachin., 1897, p. 104.—BAKER, Invertebrata Pacifica, pt. 1, 1904, p. 38.—HOWARD and FISKE, Bull. 91, U. S. Bur. Ent., 1911, p. 145.—HYSLOP, Bull. 95, pt. 5, U. S. Bur. Ent., 1912, p. 117, fig.—TOTHILL, Canad. Ent., vol. 45, 1913, p. 73.—WINN and BEAULIEU, List of Dipt. of the Prov. of Quebec, 1915, p. 142 (Suppl. to 7th Rept. Que. Soc. for Protection of Plants).—LOVETT, Sec. Bien. Crop Pest Rept. Oregon Exp. Station, 1915, p. 145.—ESSIG, Inj. and Benef. Ins. of Cal., ed. 2, 1915, pp. 329, 401, fig.—COLE and LOVETT, List of Diptera of Oregon, 1921, p. 302.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, 1922, p. 11, fig. (puparium).
Madremyia parva TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 622.

The species can be recognized by the addition of a few characters. Front broad (.37 of the head width in the male, .39 and .40 in the two females); the parafrontals shining on upper half and bearing between the usual frontals and the eye (mesad of the orbitals in the female) a row of from three to six recurved smallish bristles; palpi black; four postsutural dorsocentrals; three sternopleurals; one pteropleural, as large as the largest sternopleural; scutellum with three lateral pairs, the apicals suberect; abdomen with discals; middle tibia with three or four long bristles on the front side; third vein with three hairs near base; first posterior cell closed in the margin or with a very short petiole.

Length 4.5 to 6.5 mm.

Besides the two Townsend types of *parva* (Cat. No. 20032), which are from the Sierra Madre Mountains of Chihuahua, Mexico, altitude 7,300 feet, and Sierra Blanco Mountains of New Mexico, alti-

tude 6,400 feet, the United States National Museum has three specimens from Harvey's Ranch, Pecos National Forest, New Mexico, altitude 10,000 feet; one from Manzanares Creek, Pecos National Forest, New Mexico; one from Rio Tularosa, New Mexico (all the preceding collected by Townsend); two Alameda County, California (Coquillett); one Ormsby County, Nevada (C. F. Baker); one Mono Lake, California (Aldrich); three Mendocino County, California (Essig); one San Francisco, California, reared by H. H. Severin from *Agrotis ypsilon* Rottenburg; one from Moscow, Idaho (Aldrich), reared from *Pieris occidentalis* Reakirt; two from California without other data. All these localities appear to be in the Canadian zone or immediately below it, those from the far south being from high altitudes.

In addition to the rearing records just given, the species has been recorded as a parasite of *Argynnis cybele* Fabricius (Williston, the type material); *Euproctis chrysorrhea* Linnaeus (Howard and Fiske); *Autographa californica* Speyer (Hyslop); *Ennomos magnarius* Guenée and *Euwanessa antiopa* Linnaeus (Tothill); *Lycophotia margaritosa* Haworth (Essig and Lovett). Published localities range from New Brunswick to California, through the northern region.

Genus MURDOCKIANA Townsend.

Murdockiana TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1916, p. 622; type and sole species, *Euphorocera gelida* Coquillett..

MURDOCKIANA GELIDA Coquillett.

Euphorocera gelida COQUILLET, Revis. Tachin, 1897, p. 101. Point Barrow, Alaska.

The United States National Museum contains the type material, one male and two females and two males from the Alaska-Yukon boundary, 30 miles south of the Arctic Ocean; in the Academy of Natural Sciences, Philadelphia, are several specimens from the type locality. Additional characters: Black, subshining, arista thickened for half its length, proboscis slender but not much elongated, labella large; posterior dorsocentrals four, but the third from behind smaller; sternopleurals three; apical scutellars upturned; abdomen shining black, the bases of the segments white pollinose, discals present and the hairs long and erect; abdomen with numerous long, stiff bristles on fourth abdominal segment below and behind. First posterior cell narrowly open or closed in margin; third vein with four bristles at base. The genitalia are of the *Parasetigena* type, the inner forceps united, long and tapering, flat behind.

Length 6-7 mm.

Type.—Female, Cat. No. 3602, U.S.N.M.

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Genera are capitalized; synonyms in italics; where there are several references, the last is generally the important one.

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