

---

# *Manual of Nearctic Diptera*

## *Volume 2*

---

Coordinated by

J. F. McAlpine (Editor)  
B. V. Peterson  
G. E. Shewell  
H. J. Teskey  
J. R. Vockeroth  
D. M. Wood

Biosystematics Research Centre (formerly Institute)  
Ottawa, Ontario

Research Branch  
Agriculture Canada

Monograph No. 28  
1987

D. M. Wood



Fig. 110.1. Male of *Tachina florum* Walker.

Minute to very large flies (Fig. 1), often extensively bristled.<sup>1</sup> Subscutellum (postscutellum, infrascutellum) well-developed, as convex on upper half as on lower half when viewed in profile (Fig. 2.66, except *Bezzimyia* Townsend); meral bristles present (except in a few exotic species).

Larva endoparasitic in insects and occasionally in centipedes (there are unpublished records of parasitism of spiders and scorpions). First-instar larva with elongate hook-like or axe-shaped labrum broadly fused with cephalopharyngeal skeleton and extending from it as a continuation; mandibles (lateral plates) reduced or unrecognizable, without hooked apices. Second and third instars each with well-developed paired mandibles as in most calyptrates; posterior end of developing larva usually encased in a respiratory funnel formed from the host's hypodermis.

<sup>1</sup> In this chapter, the term seta is used for all macrotrichia without reference to their size. Setae that are slender and usually rather straight are called hairs; bristles are large, stout, usually curved setae. The two are often intermingled.

**Adult.** Head: extremely variable in proportions, usually higher than long with sloping frons, small face, and short antennae in holoptic males (Figs. 80, 84), or subquadrate in profile with more horizontal frons, long antennae, and face nearly as high as back of head (Figs. 89, 100). Frons of holoptic males moderately to very narrow, usually without proclinate lower orbital bristles; frons of dichoptic males and of females usually broad (narrow in some female Phasiinae), almost always with two pairs of proclinate lower orbital bristles, but rarely with one pair (Fig. 45) or more than two pairs (Fig. 52); frontal bristles usually mediocline, extending forward only to level of pedicel in most Phasiinae and most Dexiinae (Figs. 55-58), in others extending farther forward with the row usually also curving laterally (Figs. 50-53) or rarely extending ventrally nearly to lower level of eye; fronto-orbital plate sometimes with one or more extra rows of frontal bristles flanking main row, especially among Goniini (Figs. 21 and 25, o fr s); one or two upper orbital bristles usually present, sometimes more, usually reclinate, sometimes laterocline, sometimes in line with uppermost frontal seta but usually arising lateral to it, rarely forming row well outside frontal row (Fig. 24). Ocellar tubercle

usually distinct, although seldom prominent; ocelli rarely absent (Fig. 60); ocellar setae usually present, normally proclinate, rarely latero-clinate or reclinate (Figs. 2-4, 20, 21, 108), arising behind anterior ocellus except in *Euhalidaya* Walton (Fig. 52).

Antenna extremely small (Figs. 80-82) to nearly as long as height of head (Figs. 98, 100), usually short in holoptic males, longer in dichoptic males; antennal bases usually contiguous (Fig. 87), occasionally separated (Figs. 84, 86). Scape usually inconspicuous. Pedicel with patch of short setae on anterior surface, one or two of which are elongate; in Dexiini pedicellar seta usually more than half as long as arista (Figs. 64, 83, 84), and usually with a patch of minute setae on medial surface intersecting with setae on opposite pedicel (absent in those species with separated antennae). First flagellomere usually subrectangular in profile with rounded or truncate apex, occasionally kidney-shaped in some Tachininae (Figs. 63, 130), rarely subdivided, bifurcate, or trifurcate (Fig. 2.45). Arista usually bare (except for microscopic pubescence), sometimes plumose (most Dexiini, Fig. 64), usually tapering evenly to thread-like apex, though often thickened partway up or nearly at apex (Figs. 128, 136); first and second aristomeres usually short and inconspicuous, although either or both sometimes elongate (Figs. 129, 132).

Parafacial (used in this chapter to refer to that part of head between ptilinal suture anteriorly and eye posteriorly, and between lowest frontal bristle dorsally and genal groove ventrally) usually pruinose, rarely shiny black or with shiny black areas around setae (Figs. 68-70), usually bare, although sometimes with setae (as hairs or bristles, or both) on any part thereof (Figs. 89-97). Face usually concave or flat and therefore not visible in profile, but sometimes convex and visible in profile, especially in most Tachinini, Aphriini, and Leskiini (Figs. 101, 102), or with median longitudinal carina as in some Dexiini and Phasiinae (Figs. 83, 84, 122). Lower corner of face (vibrissal angle) usually with an exceptionally large bristle, the vibrissa; lower facial margin (epistoma) usually level with vibrissa, but sometimes below level of vibrissa (Figs. 141, 145, 149); ridge below vibrissa usually with bristles (subvibrissal bristles), either separated from genal bristles by an extension of the genal groove (Fig. 142) or contiguous (Figs. 140, 141, 144); subvibrissal bristles numerous (Fig. 40), few (Figs. 41-43), or absent (Figs. 46, 145). Gena continuous with setose part of postgena, and more or less covered with setae, a few of which are bristle-like; dorsal border of genal hair patch sinuous, thus forming a genal dilation (Figs. 13, 40, 49), or concave or straight in which case genal dilation absent (Figs. 38, 39); anteroventral margin of gena usually with row of subgenal bristles extending posteroventrally or posteriorly along lower edge of gena; subgenal and subvibrissal bristles usually appearing to form a continuous row extending posteroventrally or posteriorly along lower edge of gena, often interrupted by a membranous extension of genal groove. Eye with fine straight hairs arising between facets; hairs sometimes so short as to be scarcely visible, with eye then appearing bare (Figs. 3, 4), or long and dense except along hind margin (Figs. 5-12); eye facets uniform in size, or if enlarged dorsally, then not changing in size abruptly even in holoptic males.

Postcranium covered with short black setae or long pale hairs, or a mixture of both; postocular setae usually alternating long and short; median occipital area dorsal to occipital foramen usually flat, rarely deeply concave (*Opesia* Robineau-Desvoidy, Fig. 61).

Mouthparts always present, probably always functional, though occasionally very small (Figs. 80, 81). Clypeus usually inverted U-shaped or horseshoe-shaped, sometimes rectangular. Palpus usually clavate, exceptionally long in some Tachininae (*Adejeania* Townsend, Fig. 145), reduced in length in a few genera (Figs. 96, 97, 101), absent altogether in some species (Fig. 111). Prementum sometimes extremely long, probably to facilitate flower-feeding, in which case labella always minute (Figs. 110-115); or slender and elongate (*Siphona* Meigen, Fig. 143).

Thorax: postpronotum with two to five major bristles, but typically with four, namely three basal bristles (outer, middle, and inner) and one anterior bristle; basal bristles either arranged in a fairly straight line parallel to hind margin of postpronotum (Figs. 158, 160), or in a triangle with middle basal bristle displaced anteriorly to arise in front of outer basal bristle rather than between it and the inner basal bristle (Figs. 157, 159); anterior bristle situated anterolateral to inner basal bristle; occasionally also a fifth bristle present, namely an outer anterior one, anteromedial to displaced middle bristle and more or less in line with middle and outer basal bristles (Fig. 157); postpronotal bristles occasionally reduced to three or two (Figs. 156, 160, 161). Proepisternum usually bare, its central portion haired in some Tachininae and Blondeliini (Fig. 166), always with at least one anteroventrally directed proepisternal bristle at lower margin. Proepimeron usually with two or more bristles directed anterodorsally, rarely with lower seta inclined anteroventrally (Fig. 167). Prosternum bare (Fig. 155) or setose (Figs. 153, 154); setae confined to lateral margin, usually hair-like, but sometimes with one or more bristle-like; rarely one or two long straight bristles present without accompanying hairs (Fig. 154).

Scutum usually extensively bristled, especially in Goniinae, or with various bristles weakly developed, especially those in central part of scutum (Tachinini), or mostly absent (many Phasiinae); bristles arranged in four pairs of longitudinal rows (Fig. 2.65), namely a median acrostichal row, a dorsocentral row lateral to acrostichal row, an intra-alar row lateral to dorsocentral row, and a supra-alar row nearest lateral margin; each row is further subdivided by the transverse suture into a presutural and a postsutural portion; three presutural acrostichal bristles normally present, with posteriormost sometimes close to and sometimes more distant from suture; three postsutural acrostichal bristles also usually present; three presutural dorsocentral bristles usually present; three or four postsutural dorsocentral bristles present, the number usually constant within a species but often varying among closely related species; one to three presutural intra-alar bristles present, always one, sometimes with a smaller second one anterior to it close to edge of postpronotum (posthumeral), and sometimes with a third close to transverse suture; three postsutural intra-alar bristles usually present; two presutural supra-alar bristles present,

with the anteriormost, close to postpronotum, displaced medially toward intra-alar row (therefore, in most literature, considered as one of the posthumeral) and with the posterior-most large, situated close to suture (in many works referred to simply as presutural); two to five postsutural supra-alar bristles present, but usually three; the anteriormost postsutural supra-alar (referred to as the prealar) always smaller than second postsutural supra-alar and usually also smaller than first postsutural dorsocentral in nearly all Tachinidae except in some Goniinae (Fig. 163) and a few Tachininae (Fig. 162), sometimes displaced anterolaterally (Fig. 162); in Exoristini a third small seta usually present between second and fourth (Fig. 164). Notopleuron typically with two bristles, occasionally with one or two additional smaller ones anterolateral to hindmost large bristle (Fig. 163); postalar callus usually with two large bristles and with up to three or more smaller setae between them; postalar wall (see Fig. 217) sometimes with a patch of hair. Scutellum usually with three or four pairs of marginal bristles, namely basal, lateral, subapical, and apical bristles, and one pair of discal bristles; basal bristles always present, usually directed somewhat dorsoposteriorly; typically only one pair of lateral bristles present, usually parallel (Figs. 182, 184), sometimes divergent (Fig. 185), sometimes with additional pairs (Figs. 188, 189), sometimes absent (Figs. 186, 190); subapical bristles divergent (Fig. 179), parallel (Fig. 180), or convergent (Fig. 182); apical bristles usually the smallest, often crossed or inclined dorsally and frequently reduced in size, hair-like, or absent (Fig. 182), less often large and crossed (Figs. 181, 183, 187, 190); lateral and subapical bristles occasionally replaced by a single large bristle intermediate in position (Fig. 183); typically one pair of discal bristles present, usually arising as far apart as subapical ones (Figs. 180, 184, 185) but sometimes closer together (Fig. 179), usually two-thirds distance from base but sometimes near apex as in Voriini (Fig. 187), in Tachinini present as a group of stout straight erect bristles. Subscutellum well-developed (except in *Bezzimyia*), usually evenly convex from top to bottom when viewed in profile (Fig. 2.66). Anepisternum (mesopleuron) sometimes with anterodorsal bristles, always with a posterior row anterior to pleural suture; katepisternum (sternopleuron) with one to four or more bristles, usually with three arranged in a triangle of various shapes (Figs. 173–175) or in a longitudinal row (Fig. 178), but if only one present (some Phasiini), then arising near posterodorsal corner of katepisternum (Fig. 171); anepimeron (pteropleuron) always with hair, usually with one or more short bristles, sometimes with an immense sickle-shaped bristle extending back beyond lower calypter (Figs. 215, 216); katepimeron (barette) usually bare, often with one to five hairs on anterior half, more extensively haired in Winthemiini (Fig. 170), or with a single bristle (*Phytomyptera* Rondani); meron (hypopleuron) always with a vertical row of bristles, rarely reduced to two or three in some Phasiinae (or none in the Neotropical phasiine genus *Tarassus* Aldrich).

Metepisternal area and metepimeron bare. Lappets (flaps) of posterior thoracic spiracle typically quite unequal; posterior lappet large, operculum-like; anterior lappet crescent-shaped (Fig. 170); some Tachininae with lappets

more equal to each other, each extending across spiracular opening from anteroventral and posteroventral corners leaving a V-shaped opening (Fig. 169), sometimes with both lappets projecting outward (e.g. *Lypha* Robineau-Desvoidy, *Lydina* Robineau-Desvoidy).

Wing usually transparent, sometimes with distinctive spots or marks (Figs. 207–214), or entirely dark. M nearly always with a bend (cubitus), found also in all Calliphoridae, Rhinophoridae, and Sarcophagidae, as well as in most Oestridae and some Muscinae; this bend acute (Figs. 193, 203), right-angled (most Exoristini, Fig. 197), or obtuse (Figs. 195, 199, 200); a short extension, or stub, sometimes evident beyond bend, in line with basal portion of M (Figs. 192, 202), sometimes called a stump vein (incorrectly called  $M_2$ ); an apparent extension also sometimes evident, caused by a fold in membrane (Fig. 197); M usually ending in wing margin just behind apex of  $R_{4+5}$ , often ending in  $R_{4+5}$  itself (Figs. 191, 192); cell  $r_{4+5}$  (apical cell) then regarded, in most literature, to be closed and petiolate, occasionally ending in membrane at position of bend. Veins rarely crowded anteriorly (a few Voriini, Fig. 204). Base of  $R_{4+5}$  with setae dorsally (except in *Cleonice* Robineau-Desvoidy) and usually also with setae ventrally; dorsal setae often extending along  $R_{4+5}$  to crossvein r-m or even beyond;  $R_1$  and  $CuA_1$  also sometimes setose dorsally; Sc rarely setose ventrally (*Chaetoplagia* Coquillett, Fig. 205). Lower calypter (squama) usually well-developed, with its medial margin closely appressed against postalar wall, rarely (*Macquartia* Robineau-Desvoidy, some Phasiinae) deflected anterolaterally as in Rhinophoridae (Fig. 4.172), usually bare dorsally but with long erect hair in *Hystricia* Macquart (Fig. 215), exceptionally large in *Leucostoma* Meigen (Fig. 217).

Abdomen: slender, rarely narrowed basally (i.e. petiolate) to very broad (Figs. 240–245), convex dorsally or flattened to globose (forms laying microtype eggs), occasionally without bristles (Figs. 253, 254), but usually covered to varying degrees with stout spike-like erect bristles, occasionally emarginate apically (Fig. 240). Syntergite 1 + 2 with mid-dorsal concavity usually extending only partway back to hind margin (Figs. 236–238) but sometimes all the way to hind margin (Fig. 231); syntergite 1 + 2 usually without bristles, but sometimes with one pair of median marginal bristles (Fig. 231), rarely with more than one pair (Fig. 232); tergites 3 and 4 usually with at least one pair of median marginal bristles in female but with none in male of some species of some Goniinae, often with an additional transverse row of marginal bristles, and usually with one pair of median discal bristles, or sometimes with a transverse row or patch of discal bristles (some Tachininae) (Figs. 242, 243) or with a second pair in front of main pair (Fig. 239); tergite 5 normally with both median marginal and median discal bristles, although usually these somewhat irregularly arranged with scattered intermediate bristles. Sternite 1 wider than long, always fully exposed, usually abutting edges of syntergite 1 + 2, but separated by wide membrane in some Phasiinae (Fig. 254); sternites 2–5 usually overlapped by edges of adjacent tergites, often nearly concealed (Fig. 245), or abutting edges of tergites as in sternite 1 (some Tachinini, Fig. 244), in most Phasiinae separated from edges of tergites by membrane; each sternite usually with at least one pair of bristles or a

transverse apical row; sternite 5 in male with U- or V-shaped apical cleft (Figs. 244, 245, 262); edges of cleft usually thickened or infolded and intimately fused at anterior (narrow) end of cleft with sternite 6 (Fig. 262).

Male terminalia usually retracted within tergite 5. Tergite 6 reduced, sometimes with a few bristles, often vestigial, represented only by setae, usually overlapped by tergite 5, though in many Tachininae fully exposed; sternite 6 well-developed on left side only, or with nearly symmetric development on right side as well, articulating with right side of syntergosternite 7 + 8; spiracle 6 situated in membrane. Syntergosternite 7 + 8 seldom showing distinct transverse subdivisions (distinct in *Macquartia*), occasionally with bristles (sometimes with two patches of bristles, indicative of fused origin), quite large and convex in Tachininae; spiracle 7 either appearing with spiracle 6 in membrane, or in syntergosternite 7 + 8. Epandrium usually smaller than syntergosternite 7 + 8. Cerci usually rigid, fleshy and pad-like only in *Cylindromyia* Meigen, usually closely approximated medially at base, separated apically to form an apical cleft, rarely (*Phebellia* Robineau-Desvoidy) with interlocking teeth (Fig. 263); cerci in Tachininae, Exoristini, Winthemiini, and some others without apical cleft, instead completely fused medially to form a hook (probably apomorphic). Surstylus usually well-developed, long and hook-like in *Cylindromyia* (i.e. perhaps replacing function of cerci), long and finger-like to short and rounded, closely applied to cerci in most groups, widely separated in Tachininae, or reduced to a plate with setose apical papilla in *Phorocera* Robineau-Desvoidy (i.e. evidently sensory rather than mechanical); bacilliform sclerite present, usually articulating with hypandrium and surstylus, not attached to surstylus in *Phorocera* (Wood 1972). Hypandrium usually Y-shaped, rarely (*Macquartia*, *Phorocera*) with the arms completely encircling base of aedeagus to meet each other behind it, forming a tube; gonopod (pregonite) with somewhat triangular base and finger-like or hook-like setose projection, fused along its anterior and lateral edges with medial margin of arm of hypandrium, or (in Dexiinae) strap-like, with a minute nonsetose projection or none at all, articulating at its anterior end with hypandrium (Fig. 261); paramere (postgonite) usually hook-like, paralleling epiphallus when latter present, or (in Dexiinae) located parallel to basiphallus and about same length and shape as this structure; basiphallus usually short (elongate in most Dexiinae); distiphallus usually lacking distinct dorsolateral or ventrolateral processes, in Dexiinae hinged to anterior surface of basiphallus near apex, in Voriini very long, strap-like, and coiled, asymmetric in Phasiinae.

Female terminalia (from Herting 1957) usually with tergites 6 and 7 intact dorsally (probably the plesiomorphic condition); often tergite 7, and sometimes also tergite 6, interrupted middorsally, sometimes reduced to a pair of small sclerites on either side of sternite 7; spiracle 6 always located in lateral margin of tergite 6; spiracle 7 either located in tergite 7 (undoubtedly the primitive condition), or displaced anteriorly to sternite 6; sternites 6 and 7 usually broadened at the expense of adjacent tergite, broader than sternites 2-5; lateral corners of tergite 6 in some Phasiinae (*Leucostoma*, *Imitomyia* Townsend) produced posteriorly as a pair of clasp-

ing lobes (Fig. 249); sternite 7 in some Blondeliini and in *Phorocera* (Exoristini) modified into a hook-like piercer, grooved on its posterior surface to accommodate remainder of ovipositor (Figs. 248, 256, 257). Tergite 8 usually divided middorsally into two remnants; sternite 8 never subdivided or emarginate apically, often large and plate-like, in most Phasiinae elongated to form a piercer partially ensheathed in sternite 7 (Fig. 253) or reduced to a small lobe usually with sensory pores and setae probably for sensory contact with host; sternite 10 (postgenital plate) usually small, rounded, and weakly sclerotized, hidden above sternite 8, but in *Cylindromyia* (Phasiinae) modified into an elongate sharp piercer. Cerci small, pad-like, probably always sensory in function.

**Egg.** Primitively, as in oviparous species (Exoristini, Winthemiini, *Aplomya* Robineau-Desvoidy, some Blondeliini), white, oval or elliptic to nearly circular, convex and rather firm dorsally, membranous and flattened ventrally, with an adhesive coating to stick to host, or rarely (*Phorocera* subgenus *Pseudotachinomyia* Smith) cylindrical and adapted for partial insertion into host's integument (Wood 1972); anterior cleavage line evident in Exoristini and Winthemiini delineating an operculum through which larva hatches (Fig. 264); in the majority of other species, such a cleavage line absent (larva breaks through ventral chorion); one or two groups of aeropyles present dorsally. In ovolarviparous species, dorsal chorion less firm, transparent or white, with or without remnants of aeropyles; in the most derived state dorsal chorion hardly different from ventral surface except for lack of adhesive material. Egg in microovolarviparous Goniini minute and limpet-like, with tough often highly sculptured upper chorion (Figs. 266-268).

**First-instar larva.** Fundamentally different from later instars in cephalopharyngeal structure. Anterior end of cephalopharyngeal skeleton (probably the labrum although homology has not been established, usually called "mouth hook" in previous literature) extending forward as a hook-like or hatchet-like structure, often with serrated anterior margin, presumably to facilitate access to the host. Lateral plate (probably a reduced mandible, although homology not yet convincingly established) a vaguely defined sclerotized area on side of mouth opening, without hook-like extension and probably not functional as is mandible of other calyptates.

**Second- and third-instar larvae.** Labrum minute. Mandibles present, symmetrical, articulated with hypopharynx which is in turn articulated with cephalopharyngeal skeleton (Figs. 5.31, 5.32). Anterior spiracle simple, with one or more papillate openings at apex (Figs. 5.22, 5.23), usually elevated from surface of prothorax, sometimes absent. Posterior spiracle usually heavily sclerotized, flush with abdominal surface or elevated on a cone-like prominence (Figs. 5.21, 5.27), never concealed in a depression as in Sarcophagidae; each spiracle with usually three, sometimes four or more, rows of openings; rows straight (Fig. 5.25) or sinuous (Fig. 5.27), branched, or subdivided into "segments" or areas (Figs. 5.21, 5.30) (see also couplet 62, Ch. 5).

**Biology and behavior.** The life cycles of a wide range of genera of Tachinidae are now known. All known larvae are parasitic on other arthropods, almost exclusively on other insects. Although many species have not yet been reared, so many have been shown to be parasitic that this feature is probably characteristic of the family as a whole.

The most primitive mode of attack on an exposed host is to attach an undeveloped egg (Fig. 264) onto the skin of the host. The large oval planoconvex egg is translucent at the moment of oviposition but turns white on drying and is quite conspicuous. Its flat ventral surface is covered with a sticky substance that ensures firm adhesion to any part of the host. The developing embryo within respire via many minute pores called aeropyles, grouped at each end of the egg. When ready to hatch, the larva either pushes off the cap, or operculum, at the anterior end of the egg and burrows into the host in front of it, or burrows directly into the host through the floor of the egg. The species that deposit this type of egg lack a uterus, or ovisac, for retention of eggs undergoing embryonic development. Hence such eggs show little or no embryonic development and are said to be unembryonated. Eggs left to undergo embryonic development on the skin of the host remain vulnerable for several days. During this period they may be eaten off by the host or may become lost when the host molts. Contrary to popular belief, this type of egg is characteristic of only a small number of genera, constituting a tiny fraction of the Tachinidae. These genera, believed to be among the most primitive members of the family (Herting 1960), comprise the Phasiinae, the goniine tribes Exoristini and Winthemiini, a few Blondeliini (*Meigenia* Robineau-Desvoidy, *Medina* Robineau-Desvoidy, *Belida* Robineau-Desvoidy), and *Aplomya* in the Eryciini.

Several modifications to this primitive system have evolved in certain genera, which serve to speed up entry of hatching larvae into the host and thus allow them to avoid the pitfalls described above. A small departure from simple deposition of the primitive planoconvex egg on the host's skin involves modifications of the female's abdominal sternites to facilitate partial or complete insertion of the egg into the body of the host. In the Exoristini, members of one genus, *Phorocera*, have developed devices for partly or entirely inserting their unembryonated egg into the skin of the host (Figs. 248, 265) (Herting 1963, Wood 1972). Although a few phasiines, e.g. *Gymnosoma* Meigen and *Trichopoda* Berthold, attach planoconvex eggs to the surfaces of their hemipteran hosts, some abdominal sternites of females of most Phasiinae have also developed into rather elaborate piercing structures for inserting their unembryonated eggs into their hosts (Figs. 253, 254).

Certain other strategies are used by some genera to allow them to parasitize hosts that are too aggressive, that are protected by spines, hairs, or webbing, or that are hidden and otherwise inaccessible to the adult fly. Probably the most important advance in reproductive strategy, shared by the vast majority of Tachinidae, is the storage of eggs in an ovisac until embryonic development is complete. The ovisac is little more than an enlargement and elongation of the common oviduct, with increased tracheal supply to provide more oxygen for the developing larvae. Thus a single female may

carry hundreds or thousands of eggs, the ones farthest from the ovaries ready to hatch at the moment of deposition. Unlike members of the Sarcophagidae, which are all viviparous (i.e. in which eggs hatch within the female and active larvae are deposited directly on the substrate), all Tachinidae are apparently ovolarviparous (i.e. eggs hatch after they are deposited). Sometimes a female will die before her offspring do, and they may subsequently hatch and escape from her abdomen. Except for such instances, however, no egg shells have ever been encountered, after thousands of dissections, in the ovisac of any species. Eggs of many species, however, may hatch within seconds after deposition, giving the appearance of larvipary. The advantage of rapid hatching after oviposition is obvious; the larva is immediately able to begin penetrating the host. In spite of such efficiency, the system is not infallible. I observed one species of arctiid biting its own integument, in an apparently successful effort to destroy the larva of *Calolydella lathami* (Curran) before it was able to penetrate completely.

Most potential hosts escape direct attack from ovipositing tachinids by remaining inaccessible during the day while females are active; either the larvae hide in the litter or soil, or they are protected by webbing. Both can thus avoid the direct attack of adult flies by feeding at night.

A large group, the Goniini, has circumvented the problem of host inaccessibility by evolving a system in which minute eggs are produced for consumption by the host. Termed microtype eggs, they somehow escape being crushed by the host's mandibles, hatch in the foregut when stimulated by digestive enzymes, and burrow through the gut wall into the haemocoel. The fly need only find recently damaged foliage of the appropriate food plant and lay eggs thereon. Such a haphazard approach requires deposition of thousands of eggs.

Members of another vast group of species, including most of the Tachininae, broadcast their eggs in places likely to be visited by the host, usually a food plant that has already sustained damage. Larvae hatching from these eggs remain in ambush, waiting until they can attach themselves to, and burrow into, a suitable passing host. To minimize desiccation, these larvae, which may have to wait many days, are covered with small sclerites that fit together like a suit of armor. Not surprisingly this group of Tachininae has the widest range of hosts, many of them hidden by day. These hosts include Orthoptera, Dermaptera, Embioptera, and Lepidoptera, as well as Chilopoda and Arachnida.

Members of a third large group of Tachinidae, belonging to the tribe Dexiini *sensu lato*, and including the Australasian Rutiliini, also broadcast their eggs; but the hatchlings burrow into the substrate on which they were deposited, either soil, rotten wood, or the host's frass (if the host is a burrower or miner), and actively search for the host. A few genera of Goniinae do this as well. For example, newly hatched larvae of *Lixophaga* Townsend and *Lydella* Robineau-Desvoidy can successfully parasitize wood and stem borers by depositing their eggs at openings made by the host; the first instar is then left to burrow through the host's frass to make final contact.

At least eight orders of insects, as well as centipedes, serve as hosts. Larvae of Lepidoptera probably support the majority of species of Tachinidae; most members of the large subfamilies Tachininae and Goniinae attack lepidopterous larvae.

True bugs (Hemiptera-Heteroptera, particularly Pentatomidae, Coreidae, Nabidae, and Lygaeidae) are parasitized almost exclusively by the Phasiinae. The egg-laying apparatus of some exotic phasiines is the most complex in the family; but because all phasiines deposit or inject unembryonated eggs, the subfamily is assumed to be one of the more primitive groups of Tachinidae.

Both adults and larvae of Coleoptera serve as hosts to various genera of tachinids. Larvae of Scarabaeidae, Cerambycidae, and Elateridae, which are invariably buried in soil or rotten wood, are sought out by first instars of Dexiini. Adult scarabs are attacked by members of the tribe Palpostomatini, as well as those of the blondeliine genus *Cryptomeigenia* Brauer & Bergenstamm. Adult Carabidae may be parasitized by species of *Zaira* Robineau-Desvoidy and *Freraea* Robineau-Desvoidy. The first instars of *Cryptomeigenia* and *Zaira* have saw-like teeth on the anterior edge of the labrum, presumably for cutting through the tough cuticle of their hosts. *Zaira eleodivora* (Walton) has also been reared from a tenebrionid, a beetle group noted for its tough cuticle. Both adults and larvae of the Chrysomelidae are heavily attacked by various Blondeliini. Even a few weevils are parasitized. Weevil larvae hidden within roots, stems, fruits, or nuts are sought out by burrowing first instars of *Gnadochaeta* Macquart. Adult weevils are parasitized through the mouth while feeding by the female of *Rondania* Robineau-Desvoidy.

Orthopteroid orders also serve as hosts for a miscellaneous collection of genera. Best known are the Acemyiini, which deposit embryonated eggs directly on grasshoppers. The tachinine genera *Ormia* Robineau-Desvoidy and *Glaurocara* Thomson are crepuscular or nocturnal, ovularvipositing on or near long-horned grasshoppers and crickets of the families Gryllidae, Gryllotalpidae, and Tettigoniidae (Crosskey 1965, Cade 1975). Females of *Ormia* are attracted to the songs of singing males; they may even be attracted to a loudspeaker reproducing a recording of the call notes of the appropriate host (Cade 1975). Species of the blondeliine genus *Anisia* Wulp deposit minute fully embryonated eggs, each enclosed in a gelatinous capsule, on potential food of crickets and cave crickets. Members of the genus *Phasmophaga* Townsend, which have been reared from walkingsticks, apparently oviposit in a similar fashion and this habit, when more fully investigated, may prove to be a synapotypy of *Anisia* and *Phasmophaga* and perhaps of *Meigenielloides* Townsend as well. Another unrelated tachinid, *Dichocera orientalis* (Coquillett), has been reared from cave crickets (Silberglied, personal communication). The walkingstick, *Diapheromera femorata* (Say), is also parasitized by *Euhaldaya genalis* (Coquillett); females of this species run about over the dorsum of the walkingstick, depositing fully embryonated eggs at random on its cuticle. Mantids are attacked by the mainly Neotropical genus *Masiphya* (Thompson 1963, Guimarães 1966); some large mantids have even survived the parasitic

encounter (Heitzmann-Fontenelle and Guimarães 1966). Even cockroaches are not immune from attack. In the Neotropics they are attacked by females of *Calodexia* Wulp when marauding columns of army ants flush them from their hiding places; the females of *Calodexia* accompany the advancing ant columns, along with females of the phasiine genus *Androeryops* Benaway and conopids of the genus *Stylogaster* Macquart, to take advantage of the ants' ability to uncover potential hosts (Rettenmeyer 1961). Some species of *Calodexia* may not be dependent on army ants to find their prey, however, for one species has been taken in the highlands of Mexico where such ants apparently do not occur.

Dermaptera in Europe are attacked by two tachinids, the tachinine *Triarthria spinipennis* (Meigen) and the goniine *Ocytata pallipes* (Fallén). *T. spinipennis* has been successfully introduced into Newfoundland and the Pacific Northwest to combat the introduced European earwig in those areas, and it has evidently spread to New England (Woodley, personal communication). Even the small order Embioptera has its share of tachinid parasites, most of which are undescribed (Arnaud 1963, personal communication).

Although larvae of Diptera have generally escaped parasitism by tachinids, those of Tipulidae and Tabanidae, both of which are soil dwellers, are regular hosts of a few genera. Tipulid larvae are attacked by species of *Admontia* Brauer & Bergenstamm and of *Siphona*, which apparently seek out the exposed spiracular plates of the hosts and deposit their embryonated eggs directly on them, and by members of *Allophorocera* Hendel, which deposit microtype eggs, presumably in situations where tipulid larvae are feeding. *Phasiops flavus* Coquillett and three species of *Billaea* Robineau-Desvoidy have been reared from larvae of *Tabanus* and *Hybomitra* (Hayes 1958; Teskey 1969; Burger, personal communication).

The only noninsects to be parasitized are centipedes, in addition to a single unpublished record each for a spider and a scorpion. In North America, *Lypha harrisi* (Reinhard) was reared from an unidentified species of geophilid centipede. A European species, *Loewia foeda* (Meigen), which parasitizes the common European centipede, *Lithobius forficatus* (Linnaeus), appeared recently in eastern United States (Wood and Wheeler 1972) and southern Ontario (Arnaud, personal communication).

Among the Hymenoptera, members of several genera of tachinids have been reared from leaf-feeding larvae of sawflies. The only other Hymenoptera parasitized by tachinids are adult ants, attacked by a rare European species, *Strongygaster globosa* (Meigen), and colonial wasps, whose nests are infested in the New World by members of the genus *Ophirion* Townsend and by a species of *Lixophaga*. The various species of *Ophirion* are presumed to deposit fully embryonated eggs at the entrances of the nests, leaving their newly hatched larvae to make their own way to the brood chambers. In the Afrotropical, Oriental, and Australian regions, social wasps are also parasitized, but by quite unrelated genera of tachinids belonging to the tribe Anacampatomyiini (Crosskey 1973, 1976, 1980). Adults of all these

wasp-parasitizing species are pale in coloration (a characteristic associated with a variety of crepuscular and nocturnal tachinids). Possibly they escape their hosts' defences by ovipositing at or after dusk.

Hyperparasitism by one tachinid on another has apparently not been recorded. However, hyperparasitism by the tachinids *Nemorilla floralis* (Fallén) and *Bessa selecta* (Meigen) on an ichneumonid, *Cephaloglypta laricis* Momoi, has been reported from Japan (Kamijo 1973).

Adult Tachinidae are usually among the most active of insects, seldom remaining still long enough to be captured easily. This hyperactivity usually serves to distinguish them from adult sarcophagids, especially the Sarcophaginae, which they resemble to some extent; the latter are sedentary by comparison. Adult tachinids probably all require daily access to a source of sugar. Flowers, especially composites of the genera *Aster*, *Solidago*, *Chrysanthemum*, and *Erigeron*, as well as many others south of the Nearctic region, are avidly visited by the large Tachinini, as well as by Phasiinae, some Dexiini, and some Goniini. Nevertheless, honeydew seems to be the preferred food source for most Nearctic species, and a greater array may be collected at honeydew than at flowers. In the spring, before the leaves have appeared, sap flowing from tree wounds provides sugar for such early species as those of *Gonia* Meigen. If protein is required in the adult diet, it seems not to be needed in quantity, for adults have been kept in cages for several weeks on honey alone.

Males of many tachinids are conspicuous among the many different kinds of insects that aggregate on hilltops, a phenomenon called hilltopping (McAlpine and Munroe 1968). This behavior is now generally interpreted as a mechanism for the meeting of the sexes, for mated pairs are only encountered at aggregation sites. On almost any sunny morning or early afternoon throughout the spring and summer, various species may be encountered on hilltops, each species occupying a particular spot. So precise is this spot that a given species may be found year after year in exactly the same place, waiting on the same shrub, or even the same branch of that shrub. Selection of such precise sites, year after year, by successive generations of tachinids must be instinctive, and presumably must be visually determined by characteristics of the foliage and topography of the hilltop rather than by olfactory cues. Females are seldom seen at these sites, but may occasionally be found waiting there, probably when males are not present at that moment. As has been found for oestrids (which have been more intensively studied, see Ch. 107), females are probably intercepted by a waiting male the instant they arrive at the site; therefore not surprisingly they are seldom collected.

The behavior of hilltopping male tachinids is of two types, evidently depending on whether they use their eyes or their antennae predominantly in recognizing a potential female. Both types can be found together in the same genus. Those species that seem to rely on vision have a narrower frons, i.e. larger eyes, than the female of that species, while their antennae usually do not differ appreciably from those of the female. These males can be seen resting on foliage or on tree trunks in an apparently alert stance, always head down

if on a vertical surface. Each male chases any passing object, including other males of their species or other insects, even those much larger than themselves. Bright sunlight seems to be a prerequisite for this activity. If the object pursued proves not to be a female of the same species, the male usually returns to his original perch or to another leaf or portion of tree trunk nearby, and again takes up a waiting stance. Those species that apparently do not rely on vision have their eyes and frontal widths essentially the same as those of their respective females; their antennae, however, specifically the third flagellomeres, are demonstrably longer than those of the female. It is to this group that all species with subdivided third flagellomeres belong (Fig. 2.45). Males of these species do not aggregate at a waiting station and consequently are much more difficult to collect or study. Nevertheless, several species have been observed and collected as they visit specific sites, usually tips of prominent branches, tops of isolated shrubs and other landmarks, hilltops, or prominent isolated tree trunks. On cool mornings these males occasionally land on their specific site, perhaps to sun themselves briefly; but such visits are usually so brief that they are easily overlooked. Bright sunlight may not be as important to this group of species as it is for the visually oriented ones. As with the waiting males, these flying males may be collected at precisely the same sites year after year, and such sites must be selected visually by the flies by instinct according to topography.

Males assembled at an aggregation site are usually seen chasing one another. This activity has often been interpreted as territorial behavior, an incorrect assumption in my opinion, at least as far as the Tachinidae are concerned. Among other families, for example, species of *Cuterebra* Clark, a male patrolling an area most likely to be visited by females may gain some advantage by repelling competitors. However, if an aggregation site is indeed selected visually by instinct, many males of a given species will all assemble there, and if their predominant behavior is to chase any passing object in anticipation of intercepting a female, they are likely to end up chasing one another. Although this behavior does indeed appear to be aggressive interaction, I have not seen one individual tachinid succeed in repelling another; instead they instantly lose interest in each other and return to their waiting stations once physical contact is made. Studies with butterflies performing similarly have shown that males have very little power of discrimination between different passing objects (Tinbergen 1958). Such interactions between males, even if not territorial, are at least wasteful of energy and a group of males sharing the same aggregation site will usually ignore each other until one departs rapidly from its respective place, inciting all the others to follow in hot pursuit.

Not all male Tachinidae aggregate on hilltops. In mountainous terrain, a few species may, indeed, be found on the highest peaks, but smaller side peaks and ridges may be equally favored. In these areas some species also aggregate in the valleys, on foliage alongside rivers or streams, and on prominent sunlit tree trunks, in situations analogous to those on hilltops. Males of a few species, in particular those of *Gonia*, seem to search at random throughout their par-



ticular habitat; although evidence is lacking, these species may be able to detect females from a distance.

Host-seeking gravid females may be encountered almost any time of the day, whether the sun is shining or not, frantically scurrying over and under foliage. Selection of an appropriate habitat and host plant must precede actual host seeking, or much time would be wasted searching in unproductive areas. For those species laying microtype eggs, or those depositing waiting or searching larvae, selection of an appropriate habitat must be critical, for powers of dispersal of first instars must be quite limited, even for those that must burrow into the host's substrate. Insufficient research has been done into the habits of host-seeking female Tachinidae, and into the stimuli that guide them ultimately to their hosts. However, Monteith (1955, 1956, 1958a, 1958b, 1960) showed that host-plant odor was probably the primary factor in attracting *Bessa harveyi* (Townsend) to its host. Other factors, such as host odor and host movement, subsequently acted as stimulants. Odors of nonhost plants in the vicinity exerted a negative effect and in nature may help to protect some host colonies.

**Classification and distribution.** The family Tachinidae may be the second largest family of Diptera in number of described species in the Nearctic region, second only to the Tipulidae. Perhaps 8000 species have been described world wide, over 1200 of these from the Nearctic region. From other faunal regions many hundreds more await description in the major museums. An accurate count of described species is unattainable at present; many supposedly valid names may, after revision, turn out to be synonyms.

As a group adults are readily characterized among calyptrates by the presence of meral bristles and a well-developed subscutellum. Members of only two genera (*Litophasia* Girschner and *Tarassus*, neither found in the Nearctic region) lack meral bristles, and a small, mostly Neotropical group of genera, including *Bezzimyia*, have such a weak subscutellum that they could be confused with Rhinophoridae or Calliphoridae such as *Angioneura* Brauer & Bergenstamm. Nearly all adult tachinids have a distinct bend in M (Fig. 191), a character they share with sarcophagids, oestrids, and calliphorids. Most sarcophagids, but few tachinids, have three prominent longitudinal dark stripes on the scutum; tachinids tend to have four stripes (i.e. the midline is pale) or none (although *Nemorilla* Rondani and *Billaea* are notable exceptions). Most calliphorids have blue or green metallic bodies, but members of two tachinid genera, *Gymnocheta* Robineau-Desvoidy and *Chrysotachina* Brauer & Bergenstamm, are as brilliantly metallic green as any calliphorid.

Characters of the mouthparts of first-instar larvae provide a convincing synapomorphy attesting to the monophyly of the Tachinidae: the anterior end of the cephalopharyngeal skeleton, which is assumed to be the labrum that has become broadly fused to the rest of the cephalopharyngeal skeleton, extends anteriorly as a single hook-like or axe-like beak, while the mandibles are not recognizable and are presumably vestigial, present as lateral sclerites. In the Sarcophagidae, the labrum, if well-developed as in Miltogramminae and

Paramacronychiinae, is articulated with the cephalopharyngeal skeleton and the mandibles are distinct and usually well-developed, with hooked apices.

Although the family appears to be a monophyletic unit, and, by and large, is readily defined and universally recognized, there is no consistent classificatory scheme within the family. By an unfortunate accident of fate, early specialists in the Tachinidae, from Robineau-Desvoidy (1863) to Townsend (1934–1942), have been more concerned with differences than with similarities. This perspective has resulted in finer and finer splitting at the generic level. Proliferation of genera by these authors became an end in itself, at the expense of a deeper understanding of higher levels of classification. Because of the superficial heterogeneity in appearance of many adult tachinids, few stable taxonomic characters have been found that may be depended upon to indicate relationships. Instead, Townsend used various permutations and combinations of the presence or absence of bristles but made little use of their relative size or arrangement. Unfortunately, there are only a limited number of possible combinations of presence or absence relative to the many thousands of extant species and most of them do not seem to serve as a basis for understanding relationships or building a stable classification. Descriptions of new taxa, even today, sometimes neglect to mention unique features, but instead, present further combinations or recombinations of the same limited suites of characters. Furthermore, these character suites are usually not correlated with internal structure, life cycle, larval characters, or other character states; instead, they appear, presumably by convergence or parallel development, in various genera that seem unrelated on other characters of terminalia or developmental stages. Such convergence, multiplied many times over because of the vast number of superficially similar species, has resulted in a long history of incorrect identifications and misunderstandings of relationships, a trend that still continues. A classification based on shared derived character states is badly needed but will be difficult to develop and may be long in coming. This need is now being met by research into internal structures, terminalia, larvae, and life cycles. However, much remains to be discovered, and even the most recent classifications still rely mainly on arrangements of bristles and probably contain few monophyletic taxa.

Four subfamilies, Phasiinae, Tachininae, Dexiinae, and Goniinae, are recognized here, corresponding in most respects to classifications proposed in several recent treatments, for example those of Herting (1960, 1984), Mesnil (1944–1975), and Crosskey (1973, 1976, 1977, 1980), but with some important differences. Namely, several tribes that Mesnil and Crosskey included in the Tachininae have been shifted here to the Dexiinae. The small subfamily Dufouriinae of these authors has also been combined here with the Dexiinae because of the shared presence of a special type of hinged aedeagus (discussed below), believed to be a synapomorphy of the subfamily. Classification of the Tachinidae into four subfamilies differs in some important respects from the arrangement proposed by Townsend (1934–1942) on which the subsequent Nearctic (Sabrosky and Arnaud 1965) and Neotropical (Guimarães 1971)

catalogs were based, although the composition of the Phasiinae is essentially the same.

Members of the Phasiinae show the greatest diversity of adult structure of any group of Tachinidae. Some are bee or wasp mimics, although they fall far short of the Syrphidae in this respect. All Phasiinae, except *Strongygaster* Macquart, lay unincubated eggs on bugs (Hemiptera-Heteroptera), and this is virtually the sole justification for the taxon. The possession of a uterus by *Strongygaster*, coupled with ovariole position on beetles and ants rather than bugs, is itself evidence that this genus may not be a member of the Phasiinae. Unfortunately, there are apparently no morphological characters that are common to all members of this assemblage.

The Tachininae and Goniinae cannot be separated at present. Most species with a setose prosternum have been placed in the Goniinae, but there are ample exceptions, including some species in which this character is variable. The tribe Siphonini has been placed in the Tachininae by Herting (1960) and in the Goniinae by Mesnil and Crosskey; its members have a setose prosternum, as in Goniinae, but in other features the group resembles Tachininae more than Goniinae. Several other, otherwise typical Tachininae have a setose prosternum (e.g. *Hystricia*, *Macromya* Robineau-Desvoidy, and some *Lypha*), and there are some genera whose position is not evident.

All members of the Tachininae possess a uterus and deposit eggs ready to hatch. Although species of a few genera deposit eggs directly on the host (e.g. *Macquartia* and *Cleonice* on chrysomelid larvae), the majority seem to scatter their maggots about in a potential host's habitat, leaving host-finding to the larva or to chance encounter by a passing host. In the male terminalia of tachinines, the surstyli are usually widely separated and syntergosternite 7 + 8 is often large and bulbous.

A small minority of genera of Goniinae, including all members of the tribes Exoristini and Winthemiini, the genera *Aplomya* and *Prooppia* Townsend, and a few genera of Blondeliini (*Belida*, *Medina*, and *Meigenia*), deposit unincubated eggs on their hosts. The remaining members of the subfamily all have a uterus and all deposit fully embryonated eggs ready to hatch; their relationship to those above that lack a uterus is problematic. Among those with a uterus, all members of a large group deposit microtype eggs, minute, limpet-shaped eggs that are scattered over the host's food plant, especially where it has been recently damaged. An egg does not hatch until eaten by the host, stimulated to do so by enzymes in the host's foregut. The newly hatched larva penetrates the gut wall to take up its initial position within the body. This complex of characters and behavior is surely a synapotypy, by which this group of genera can be recogniz-

ed as a monophyletic unit; but unfortunately it cannot be recognized on external characters, except for the globose female abdomen enlarged in most genera to accommodate the large number of eggs developing therein. The remaining Goniinae that do not produce microtype eggs are a diverse lot that probably do not form a single monophyletic group; their interrelationships need much additional study.

The Dexiinae is the only subfamily that can be defined on the basis of a synapomorphy. The aedeagus is hinged (Fig. 261) presumably between basiphallus and distiphallus, and the apex of the basiphallus extends beyond the hinge as a tapering prolongation. The gonopod lacks setae and is reduced to a strap-like supporting sclerite at the base of the aedeagus, and has, at most, a small conical point instead of the usual ventrally projecting portion. The parameres are usually closely applied to the basal part of the aedeagus, usually ending at about the same point as the apex of the basal part of the aedeagus. As here constituted, the Dexiinae includes all species with this type of male terminalia, thus corresponding closely only with the subfamily of the same name of Herting (1960, 1984); it encompasses tribes such as the Palpostomatini, Phyllomyini, Thelairini, Voriini, and Wagneriini, which are included in Tachininae by Mesnil and Crosskey. Two quite different species have been regarded as type species of *Dexia* Meigen, and application has been made to the International Commission on Zoological Nomenclature for fixation of a type species. The uncertain status of the genus, however, has no bearing on the name of the subfamily, for as used here and by Herting (1960, 1984), both taxa to which the name has been applied have the same type of aedeagus and therefore belong to the same subfamily.

Tachinidae are abundant on all continents and on all of the larger continental islands. The faunas of the largest islands, such as New Zealand, New Guinea, and Madagascar, are rich in endemic genera and species; the origins of only the tachinid fauna of New Zealand have been discussed (Dugdale 1969). However, their diversity dwindles rapidly as one proceeds along island chains away from the larger islands and continents. The larger islands of Polynesia have a moderate number of species, but on Hawaii tachinids are known only as introductions and are rare or absent on small remote oceanic islands. Greenland has only five species, all shared with, and presumably derived from, adjacent Ellesmere Island. Bermuda, Iceland, Spitzbergen, and the Soviet Arctic Islands (except Wrangell Island) apparently lack tachinids. The Pribilof Islands have only two recorded species, and the Aleutian Islands seem to be devoid of them. The West Indies (with the notable exception of Trinidad) are likewise impoverished when compared with the large and diverse faunas of the adjacent Neotropical region.

Key to genera<sup>2</sup>

1. Prosternum setose (Figs. 153, 154), sometimes sparsely so .....2  
 Prosternum without setae (Fig. 155)<sup>3</sup> .....175
2. Scutum with five or more postsutural supra-alar bristles, two anterior to largest bristle; first bristle arising close to transverse suture; second bristle smallest and displaced medially (Fig. 162) .....3  
 Scutum with three or four postsutural supra-alar bristles, only one anterior to largest bristle; first bristle arising more or less equidistant between transverse suture and second bristle (Figs. 163–165) .....9
3. Anepimeron with an exceptionally long bristle extending posteriorly beyond middle of lower calypter (Figs. 215, 216). Anterior and posterior lappets of posterior thoracic spiracle about equal in size, each with a fringe of plumose hairs enclosing a narrow V-shaped opening at or near middle of spiracle (Fig. 169) .....4  
 Anepimeron with shorter bristles not extending to middle of lower calypter or with none. Anterior and posterior lappets of posterior thoracic spiracle unequal; the posterior one larger, forming a crescent-shaped opening with anterior lappet (Fig. 170) .....7
4. Dorsal surface of lower calypter, except for a narrow band along posterior margin, covered with long erect hairs (Fig. 215) .....*Hystricia* Macquart, in part<sup>4</sup>  
 2 spp.; widespread  
 Dorsal surface of lower calypter without long erect hairs (Figs. 216, 217) .....5
5. Abdominal tergite 3 with only one pair of median marginal bristles (as in Fig. 231). Body bright metallic green or blue .....*Chrysotachina* Brauer & Bergenstamm  
 2 spp.; widespread; Curran 1939  
 Abdominal tergite 3 with more than one pair of median marginal bristles (Fig. 233) .....6
6. Abdominal tergites 3 and 4 each with numerous scattered discal bristles (Fig. 234); abdomen black. Parafacial setose on upper half or more .....*Bombyliomyia* Brauer & Bergenstamm  
 1 sp., *soror* (Williston); western  
 Abdominal tergites 3 and 4 each with a single transverse row of discal bristles (Fig. 233); abdomen metallic purplish or greenish. Parafacial bare at least on lower half .....*Chlorohystricia* Townsend  
 1 sp., *cyaneiventris* (Wulp); Arizona
7. Thorax, abdomen, and most of head metallic green or blue. First postsutural intra-alar bristle about as close to transverse suture as first dorsocentral bristle; outer basal bristle of postpronotum not accompanied by a smaller posteromedially placed bristle .....*Gymnocheta* Robineau-Desvoidy, in part  
 4 spp.; widespread; Brooks 1945a  
 Thorax, abdomen, and head without metallic green integument. First postsutural intra-alar bristle almost as close to transverse suture as first postsutural supra-alar bristle and much closer to suture than first postsutural dorsocentral bristle (Fig. 162); outer basal bristle of postpronotum with a smaller bristle posteromedial to it .....8
8. Outer third of lower calypter with pale recumbent hairs dorsally. Medial surface of fore coxa entirely covered with short appressed setae, arranged in a longitudinal band of black setae bordered by pale setae (Fig. 153). Large species, over 10 mm in length, with broad orange abdomen .....*Macromya* Robineau-Desvoidy  
 1 sp., *crocata* Reinhard; Arizona, Texas; Reinhard 1968b  
 Lower calypter with a few pale recumbent hairs confined to outer margin only. Medial surface of fore coxa bare (as in Fig. 154). Size various, with abdomen brown, gray, or bluish, tessellated .....*Xanthophyto* Townsend, in part  
 2 spp.; widespread

<sup>2</sup> Only native genera, and those successfully introduced, occurring north of Mexico, are included.

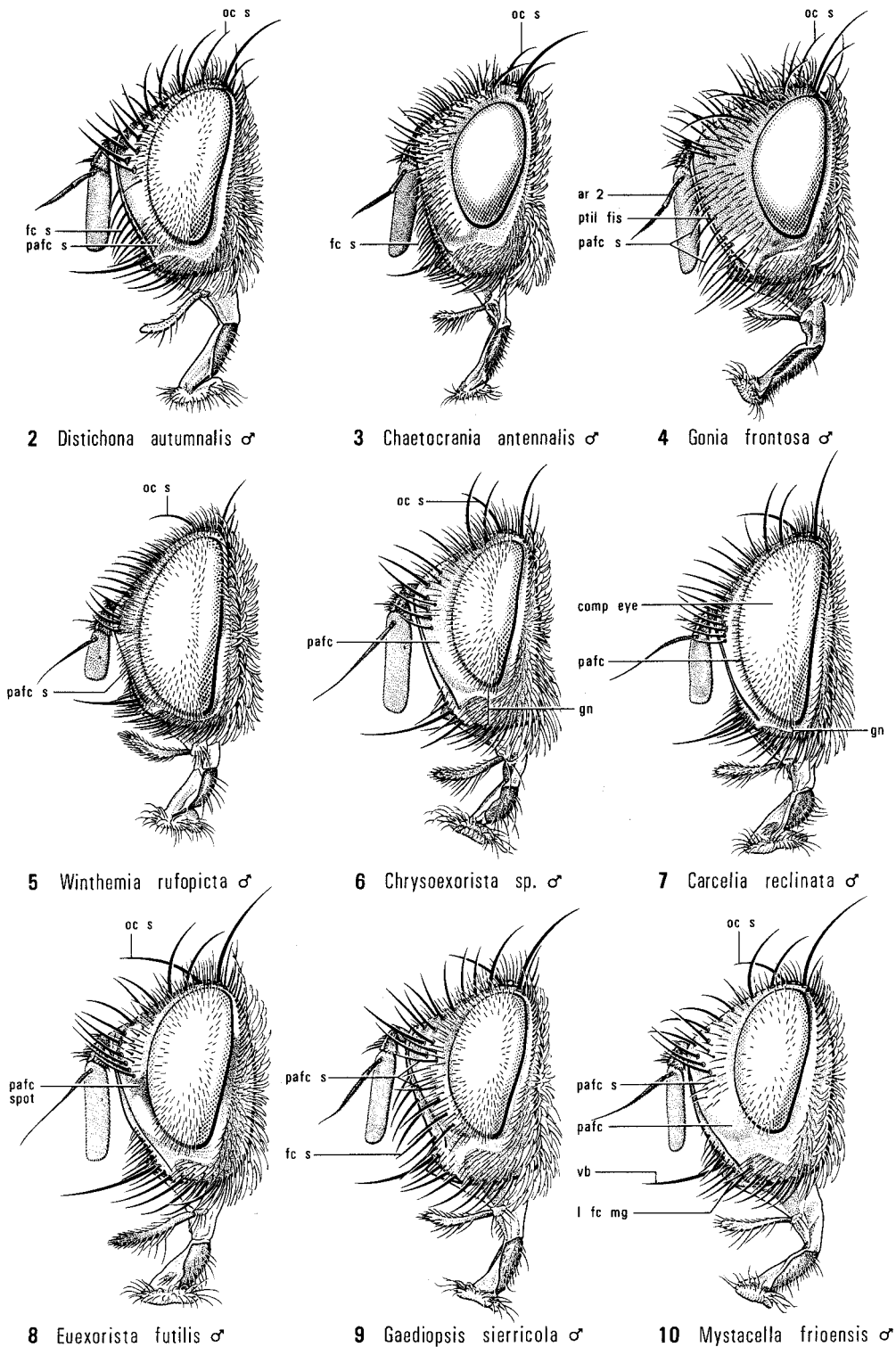
<sup>3</sup> Any specimen with a single hair, or pair of hairs, may be an atypical member of either group and should be keyed out under both couplet 2 and couplet 175.

<sup>4</sup> Including *H. testaceiventris* Wulp, and species formerly placed in *Bombyliopsis* Townsend.

9. First postsutural supra-alar bristle at least as long and stout as first postsutural dorsocentral bristle (Fig. 163) ..... 10  
 First postsutural supra-alar bristle shorter and finer than first postsutural dorsocentral bristle (Figs. 164, 165) ..... 96
10. Ocellar bristles reclinate or lateroclininate (Figs. 2-4) ..... 11  
 Ocellar bristles proclinate or absent (as in Figs. 5-10) ..... 17
11. Parafacial bare (as in Figs. 6-8) ..... *Distichona* Wulp, in part<sup>5</sup>  
 3 spp.; widespread  
 Parafacial setose (as in Figs. 2-5) ..... 12
12. Eye covered with conspicuous dense hairs, each hair longer than combined diameter of four or more eye facets (Figs. 2, 5-10). Lower part of parafacial with patch of fine hairs (Fig. 2) ..... *Distichona* Wulp, in part  
 see couplet 11  
 Eye apparently bare (Figs. 3, 4). Parafacial with coarse hairs or bristles or both over most of its length ..... 13
13. Facial ridge with dense row of short stout decumbent bristles along almost its entire length, flanked ventrally by two rows of shorter bristles (Fig. 3) ..... *Chaetocrania* Townsend  
 1 sp., *antennalis* (Coquillett); southwestern  
 Facial ridge with fewer bristles, with, at most, a single row of bristles on lower two-thirds or less (as in Fig. 2) ..... 14
14. Katepisternum with four bristles arranged in a transverse row, the bristle next to the anteriormost in line with the other three (Fig. 178); apical scutellar bristles horizontal, thin and decurved ..... *Eucnephalia* Townsend  
 1 sp., *gonoides* Townsend; southwestern  
 If katepisternum with four bristles, then the one next to the anteriormost is displaced ventrally out of line with the other three (as in Figs. 176, 177); apical scutellar bristles usually inclined upward ..... 15
15. Parafacial with an even row of four or more bristles adjacent to ptilinal fissure, isolated from smaller remaining parafacial setae (Fig. 4). Second aristemere usually 10 or more times as long as wide, and usually more than half as long as third aristemere (Fig. 4). Male with proclinate orbital bristles (as in Fig. 20) ..... *Gonia* Meigen  
 29 spp.; widespread; Morrison 1940, Brooks 1944a  
 Parafacial with scattered setae; if those nearest ptilinal fissure appear larger, then they are distant from fissure by at least half their length and do not form an even row. Second aristemere usually less than five times as long as wide and usually less than half as long as third aristemere ..... 16
16. Three or more upper orbital bristles usually present, arranged in an arc with the innermost reclinate and the outermost lateroclininate (Fig. 20); male with proclinate orbital bristles. Head yellow in ground color, with yellow or silvery pollen, contrasting with dark sparsely pruinose body ..... *Onychogonia* Brauer & Bergenstamm  
 4 spp.; northern and western, Arctic-alpine; Brooks 1944a  
 One or two reclinate upper orbital bristles present (Fig. 21); male without proclinate orbital bristles. Head and body gray or silvery pruinose, not contrasting .....  
 ..... *Spallanzania* Robineau-Desvoidy<sup>6</sup>  
 6 spp.; widespread
17. Eye covered with conspicuous dense hairs (Figs. 5-12) ..... 18  
 Eye apparently bare (hairs usually present, but so sparse and short as to be easily overlooked, each hair no longer than combined diameter of two facets) (as in Figs. 13-19) ..... 57
18. Postpronotum with middle basal bristle displaced anterolaterally forming a nearly right-angled triangle with outer and inner basal bristles (Fig. 157); middle basal bristle also arising lateral to a line between outer basal and outer anterior bristles ..... 19

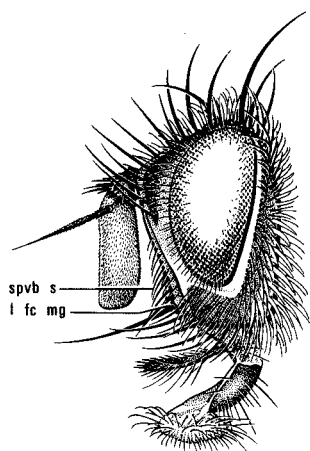
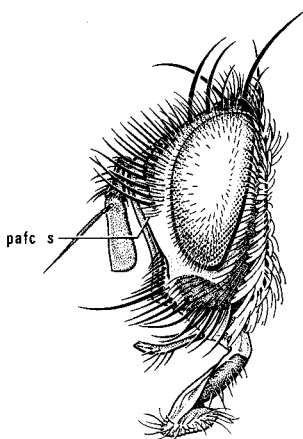
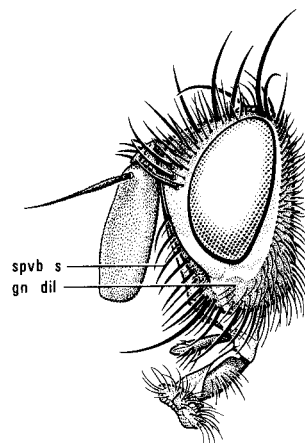
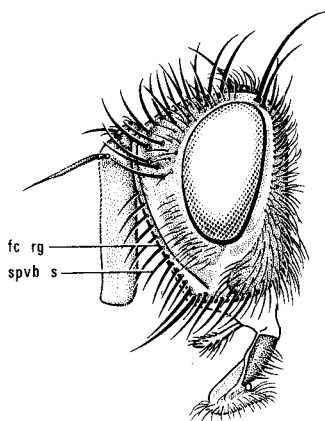
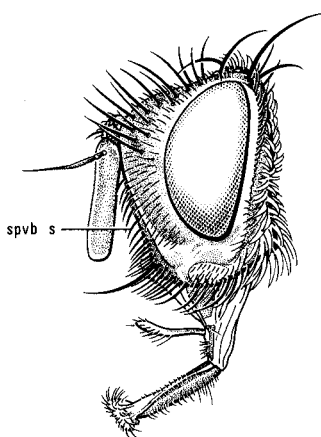
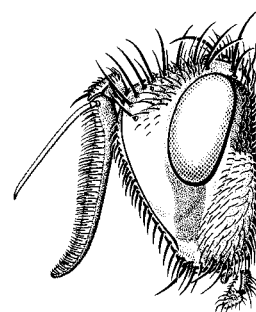
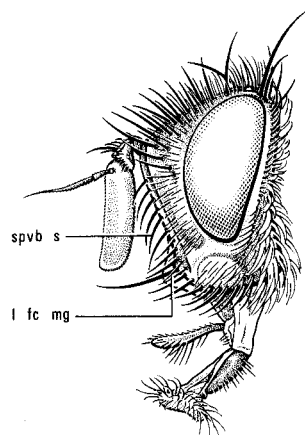
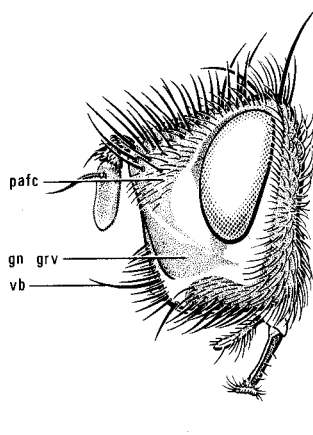
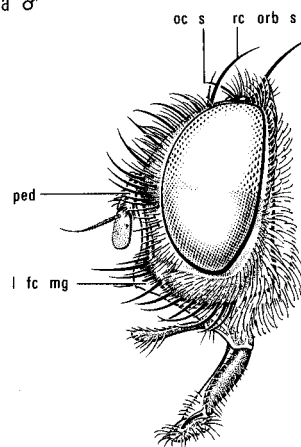
<sup>5</sup> Also included here are species formerly placed in *Aravaipa* Townsend and *Olenochaeta* Townsend.

<sup>6</sup> Also included here are species formerly placed in *Acroglossa* Williston and *Imaguncula* Reinhard.



Figs. 110.2-10. Lateral views of head: (2) *Distichona autumnalis* (Townsend); (3) *Chaetocrania antennalis* (Coquillett); (4) *Gonia frontosa* Say; (5) *Winthemia rufopicta* (Bigot); (6) *Chrysoexorista* sp.; (7) *Carcelia reclinata* (Aldrich & Webber); (8) *Euexorista futilis* (Osten Sacken); (9) *Gaediopsis sierricola* (Townsend); (10) *Mystacella frioensis* (Reinhard) (continued).

Abbreviations: ar, aristomere; comp eye, compound eye; fc s, facial seta; gn, gena; l fc mg, lower facial margin; oc s, ocellar bristle; pafc, parafacial; pafc s, parafacial seta; ptil fis, ptilinal fissure; vb, vibrissa.

11 *Phryxe pecosensis* ♂12 *Eunemorilla longicornis* ♂13 *Erynnia condecens* ♂14 *Eleodiphaga pollinosa* ♂15 *Torosomyia parallela* ♂16 *Oraphasmophaga pictipennis* ♂17 *Chaetogaedia analis* ♂18 *Asseclamyia sphenofrons* ♂19 *Atactopsis reinhardi* ♂

Figs. 110.11-19. Lateral views of head (*continued*): (11) *Phryxe pecosensis* (Townsend); (12) *Eunemorilla longicornis* (Reinhard); (13) *Erynnia condecens* Reinhard; (14) *Eleodiphaga pollinosa* Walton; (15) *Torosomyia parallela* Reinhard; (16) *Oraphasmophaga pictipennis* (Reinhard); (17) *Chaetogaedia analis* (Wulp); (18) *Asseclamyia sphenofrons* Reinhard; (19) *Atactopsis reinhardi* Sabrosky & Arnaud (*continued*).

Abbreviations: fc rg, facial ridge; gn dil, genal dilation; gn grv, genal groove; l fc mg, lower facial margin; oc s, ocellar bristle; pafc, parafacial; pafc s, parafacial seta; ped, pedicel; rc orb s, reclinate orbital bristle; spvb s, supravibrissal bristle; vb, vibrissa.

- Postpronotum with middle basal bristle more or less in line with outer and inner basal bristles (Fig. 158), or with inner basal bristle absent (Fig. 156); if middle basal bristle forming an apparent angle with outer and inner basal bristles, this angle at least 160°; middle basal bristle usually medial to a line between outer basal and outer anterior bristles (latter not always present) . . . . . 34
19. Katepimeron haired, at least on its anterior two-thirds (Fig. 169) . . . . . 20  
 Katepimeron bare, or with at most three or four hairs on anterior fourth . . . . . 25
20. Parafacial with hairs on upper half or more (Fig. 5) . . . . . 21  
 Parafacial bare on lower two-thirds or more (Figs. 6-8) . . . . . 22
21. Hairs on abdominal tergites 3 and 4 recumbent. Katepisternum rarely with more than two bristles . . . . . *Winthemia* Robineau-Desvoidy, in part<sup>7</sup>  
 27 spp.; widespread; Guimarães 1972, Sabrosky 1973 (females)  
 Hairs on abdominal tergites 3 and 4 erect, at right angles to surface of tergite. Katepisternum with three bristles . . . . . *Diotrephes* Reinhard  
 1 sp., *atriventris* (Walker); eastern U.S.A.
22. Facial ridge with bristles on at least lower third or more (as in Figs. 2, 9) . . . . . *Hemisturmia* Townsend<sup>8</sup>  
 2 spp.; widespread  
 Facial ridge bare on all but lowest fifth . . . . . 23
23. Parafacial with a few proclinate hairs below lowest frontal bristle . . . . *Chesippus* Reinhard  
 1 sp., *notialis* Reinhard; Arizona  
 Parafacial entirely bare below lowest frontal bristle . . . . . 24
24. Abdominal tergites 3 and 4 each with median discal bristles (as in Fig. 231). Scutum with a median dark longitudinal stripe and a paired lateral stripe . . . . . *Nemorilla* Rondani  
 3 spp.; widespread; Aldrich and Webber 1924  
 Abdominal tergites 3 and 4 without median discal bristles. Scutum with pale median stripe and two pairs of longitudinal stripes . . . . . *Orasturmia* Reinhard<sup>9</sup>  
 1 sp., *vallicola* Reinhard; Arizona, Texas
25. Facial ridge with row of long erect bristles on lowest two-thirds or more (as in Figs. 14, 35) . . . . . *Patelloa* Townsend  
 10 spp.; widespread; Aldrich and Webber 1924 (as *Phorocera*, in part)  
 Facial ridge with at most a row of hair-like decumbent setae on lower half or less . . . . 26
26. Hind coxa with one or more setae on posteroapical margin (Fig. 228) . . . . . *Hyphantrophaga* Townsend, in part<sup>10</sup>  
 10 spp.; widespread; Sellers 1943 (in part)  
 Hind coxa bare on posteroapical margin (hairs arising on first abdominal segment may, in profile, appear to arise on coxa) . . . . . 27
27. Gena exceptionally narrow; distance between eye and lower cranial margin less than one-tenth total height of head (as in Fig. 7) . . . . . *Eumasicera* Townsend, in part<sup>11</sup>  
 5 spp.; widespread  
 Gena broader; distance between eye and lower cranial margin more than one-ninth height of head (as in Fig. 8) . . . . . 28
28. Pruinescence of frons and most of thorax and abdomen, in life, vivid metallic green or yellowish green, fading soon after death to a yellowish brown that may be temporarily restored to its metallic luster by application of alcohol or a petroleum solvent; abdomen with transverse black bands. Gena exceptionally high, with the distance between eye and lower cranial margin, when seen in profile, one-fifth or more total height of head (Fig. 6) . . . . . *Chrysoexorista* Townsend  
 5 spp.; western; Sellers 1943 (as *Zenillia*, in part)

<sup>7</sup> Included here is *Timavia fumiferanae* (Tohill), placed by Sabrosky and Arnaud (1965) in *Omotoma* Liroy. *Timavia* Robineau-Desvoidy is regarded here as only a subgenus of *Winthemia*.

<sup>8</sup> Included here is *Pseudolomyia scissilis* Reinhard.

<sup>9</sup> Included here is *Angustopsis saginata* Reinhard.

<sup>10</sup> Also included here are species formerly placed in *Eusisyropa* Townsend.

<sup>11</sup> Also included here are species formerly placed in *Houghia* Coquillett and *Pacidianus* Reinhard, as well as *setinervis* (Coquillett), a species unplaced to subfamily by Sabrosky and Arnaud (1965).

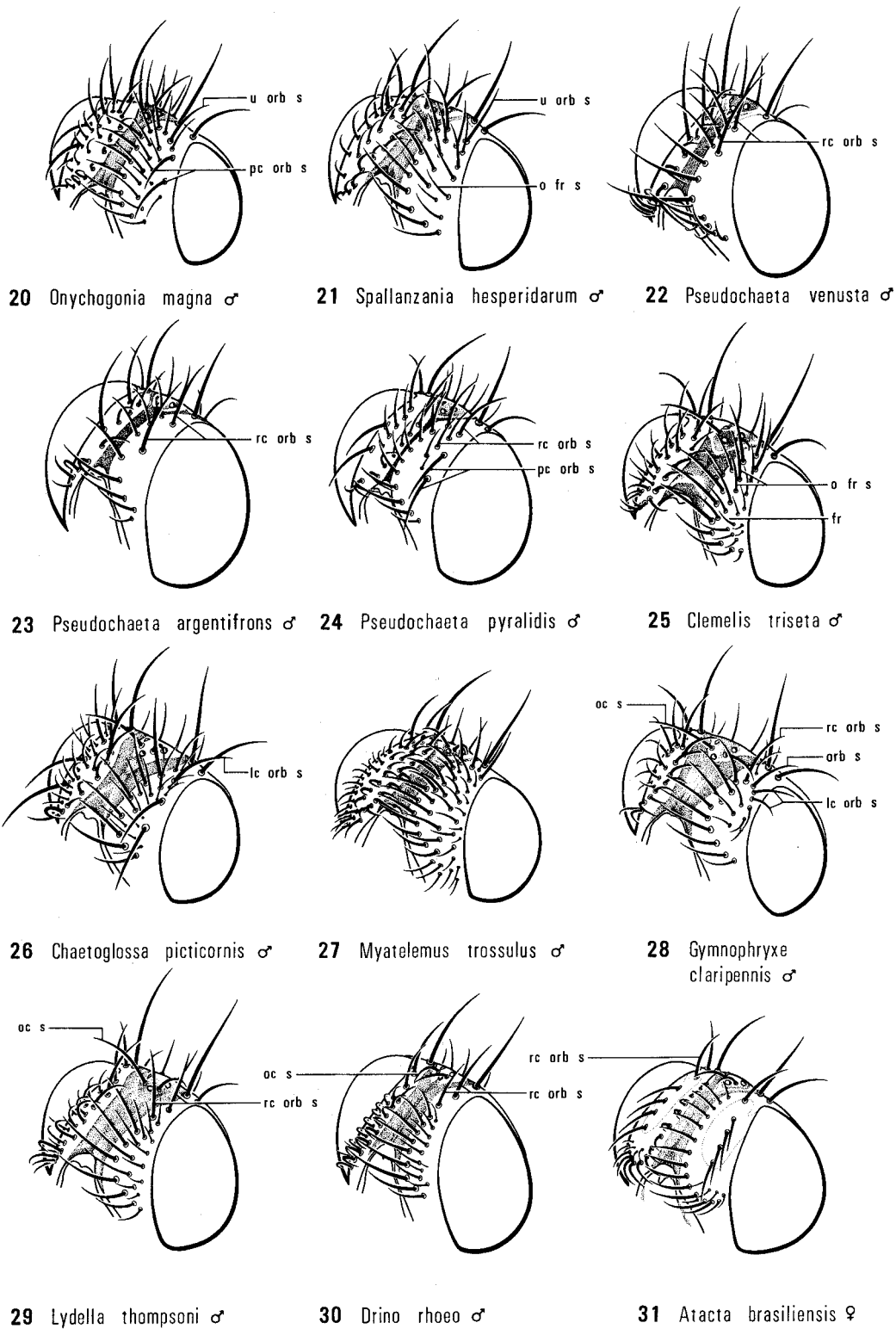
- Pruinescence of body mostly or entirely gray, without metallic green color, and gena narrower, less than one-fifth of height of head (except in *Hyphantrophaga scolex* (Reinhard); a Californian species with large globose uniformly ochrous brown abdomen and orange antenna) .....29
29. Palpus black .....30  
 Palpus brown, yellow, or orange .....32
30. Facial ridge with slender decumbent setae on lower third to half, the length of this row more than half length of palpus (Fig. 140). Egg microtype (as in Fig. 266) .....  
 .....*Myxexoristops* Townsend, in part<sup>12</sup>  
 2 spp.; widespread  
 Facial ridge with only a few small setae on lower fourth or less (as in Fig. 8); length of this row less than half length of palpus .....31
31. Facial ridge thickened, slate gray, contrasting with adjacent brassy-pruinescent parafacial; parafacial slightly concave just below lowest frontal bristle; pruinescence at this point appearing as a shiny spot when illuminated from below, or as a dark spot when illuminated from above (Fig. 8). Male lacking an outer vertical bristle. Egg microtype (as in Fig. 266) .....  
 .....*Euexorista* Townsend  
 1 sp., *futilis* (Osten Sacken); widespread  
 Facial ridge narrow, not contrasting with adjacent parafacial in color; parafacial without concave area just below lowest frontal. Male with outer vertical bristle. Egg unembryonated planoconvex (as in Fig. 264) .....  
 .....*Prooppia* Townsend  
 1 sp., *crassiseta* (Aldrich & Webber); eastern
32. Facial ridge with slender decumbent setae on lower third to half; the length of this row more than half length of palpus (Fig. 140). Egg microtype (as in Fig. 266) .....  
 .....*Myxexoristops* Townsend, in part  
 see couplet 30  
 Facial ridge with only a few small setae on lower fourth or less (as in Fig. 8); length of this row less than half length of palpus .....33
33. Mid tibia with one anterodorsal bristle (as in Fig. 221), or if with two, then the larger bristle is proximal and the smaller one is distal. Abdominal tergites 3 and 4 each with at most one pair of discal bristles. Abdomen globose, especially in female, as deep as wide, enclosing terminalia within a slit-like opening (Fig. 246) (except in *angustata* (Wulp), of Arizona and Texas, which may not belong here). Facial ridge straight or slightly convex in profile, except just above vibrissa (as in Fig. 14). Cerci of male without interlocking teeth at apices. Egg microtype (as in Fig. 266) .....  
 .....*Hyphantrophaga* Townsend, in part<sup>13</sup>  
 see couplet 26  
 Mid tibia with two or more anterodorsal bristles, with the largest the most distal (as in Fig. 222). Abdominal tergites 3 and 4 usually with more than one pair of discal bristles; abdominal tergite 5 enclosing a rounded or triangular opening, not concealing terminalia. Facial ridge concave in profile. Cerci of male with medially directed interlocking teeth at apices (Fig. 263). Egg planoconvex, embryonated *in utero* .....  
 .....*Phebellia* Robineau-Desvoidy, in part<sup>14</sup>  
 8 spp.; widespread; Sellers 1943 (as *Aplomya*, in part)
34. Parafacial with setae on upper half or more (Figs. 9, 10) .....35  
 Parafacial bare, or with at most a few hairs below lowest frontal bristle .....37

<sup>12</sup> Included here are two species, *fronto* (Coquillett) and *neurotomae* (Sellers), formerly placed in *Aplomya* by Sellers (1943) and Sabrosky and Arnaud (1965).

<sup>13</sup> This is a provisional placement for three rather distinct Nearctic species, *angustata* (Wulp), *blandita* (Coquillett), and *scolex* (Reinhard), that were previously placed in *Zenillia* Robineau-Desvoidy by Sellers (1943) and Sabrosky and Arnaud (1965). They differ from other members of *Hyphantrophaga* in lacking setae on the hind coxa. Their ultimate generic placement requires comparative studies of additional related Neotropical Goniini.

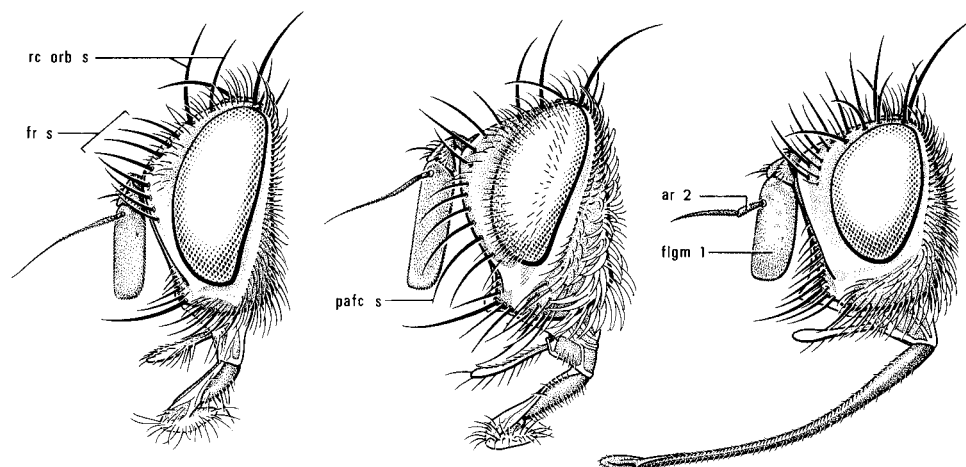
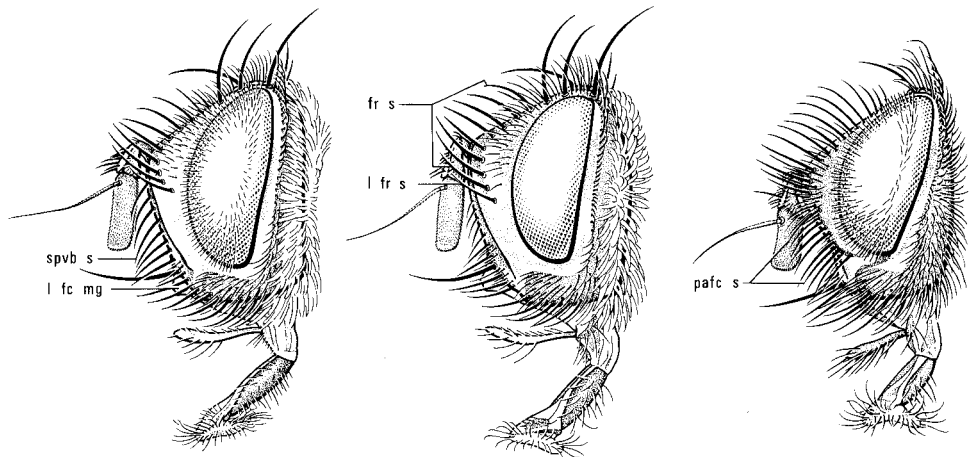
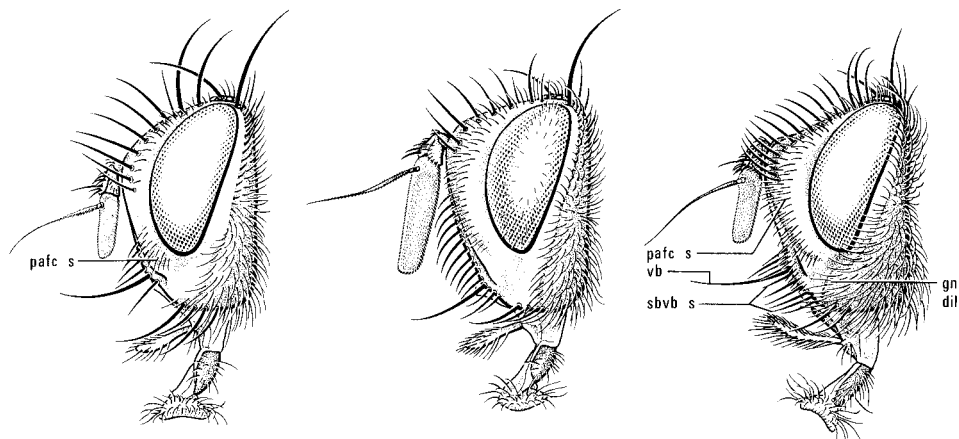
<sup>14</sup> This is a provisional placement for the following: *curriei* (Coquillett) and *erecta* (Sellers), formerly placed in *Thelymyia* Brauer & Bergenstamm by Sellers (1943) and Sabrosky and Arnaud (1965), as well as *cerurae* (Sellers), *epicydes* (Walker), *helvina* (Coquillett), *imitator* (Sellers), *pheosiae* (Sellers), and *trichiosomae* (Sellers), formerly placed by these authors in *Aplomya*.





Figs. 110.20-31. Oblique anterior views of frons: (20) *Onychogonia magna* Brooks; (21) *Spallanzania hesperidarum* (Williston); (22) *Pseudochaeta venusta* (Reinhard); (23) *Pseudochaeta argentifrons* Coquillett; (24) *Pseudochaeta pyralidis* Coquillett; (25) *Clemelis triseta* (Villeneuve); (26) *Chaetoglossa picticornis* Townsend; (27) *Myatelemus trossulus* (Reinhard); (28) *Gymnophryxe claripennis* (Reinhard); (29) *Lydella thompsoni* Herting; (30) *Drino rhoeo* (Walker); (31) *Atacta brasiliensis* Schiner (continued).

Abbreviations: fr, frons; lc orb s, lateroclinate orbital bristle; o fr s, outer frontal bristle; oc s, ocellar bristle; orb s, orbital bristle; pc orb s, proclinate orbital bristle; rc orb s, reclinate orbital bristle; u orb s, upper orbital bristle.

32 *Ametadoria harrisinae* ♂33 *Paradidyma affinis* ♂34 *Eucoronimyia hastata* ♀35 *Chetogena tachinomoides* ♂36 *Exorista larvarum* ♂37 *Eulasiona comstocki* ♂38 *Vibrissina hylotomae* ♂39 *Istocheta aldrichi* ♂40 *Cryptomeigenia theutis* ♂

Figs. 110.32–40. Lateral views of head (*continued*): (32) *Ametadoria harrisinae* (Coquillett); (33) *Paradidyma affinis* Reinhard; (34) *Eucoronimyia hastata* (Coquillett); (35) *Chetogena tachinomoides* (Townsend); (36) *Exorista larvarum* (Linnaeus); (37) *Eulasiona comstocki* Townsend; (38) *Vibrissina hylotomae* (Coquillett); (39) *Istocheta aldrichi* (Mesnil); (40) *Cryptomeigenia theutis* (Walker) (*continued*).

Abbreviations: ar, aristomere; flgm, flagellomere; fr s, frontal bristle; gn dil, genal dilation; l fc mg, lower facial margin; orb, orbital; pafc s, parafacial bristle; rc orb s, reclinate orbital bristle; sbvb s, subvibrissal bristle; spvb s, supravibrissal bristle; vb, vibrissa.

35. Parafacial with vertical rows of erect setae of different sizes; these larger and bristle-like anteromedially, fine and hair-like posterolaterally (Fig. 9) ..... *Gaediopsis* Brauer & Bergenstamm<sup>15</sup>  
9 spp.; widespread
- Parafacial setae of uniform size, all hair-like and decumbent (as in Figs. 5, 10) ..... 36
36. Parafacial very broad, setose on upper half (Fig. 10); vibrissa arising above level of lower facial margin; ocellar bristles well-developed. Katepimeron bare ..... *Mystacella* Wulp<sup>16</sup>  
3 spp.; widespread; Reinhard 1930b
- Parafacial narrow, setose along its entire length (Fig. 5); vibrissa level with lower facial margin; ocellar setae hair-like. Katepimeron entirely setose (as in Fig. 170) ..... *Winthemia* Robineau-Desvoidy, in part<sup>17</sup>  
see couplet 21
37. Hind coxa with one or more setae on posteroapical margin (Fig. 228) ..... *Carcelia* Robineau-Desvoidy  
12 spp.; widespread; Sellers 1943
- Hind coxa bare on posteroapical margin ..... 38
38. Apical scutellar bristles hair-like, parallel or divergent, or absent (Figs. 179, 180) ..... *Cyzenis* Robineau-Desvoidy<sup>18</sup>  
8 spp.; widespread
- Apical scutellar bristles crossed (as in Figs. 182, 185) ..... 39
39. Facial ridge setose on at least lower third (as in Figs. 11, 13-17) ..... 40
- Facial ridge bare except for a few recumbent setae on lowest third or less (as in Fig. 12) ..... 48
40. Distance between eye and subcranial margin less than one-tenth height of head (as in Fig. 7). Frons with two or more large reclinate orbital bristles arising distinctly lateral to frontal row, the anteriormost arising near midlength of frons (Figs. 22-24); ocellar setae minute or absent ..... *Pseudochaeta* Coquillett, in part<sup>19</sup>  
11 spp.; widespread; Reinhard 1946a
- Distance between eye and subcranial margin more than one-sixth height of head. Reclinate upper orbital bristles confined to posterior third of frons, usually arising behind uppermost frontal; ocellar bristles well-developed ..... 41
41. Katepisternum with four or more bristles (Figs. 176, 177) ..... 42
- Katepisternum with three bristles (as in Fig. 174) ..... 44
42. Facial ridge with fine recumbent setae (as in Fig. 15). M ending in R<sub>4+5</sub> close to wing margin (as in Figs. 191, 201) ..... *Tsugaea* Hall  
1 sp., *nox* Hall; western
- Facial ridge with stout erect supravibrissal bristles (as in Figs. 14, 15, 17). M ending separately in wing margin (as in Figs. 193-196) ..... 43
43. Katepisternum with posteroventral bristle arising nearly in line with anterior and posterior bristles and nearly equidistant between the two; only the anteroventral bristle displaced ventrally (Fig. 176). Apical scutellar bristles directed posteriorly, almost horizontally ..... *Nilea* Robineau-Desvoidy, in part<sup>20</sup>  
8 spp.; widespread

<sup>15</sup> Also included are species formerly assigned to *Gaediophana* Brauer & Bergenstamm.

<sup>16</sup> Also included are species formerly assigned to *Organomyia* Townsend and *Bolomyia* Brauer & Bergenstamm. *M. rufata* (Bigot) apparently does not occur north of Mexico and is not a synonym of *violacea* Wulp.

<sup>17</sup> This is a provisional placement for *antennalis* Coquillett, excluded from *Winthemia* by Guimarães (1972) and Sabrosky (1973). Although arrangement of postpronotal bristles is different from other species of *Winthemia*, the male terminalia and unembryonated planoconvex egg suggest a relationship, which may ultimately be resolved by additional study of the tribe Winthemiini.

<sup>18</sup> Also included are *Zenillia browni* Curran, as well as *anassa* Reinhard, *festinans* (Aldrich & Webber), *incrassata* (Smith), *mitis* (Curran), *regilla* (Reinhard), and *ustulata* (Reinhard), species that were not placed to genus by Sabrosky and Arnaud (1965).

<sup>19</sup> Also included are the species formerly placed in *Metopiops* Townsend and *Phaenopsis* Townsend.

<sup>20</sup> The species provisionally placed here include those formerly placed in *Clemelis* Robineau-Desvoidy and *Pseudoperichaeta* Brauer & Bergenstamm, as well as *halisidotae* (Aldrich & Webber), *dimmocki* (Webber), *lobeliae* (Coquillett), *valens* (Aldrich & Webber), and *victoria* (Aldrich & Webber), among species unplaced to genus by Sabrosky and Arnaud (1965).

- Katepisternum with both posteroventral and anteroventral bristles displaced ventrally; the posteroventral bristle much closer to the posterior than to the anterior bristle (Fig. 177). Apical scutellar bristles erect, nearly at right angles to scutellum ..... *Lespesia* Robineau-Desvoidy, in part 28 spp.; widespread; Beneway 1963, Sabrosky 1980
44. Katepisternal bristles arising quite close together; distance between anterior and posterior bristles less than three times distance between anterior and anteroventral bristles (Fig. 174) . . . 45  
 Katepisternal bristles more dispersed; distance between anterior and posterior bristles more than three times distance between anterior and anteroventral bristles (Fig. 175) . . . . . 46
45. Facial ridge with row of stout erect bristles (as in Fig. 14). Third aristomere thickened on basal three-quarters or more (as in Fig. 14) ..... *Madremyia* Townsend 2 spp.; widespread  
 Facial ridge with finer more decumbent setae (Fig. 11). Third aristomere thickened on basal two-thirds or less ..... *Phryxe* Robineau-Desvoidy 2 spp.; widespread
46. Bend of M nearly a right angle without a stub, or continuation of M (as in Fig. 191). Apical scutellar bristles directed posteriorly, almost horizontally. Frons with a single row of frontal bristles ..... *Nilea* Robineau-Desvoidy, in part see couplet 43  
 Bend of M either with a short stub (as in Fig. 192) or distinctly obtuse (as in Figs. 195, 196). Apical scutellar bristles inclined at 45° or more to horizontal, usually curving forward. Frons with extra row of bristles outside frontal row (Fig. 25) ..... 47
47. Bristles of facial ridge slender, decumbent (as in Fig. 13). Frons, even of male, very broad (Fig. 25). Bend of M with short stub (as in Fig. 192). Arista thickened on basal three-quarters or more. Abdomen of female rounded apically, with short ovipositor ..... *Clemelis* Robineau-Desvoidy 1 sp., *triseta* (Villeneuve); Yukon, Northwest Territories  
 Bristles of facial ridge stout, erect, and evenly spaced (as in Fig. 14). Frons, especially in male, narrower. Bend of M obtuse, without a stub (as in Fig. 195). Arista thickened only on basal half. Abdominal segment 5 of female pointed, with slender telescopic sharp-tipped ovipositor (Fig. 255) that is almost entirely concealed except for the sharp-tipped apex; apical segment, when extended, slender, straight, and as long as fore tibia. . . . *Acantholespesia* n. gen. 3 spp., *comstocki* (Williston) (type species of genus), *signata* (Aldrich & Webber), and *texana* (Aldrich & Webber), all reared from stem-boring larvae of Cossidae, Megathymidae, Pyralidae, and Noctuidae (Arnaud 1978); southern
48. Katepisternum with four bristles arranged in a trapezoidal pattern (as in Fig. 177) . . . . . 49  
 Katepisternum with two or three bristles (a fourth may rarely occur either between anterior and posterior bristles or ventral to anteroventral one, not forming a trapezoid) . . . . . 50
49. Parafacial with a few hair-like setae below lowest frontal bristle (Fig. 12). Frons with one or more rows of bristles (o fr s) lateral to frontal row (as in Figs. 21, 25). All abdominal tergites with transverse bands of silvery pruinescence . . . . . *Eunemorilla* Townsend<sup>21</sup> 5 spp.; western; Reinhard 1944b (as *Masiphyomyia*)  
 Parafacial bare below lowest frontal bristle (as in Figs. 11, 13). Frons with only scattered hairs outside frontal bristles. Abdominal tergite 5 of female and tergites 4 and 5 of male shining black except for narrow basal band of silvery pruinescence on tergite 4 . . . . . *Aplomya* Robineau-Desvoidy 1 sp., *theclarum* (Scudder); widespread; Sellers 1943, in part
50. Vibrissa arising as far above lower facial margin as width of face between vibrissae (Fig. 149); ocellar setae absent. Katepimeron fully haired (as in Fig. 170); katepisternum with two bristles. Female ovipositor with piercer . . . . . *Mystacomyia* Giglio-Tos 1 sp., *scordala* (Reinhard); Texas  
 Vibrissa arising at level of lower facial margin; ocellar bristles well-developed. Katepimeron bare on all but anterior end; katepisternum with three bristles. Female ovipositor tubular, without piercer . . . . . 51

<sup>21</sup> Included are species formerly placed in *Masiphyomyia* Reinhard and *Mimologus* Reinhard.

51. M ending in  $R_{4+5}$  well before reaching wing margin (Fig. 191)..... *Tryphera* Meigen  
1 undescribed species; Yukon  
M ending in wing margin (as in Figs. 193-196) .....52
52. Palpus black or dark brown. Egg microtype (as in Figs. 266-268) .....53  
Palpus pale brown or yellowish. Egg planoconvex (unknown in *Aplomyopsis* Townsend)  
.....54
53. Parafacial with several hairs below lowest frontal bristle (as in Figs. 10, 12) .....  
.....*Eumea* Robineau-Desvoidy  
1 sp., *caesar* (Aldrich); widespread; Sellers 1943 (as *Aplomya*, in part)  
Parafacial without hairs below lowest frontal (as in Figs. 11, 13) .....  
.....*Platymya* Robineau-Desvoidy<sup>22</sup>  
2 spp.; widespread; Sellers 1943 (as *Aplomya*, in part)
54. Hind tibia with comb-like row of anterodorsal setae of rather uniform length, except for one  
longer bristle at midlength (Fig. 226). Abdominal tergites 2 and 3 each lacking median discal  
bristles .....*Sisyropa* Brauer & Bergenstamm  
2 spp.; widespread; Sellers 1943  
Anterodorsal setae of hind tibia uneven in length, alternating long and short. Abdominal tergites  
2 and 3 each with scattered median discal bristles .....55
55. Hind coxa with one or more setae on posteroapical margin (as in Fig. 228) .....  
.....*Hubneria* Robineau-Desvoidy  
1 sp., *estigmenensis* (Sellers); widespread  
Hind coxa bare on posteroapical margin .....56
56. Apex of abdomen of male with a pair of circular patches of appressed hair arising from shiny  
black cuticle ventrally (female unknown) .....*Aplomyopsis* Townsend  
1 sp., *polita* (Coquillett); southern  
Apex of abdomen lacking such patches of appressed hair .....  
.....*Phebellia* Robineau-Desvoidy, in part  
see couplet 33
57. Gena reduced to a narrow strip about one-twelfth height of head (as in Fig. 7) .....58  
Gena higher, at least one-tenth height of head (as in Figs. 8-10) .....61
58. Hind coxa with one or more setae on its posteroapical margin (as in Fig. 228) .....  
.....*Gymnocarcelia* Townsend<sup>23</sup>  
2 spp.; widespread  
Hind coxa bare on posteroapical margin .....59
59. Frons with two or more stout reclinate orbital bristles arising distinctly outside frontal row  
(Figs. 22-24); facial ridge with stout bristles on lower half or more; ocellar setae minute or  
absent .....*Pseudochaeta* Coquillett, in part  
see couplet 40  
Frons with reclinate orbital bristles more or less continuous with frontal row (as in Figs. 29,  
30); facial ridge with fine hairs, or with a few bristles on lowest fourth, or bare; ocellar  
setae well-developed .....60
60. Palpus inflated apically, with the swollen part bare (Fig. 138). Gena almost obliterated by lower  
margin of eye, scarcely visible in profile .....*Hypertrophomma* Townsend  
1 sp., *opacum* Townsend; eastern  
Palpus setose, not inflated apically (Fig. 139). Gena, although narrow, with both genal dilation  
and genal groove evident (as in Fig. 7) .....*Eumasicera* Townsend, in part  
see couplet 27
61. M ending in  $R_{4+5}$  some distance from wing margin (Fig. 192) .....62  
M ending in wing margin separately from  $R_{4+5}$  (as in Figs. 193-196) .....67

<sup>22</sup> Included here are two species, *confusionis* (Sellers) and *trisetosa* (Coquillett), formerly placed in *Aplomya* by Sellers (1943) and Sabrosky and Arnaud (1965).

<sup>23</sup> Included here is *Elassomyia defecta* Reinhard, described from a specimen of *languida* (Walker) (senior synonym of *ricinorum* Townsend).

62. Proboscis elongate and very slender, longer than height of head (as in Figs. 34, 147). Posterior-most orbital bristle laterocline (Fig. 26). Postpronotum with only two bristles (Fig. 156) ..... *Chaetoglossa* Townsend  
1 sp., *picticornis* Townsend; central and southern  
Proboscis not elongate, shorter than height of head. Posterior-most orbital bristle reclinate (as in Figs. 29–31). Postpronotum with three or more bristles (except in *Erynnia*) ..... 63
63. Facial ridge bare on most of its length. M with stub or appendage extending beyond bend (Fig. 192) ..... *Hesperomyia* Brauer & Bergenstamm  
2 spp.; southwestern  
Facial ridge bristled on most of its length. M without a stub or appendage (as in Figs. 191, 193) ..... 64
64. Parafacial setose, exceptionally broad; facial ridge thickened, prominent in profile (Fig. 14) ..... *Eleodiphaga* Walton  
3 spp.; western  
Parafacial bare. Facial ridge less prominent ..... 65
65. Arista thickened only to midpoint (Fig. 13). Anterior margin of postgena convex, with distinct genal dilation ..... *Erynnia* Robineau-Desvoidy  
4 spp.; widespread; Reinhard 1968a  
Arista thickened nearly to apex (Fig. 16). Anterior margin of postgena concave, evenly curved, without distinct genal dilation ..... 66
66. Antenna orange, exceptionally long, slender, and anteriorly curved, long pilose in male (Fig. 16). Wing patterned ..... *Oraphasmophaga* Reinhard  
1 sp., *pictipennis* (Reinhard); Texas  
Antenna dark, not as long or as slender as above, not curved forward. Wing transparent, milky, or evenly darkened ..... *Paraphasmophaga* Townsend  
2 spp.; southwestern
67. Anterodorsal bristles on hind tibia forming an even closely spaced row; each bristle separated from adjacent bristles by no more than three times its width (in female one bristle near middle of row usually slightly longer than the rest) (Figs. 225, 227) ..... 68  
Anterodorsal bristles on hind tibia irregular in length and spacing; each separated from adjacent setae by over three times its width (both sexes always with at least one much longer bristle near middle of row) ..... 70
68. Abdomen black or dull dark brown without tessellated pattern of pruinescence. Anterodorsal setae of hind tibia nearly touching each other in both sexes (Fig. 225). Tergite 4 of male without patch of short dense hairs ..... *Leschenaultia* Robineau-Desvoidy<sup>24</sup>  
10 spp.; widespread; Brooks 1947 (as several genera)  
Abdomen gray or brown, with tessellated pattern of pruinescence. Anterodorsal bristles on hind tibia usually more widely spaced (Fig. 227) ..... 69
69. Katepisternum with four bristles (Fig. 177). Subvibrissal ridge with row of usually fewer than four bristles; this row less than half as long as length of row of setae on facial ridge. Abdomen of male without patches of short dense hair .....  
..... *Lespesia* Robineau-Desvoidy, in part  
see couplet 43  
Katepisternum with three bristles, the posteroventral one absent (as in Fig. 173). Subvibrissal ridge with evenly spaced row of more than four bristles; this row as long as row of setae on facial ridge. Tergite 4 of male with patch of short dense hairs (Fig. 247) .....  
..... *Blepharipa* Rondani<sup>25</sup>  
2 spp.; eastern
70. Parafacial with setae over upper half or more (Figs. 15, 17–19) ..... 71  
Parafacial bare, or at most with a few hairs below lowest frontal bristle ..... 77
71. Facial ridge with row of stout erect curved bristles on more than lower half (Fig. 17) .. 72  
Facial ridge with bristles confined to region of vibrissa (as in Fig. 18) ..... 74

<sup>24</sup> Also included are species formerly assigned to *Parachaeta* Coquillett.

<sup>25</sup> Also included is *Thysanomyia fimbriata* (Wulp), found in eastern U.S.A.

72. M ending in R<sub>4+5</sub> before reaching wing margin (as in Fig. 191) . . . . . *Cloacina* Reinhard  
1 sp., *filiolis* Reinhard; southwestern  
M ending separately in wing margin . . . . . 73
73. Bristles of facial ridge short (their length much less than width of parafacial) and closely spaced  
(Fig. 15); parafacial with small scattered hairs of uniform size . . . *Torosomyia* Reinhard  
1 sp., *parallela* Reinhard; Kansas  
Bristles of facial ridge as long as width of parafacial, and more widely spaced (Fig. 17); parafacial  
with setae of different sizes . . . . . *Chaetogaedia* Brauer & Bergenstamm  
7 spp.; widespread
74. Parafacial relatively small, triangular, about as long as high (Fig. 18); genal groove correspon-  
dingly very large; vibrissa small, arising well above lower facial margin . . . . .  
. . . . . *Asseclamyia* Reinhard  
1 sp., *sphenofrons* Reinhard; California  
Parafacial narrower, setose nearly to lower margin; genal groove less conspicuous; vibrissa  
arising at level of lower facial margin . . . . . 75
75. Fronto-orbital plate very broad, with three rows of medioclinate frontal bristles (Fig. 27). Sec-  
ond aristomere several times longer than wide . . . . . *Myatelemus* Reinhard  
1 sp., *trossulus* (Reinhard); Texas, Arizona  
Fronto-orbital plate narrower, with one or at most two rows of medioclinate or reclinate frontal  
bristles. Second aristomere usually at most twice as long as wide . . . . . 76
76. Ocellar setae small, less than half as long as reclinate orbital bristle (Fig. 19). Pedicel as long  
as first flagellomere. Notopleuron with a small extra bristle anterolateral to usual posterior  
bristle (Fig. 163) . . . . . *Atactopsis* Townsend  
1 sp., *reinhardi* Sabrosky & Arnaud; Texas  
Ocellar setae nearly as long as either reclinate orbital bristle. Pedicel less than half as long as  
first flagellomere. Notopleuron with the usual two bristles . . . . .  
. . . . . *Buquetia* Robineau-Desvoidy  
1 sp., *obscura* (Coquillett); widespread in U.S.A.
77. Facial ridge with erect bristles on lower half or more (as in Figs. 14-17) . . . . . 78  
Facial ridge bare, or with small recumbent setae on lower third . . . . . 84
78. Ocellar setae absent . . . . . 79  
Ocellar setae well-developed, bristle-like (as in Figs. 28-30) . . . . . 80
79. Katepisternum with three bristles forming a triangle (as in Figs. 173-175). All abdominal tergites  
gray pruinose . . . . . *Heliodorus* Reinhard  
2 spp.; western  
Katepisternum with four or more bristles (rarely three), arranged in a straight line (as in Fig. 178).  
Abdominal tergite 5 and often 4 also with gold or orange pruinescence . . . . .  
. . . . . *Belvosia* Robineau-Desvoidy<sup>26</sup>  
14 spp.; widespread; Aldrich 1928
80. Anterior margin of postgena without a genal dilation (as in Fig. 16). Arista pubescent (Fig. 125)  
. . . . . *Prospherysa* Wulp<sup>27</sup>  
2 spp.; southern  
Anterior margin of postgena with well-developed genal dilation (as in Figs. 11-13, 17-19). Arista  
apparently bare . . . . . 81
81. Katepisternum with four bristles . . . . . 82  
Katepisternum with three bristles . . . . . 83
82. Three or more upper orbital bristles present, arranged in an arc, with the innermost reclinate,  
the outermost latero-clinate, and those between inclined posterolaterally (Fig. 28) . . . . .  
. . . . . *Gymnophryxe* Villeneuve  
1 sp., *claripennis* (Reinhard); western, Arctic-alpine

<sup>26</sup> Also included are species formerly assigned to *Triachora* Townsend.

<sup>27</sup> These species were formerly assigned to *Epidexia* Townsend.

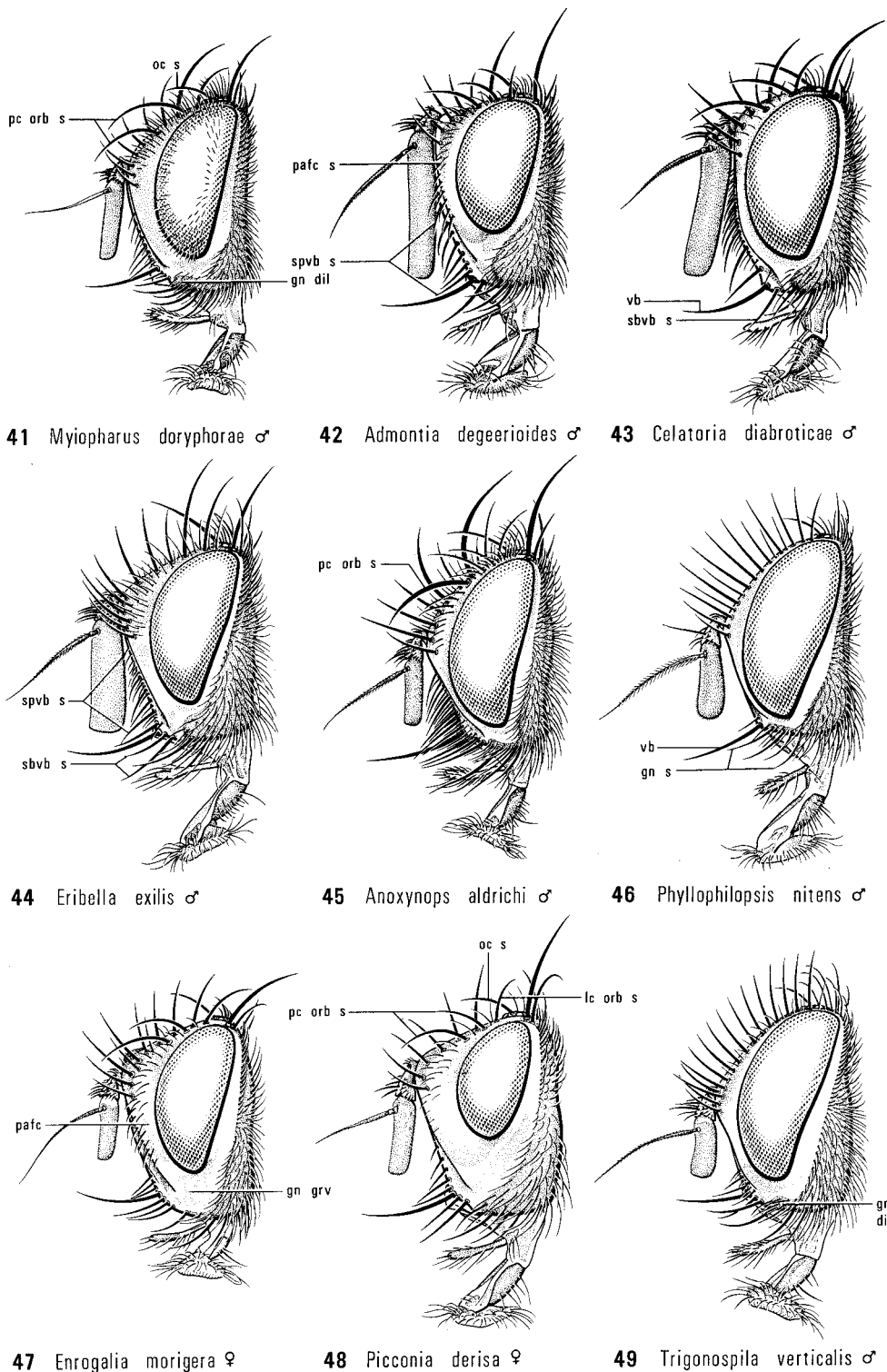
- Upper orbital bristles reclinate; if more than one present, then bristles arranged in a longitudinal row ..... *Lespesia* Robineau-Desvoidy, in part see couplet 43
83. Abdomen almost entirely gold or grayish yellow pruinulent. Egg microtype (as in Fig. 266) ..... *Eufrontina* Brooks  
2 spp.; widespread  
Abdomen black, with transverse gray pruinulent bands. Egg planoconvex ..... *Frontiniella* Townsend  
1 sp., *parancilla* Townsend; widespread
84. Postpronotum with middle basal bristle displaced anteriorly, forming a triangle with outer and inner basal bristles (as in Figs. 157, 159) ..... 85  
Postpronotum with middle basal bristle more or less in line with outer and inner basal bristles (as in Fig. 158), or inner basal bristle absent (as in Figs. 156, 161) ..... 86
85. Lower facial margin sloping evenly forward from lower part of face, thus visible in lateral view below and in front of vibrissal angle (Fig. 141). Postpronotum with five large bristles arranged in a V (as in Fig. 157) ..... *Masiphya* Brauer & Bergenstamm<sup>28</sup>  
5 spp.; southern  
Lower facial margin, if visible in profile, bent forward abruptly at level of vibrissal angle (as in Figs. 11, 17). Postpronotum with three large bristles, sometimes with one or two additional smaller ones anteriorly (as in Fig. 159) ..... *Allophorocera* Hendel<sup>29</sup>  
12 spp.; widespread; Curran 1927c (as *Erycia*)
86. Bifurcation of R<sub>2+3</sub> and R<sub>4+5</sub> with a single rather long seta on dorsal surface (Fig. 193) ..... 87  
Bifurcation of R<sub>2+3</sub> and R<sub>4+5</sub> with two or more small setae on dorsal surface ..... 89
87. Katepisternum with three bristles. Fronto-orbital plate with a single row of frontal bristles; anterior reclinate orbital bristle larger than posterior one, with the two well-separated from each other (Fig. 32) ..... *Ametadoria* Townsend  
1 sp., *harrisinae* (Coquillett); widespread  
Katepisternum with four bristles. Fronto-orbital plate with extra medioclinate bristles outside frontal row, usually forming a second row (Figs. 29, 30); two or three reclinate orbital bristles usually present, but if only two, then anterior one usually smaller than the posterior one (Fig. 30) ..... 88
88. Ocellar bristles long, divergent (Fig. 28) ..... *Lydella* Robineau-Desvoidy  
3 spp.; widespread; Herting 1959  
Ocellar bristles short, curving toward each other apically (Fig. 30), or absent ..... *Drino* Robineau-Desvoidy  
8 spp.; widespread
89. Postpronotum with only two bristles (as in Fig. 156); katepisternum with ventral bristle arising almost directly below anterior bristle. Uppermost orbital bristle laterocline. Bend of M broadly obtuse (Fig. 194) ..... *Masistylum* Brauer & Bergenstamm  
1 sp., *stenommatum* Wood; western, alpine  
Postpronotum with three or more bristles; katepisternum with four bristles, or if with three, not arranged as above. Uppermost orbital bristle reclinate. Bend of M more acute . . . 90
90. Notopleuron with one or more smaller bristles in addition to the usual two large ones (as in Fig. 163) ..... *Atacta* Schiner  
2 spp.; southeastern; Aldrich 1925b  
Notopleuron with two bristles (as in Figs. 162, 164, 165) ..... 91
91. Lower facial margin protruding in front of vibrissal angle when viewed laterally (as in Figs. 19, 141) ..... *Siphosturmia* Coquillett<sup>30</sup>  
8 spp.; widespread; Reinhard 1931, 1934a  
Lower facial margin not visible in lateral view ..... 92

<sup>28</sup> Included here are all species placed by Sabrosky and Arnaud (1965) in the tribe Masiphyni.

<sup>29</sup> Included here are all species formerly placed in *Pilatea* Townsend.

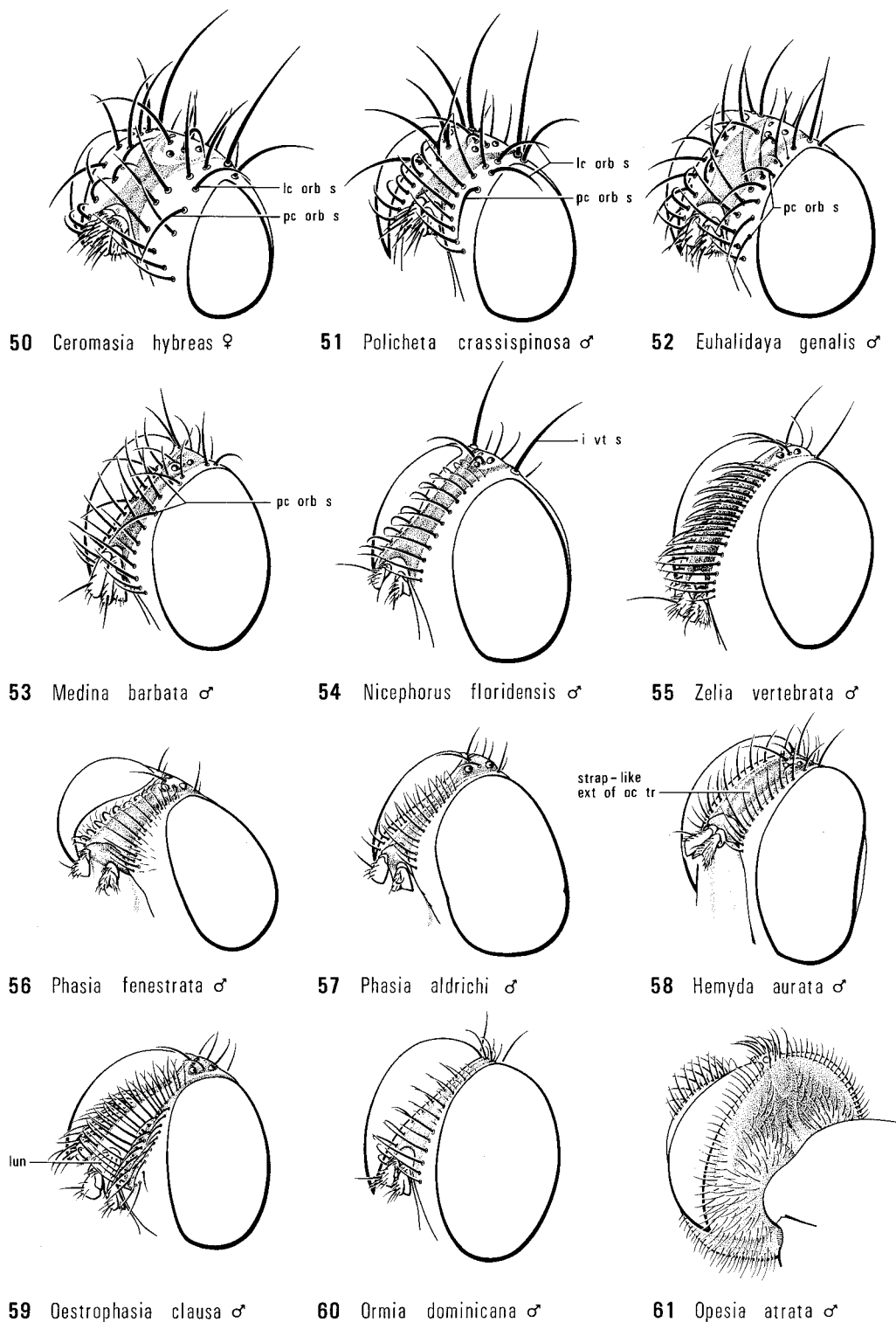
<sup>30</sup> Also included is *Microsillus baccharis* (Reinhard).





Figs. 110.41-49. Lateral views of head (continued): (41) *Myiopharus doryphorae* (Riley); (42) *Admontia degeerioides* (Coquillett); (43) *Celatoria diabroticae* (Shimer); (44) *Eribella exilis* (Coquillett); (45) *Anoxynops aldrichi* (Curran); (46) *Phyllophilopsis nitens* (Coquillett); (47) *Enrogalia morigera* Reinhard; (48) *Picconia derisa* (Reinhard); (49) *Trigonospila verticalis* (Reinhard) (continued).

Abbreviations: gn dil, genal dilation; gn grv, genal groove; gn s, genal seta; lc orb s, laterocline orbital bristle; oc s, ocellar bristle; pafc s, parafacial bristle; pc orb s, proclinate orbital bristle; sbvb s, subvibrissal bristle; spvb s, supravibrissal bristle; vb, vibrissa.



Figs. 110.50–61. Oblique views of head: anterior views of frons (*concluded*) of (50) *Ceromasia hybreas* (Walker), (51) *Policheta crassispinosa* Wood, (52) *Euhalidaya genalis* (Coquillett), (53) *Medina barbata* (Coquillett), (54) *Nicephorus floridensis* Reinhard, (55) *Zelia vertebrata* (Say), (56) *Phasia fenestrata* (Bigot), (57) *Phasia aldrichi* (Townsend), (58) *Hemyda aurata* Robineau-Desvoidy, (59) *Oestrophasia clausa* Brauer & Bergenstamm, and (60) *Ormia dominicana* Townsend; (61) posterior view of back of head of *Opesia atrata* (Coquillett).

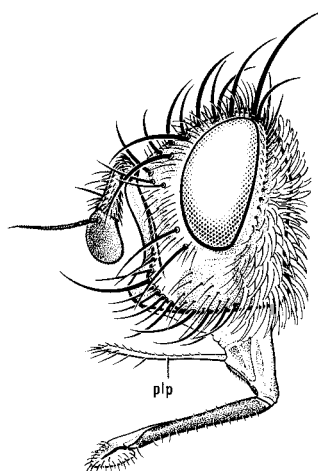
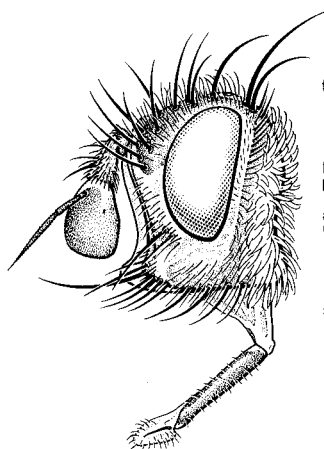
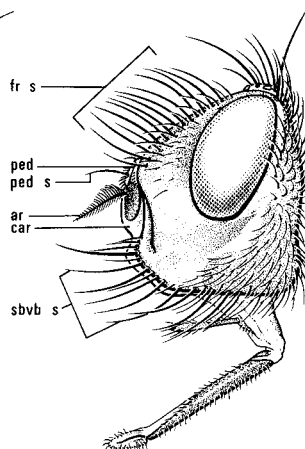
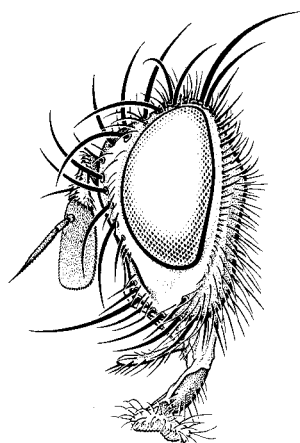
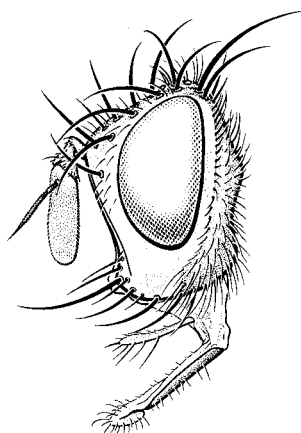
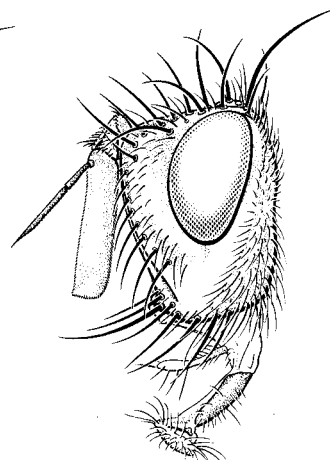
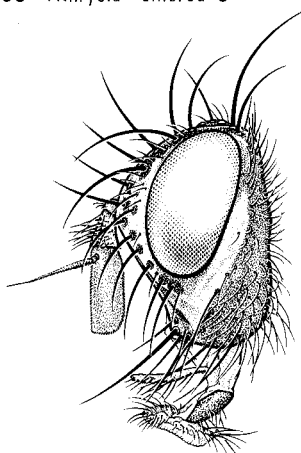
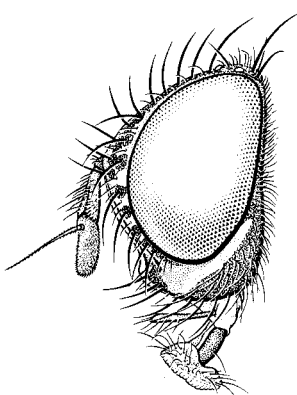
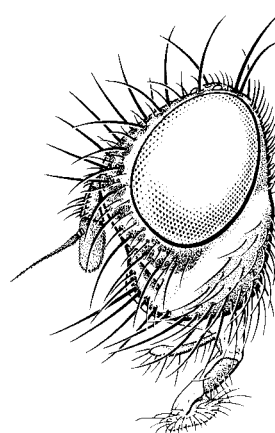
Abbreviations: i vt s, inner vertical bristle; lc orb s, laterocline orbital bristle; lun, lunule; pc orb s, proclinate orbital bristle.

92. Katepisternum with three bristles. Fronto-orbital plate with a few irregularly arranged bristles lateral to frontal row, some more than two-thirds length of longest frontal bristles (Fig. 50); female with only one proclinate orbital bristle; those behind it latero-clinate or reclinate (Fig. 50) . . . . . *Ceromasia* Rondani  
3 spp.; widespread
- Katepisternum with four bristles. Fronto-orbital plate without bristles but with fine hairs lateral to frontal row (some small bristles less than half length of longest frontal bristle in *Zizyphomyia limata* (Coquillett)); female with two proclinate orbital bristles . . . . . 93
93. Wing with anterior third darkly pigmented (Fig. 208). Mid tibia with a single anterodorsal bristle (Fig. 221) . . . . . *Myothyriopsis* Townsend  
1 sp., *picta* (Wulp); Texas
- Wing without pigmented area. Mid tibia with more than one anterodorsal bristle (as in Figs. 222, 223) . . . . . 94
94. Palpus flattened dorsoventrally; setae on its dorsomedial surface short, stout, rather appressed (Fig. 137) . . . . . *Euceromasia* Townsend  
5 spp.; widespread
- Palpus cylindrical; setae on dorsomedial surface longer and more erect . . . . . 95
95. Male with only one anterodorsal bristle on mid tibia and with patch of dense appressed hairs on ventral surface of abdominal tergite 4 (as in Fig. 247). Female with pointed, uniformly gray pruinulent abdomen . . . . . *Townsendiellomyia* Baranov  
1 introduced sp., *nidicola* (Townsend); northeastern U.S.A.
- Male with two or more anterodorsal bristles on mid tibia, and either without patch of appressed hairs on abdomen or with extensive patches covering all of abdominal tergites 4 and 5 except for a middorsal longitudinal bare stripe. Female abdomen more rounded apically, with a basal pruinulent band on each tergite contrasting with dark apex . . . . .  
. . . . . *Zizyphomyia* Townsend<sup>31</sup>  
3 spp.; widespread
96. Scutellum with three pairs of bristles; the lateral bristles longest, straight and divergent, arising about midway between the basal and apical bristles; apical bristles crossed (Fig. 183) . . . . . 97
- Scutellum usually with four pairs of bristles, with the lateral bristles arising more proximally between the basal and subapical bristles (Figs. 182, 185); if three pairs present (Fig. 184), then the lateral bristles are shorter than the apical bristles . . . . . 100
97. Parafacial with vertical row of long stout erect bristles (Fig. 33) . . . . .  
. . . . . *Paradidyma* Brauer & Bergenstamm, in part<sup>32</sup>  
16 spp.; widespread; Reinhard 1934b . . . . . 98
- Parafacial bare . . . . . 98
98. Eye covered with conspicuous dense hairs; each hair longer than combined diameter of four or more eye facets; facial ridge with long erect bristles on lower half or more (as in Fig. 35) . . . . . *Neomintho* Brauer & Bergenstamm<sup>33</sup>  
2 spp.; eastern
- Eye bare; facial ridge with fine decumbent setae on lower half or less . . . . . 99
99. First flagellomere with conically pointed apex; second aristemere minute (Fig. 126). Proboscis not elongate. Facial ridge bare; genal bristles curving forward, in lateral view crossing subvibrissal bristles . . . . . *Ceracia* Rondani  
1 sp., *dentata* (Coquillett); widespread
- First flagellomere rounded apically; second aristemere more than half as long as third aristemere. Proboscis long and slender (Fig. 34). Facial ridge with fine hairs on lower half or more . . . . . *Eucoronimyia* Townsend  
1 sp., *hastata* (Coquillett); southwestern

<sup>31</sup> Also included are *chihuahuaensis* (Townsend) (senior synonym of *chrysoprocta* (Reinhard), formerly placed in *Sturmia* Robineau-Desvoidy by Sabrosky and Arnaud (1965)) and *crescentis* (Reinhard), placed by these authors in *Drino*.

<sup>32</sup> Also included are all species placed by Sabrosky and Arnaud (1965) in *Atrophopalpus* Townsend, *Ceratomyiella* Townsend, and *Micromintho* Townsend.

<sup>33</sup> Included are both species placed by Sabrosky and Arnaud (1965) in the tribe Neominthoini.

62 *Peleteriaanaxias* ♂63 *Copecryptaruficauda* ♂64 *Estheriacinerea* ♂65 *Athryciacinerea* ♂66 *Hypovoriacauta* ♂67 *Uclesiazonalis* ♂68 *Wagneriapacata* ♂69 *Kirbyasetosa* ♂70 *Kirbyaldrichi* ♂

Figs. 110.62–70. Lateral views of head (*continued*): (62) *Peleteriaanaxias* (Walker); (63) *Copecryptaruficauda* (Wulp); (64) *Estheriacinerea* (Townsend); (65) *Athryciacinerea* (Coquillett); (66) *Hypovoriacauta* (Townsend); (67) *Uclesiazonalis* Curran; (68) *Wagneriapacata* Reinhard; (69) *Kirbyasetosa* (Townsend); (70) *Kirbyaldrichi* (Curran) (*continued*).

Abbreviations: ar, arista; car, carina; fr s, frontal seta; ped, pedicel; ped s, pedicellar seta; plp, palpus; sbvb s, subvibrissal bristle.

100. Ventral proepimeral bristle directed anteroventrally (Fig. 167). Base of  $R_{4+5}$  with a single large bristle (rarely with a smaller additional bristle); M ending at apex of wing (Fig. 196). Katepimeron usually with a single seta . . . . . *Phytomytera* Rondani<sup>34</sup>  
23 spp.; widespread  
If ventral proepimeral bristle directed anteroventrally and M ending at apex of wing (some *Chaetostigmoptera*), then base of  $R_{4+5}$  with several short bristles (Fig. 195) and katepimeron bare . . . . . 101
101. At most only one frontal bristle arising below upper margin of pedicel (as in Fig. 64); pedicel with one or two long slender curved setae more than half as long as length of plumose arista; male with all frontal bristles proclinate (Fig. 97). M terminating in  $R_{4+5}$  well before wing margin, with a long extension beyond bend (as in Fig. 202) . . . . . *Microchaetina* Wulp, in part<sup>35</sup>  
8 spp.; western and southern; Reinhard 1942a (in part)  
Frontal bristles usually descending below upper margin of pedicel (as in Fig. 63), but if not, then either pedicel without such long bristles or arista bare; male usually with some reclinate frontal bristles. M with at most a short extension, usually terminating in or near wing margin (Fig. 205) . . . . . 102
102. Anepimeron with an exceptionally long bristle extending posteriorly beyond middle of lower calypter (Fig. 216). Anterior and posterior lappets of posterior thoracic spiracle about equal in size; each a fringe of plumose hairs, enclosing a narrow V-shaped opening at or near middle of spiracle (as in Fig. 169) . . . . . 103  
Anepimeron with shorter bristles not extending to middle of lower calypter or with none at all. Anterior and posterior lappets of posterior thoracic spiracle unequal; the posterior one larger, forming a crescent-shaped opening with anterior lappet (as in Fig. 170) . . . . . 105
103. Dorsal surface of lower calypter, except for a narrow band along posterior margin, covered with long erect hairs (Fig. 215) . . . . . *Hystricia* Macquart, in part  
see couplet 4  
Dorsal surface of lower calypter without long erect hairs . . . . . 104
104. Abdomen with tessellated pattern of pruinescence . . . . *Lypha* Robineau-Desvoidy, in part<sup>36</sup>  
16 spp.; widespread  
Abdomen shining black, usually with metallic greenish luster, each tergite without basal transverse pruinescent bands . . . . . *Lydina* Robineau-Desvoidy  
3 spp.; widespread
105. Lower calypter with a few pale recumbent hairs dorsally along outer margin . . . . . *Xanthophyto* Townsend, in part  
see couplet 8  
Lower calypter bare dorsally, fringed only along margin . . . . . 106
106. Bend of M a right angle; the portion beyond bend sinuous, curving toward apex (Fig. 197). An extra smaller bristle usually present between second and third postsutural supra-alar bristles (Fig. 164) . . . . . 107  
Bend of M obtuse; the portion beyond bend straight or convex (Figs. 195, 199, 200). No extra small bristle between second and third postsutural supra-alar bristles . . . . . 116
107. Eye covered with conspicuous dense hairs (as in Fig. 6) . . . . . 108  
Eye apparently bare (as in Fig. 36) . . . . . 112
108. Facial ridge with row of erect, widely and evenly spaced, stout bristles, usually on lower two-thirds or more (Fig. 35) . . . . . 109  
Facial ridge with small decumbent irregularly and more closely spaced setae, usually on lower half or less (Fig. 36) . . . . . 110

<sup>34</sup> Included here are the species formerly placed in *Acronarista* Townsend, *Apheloghutus* Greene, *Elfia* Robineau-Desvoidy, *Lispideosoma* Townsend, *Phasiostoma* Townsend, *Schizactia* Townsend, and *Schizotachina* Walker.

<sup>35</sup> Also included are all species formerly placed in *Reinhardiana* Arnaud and *Steveniopsis* Townsend.

<sup>36</sup> This is a provisional placement for all species formerly included in *Chromatocera* Townsend, *Exoristoides* Coquillett, *Helioplugia* Townsend, *Homalactia* Townsend, and *Plagiosippus* Reinhard. Their ultimate generic placement requires study of the tribe Poliini (=Lyphini) on a world basis.

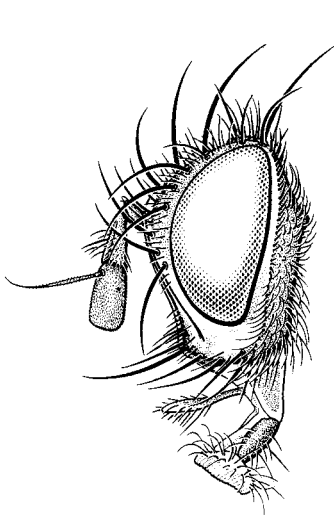
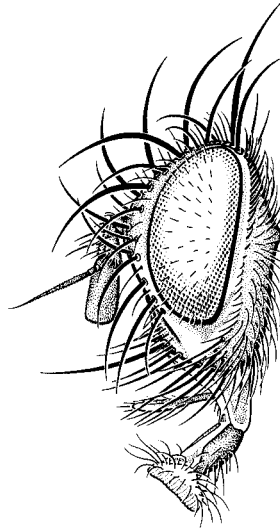
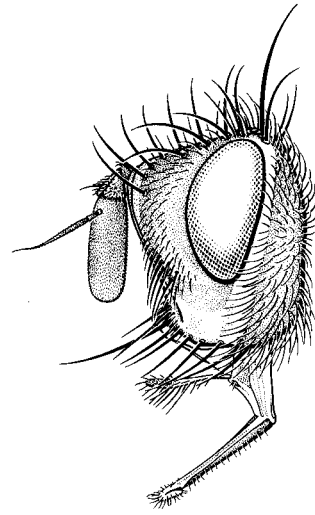
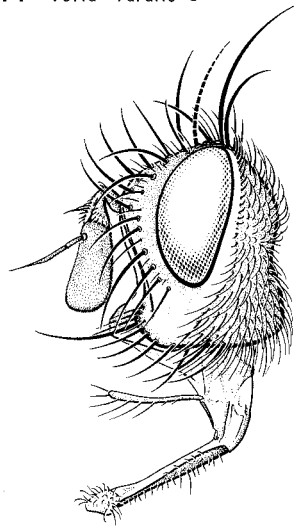
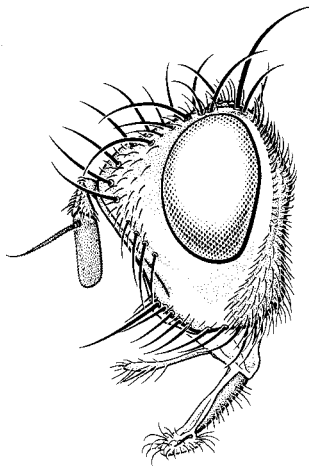
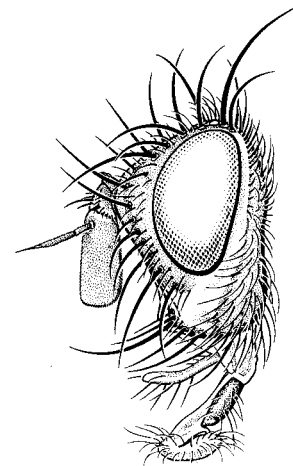
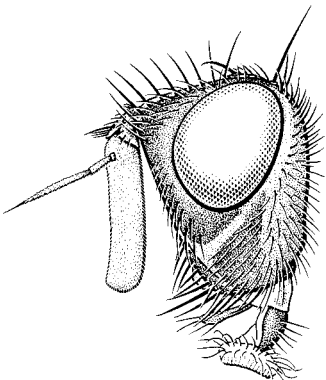
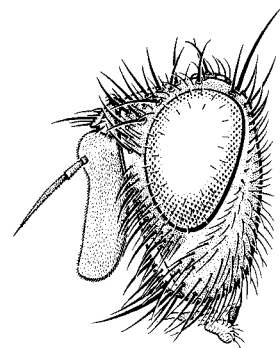
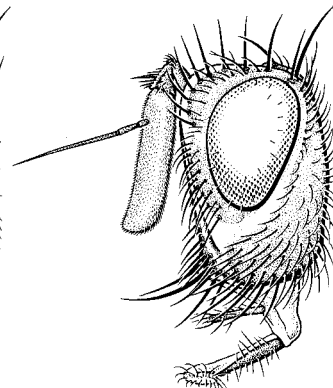
109. Lower margin of face not protruding, not visible in profile. Wing membrane flat at bend of M, not appearing as a continuation of M . . . . . *Austrophorocera* Townsend<sup>37</sup>  
9 spp.; widespread; Aldrich and Webber 1924 (as *Phorocera* subgenus *Parasetigena*, in part)  
Lower margin of face protruding below vibrissal angle, visible in profile (Fig. 35). Wing membrane creased for a short distance distal to bend of M, appearing from above as a stub or continuation of M (Fig. 197) . . . . . *Chetogena* Rondani<sup>38</sup>  
16 spp.; widespread; Aldrich and Webber 1924 (as *Phorocera* subgenus *Parasetigena*, in part)
110. Lower margin of face not visible in profile . . . . . *Phorocera* Robineau-Desvoidy, in part  
8 spp.; widespread; Wood 1972  
Lower margin of face protruding beyond vibrissal angle, visible in profile (as in Figs. 35, 36) . . . . . 111
111. Facial ridge bristled on lower two-thirds or more (as in Fig. 36) . . . . .  
. . . . . *Parasetigena* Brauer & Bergenstamm  
1 introduced sp., *silvestris* (Robineau-Desvoidy); northeastern U.S.A.  
Facial ridge with bristles confined to lower third or less . . . . .  
. . . . . *Chaetexorista* Brauer & Bergenstamm  
1 introduced sp., *javana* Brauer & Bergenstamm; Massachusetts
112. Facial ridge with row of stout erect bristles (as in Fig. 35) . . . . . 113  
Facial ridge with shorter decumbent bristles (Fig. 36) . . . . . 114
113. Scutellum lacking apical bristles (as in Figs. 180, 184) . . . . . *Bessa* Robineau-Desvoidy  
2 spp.; widespread  
Scutellum with crossed apical bristles (as in Fig. 185) . . . . . *Gueriniopsis* Reinhard  
1 sp., *setipes* (Coquillett); central and eastern
114. Frontal bristles descending to level of middle of facial ridge (Fig. 36) . . . *Exorista* Meigen  
5 spp.; widespread  
Frontal bristles ending before reaching level of middle of facial ridge . . . . . 115
115. Cerci of male spatulate in posterior view, broadest beyond middle. Sternite 7 of female with reflexed triangular piercer (Fig. 248) . . . . . *Phorocera* Robineau-Desvoidy, in part  
see couplet 110  
Cerci of male slender, curved anteriorly, in posterior view broadest at base. Sternite 7 of female unmodified . . . . . *Tachinomyia* Townsend  
10 spp.; widespread; Curran 1926, Webber 1941
116. Apical scutellar bristles among the longest bristles on scutellum, at least as long as lateral scutellar bristles, arising close to midline, and crossing each other near their midlength (Fig. 181) . . . . . 117  
Apical scutellar bristles much shorter than sublateral or lateral scutellar bristles (Figs. 184–186) . . . . . 118
117. Antennal bases separated, not touching each other (as in Figs. 83, 84, 86). End of M nearly perpendicular to R<sub>4+5</sub> (Fig. 198) . . . . . *Graphogaster* Rondani<sup>39</sup>  
14 spp.; widespread; Brooks 1942 (as *Psaliidopteryx*)  
Antennal bases contiguous. End of M forming an acute angle with R<sub>4+5</sub> or ending separately in margin . . . . . *Clastoneuriopsis* Reinhard, in part  
1 sp., *meralis* Reinhard; Washington; Brooks 1942
118. Subapical scutellar bristles divergent (Figs. 184–186) . . . . . 119<sup>40</sup>  
Subapical scutellar bristles convergent (Fig. 182) . . . . . 167

<sup>37</sup> This genus includes those species formerly included in *Euphorocerosis* Townsend and *Palpexorista* Townsend (the former having priority over the latter).

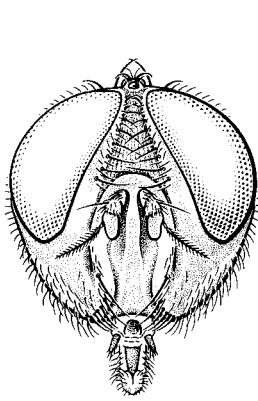
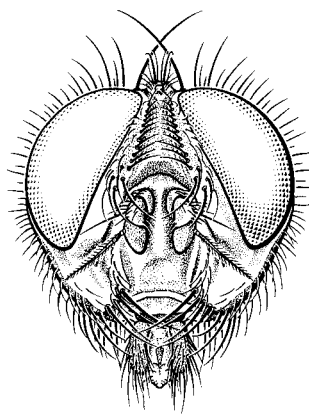
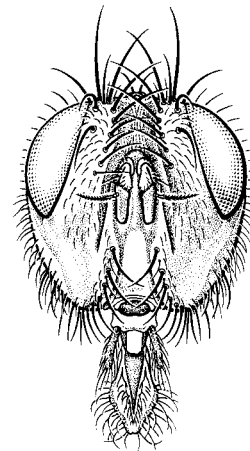
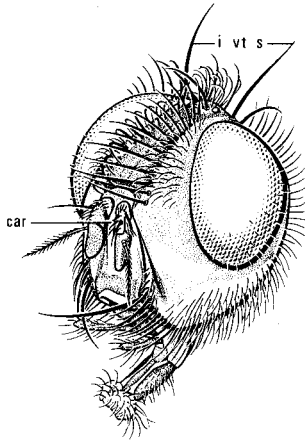
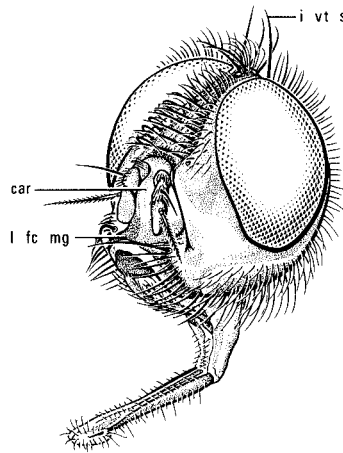
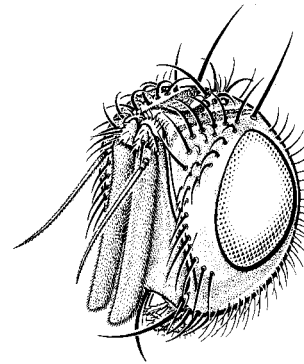
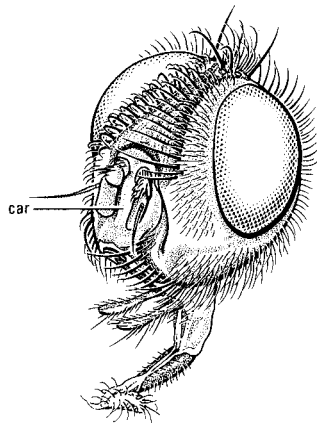
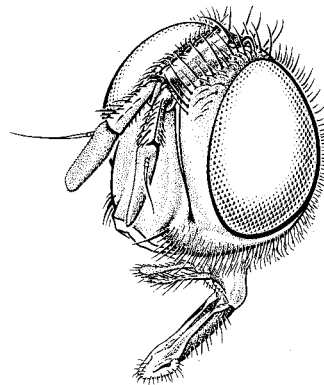
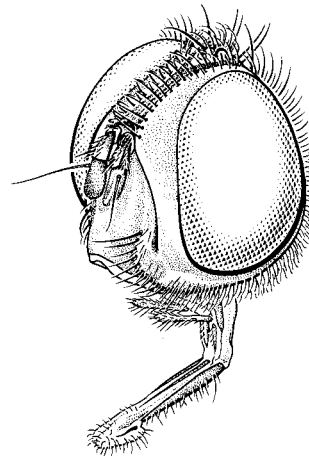
<sup>38</sup> Included here are all species formerly placed in *Euphorocera* Townsend, *Spoggosia* Rondani, and *Stomatomyia* Brauer & Bergenstamm.

<sup>39</sup> Included here are all species formerly placed by Sabrosky and Arnaud (1965) in the tribe Graphogastrini, except for the type species of *Clastoneuriopsis*.

<sup>40</sup> Included in couplets 119–166 (except for *Eulasiona* (Dexiinae) and *Pelatachina* Meade (Tachiniinae)) are almost all the Nearctic genera of the tribe Blondeliini; generic synonymy is given by Wood (1985).

71 *Voria ruralis* ♂72 *Cyrtophleba coquilletti* ♂73 *Menetus macropogon* ♂74 *Chaetovoria seriata* ♂75 *Cockerelliana capitata* ♂76 *Euptilopareia erucicola* ♂77 *Euscopolia dacotensis* ♂78 *Paradmontia brevis* ♂79 *Mauromyia pulla* ♂

Figs. 110.71-79. Lateral views of head (continued): (71) *Voria ruralis* (Fallén); (72) *Cyrtophleba coquilletti* Aldrich; (73) *Menetus macropogon* (Bigot); (74) *Chaetovoria seriata* (Aldrich); (75) *Cockerelliana capitata* Townsend; (76) *Euptilopareia erucicola* (Coquillett); (77) *Euscopolia dacotensis* Townsend; (78) *Paradmontia brevis* Coquillett; (79) *Mauromyia pulla* Coquillett (continued).

80 *Phasiops flavus* ♂81 *Eumegalaria flaveola* ♂82 *Microphthalma disjuncta* ♀83 *Billaea satisfacta* ♂84 *Arctophyto marginalis* ♂85 *Hypertrophocera parvipes* ♂86 *Ursophyto nigriceps* ♂87 *Gymnosoma canadensis* ♀88 *Gymnoclytia immaculata* ♂

Figs. 110.80–88. Anterior views of head: anterior views of (80) *Phasiops flavus* Coquillett, (81) *Eumegalaria flaveola* (Coquillett), and (82) *Microphthalma disjuncta* (Wiedemann); oblique anterior views of (83) *Billaea satisfacta* (West), (84) *Arctophyto marginalis* Curran, (85) *Hypertrophocera parvipes* Townsend, (86) *Ursophyto nigriceps* (Bigot), (87) *Gymnosoma canadensis* (Brooks), and (88) *Gymnoclytia immaculata* (Macquart).

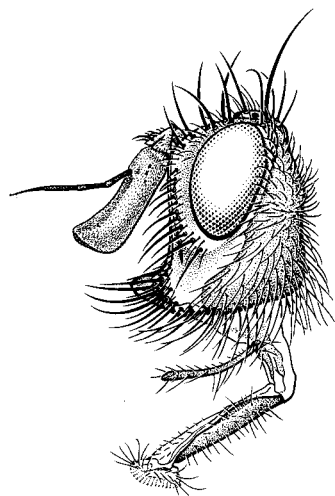
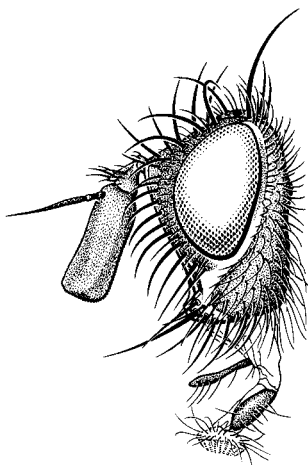
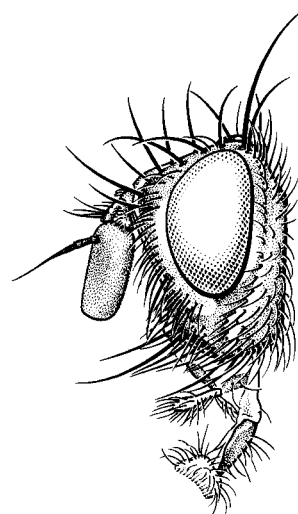
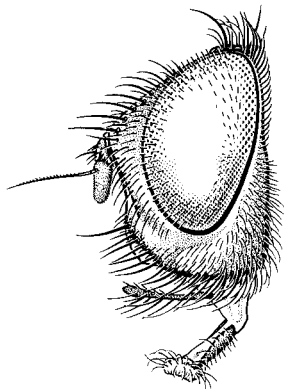
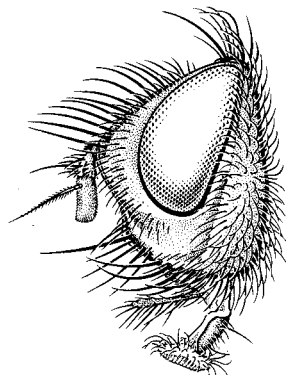
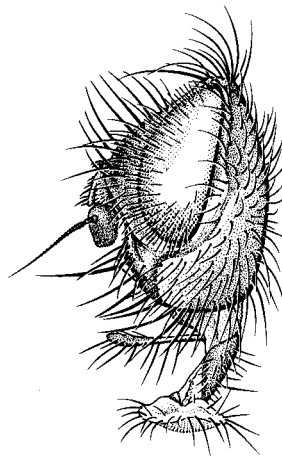
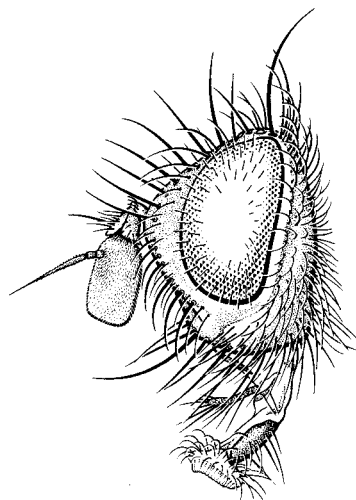
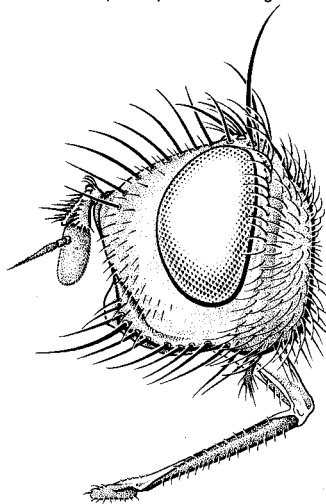
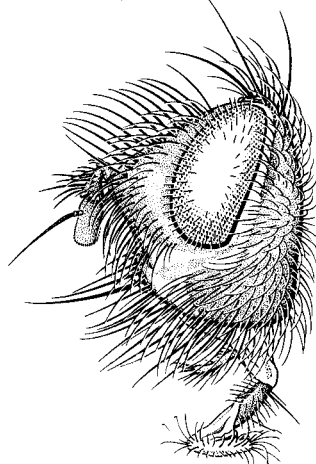
Abbreviations: car, carina; i vt s, inner vertical bristle; l fc mg, lower facial margin.



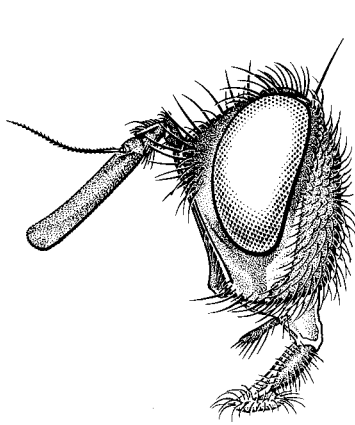
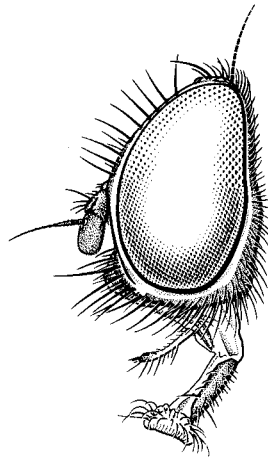
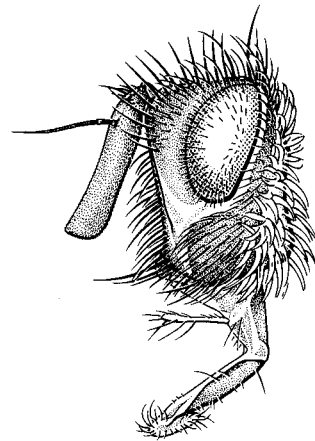
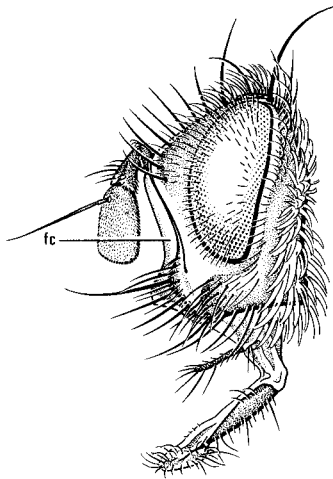
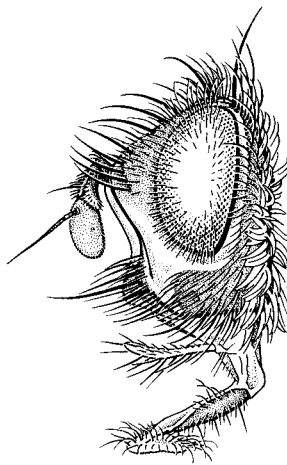
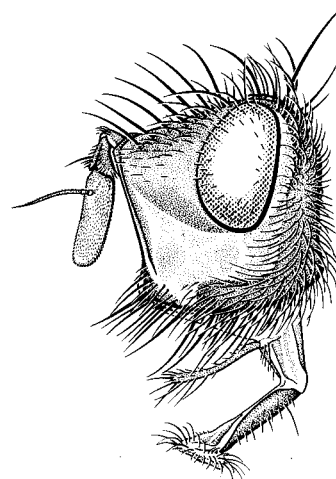
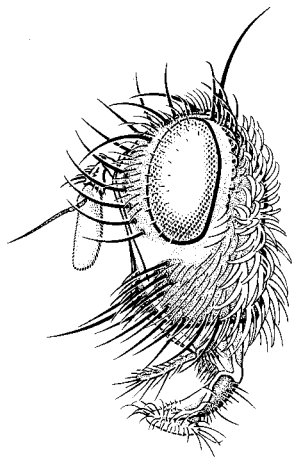
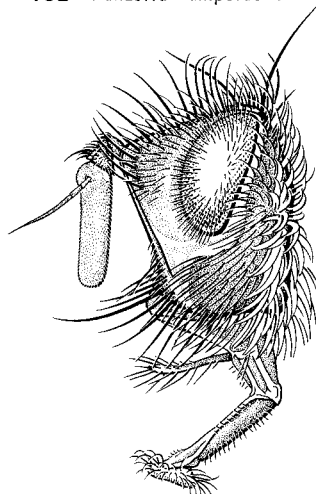
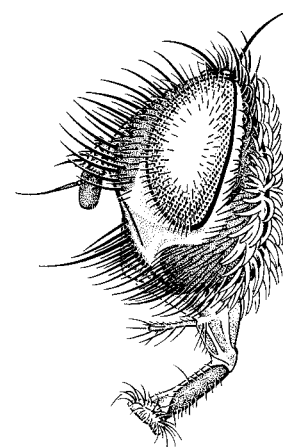
119. Middorsal depression on abdominal syntergite 1 + 2 extending back to hind margin of syntergite (Fig. 231) ..... 120  
 Middorsal depression on abdominal syntergite 1 + 2 not extending back to hind margin of syntergite (Fig. 236) ..... 123
120. Eye haired and facial ridge with bristles on lower two-thirds or more; ocellar bristles usually absent ..... *Compsilura* Bouché, in part  
 1 introduced sp., *concinata* (Meigen); widespread  
 Eye apparently bare, with hairs sparse and inconspicuous, if present; facial ridge usually without setae except on lowest fourth; ocellar bristles present, usually well-developed ..... 121
121. Parafacial with decumbent hair on lower third to half, usually not extending up as high as lowest frontal bristle (Fig. 38). Parasites of sawfly larvae ..... *Vibrissina* Rondani, in part  
 11 spp.; widespread; Aldrich 1931a, Reinhard 1958a (as *Spathimeigenia*)  
 Parafacial bare, except for a few hairs just below lowest frontal bristle. Parasites of larvae of Lepidoptera and larvae or adults of Coleoptera ..... 122
122. Mid tibia with one anterodorsal bristle (a second, small bristle arising proximal to it) (as in Fig. 221) ..... *Eucelatoria* Townsend, in part  
 10 spp.; widespread; Sabrosky 1981 (in part)  
 Mid tibia with at least three well-developed bristles, namely one or two small bristles above and one small one below largest bristle (as in Fig. 223) .....  
 ..... *Blondelia* Robineau-Desvoidy  
 6 spp.; widespread
123. Eye covered with conspicuous dense hairs; each hair longer than combined diameter of four or more eye facets (Figs. 37, 39, 41) ..... 124  
 Eye apparently bare ..... 132
124. Proepisternum setose (Fig. 166) ..... *Meigenia* Robineau-Desvoidy  
 1 sp., *submissa* (Aldrich & Webber); western  
 Proepisternum bare (as in Figs. 167, 168) ..... 125
125. Parafacial with hairs or bristles below lowest frontal bristle (Figs. 37, 39) ..... 126  
 Parafacial bare ..... 127
126. Facial ridge bristled on lower two-thirds or more; parafacial with small decumbent setae below lowest frontal bristle (Fig. 39) ..... *Istocheta* Rondani  
 1 introduced sp., *aldrichi* (Mesnil); northeastern U.S.A.  
 Facial ridge bare or nearly so; parafacial with row or patch of long erect bristles (Fig. 37) ..... *Eulasiona* Townsend, in part<sup>41</sup>  
 8 spp.; widespread; Curran 1927b
127. R<sub>4+5</sub> setose nearly to crossvein r-m (as in Figs. 195, 199) ..... *Thelairodoria* Townsend  
 1 sp., *setinervis* (Coquillett); eastern U.S.A.  
 R<sub>4+5</sub> setose less than halfway to crossvein r-m ..... 128
128. Male without proclinate orbital bristles. Female abdomen carinate midventrally and with sternite 7 modified into hook-like piercer (Fig. 256) ..... 129  
 Male with proclinate orbital bristles. Female abdomen with a tubular or transversely flattened ovipositor (as in Figs. 258-260) ..... 130
129. Facial ridge bristled on lower half or more (as in Fig. 39) .... *Compsilura* Bouché, in part  
 see couplet 120  
 Facial ridge bare except on lowest fourth or less (Fig. 38) .....  
 ..... *Eucelatoria* Townsend, in part  
 see couplet 122
130. Frons with three long slender upper orbital bristles, with the foremost proclinate and the hindmost latero-clinate (Fig. 51); lower facial margin strongly turned forward, projecting beyond vibrissal angles in lateral view (as in Fig. 11) ..... *Policheta* Rondani  
 1 sp., *crassispinosa* Wood; Oregon

<sup>41</sup> Also included are the species formerly included in *Canelomyia* Reinhard, *Lasionalia* Curran, *Paralispidea* Townsend, and *Paramuscopteryx* Townsend.

- Frons with two stout upper orbital bristles, both of which proclinate (Fig. 41). Lower margin of face not protruding beyond vibrissal angles in lateral view ..... 131
131. Body dark brown or black in ground color ..... *Myiopharus* Brauer & Bergenstamm, in part  
14 spp.; widespread; Reinhard 1935, in part (as *Doryphorophaga*)  
Body pale orange or yellow in ground color ..... *Angustia* Sellers  
1 sp., *angustivitta* (Aldrich & Webber); eastern U.S.A.
132. Subvibrissal ridge with a row of four or more well-developed bristles; this ridge longer than row of supravibrissal setae on facial ridge (Figs. 40, 142) ..... 133  
Subvibrissal ridge with at most three large bristles arranged in a row shorter than the row of setae above vibrissa ..... 135
133. Ptilinal sulcus extending posteriorly below genal dilation to level of hind margin of eye; genal dilation somewhat triangular (Fig. 142). Abdominal syntergite 1 + 2 with more than one pair of median marginal bristles. Upper part of frons of female with laterocline upper orbital bristle arising outside of frontal row (as in Figs. 50, 51). Postpronotum with three basal bristles. Egg with thin white or transparent chorion ..... *Pelatachina* Meade  
3 spp.; widespread  
Ptilinal sulcus ending below vibrissa at level of front margin of eye; genal dilation scarcely developed (Fig. 40). Abdominal syntergite 1 + 2 with only one pair of median marginal bristles. Frons of female lacking a laterocline bristle. Postpronotum usually with only two large basal bristles, namely the outer and middle basal bristles; inner bristle usually hair-like (as in Fig. 156). Egg planoconvex, with tough pale brown shiny chorion and thickened edges ..... 134
134. Parafacial with hairs, at least on upper two-thirds or more (hairs sometimes pale, concolorous with parafacial and thus visible only against a dark background) (Fig. 40) .....  
..... *Cryptomeigenia* Brauer & Bergenstamm  
14 spp.; widespread; Curran 1926  
Parafacial bare, or with a few hairs on upper third below lowest frontal bristle (as in Fig. 48)  
..... *Zaira* Robineau-Desvoidy  
13 spp.; widespread; Reinhard 1930a (as *Viviania*)
135. Male with two pairs of slender proclinate orbital bristles crowded against frontal bristles on narrow frons (Fig. 53). Sternite 5 of male usually with pair of tufts of curved setae. Female with broad ovipositor, flattened dorsoventrally; sternite 7 truncate or obtusely pointed; midventral margins of some abdominal tergites with paired patches of thorn-like bristles (Fig. 252). Posteroapical margin of hind coxa with similar bristles ..... *Medina* Robineau-Desvoidy  
4 spp.; widespread  
Male with much broader frons, with or without proclinate orbital bristles. Sternite 5 of male without tufts of curved setae. Female with tubular ovipositor or with saber-like piercer  
..... 136
136. Eye almost as high as head; gena in lateral view reduced to a narrow setose strip less than one-tenth height of head (as in Fig. 99) ..... 137  
Eye height much less than head height; gena at least one-sixth height of head ..... 138
137. Ocellar setae arising beside or in front of anterior ocellus; fronto-orbital plate with row of four or more proclinate orbital bristles (Fig. 52) ..... *Euhalidaya* Walton, in part  
1 sp., *genalis* (Coquillett); widespread  
Ocellar setae arising behind anterior ocellus; fronto-orbital plate with two or three proclinate orbital bristles ..... *Sphaerina* Wulp  
1 sp., *linearis* (Townsend); southern Florida
138. Facial ridge setose on lower half or more (Figs. 42-45) ..... 139  
Facial ridge bare except on lowest one third or less ..... 147
139. Scape, pedicel, and first flagellomere bright orange; arista of male usually thickened to apex (Fig. 128). Facial ridge prominent in lateral view, appearing as a band anterior to parafacial, and usually adorned with small scattered setae on lower half or more. Parasite of the walkingstick ..... *Phasmophaga* Townsend, in part  
4 spp.; eastern U.S.A. and southern Canada

89 *Periscepsia stylata* ♂90 *Periscepsia helymus* ♂91 *Goniocera io* ♂92 *Gnadochaeta clistoides* ♂93 *Phyllomya washingtoniana* ♂94 *Macquartia obscura* ♂95 *Blepharomyia tibialis* ♂96 *Meledonus latipennis* ♂97 *Metopomuscopteryx tibialis* ♂

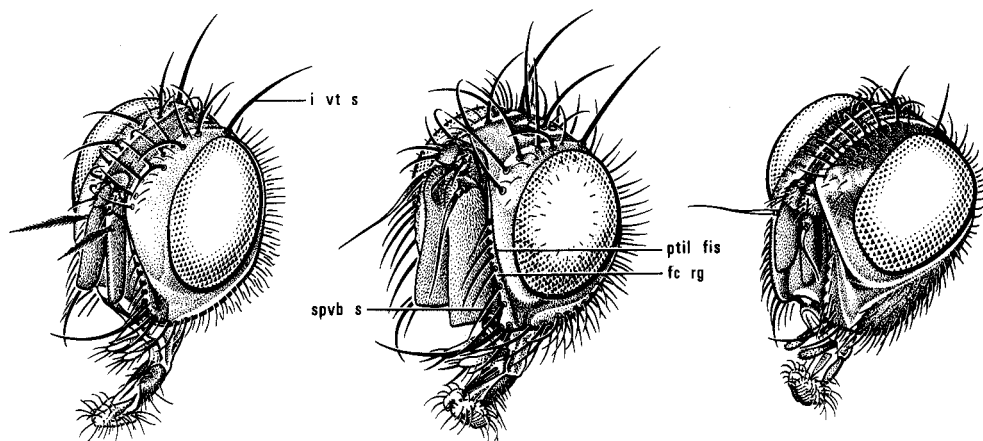
Figs. 110.89-97. Lateral views of head (*continued*): (89) *Periscepsia stylata* (Brauer & Bergenstamm); (90) *Periscepsia helymus* (Walker); (91) *Goniocera io* (Aldrich); (92) *Gnadochaeta clistoides* (Townsend); (93) *Phyllomya washingtoniana* (Bigot); (94) *Macquartia obscura* (Coquillett); (95) *Blepharomyia tibialis* (Curran); (96) *Meledonus latipennis* Aldrich; (97) *Metopomuscopteryx tibialis* (Coquillett) (*continued*).

98 *Penthosia satanica* ♂99 *Strongygaster triangulifera* ♀100 *Mactomyia fracida* ♂101 *Linnaemya tessellata* ♂102 *Panzeria ampelus* ♂103 *Melanophrys flavipennis* ♂104 *Dichocera robusta* ♀105 *Ostracophyto aristalis* ♂106 *Spilochaetosoma californicum* ♂

Figs. 110.98-106. Lateral views of head (continued): (98) *Penthosia satanica* (Bigot); (99) *Strongygaster triangulifera* (Loew); (100) *Mactomyia fracida* Reinhard; (101) *Linnaemya tessellata* (Brooks); (102) *Panzeria ampelus* (Walker); (103) *Melanophrys flavipennis* Williston; (104) *Dichocera robusta* Brooks; (105) *Ostracophyto aristalis* Townsend; (106) *Spilochaetosoma californicum* Smith (continued).

Abbreviation: fc, face.

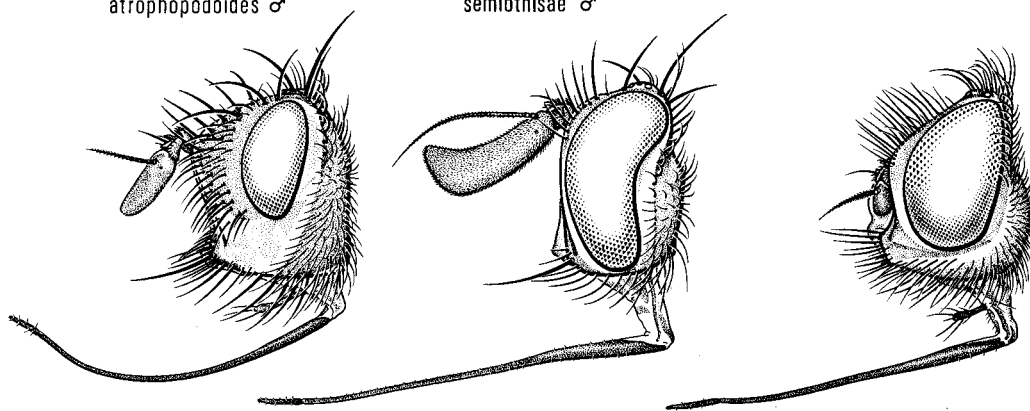
- Antenna usually black (partially orange in *Admontia nasoni* Coquillett, with row of small bristles on parafacial); arista hair-like on apical third or more. Facial ridge usually not prominent in lateral view except for that portion just above vibrissa. Parasite of insects other than the walkingstick . . . . . 140
140. Parafacial with a patch of small setae adjacent to ptilinal suture and usually continuous with small setae outside lower frontal bristles; setae usually extending ventrally at least to a level opposite uppermost bristles on facial ridge (Fig. 42) . . . . . *Admontia* Brauer & Bergenstamm  
10 spp.; widespread; Curran 1927a
- Parafacial without setae below lowest frontal bristle . . . . . 141
141. Base of  $R_{4+5}$  with a single long seta, usually as long as a third or more the distance to cross-vein r-m (as in Figs. 193, 196). Parafacial narrow and parallel-sided (Fig. 43). Sternite 7 of female forming an enormous sickle-shaped piercer, opposing a seta-studded peg-like extension of ventral margin of syntergite 1 + 2 (Fig. 257) . . . . . *Celatoria* Coquillett  
2 spp.; widespread
- Base of  $R_{4+5}$  usually with two or more shorter setae. Parafacial, if narrow, not parallel-sided, instead tapering ventrally. Piercer, if present (as in *Chaetonodexodes*), inconspicuous, often concealed between ventral margins of tergites . . . . . 142
142. Discal bristles absent on abdominal tergite 3. Median marginal bristles on tergite 3 arising rather far forward, halfway between middle and hind margin of tergite (Fig. 236). Female with small hooked piercer . . . . . *Chaetonodexodes* Townsend, in part  
1 sp., *vanderwulpi* (Townsend); southern; Aldrich 1931b
- Discal bristles present on abdominal tergite 3 (as in Fig. 231). Median marginal bristles on tergite 3 arising closer to hind margin of tergite than to middle. Female without piercer . . . 143
143. Setae on facial ridge decreasing markedly in length and thickness dorsally, becoming hair-like above lower fourth (Fig. 44) . . . . . *Eribella* Mesnil  
2 spp.; widespread
- Setae on facial ridge decreasing only slightly in length and thickness dorsally, retaining their bristle-like appearance nearly to the uppermost seta (Fig. 45) . . . . . 144
144. Katepisternum with two bristles. Male with only one stout proclinate upper orbital bristle (Fig. 45) . . . . . *Anoxynops* Townsend  
1 sp., *aldrichi* (Curran); eastern, southwestern
- Katepisternum with three bristles. Male without or with two proclinate upper orbital bristles (Fig. 41) . . . . . 145
145. M ending in  $R_{4+5}$  well before wing margin (as in Fig. 191) . . . *Ligeria* Robineau-Desvoidy  
1 sp., *latigena* Wood; Arctic
- M ending in wing margin . . . . . 146
146. Middle katepisternal bristle arising close to anterior bristle, three times farther from posterior katepisternal as from anterior katepisternal (Fig. 173) . . . . .  
. . . . . *Myiopharus* Brauer & Bergenstamm, in part  
see couplet 130
- Middle katepisternal bristle about equidistant between anterior katepisternal and posterior katepisternal bristles . . . . . *Oxynops* Townsend  
1 sp., *anthracinus* (Bigot); widespread
147. Lateral scutellar bristle absent (Fig. 186) . . . . . 148
- Lateral scutellar bristle present (Figs. 184, 185) . . . . . 150
148. Vibrissa arising from anteroventral corner of head, without any subvibrissal bristles arising ventral to it (Fig. 46). Abdominal sternite 7 of female in the form of a small piercer ensheathed in scoop-like sternite 6 (Fig. 258) . . . . . *Phyllophilopsis* Townsend, in part  
2 spp.; eastern
- Vibrissa with one or more subvibrissal bristles ventral to it (as in Figs. 43, 44). Female with tubular telescopic ovipositor without piercer (Figs. 259, 260) . . . . . 149
149. M ending in  $R_{4+5}$  well before wing margin (as in Fig. 191). Female abdomen globular (as in Fig. 260) . . . . . *Steleoneura* Stein  
1 sp., *novemmaculata* Wood; northwestern Arctic



107 *Vanderwulpia atrophopodoides* ♂

108 *Campylochaeta semiothisae* ♂

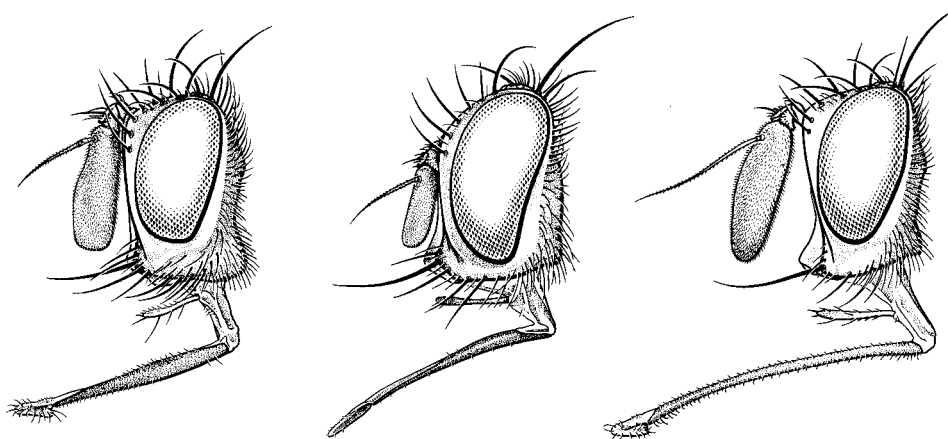
109 *Bezzimyia* sp. ♂



110 *Trochilodes skinneri* ♂

111 *Beskia aelops* ♂

112 *Imitomya sugens* ♂



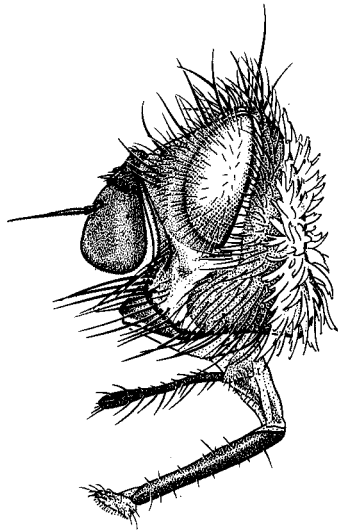
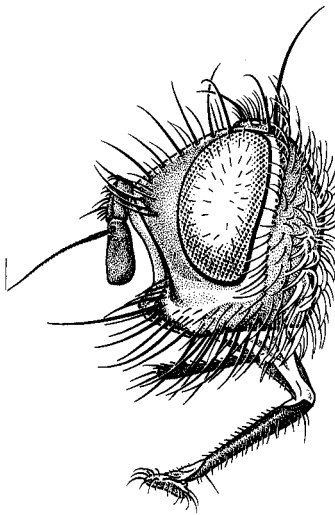
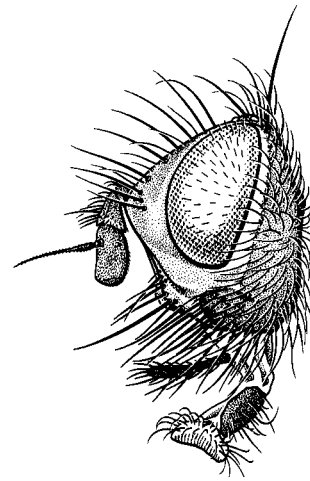
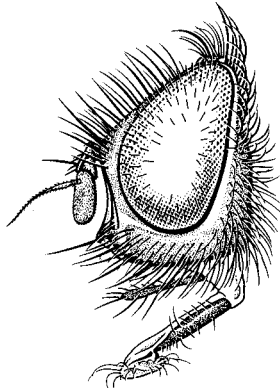
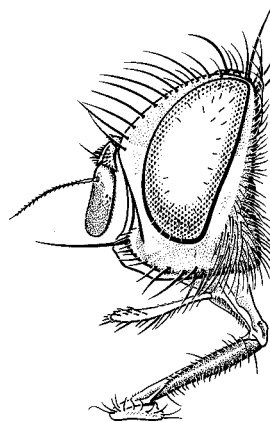
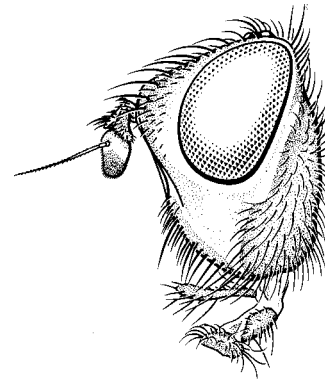
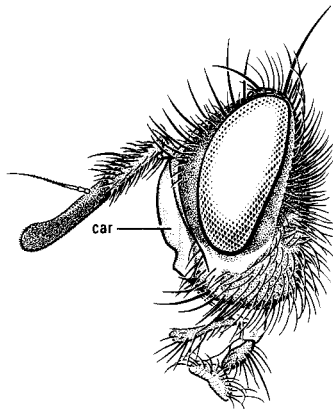
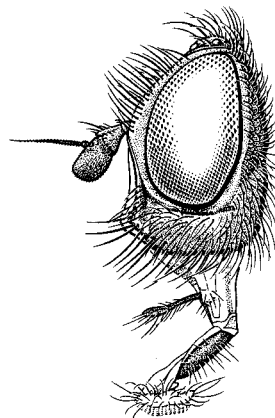
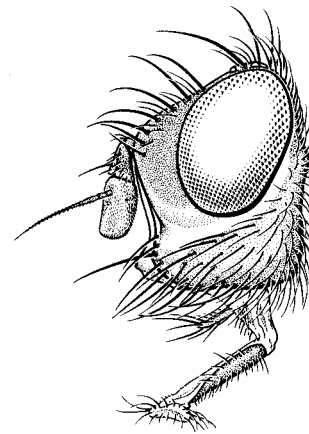
113 *Clausicella politura* ♂

114 *Epigrimyia polita* ♂

115 *Crocinosoma cornuale* ♀

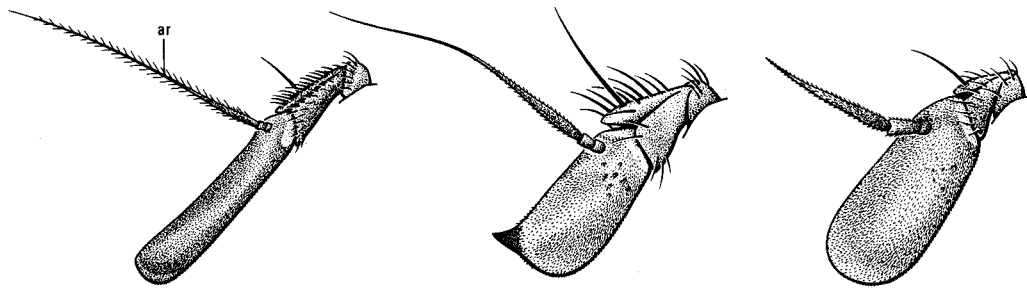
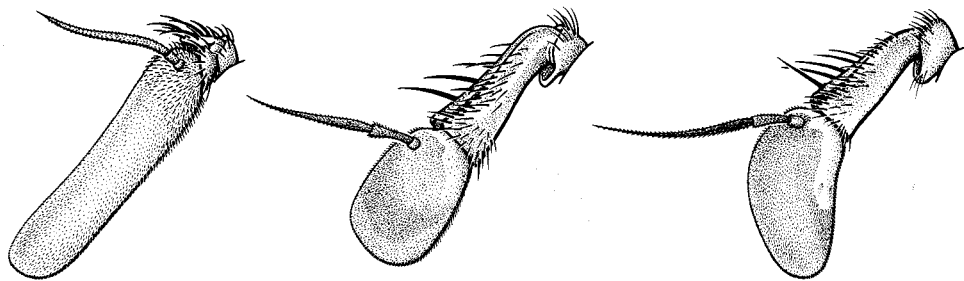
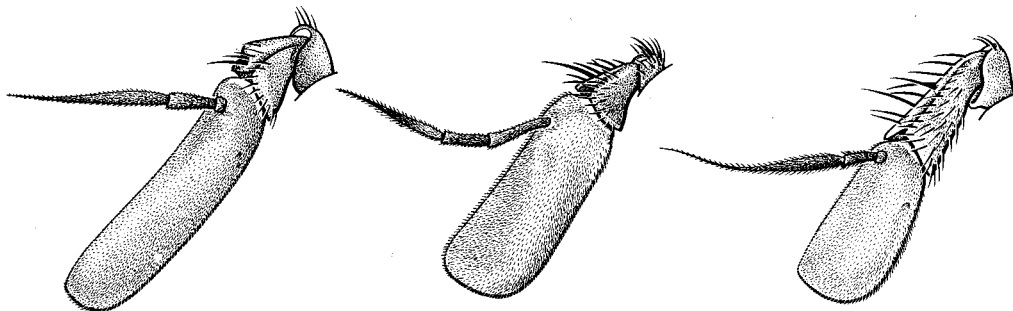
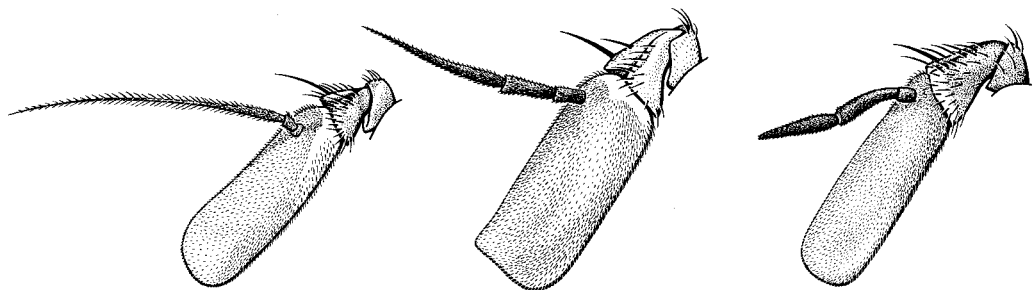
Figs. 110.107–115. Anterolateral and lateral (*continued*) views of head: anterolateral views of (107) *Vanderwulpia atrophopodoides* Townsend, (108) *Campylochaeta semiothisae* (Brooks), and (109) *Bezzimyia* sp.; lateral views of (110) *Trochilodes skinneri* Coquillett, (111) *Beskia aelops* (Walker), (112) *Imitomya sugens* (Loew), (113) *Clausicella politura* (Reinhard), (114) *Epigrimyia polita* Townsend, and (115) *Crocinosoma cornuale* Reinhard (*continued*).

Abbreviations: i vt s, inner vertical seta; fc rg, facial ridge; ptil fis, ptilinal fissure; spvb s, supravibrissal bristle.

116 *Trafoia arctica* ♂117 *Eriothrix penitalis* ♂118 *Cleonice bigelowi* ♂119 *Dufouria americana* ♂120 *Leskia similis* ♂121 *Eutrixa exilis* ♀122 *Euthera tentatrix* ♂123 *Rondania dimidiata* ♂124 *Clastoneuriopsis meralis* ♂

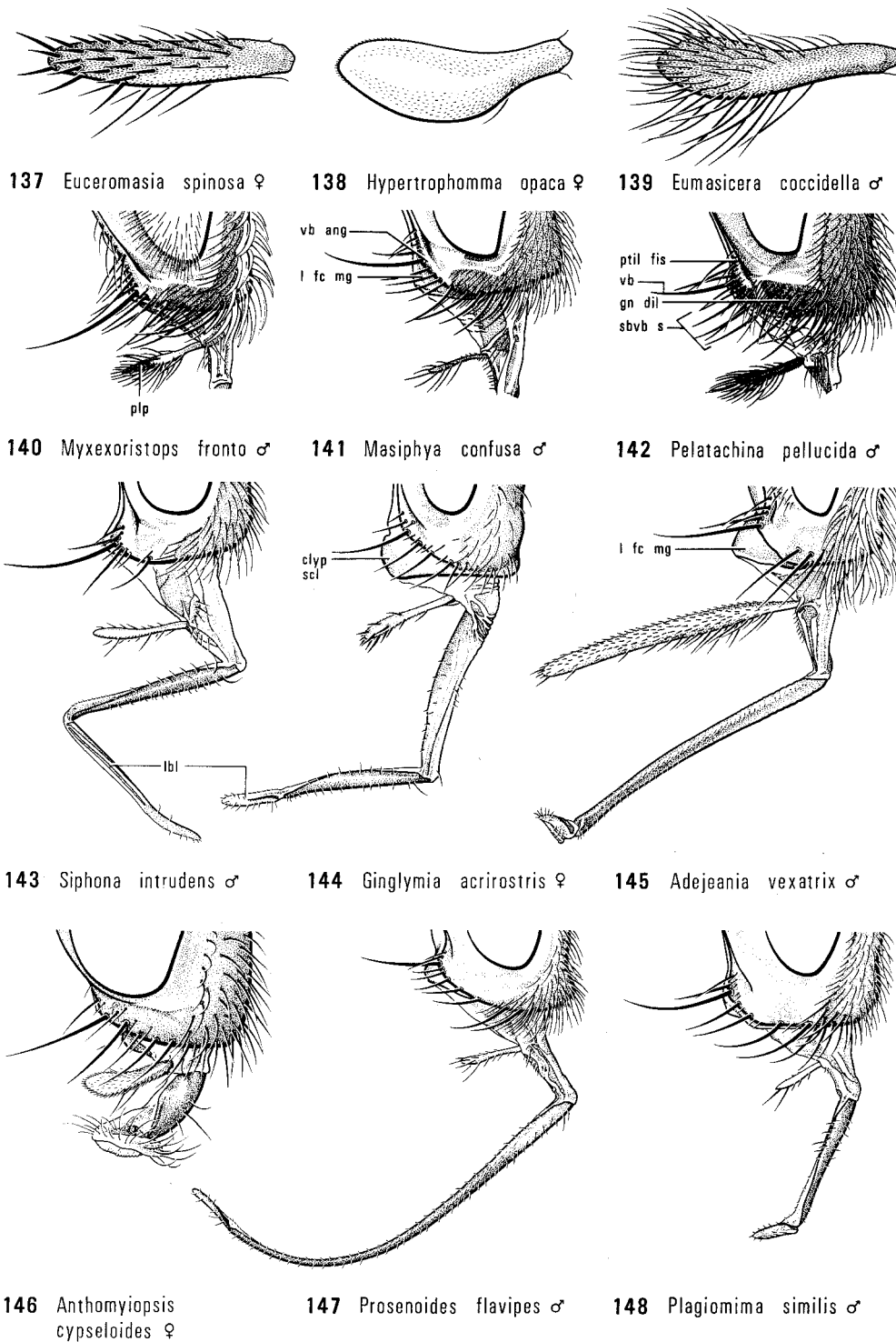
Figs. 110.116–124. Lateral views of head (concluded): (116) *Trafoia arctica* (Sack); (117) *Eriothrix penitalis* (Coquillett); (118) *Cleonice bigelowi* (Curran); (119) *Dufouria americana* Reinhard; (120) *Leskia similis* (Townsend); (121) *Eutrixa exilis* (Coquillett); (122) *Euthera tentatrix* Loew; (123) *Rondania dimidiata* (Meigen); (124) *Clastoneuriopsis meralis* Reinhard.

Abbreviation: car, carina.

125 *Prospberrya pulverea* ♀126 *Ceracia dentata* ♂127 *Evidomyia infida* ♂128 *Phasmophaga antennalis* ♂129 *Tachina florum* ♂130 *Archytas apicifer* ♂131 *Psilopleura arida* ♀132 *Triarthria spinipennis* ♂133 *Aphria ocypterata* ♂134 *Genea robertsonii* ♂135 *Impeccantia claterna* ♂136 *Germaria* sp. ♂

Figs. 110.125-136. Lateral views of left antenna: (125) *Prospberrya pulverea* (Coquillett); (126) *Ceracia dentata* (Coquillett); (127) *Evidomyia infida* Reinhard; (128) *Phasmophaga antennalis* Townsend; (129) *Tachina florum* Walker; (130) *Archytas apicifer* (Walker); (131) *Psilopleura arida* Reinhard; (132) *Triarthria spinipennis* (Meigen); (133) *Aphria ocypterata* Townsend; (134) *Genea robertsonii* (Townsend); (135) *Impeccantia claterna* Reinhard; (136) *Germaria* sp. Abbreviation: ar, arista.

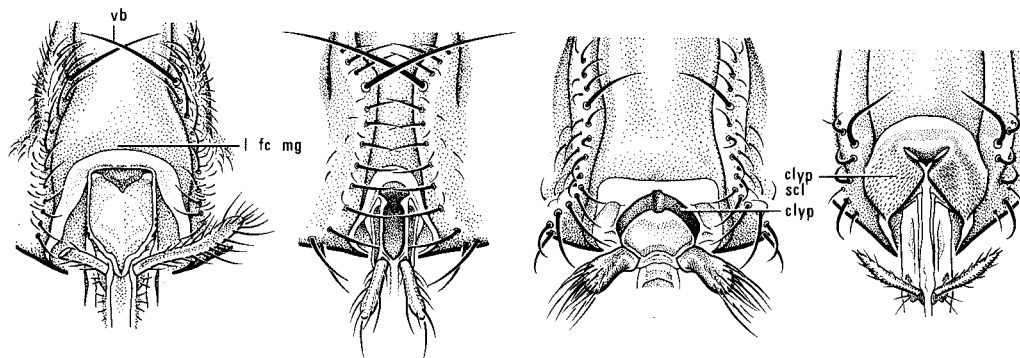
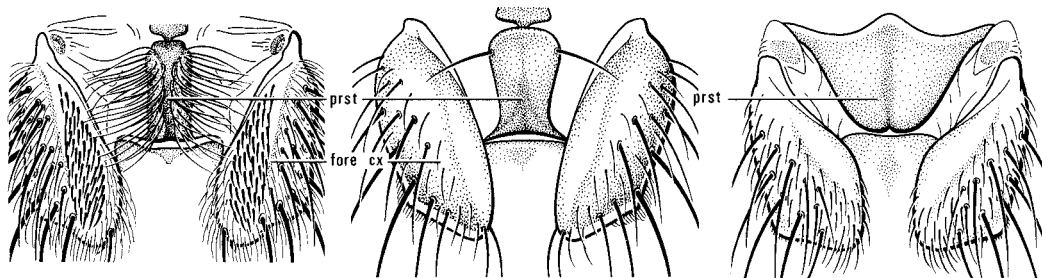
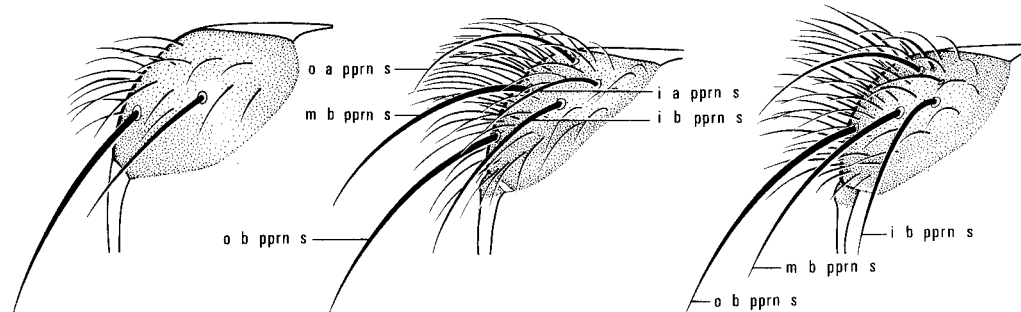
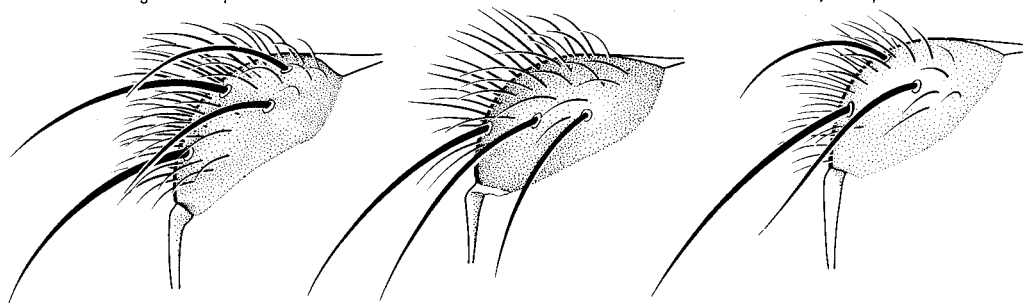




Figs. 110.137-148. Palpi and heads: lateral views of left palpus of (137) *Euceromasia spinosa* Townsend, (138) *Hypertrophomma opaca* Townsend, and (139) *Eumasicerca coccidella* Townsend; lateral views of ventral part of head of (140) *Myxexoristops fronto* (Coquillett), (141) *Masiphya confusa* Aldrich, (142) *Pelatachina pellucida* Coquillett, (143) *Siphona intrudens* (Curran), (144) *Ginglymia acirostris* Townsend, (145) *Adejeania vexatrix* (Osten Sacken), (146) *Anthomyiopsis cypseloides* Townsend, (147) *Prosenoides flavipes* Coquillett, and (148) *Plagiomima similis* (Townsend).

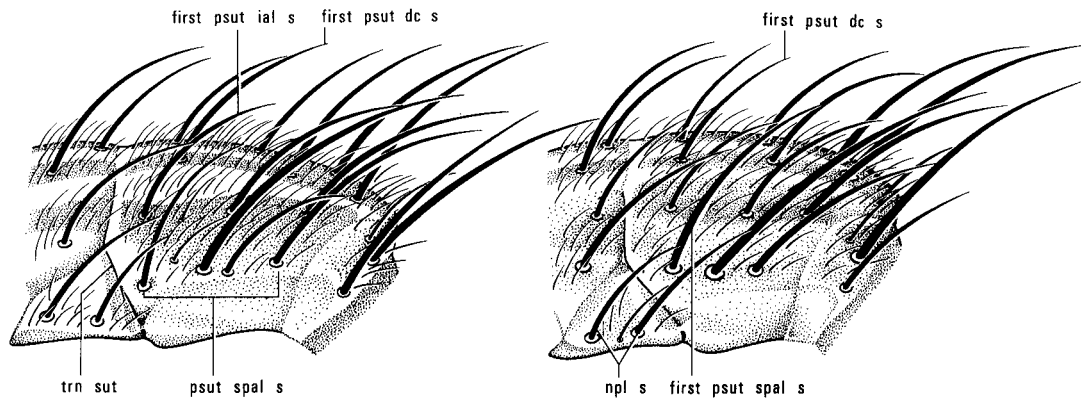
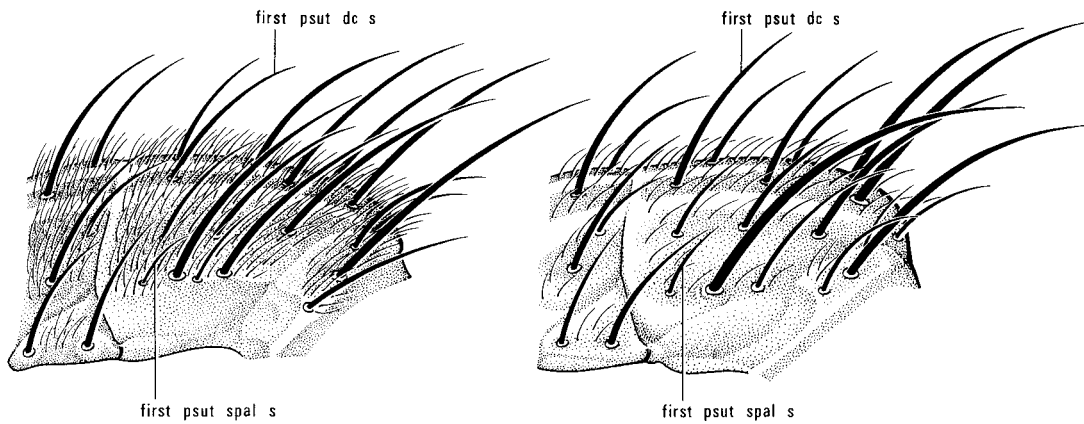
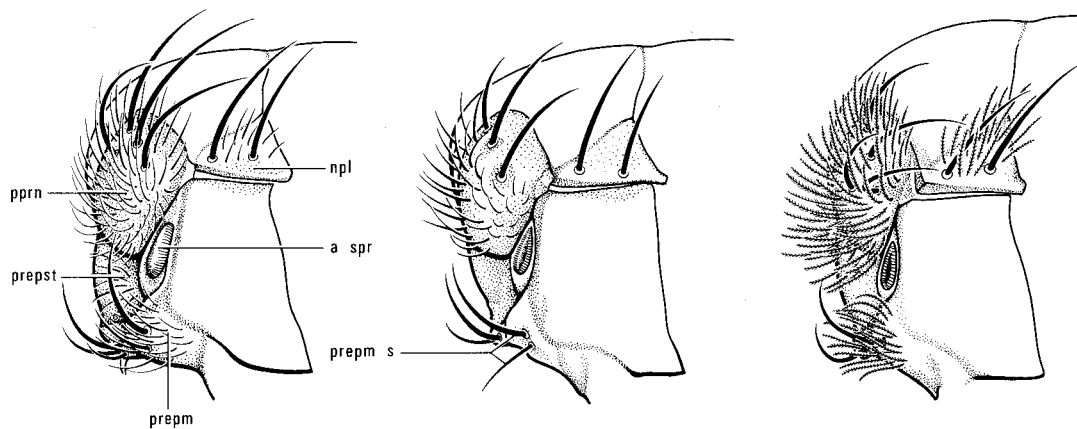
Abbreviations: clyp scl, clypeal sclerite; gn dil, genal dilation; lbl, labella; l fc mg, lower facial margin; plp, palpus; ptil fis, ptilinal fissure; sbvb s, subvibrissal bristle; vb, vibrissa; vb ang, vibrissal angle.

- M ending in  $r_{4+5}$  at wing margin or ending separately from  $R_{4+5}$  (as in Fig. 193). Female abdomen somewhat flattened from side to side (Fig. 259) ..... *Dolichotarsus* Brooks, in part  
4 spp.; widespread
150. Discal bristles absent on abdominal tergites 3 and 4 ..... 151  
Discal bristles present on abdominal tergites 3 and 4 ..... 152
151. M and  $R_{4+5}$  each ending separately rather far apart on either side of wing apex (Fig. 195) or M ending in membrane at point where bend should be, as in *C. manca* (Greene) .....  
..... *Chaetostigmoptera* Townsend  
4 spp.; widespread
- M and  $R_{4+5}$  both ending anterior to wing apex (as in Fig. 193) .....  
..... *Myiopharus* Brauer & Bergenstamm, in part  
see couplet 131
152. Parafacial with setae extending from lowest frontal at least to middle of parafacial (Fig. 37)  
..... 153  
Parafacial bare except for an occasional hair just below lowest frontal bristle (as in Figs. 35, 36)  
..... 156
153. Parafacial with a row of rather regularly arranged erect bristles (Fig. 37). Median marginal bristles on abdominal tergites 3 and 4 arising nearer middle than posterior margin of tergite  
..... *Eulasiona* Townsend, in part  
see couplet 126  
Parafacial with scattered setae (Fig. 47). Median marginal bristles arising nearer posterior margin than middle of tergites 3 and 4 ..... 154
154. Occiput without genal dilation; genal groove extensive (Fig. 47) ..... *Enrogalia* Reinhard  
1 sp., *morigera* Reinhard; California  
Occiput with a small but distinct genal dilation and correspondingly reduced genal groove  
..... 155
155. M ending in  $R_{4+5}$  well before wing margin (as in Fig. 191) ..... *Erynniopsis* Townsend  
1 introduced sp., *antennata* (Rondani); California  
M ending in wing margin ..... *Lixophaga* Townsend, in part  
16 spp.; widespread; Aldrich 1925a, Curran 1935
156. Postpronotum with two bristles, or with three arranged in a nearly straight row (as in Figs. 156, 158) ..... 157  
Postpronotum with at least three bristles, arranged in a triangle (Figs. 157, 159) ..... 159
157. Occiput with a genal dilation (as in Fig. 41) ..... *Meigenielloides* Townsend  
1 sp., *cinerea* Townsend; western  
Occiput without a genal dilation (as in Figs. 47, 48) ..... 158
158. Both sexes with three upper orbital bristles, two of which are proclinate and the posteriormost one lateroclinate (Fig. 48). Parafacial very wide; eye small and rounded. Sternite 7 of female folded longitudinally ..... *Picconia* Robineau-Desvoidy  
1 sp., *derisa* (Reinhard); widespread  
Neither sex with a lateroclinate upper orbital bristle. Parafacial narrower; eye more elliptic. Sternite 7 of female simple, unfolded ..... *Anisia* Wulp, in part  
4 spp.; widespread; Reinhard 1942b (as *Oedematocera*)
159. Proepisternum with a small patch of hairs (as in Fig. 166) .....  
..... *Prodegeeria* Brauer & Bergenstamm  
3 spp.; widespread  
Proepisternum bare (a single hair may rarely be present in *Belida*) ..... 160
160. Abdominal tergites 3 and 4 each with two or more pairs of discal bristles; the median pair arising at most slightly anterior to lateral ones (Fig. 237) ..... 161  
If abdominal tergites 3 and 4 with two pairs of discal bristles, then one pair decidedly anterior to other pair (as in Fig. 239) ..... 162

149 *Mystacomya*  
*scordala* ♂150 *Megapariopsis*  
*opaca* ♀151 *Eumegaparia*  
*flaveola* ♂152 *Clausicella*  
*politura* ♀153 *Macromya* *crocata* ♂154 *Microchaetina* *valida* ♂155 *Ormia* *dominicana* ♂156 *Chaetoglossa* *picticornis* ♂157 *Patelloa* *leucaniae* ♂158 *Phryxe* *pecosensis* ♂159 *Belida* *dexina* ♂160 *Wagneria* *vernata* ♂161 *Genea* *tenera* ♂

Figs. 110.149-161. Faces, prosterna, and postpronota: anterior views of lower facial margin and clypeus of (149) *Mystacomya scordala* (Reinhard), (150) *Megapariopsis opaca* (Coquillett), (151) *Eumegaparia flaveola* (Coquillett), and (152) *Clausicella politura* (Reinhard); anteroventral views of prosternum and fore coxa of (153) *Macromya crocata* Reinhard, (154) *Microchaetina valida* (Townsend), and (155) *Ormia dominicana* Townsend; dorsal views of left postpronotum of (156) *Chaetoglossa picticornis* Townsend, (157) *Patelloa leucaniae* (Coquillett), (158) *Phryxe pecosensis* (Townsend), (159) *Belida dexina* (Townsend), (160) *Wagneria vernata* West, and (161) *Genea tenera* (Wiedemann).

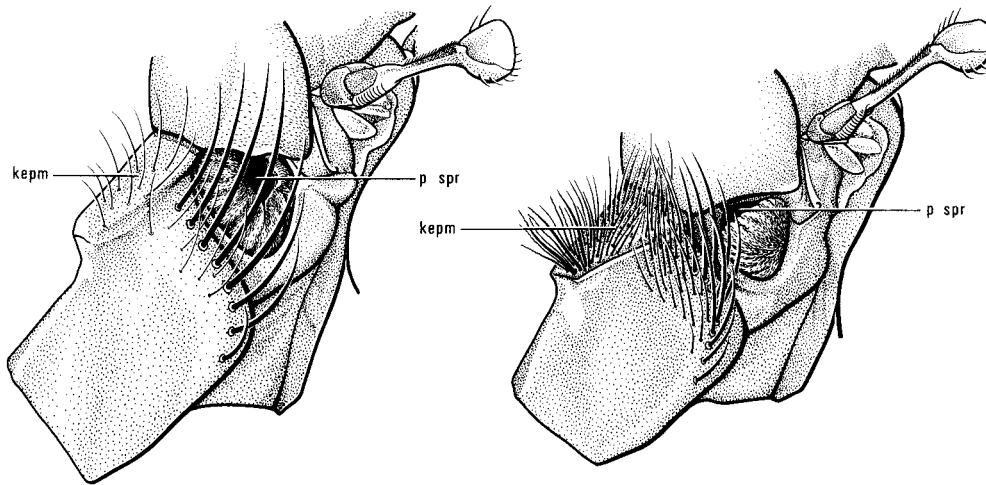
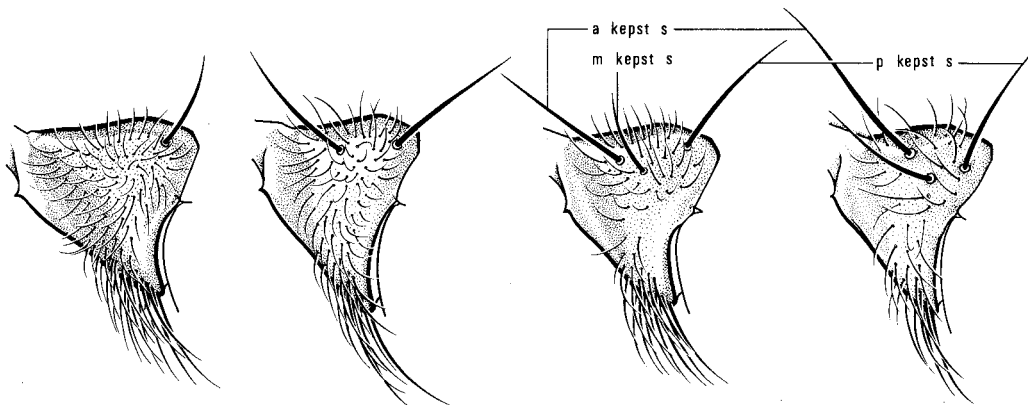
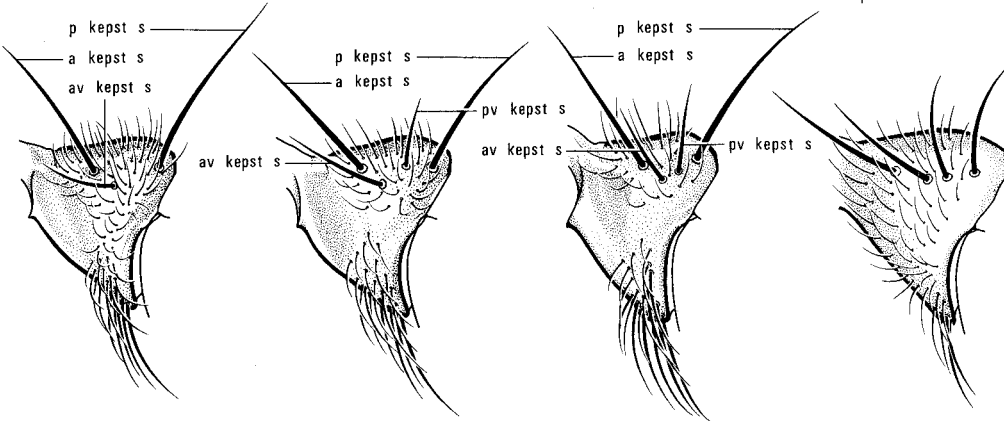
Abbreviations: a, anterior; b, basal; clyp, clypeus; clyp scl, clypeal sclerite; fore cx, fore coxa; i, inner; l fc mg, lower facial margin; m, middle; o, outer; pprn, postpronotal; prst, prosternum; s, bristle; vb, vibrissa.

162 *Xanthophyto labis* ♀163 *Atactopsis reinhardi* ♀164 *Exorista mella* ♂165 *Lixophaga parva* ♂166 *Meigenia submissa* ♂167 *Neaera leucoptera* ♀168 *Leskiopsis thecata* ♂

Figs. 110.162–168. Thoraces: lateral views of left side of postsutural scutum of (162) *Xanthophyto labis* (Coquillett), (163) *Atactopsis reinhardi* Sabrosky & Arnaud, (164) *Exorista mella* (Walker), and (165) *Lixophaga parva* Townsend; lateral views of anterior portion of thorax of (166) *Meigenia submissa* (Aldrich & Webber), (167) *Neaera leucoptera* (Johnson), and (168) *Leskiopsis thecata* (Coquillett) (continued).

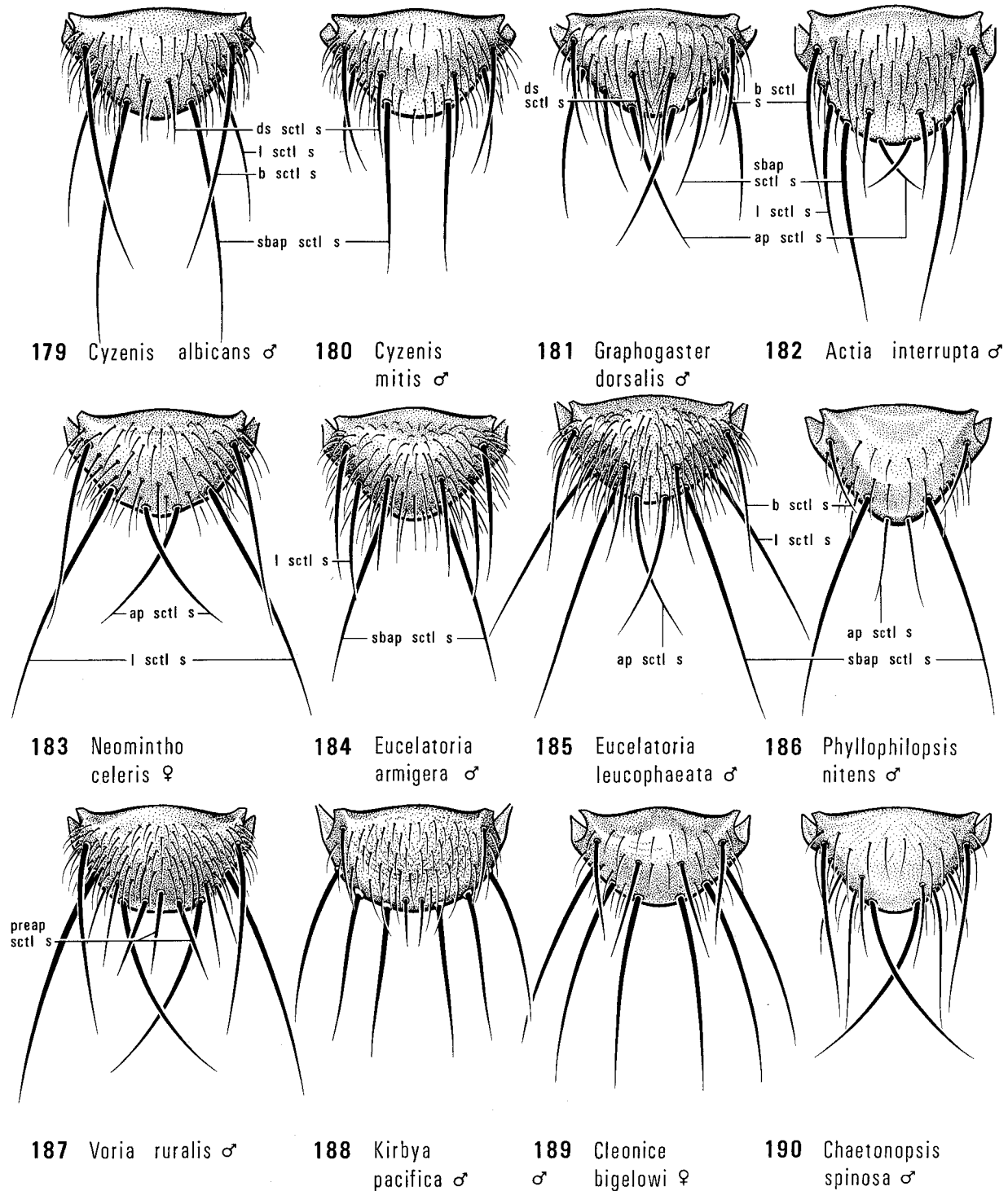
Abbreviations: a spr, anterior spiracle; dc, dorsocentral; npl, notopleuron; npl s, notopleural bristle; pprn, postpronotum; prepm, proepimeron; prepm s, proepimeral seta; prepst, proepisternum; psut dc s, postsutural dorsocentral bristle; psut ial s, postsutural intra-alar bristle; psut spal s, postsutural supra-alar bristle; trn sut, transverse suture.

161. Mid tibia with two anterodorsal bristles (Fig. 222)..... *Oswaldia* Robineau-Desvoidy  
9 spp.; widespread  
Mid tibia with one anterodorsal bristle (as in Fig. 221) ..... *Opsemeigenia* Townsend, in part  
7 spp.; widespread
162. Lateral scutellar bristles as long and straight as subapical scutellar bristles (Fig. 185); prosternum with white hairs. Abdomen of female with well-developed midventral carina; ventral margin of tergite 4 with short stout bristles ..... *Eucelatoria* Townsend, in part  
see couplet 122  
Lateral scutellar bristles two-thirds as long as subapical bristles (as in Fig. 184); prosternum with black hairs. Abdomen of female with well-developed midventral carina only in some species of *Vibrissina*, in which margins of both tergites 3 and 4 are armed with stout bristles ..... 163
163. Postpronotum with four bristles arranged in a parallelogram, with the middle basal one displaced anteriorly (Fig. 159) ..... *Belida* Robineau-Desvoidy  
3 spp.; widespread  
Postpronotum usually with three bristles, but if with four, then the three basal bristles arranged in a straight line (as in Fig. 158) ..... 164
164. Parafacial strongly narrowed ventrally (Fig. 49). Abdomen of female strongly bent ventrally, with a telescopic tubular ovipositor directed ventrally (as in Fig. 260) ..... *Trigonospila* Pokorný, in part  
3 spp.; eastern U.S.A., Mexico  
Parafacial not as strongly narrowed ventrally (Fig. 38). Ovipositor, if telescopic, not directed ventrally ..... 165
165. Katepisternum with two bristles (as in Fig. 172). Abdomen of female with midventral carina; sternite 7 modified into a hook-like piercer (shorter than that in Fig. 256) ..... *Vibrissina* Rondani, in part  
see couplet 121  
Katepisternum with three bristles. Abdomen of female with neither midventral carina nor piercer ..... 166
166. Scutum with three pairs of presutural acrostichal bristles. Sternite 5 of male with a single long bristle (Fig. 262); sternites 5 and 6 of female rounded or truncate apically ..... *Lixophaga* Townsend, in part  
see couplet 155  
Scutum with only two pairs of presutural acrostichal bristles, the anterior two pairs present, the posteriormost pair absent. Sternite 5 of male lacking a long bristle; sternites 5 and 6 of female large, heavily sclerotized, pointed apically (as in Fig. 258) ..... *Calolydella* Townsend  
2 spp.; southwestern and eastern
167. A<sub>1</sub> ending at wing margin (Fig. 199). Lower katepisternal bristle usually larger than anterodorsal katepisternal bristle ..... 168  
A<sub>1</sub> ending in membrane, before reaching margin. Lower katepisternal bristle usually smaller than anterodorsal katepisternal bristle ..... 170
168. Proboscis elongate; labella usually as long as mentum (Fig. 143) ..... *Siphona* Meigen  
14 spp.; widespread; Curran 1932, O'Hara 1982  
Proboscis shorter; labella much shorter than mentum (as in Fig. 144) ..... 169
169. Mid tibia without anterodorsal bristle. Lower katepimeral bristle smaller than anterodorsal bristle. First aristemere 2 or more times as long as wide; third aristemere rather short, about 1.5 times as long as combined length of first and second aristemeres ..... *Baeomyia* O'Hara  
5 spp.; western; O'Hara 1984

169 *Chrysotachina alcedo* ♂170 *Winthemia fumiferanae* ♂171 *Phasia diversa* ♂172 *Anoxynops aldrichi* ♂173 *Myiopharus dorsalis* ♂174 *Phryxe pecosensis* ♂175 *Nilea valens* ♂176 *Nilea sternalis* ♂177 *Lespesia archippivora* ♂178 *Eucnephalia gonoides* ♀

Figs. 110. 169–178. Thoraces (concluded): lateral views of katepimeron and posterior spiracle of (169) *Chrysotachina alcedo* (Loew) and (170) *Winthemia fumiferanae* Tothill; lateral views of left katepisternum of (171) *Phasia diversa* (Coquillett), (172) *Anoxynops aldrichi* (Curran), (173) *Myiopharus dorsalis* (Coquillett), (174) *Phryxe pecosensis* (Townsend), (175) *Nilea valens* (Aldrich & Webber), (176) *Nilea sternalis* (Coquillett), (177) *Lespesia archippivora* (Riley), and (178) *Eucnephalia gonoides* Townsend.

Abbreviations: a, anterior; av, anteroventral; kepm, katepimeron; kepst s, katepisternal bristle; m, middle; p, posterior; p spr, posterior spiracle; pv, posteroventral.



Figs. 110.179–190. Dorsal views of scutellum: (179) *Cyzenis albicans* (Fallén); (180) *Cyzenis mitis* (Curran); (181) *Graphogaster dorsalis* (Coquillett); (182) *Actia interrupta* Curran; (183) *Neomintho celeris* (Townsend); (184) *Eucelatoria armigera* (Coquillett); (185) *Eucelatoria leucophaeata* (Reinhard); (186) *Phyllophilopsis nitens* (Coquillett); (187) *Voria ruralis* (Fallén); (188) *Kirbya pacifica* (Curran); (189) *Cleonice bigelowi* (Curran); (190) *Chaetonopsis spinosa* (Coquillett). Abbreviations: ap, apical; b, basal; ds, discal; l, lateral; preap s, preapical bristle; sbap, subapical; sctl s, scutellar bristle.

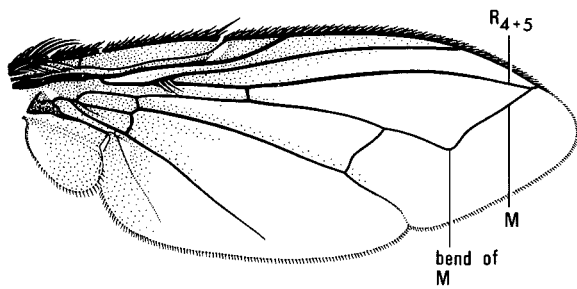
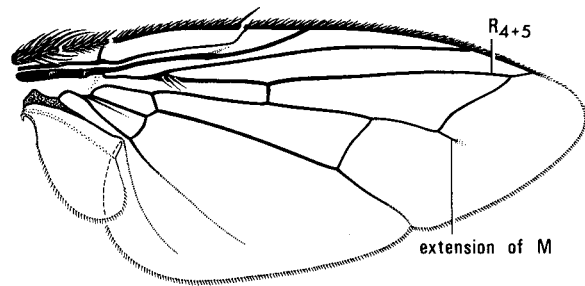
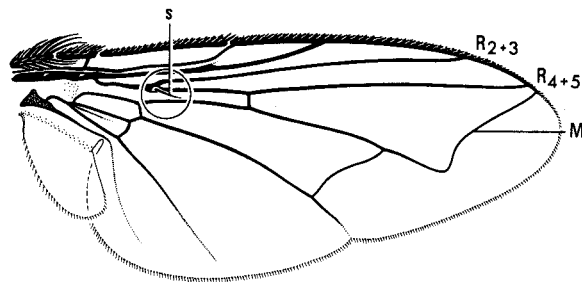
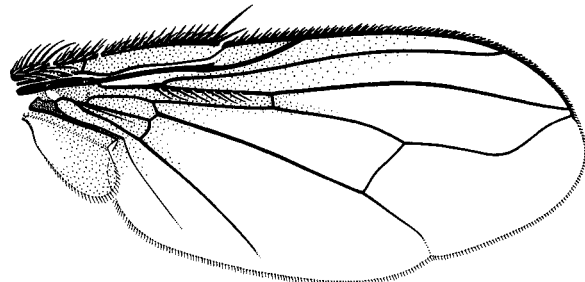
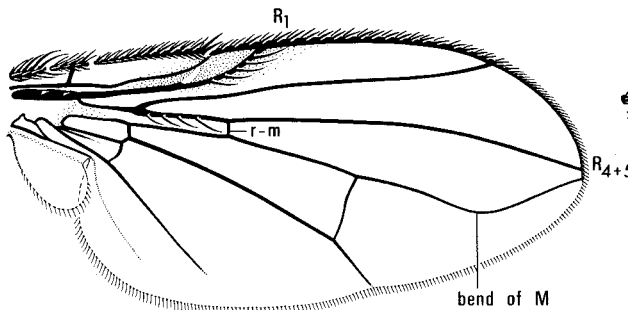
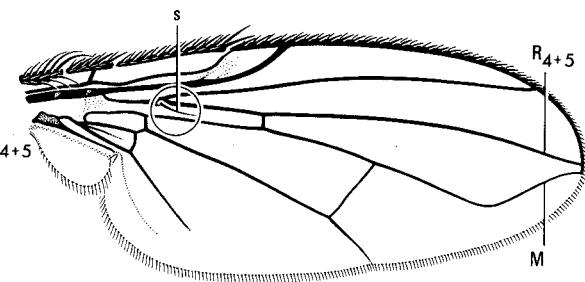
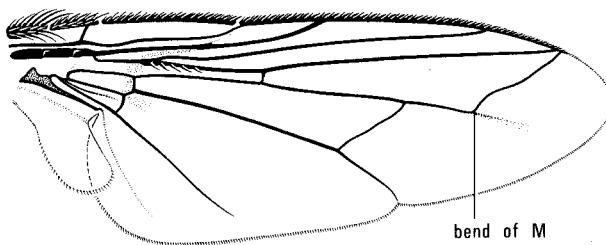
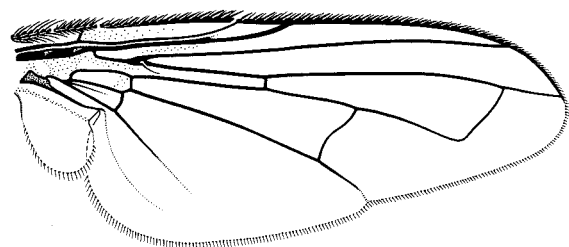
- Mid tibia with well-developed anterodorsal bristle (as in Fig. 221). Lower katepimeral bristle usually larger than anterodorsal katepimeral bristle. First aristomere minute, no longer than wide; third aristomere much more than twice as long as first and second combined . . . . . *Ceranthia* Robineau-Desvoidy<sup>42</sup>  
6 spp.; widespread; Curran 1933, in part (as *Actia*)
170. R<sub>4+5</sub> setose from base to well beyond crossvein r-m (Fig. 200) . . . . . 171  
R<sub>4+5</sub> not setose beyond crossvein r-m (as in Fig. 199) . . . . . 172
171. Katepisternum with a row of fine hairs ascending from midventral angle of katepisternum to a point just ventral to lower katepisternal bristle. Upper part of anepisternum usually with two well-developed bristles. Parafacial usually without minute setae below lowest frontal bristle . . . . . *Actia* Robineau-Desvoidy  
5 spp.; widespread; Curran 1933, in part  
Katepisternum lacking such a row of fine hairs. Upper part of anepisternum usually with a single well-developed bristle. Parafacial with minute setae extending from lowest frontal bristle usually to level of base of arista . . . . . *Ceromya* Robineau-Desvoidy<sup>43</sup>  
4 spp.; widespread; Curran 1933, in part (as *Actia*)
172. Scutellum lacking both lateral and discal bristles (as in Fig. 186). Membrane between lower genal margin and clypeus forming a convex sclerite (Figs. 144, 152) . . . . . *Ginglymia* Townsend<sup>44</sup>  
2 spp.; western and eastern  
Scutellum with small lateral bristles and well-developed discal bristles (as in Fig. 184). No sclerite between genal margin and clypeus . . . . . 173
173. Facial ridge bare, except for a few setae just above vibrissa. Middle katepisternal bristle almost in line with anterior and posterior katepisternal bristles . . . . . *Phantasiomyia* Townsend  
2 spp.; western  
Facial ridge with bristles on lower half or more. Middle katepisternal bristle ventral to other two . . . . . 174
174. R<sub>1</sub> setose dorsally (as in Fig. 200) . . . . . *Miamimyia* Townsend  
1 sp., *cincta* Townsend; southern Florida  
R<sub>1</sub> bare . . . . . *Chaetonodexodes* Townsend, in part  
see couplet 142
175. Hind coxa with one or more hairs on posterior margin (Fig. 229) . . . . . 176  
Hind coxa bare on posterior margin (as in Fig. 230) . . . . . 191
176. Parafacial with one or two bristles; these distinctly larger than surrounding hairs and situated near lower margin of eye (Figs. 62, 63) . . . . . 177  
Parafacial with hairs only or bare . . . . . 179
177. Palpus present, filiform, not enlarged apically (Fig. 62) . . . . . *Peleteria* Robineau-Desvoidy  
39 spp.; widespread; Curran 1925  
Palpus absent . . . . . 178
178. Parafacial with two stout bristles; these more or less equal in size, separated from each other by about half distance between upper parafacial bristle and lowest frontal bristle (as in Fig. 62). Frontal bristles arising in two rows, the lowest bristle at level of lower fourth of eye . . . . . *Deopalpus* Townsend  
11 spp.; widespread; Reinhard 1934c (as *Cuphocera*)  
Parafacial usually with a single stout bristle, sometimes with a smaller bristle immediately below it (Fig. 63). Frontal bristles arising in a single row, lowest bristle at level of middle of eye . . . . . *Copecrypta* Townsend  
1 sp., *ruficauda* (Wulp); widespread
179. Palpus well-developed . . . . . 180  
Palpus absent or reduced to a minute tubercle . . . . . 188

<sup>42</sup> This is a provisional placement for several species, viz. *arizonica* (Townsend), *brevirostris* (Coquillett), *conata* (Reinhard), *flavipes* (Coquillett), and *plusiae* (Coquillett), formerly included in *Aphantorhapha* Townsend, *Pseudosiphona* Townsend, and *Siphona* Meigen.

<sup>43</sup> Included here are four species, *americana* (Townsend), *elyii* (Walton), *ontario* (Curran), and *palloris* (Coquillett), formerly included in *Actia*.

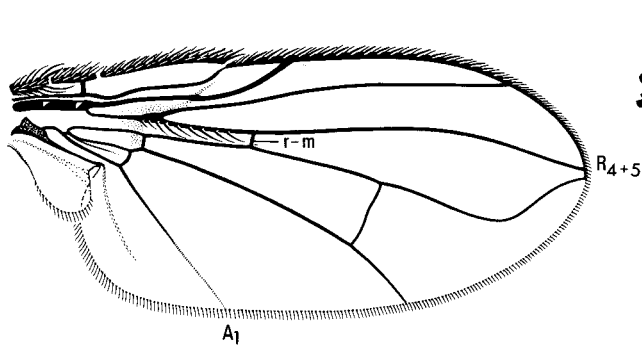
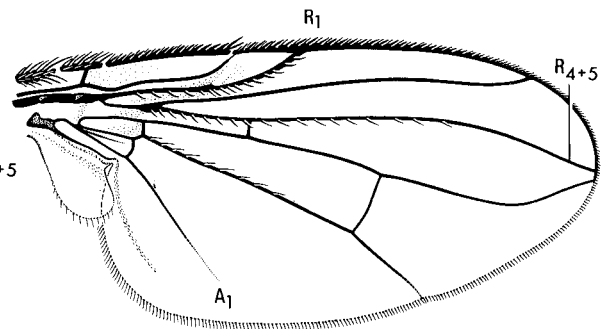
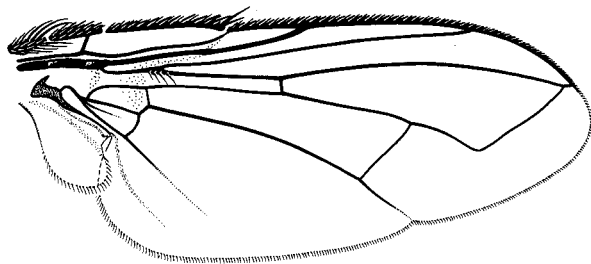
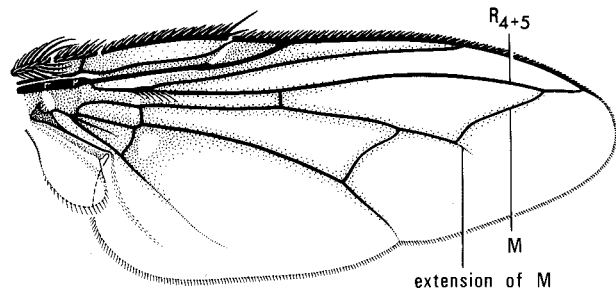
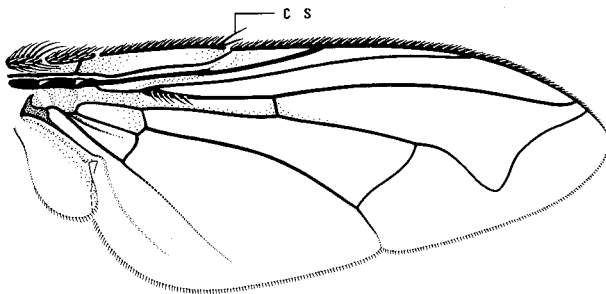
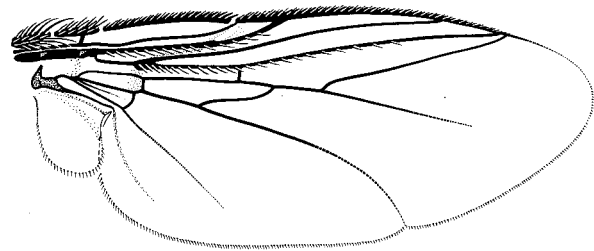
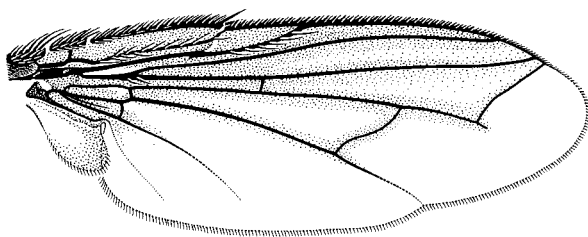
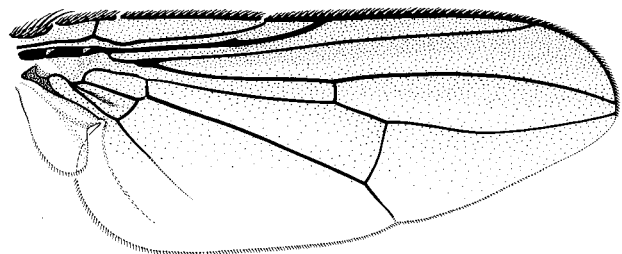
<sup>44</sup> Also included are species formerly in the genus *Lasioneura* Coquillett.



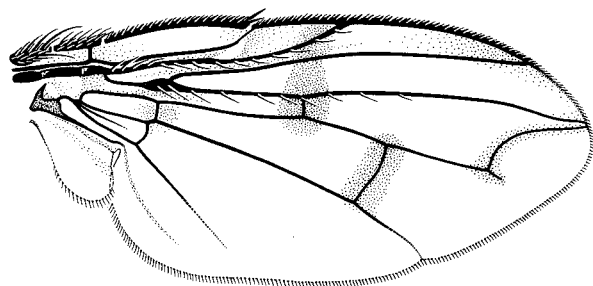
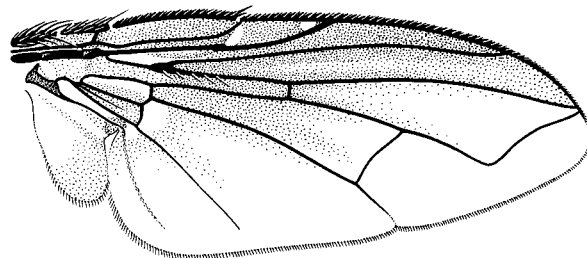
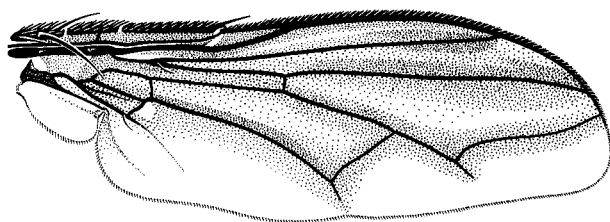
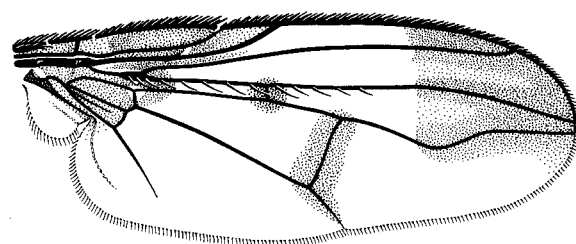
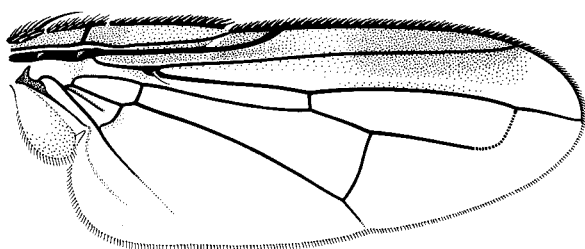
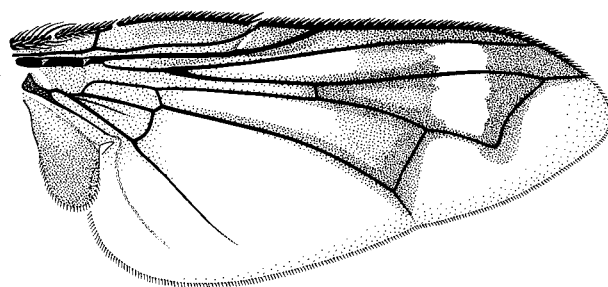
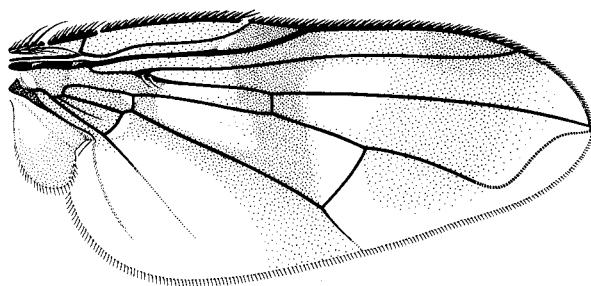
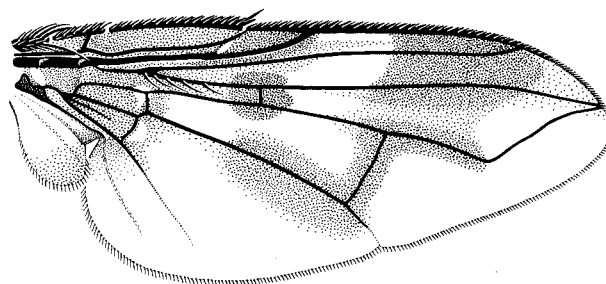
191 *Tryphera* sp. ♂192 *Hesperomyia erythrocerata* ♂193 *Drino antennalis* ♂194 *Masistylum stennomatum* ♂195 *Chaetostigma crassinervis* ♂196 *Phytomytera tarsalis* ♂197 *Chetogena gelida* ♂198 *Graphogaster brunnea* ♂

Figs. 110.191–198. Dorsal views of right wing: (191) *Tryphera* sp.; (192) *Hesperomyia erythrocerata* Brauer & Bergenstamm; (193) *Drino antennalis* (Reinhard); (194) *Masistylum stennomatum* Wood; (195) *Chaetostigma crassinervis* (Walton); (196) *Phytomytera tarsalis* (Coquillett); (197) *Chetogena gelida* (Coquillett); (198) *Graphogaster brunnea* (Brooks) (continued).

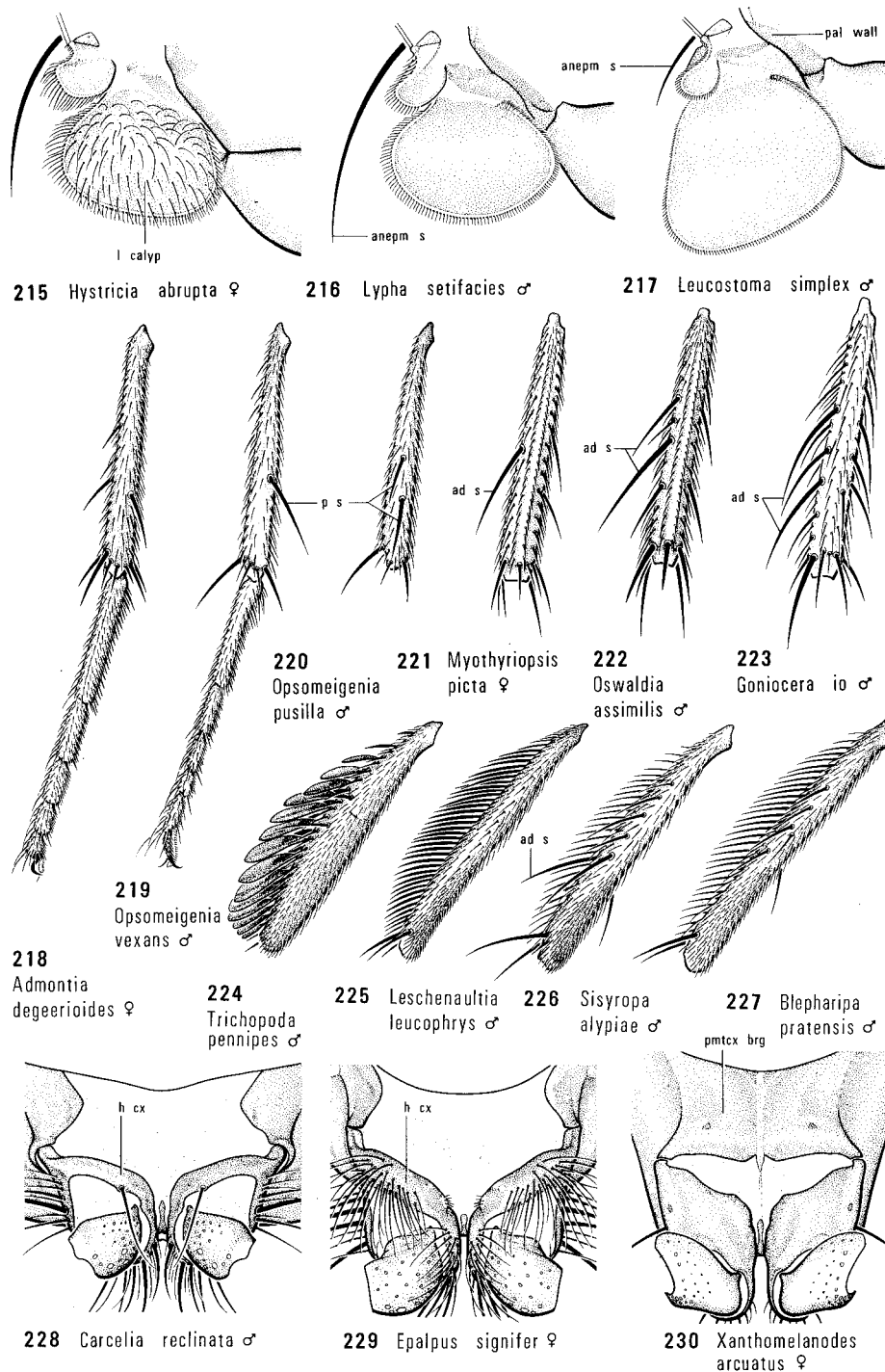
Abbreviation: s, seta at bifurcation of  $R_{2+3}$  and  $R_{4+5}$ .

199 *Ceranthia flavipes* ♀200 *Actia interrupta* ♀201 *Estheria cinerea* ♂202 *Microchaetina sinuata* ♂203 *Megapariopsis opaca* ♂204 *Goniochaeta plagioides* ♀205 *Chaetoplagia atripennis* ♂206 *Freraea montana* ♂

Figs. 110.199–206. Wings: dorsal views of right wing (*continued*) of (199) *Ceranthia flavipes* (Coquillett), (200) *Actia interrupta* Curran, (201) *Estheria cinerea* (Townsend), (202) *Microchaetina sinuata* (Townsend), (203) *Megapariopsis opaca* (Coquillett), and (204) *Goniochaeta plagioides* Townsend; ventral view of left wing of (205) *Chaetoplagia atripennis* Coquillett; dorsal view of right wing of (206) *Freraea montana* (Coquillett) (*continued*).

207 *Lypha harringtoni* ♂208 *Myothyriopsis picta* ♂209 *Euantha litturata* ♂210 *Chiricahuia* sp. ♀211 *Catharosia lustrans* ♂212 *Euthera tentatrix* ♂213 *Oestrophasia signifera* ♂214 *Oestrophasia clausa* ♀

Figs. 110.207–214. Dorsal views of right wing (*concluded*): (207) *Lypha harringtoni* (Coquillett); (208) *Myothyriopsis picta* (Wulp); (209) *Euantha litturata* (Olivier); (210) *Chiricahuia* sp.; (211) *Catharosia lustrans* (Reinhard); (212) *Euthera tentatrix* Loew; (213) *Oestrophasia signifera* (Wulp); *Oestrophasia clausa* Brauer & Bergenstamm.

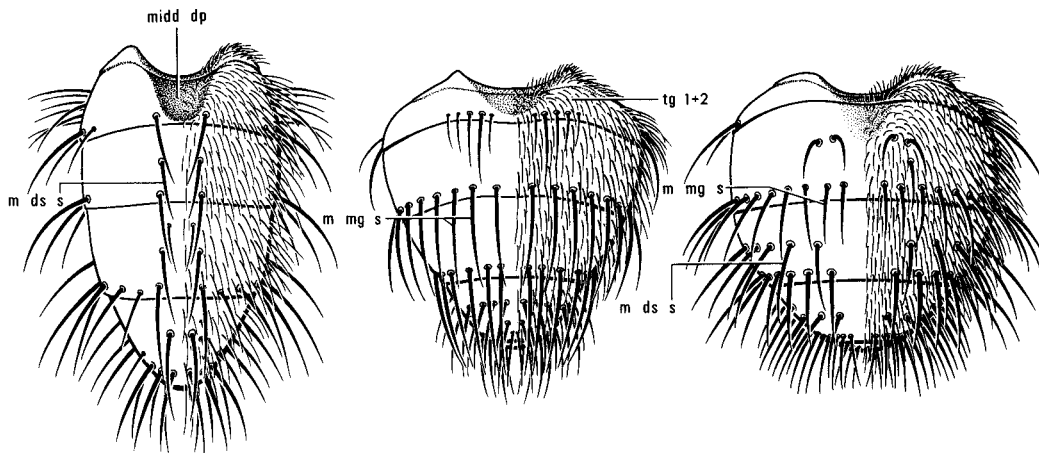
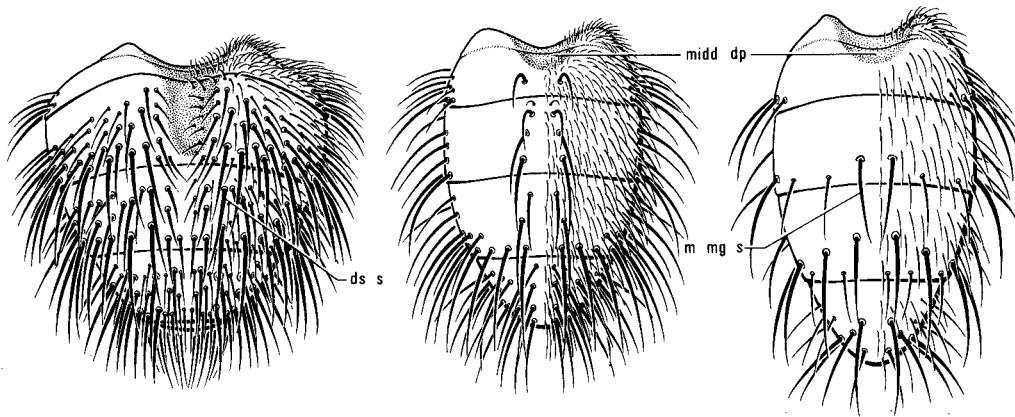
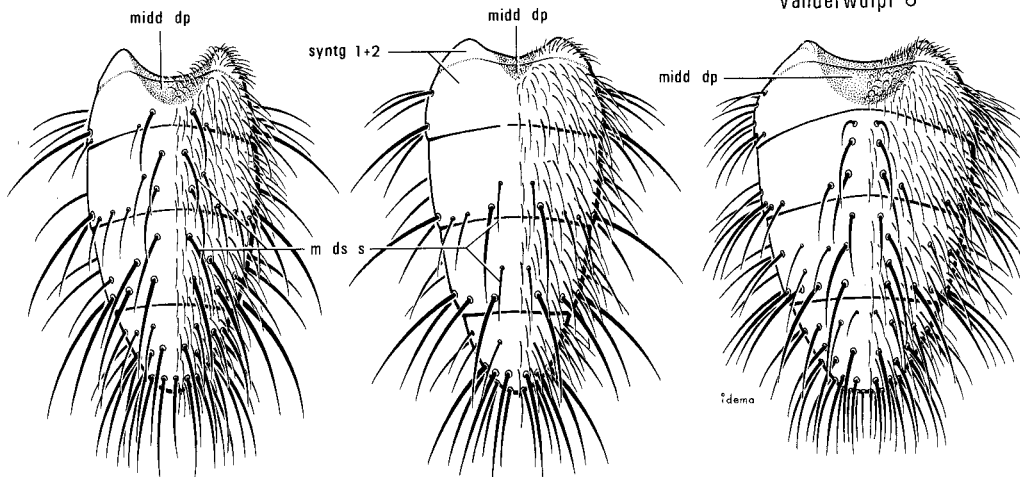


Figs. 110.215–230. Calypteres, legs, and hind coxae: dorsal views of left calypter of (215) *Hystricia abrupta* (Wiedemann), (216) *Lypha setifacies* (West), and (217) *Leucostoma simplex* (Fallén); lateral views of left foreleg of (218) *Admontia degeerioides* (Coquillett) and (219) *Opsomeigenia vexans* (Curran); (220) dorsal view of left fore tibia of *Opsomeigenia pusilla* (Coquillett); dorsal views of mid tibia of (221) *Myothyriopsis picta* (Wulp), (222) *Oswaldia assimilis* (Townsend), and (223) *Goniocera io* (Aldrich); posterior views of hind tibia of (224) *Trichopoda pennipes* (Fabricius), (225) *Leschenaultia leucophrys* (Wiedemann), (226) *Sisyropa alypiae* Sellers, and (227) *Blepharipa pratensis* (Meigen); posteroventral views of hind coxa and postmetacoxal area of (228) *Carcelia reclinata* (Aldrich & Webber), (229) *Epalpus signifer* (Walker), and (230) *Xanthomelanodes arcuatus* (Say).

Abbreviations: ad s, anterodorsal bristle; anepm s, anepimeral bristle; h cx, hind coxa; l calyp, lower calypter; pal wall, postalar wall; pmtcx brg, postmetacoxal bridge; p s, posterior bristle.

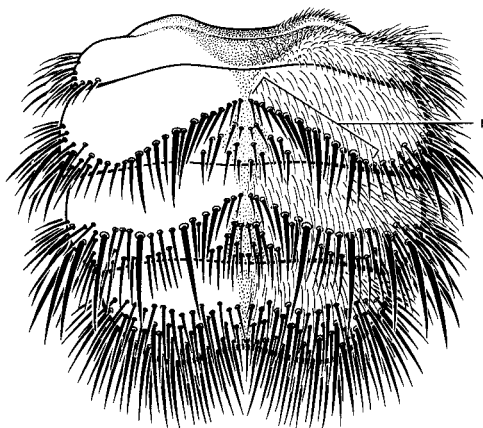
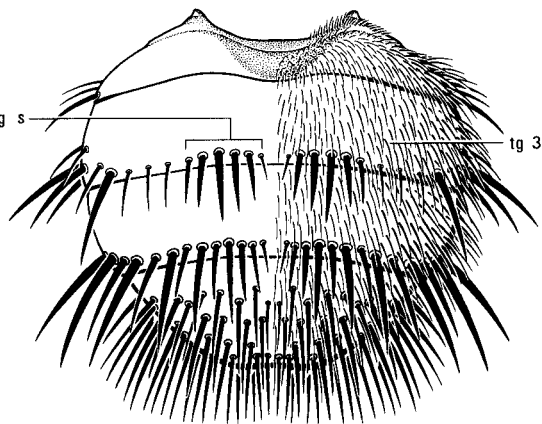
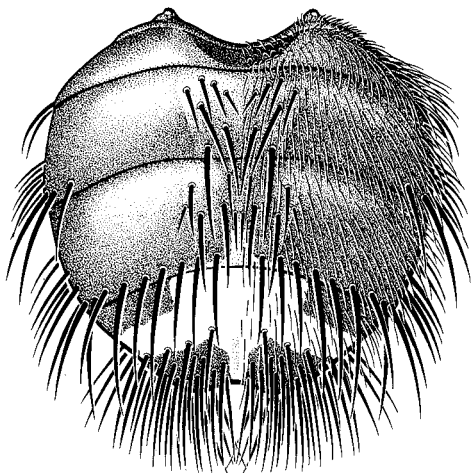
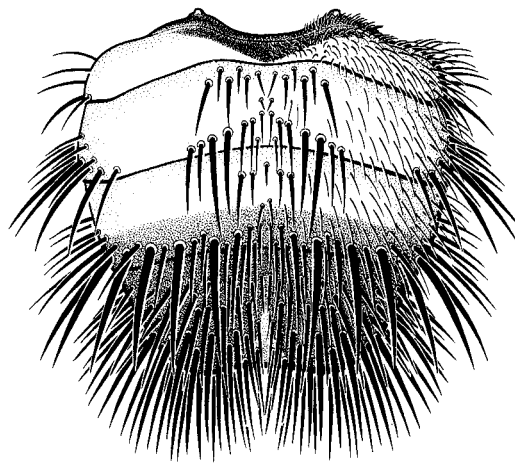
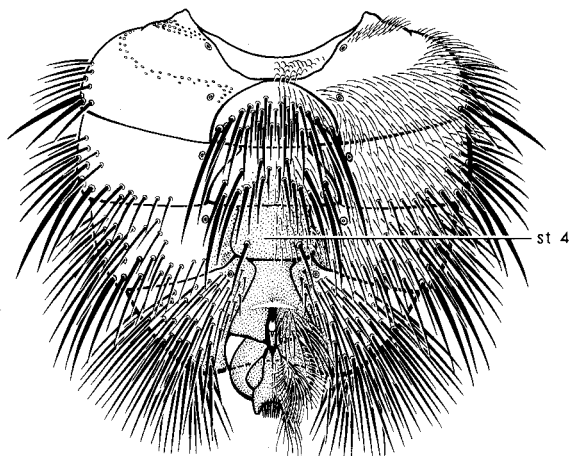
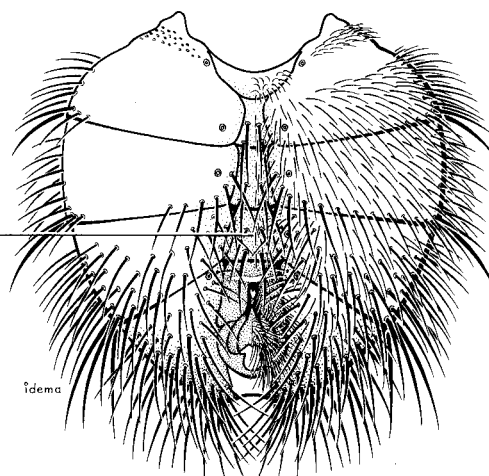
180. Eye covered with conspicuous dense hairs ..... 181  
 Eye apparently bare ..... 182
181. Abdominal tergites 3 and 4 each with only one pair of median discal bristles ..... *Jurinia* Robineau-Desvoidy  
 2 spp.; eastern  
 Abdominal tergites 3 and 4 almost completely covered with discal bristles (as in Fig. 234)  
 ..... *Jurinella* Brauer & Bergenstamm  
 1 sp., *lutzi* Curran; southwestern; Curran 1947
182. Palpus longer than height of head, flattened and parallel-sided, extending forward far beyond  
 lower facial margin (Fig. 145); proboscis long and slender, 1.5 or more times height of head  
 ..... *Adejeania* Townsend  
 1 sp., *vexatrix* (Osten Sacken); western; Curran 1947  
 Palpus not as long as head height, usually distinctly clubbed apically, but if apparently parallel-  
 sided (as in *Protodejeania*), then narrower than proboscis ..... 183
183. Abdominal tergite 3 with only one pair of median marginal bristles ..... 184  
 Abdominal tergite 3 with more than one pair (usually three or more pairs) of median marginal  
 bristles (Fig. 241) ..... 185
184. First flagellomere, even in male, small, subcircular, bluntly rounded or truncate apically, always  
 shorter than pedicel (Fig. 129) ..... *Tachina* Meigen<sup>45</sup>  
 39 spp.; widespread; Tohill 1924, Rowe 1931 (as *Fabriciella*)  
 First flagellomere kidney-shaped, somewhat pointed apically, in most species as long as, or  
 longer than, pedicel, even in female (Fig. 130); if first flagellomere shorter than pedicel (some  
 females), then abdominal tergites 2-4 bluish pruinose, contrasting with nonpruinose tergite 5  
 ..... *Archytas* Jaenicke  
 13 spp.; widespread; Ravlin and Stehr 1984
185. Abdominal tergites 3 and 4 each with a complete transverse row of marginal bristles displaced  
 anteriorly at midline enclosing a small patch of bristles between it and posterior margin of  
 tergite (Fig. 240) ..... *Paradejeania* Brauer & Bergenstamm  
 1 sp., *rutilioides* (Jaenicke); southwestern; Arnaud 1951  
 Marginal bristles all more or less equidistant from posterior margin of tergite (Fig. 241) ..  
 ..... 186
186. Abdominal tergites 3 and 4 without median discal bristles; tergite 3 with three to five pairs of  
 short stout median marginal bristles; the longest of these no more than twice as long as the  
 shortest (Fig. 241) ..... *Juriniopsis* Townsend  
 4 spp.; southern; Sabrosky 1969  
 Abdominal tergites 3 and 4 each with several pairs of discal bristles forming a median patch  
 or irregular transverse row; tergite 3 with a single pair of median marginal bristles and several  
 much shorter ones less than a third their length (as in Fig. 242) ..... 187
187. Base of wing and a small area around crossvein r-m darkened. Abdomen dark brown .....  
 ..... *Pararchytas* Brauer & Bergenstamm  
 2 spp.; widespread  
 Base of wing and area surrounding crossvein r-m not noticeably darker. Abdomen orange or  
 reddish ..... *Protodejeania* Townsend  
 2 spp.; western; Curran 1947
188. Abdomen black except for a triangular spot of white or gold pollen on tergite 5; tergite 3 with  
 two or three pairs of median marginal bristles; tergite 4 with group of discal bristles (Fig. 242)  
 ..... *Epalpus* Rondani  
 3 spp.; widespread  
 Abdomen orange, brown, or yellow with black apex; tergite 3 with more than four pairs of  
 median marginal bristles; tergite 4 without discal bristles (Fig. 243) ..... 189
189. Abdomen pale yellow on basal half, black on all of tergite 5 and adjacent margin of tergite 4  
 ..... *Xanthoepalpus* Townsend  
 1 sp., *bicolor* (Williston); western  
 Abdomen predominantly unicolorous, orange or brown ..... 190

<sup>45</sup> Included here are all species formerly placed in *Metopotachina* Townsend and *Nowickia* Wachtl.

231 *Blondelia hyphantriae* ♂232 *Diotrephes atriventris* ♂233 *Chlorohystricia cyaneiventris* ♂234 *Bombyliomyia soror* ♂235 *Pelatachina pellucida* ♂236 *Chaetonodexodes vanderwulpi* ♂237 *Oswaldia albifacies* ♂238 *Dinera grisescens* ♂239 *Ptilodexia rufipennis* ♂

Figs. 110.231-239. Dorsal views of abdomen: (231) *Blondelia hyphantriae* (Tothill); (232) *Diotrephes atriventris* (Walker); (233) *Chlorohystricia cyaneiventris* (Wulp); (234) *Bombyliomyia soror* (Williston); (235) *Pelatachina pellucida* Coquillett; (236) *Chaetonodexodes vanderwulpi* (Townsend); (237) *Oswaldia albifacies* (Townsend); (238) *Dinera grisescens* (Fallén); (239) *Ptilodexia rufipennis* (Macquart) (continued).

Abbreviations: ds s, discal bristle; m ds s, median discal bristle; midd dp, middorsal depression; m mg s, median marginal bristle; syntg, syntergite; tg, tergite.

240 *Paradejeania rutilioides* ♀241 *Juriniopsis floridensis* ♀242 *Epalpus signifer* ♀243 *Xanthoepalpus bicolor* ♀244 *Rhachoepalpus olivaceus* ♂245 *Parepalpus flavidus* ♂

Figs. 110.240–245. Abdomens: dorsal views of abdomen (*concluded*) of (240) *Paradejeania rutilioides* (Jaenicke), (241) *Juriniopsis floridensis* Townsend, (242) *Epalpus signifer* (Walker), and (243) *Xanthoepalpus bicolor* (Williston); ventral views of abdomen of male of (244) *Rhachoepalpus olivaceus* Townsend and (245) *Parepalpus flavidus* Coquillett. Abbreviations: m mg s, median marginal bristle; st, sternite; tg, tergite.

190. Abdomen orange; abdominal sternites narrow, overlapped by ventral edges of tergites (Fig. 245); tergite 3 with a pair of median marginal bristles and a single pair of median discal bristles ..... *Parepalpus* Coquillett  
1 sp., *flavidus* Coquillett; western; Curran 1947  
Abdomen ochrous brown pruinose, shinier and somewhat darker laterally and on apex of tergite 5; abdominal sternites broad, heavily bristled, overlapping tergites (Fig. 244); tergite 3 with uninterrupted row of marginal bristles ..... *Rhachoepalpus* Townsend  
1 sp., *olivaceus* Townsend; Arizona; Curran 1947
191. All four of the following characters present simultaneously (Fig. 64): only one frontal bristle arising below upper margin of pedicel; pedicel with one or two exceptionally long slender setae which are more than half as long as arista; arista pubescent or plumose; subvibrissal ridge with five or more slender bristles usually continuous with bristles of subcranial margin. Male with upper frontal bristles proclinate (Figs. 54, 55, 64) ..... 192  
Differing from the above in the following: frontal bristles usually descending below level of pedicel (Figs. 63, 65), but if not, then either setae on pedicel all shorter than half arista length or arista minutely pubescent or apparently bare; subvibrissal ridge usually with fewer than five bristles, usually not continuous with bristles along subvibrissal ridge. Male with upper frontal bristles reclinate ..... 218
192. Proepisternum setose (as in Fig. 166) ..... 193  
Proepisternum bare (as in Fig. 167), rarely with a single hair ..... 204
193. Proboscis long, slender, anteriorly curved at apex, more than twice as long as head height (Fig. 147) ..... *Prosenoides* Brauer & Bergenstamm  
3 spp.; western and southern; Reinhard 1954  
Proboscis at most 1.5 times as long as head height ..... 194
194. M ending in R<sub>4+5</sub> before reaching wing margin (as in Fig. 191) .....  
..... *Estheria* Robineau-Desvoidy, in part  
1 sp., *cinerea* (Townsend); western  
M ending separately in wing margin ..... 195
195. Middorsal depression on abdominal syntergite 1 + 2 confined to anterior half or less of that segment (Fig. 238). Median marginal bristles on this syntergite normally absent .....  
..... *Dinera* Robineau-Desvoidy  
1 sp., *grisescens* (Fallén); widespread  
Middorsal depression on abdominal syntergite 1 + 2 extending back to hind margin of that segment, or if not, then one pair of erect median marginal bristles present ..... 196
196. Large heavily spined species, over 1 cm long. Katepisternum with four or more bristles. Abdominal tergite 3 with transverse row of three or more pairs of median marginal bristles. Female abdomen entirely dark brown; abdomen of male brown on tergites 1-3, gold pruinose on tergites 4 and 5 ..... *Euchaetogyne* Townsend  
1 sp., *roederi* (Williston); Arizona, New Mexico  
Smaller more slender species than above, with fewer katepisternal and marginal bristles. Abdominal features not as above ..... 197
197. Integument and pruinose entirely pale orange brown. Proboscis and palpus both exceptionally short, shorter than arista. Lower half of face, in anterior view, high and narrow; vibrissa arising above lower facial margin (Fig. 80) ..... *Phasiops* Coquillett  
1 sp., *flavus* Coquillett; eastern U.S.A.  
Integument dark brown or black, with grayish pruinose. Proboscis well-developed. Palpus either normally developed or absent. Lower half of face not narrowed, and vibrissa arising at level of lower facial margin (Figs. 83, 84) ..... 198
198. Middorsal depression on abdominal syntergite 1 + 2 confined to anterior two-thirds of that segment (as in Fig. 237) ..... *Phalacrophyto* Townsend  
1 sp., *sarcophagina* (Coquillett); southcentral U.S.A.  
Middorsal depression on abdominal syntergite 1 + 2 reaching to or nearly to hind margin of that segment (as in Fig. 239) ..... 199



199. Face with at most a small carina that scarcely separates antennae (Fig. 83).....  
 ..... *Billaea* Robineau-Desvoidy<sup>46</sup>  
 9 spp.; widespread  
 Face with a prominent median carina, usually high enough to separate the antennae along their entire length (Fig. 84) ..... 200
200. Parafacial with setae over most of its length (as in Figs. 77-79).....  
 ..... *Dolichocodia* Townsend  
 2 spp.; southwestern  
 Parafacial bare or with a few minute scattered setae ..... 201
201. Proboscis slender, straight, about as long as height of head. Hind tibia of male with comb-like dorsolateral row of short evenly and closely set setae (as in Fig. 227) .....  
 ..... *Opsotheresia* Townsend  
 2 spp.; eastern  
 Proboscis stouter, shorter than height of head. Hind tibia of male without comb-like row of setae ..... 202
202. Facial carina widest and most prominent ventrally, below level of apices of antennae .....  
 ..... *Dexia* Meigen  
 1 introduced sp., *ventralis* Aldrich; New Jersey  
 Facial carina widest and most prominent near middle of face, between antennae ..... 203
203. Facial carina of rather uniform height, flattened along its crest, in anterior view widest near its midpoint, just below level of base of arista. Inner vertical bristles parallel or divergent (Fig. 54). Anterior genal margin straight or slightly concave, ending ventrally below eye well behind its midpoint ..... *Nicephorus* Reinhard  
 1 sp., *floridensis* Reinhard; southeastern  
 Facial carina more conical, most prominent at level of junction of pedicel and first flagellomere, with rounded crest (Fig. 84). Apices of inner vertical bristles convergent. Anterior genal margin convex, sometimes with a few small hairs extending across membrane of genal groove to lower corner of face ..... *Arctophyto* Townsend<sup>47</sup>  
 14 spp.; widespread; Curran 1924
204. Middorsal depression of abdominal syntergite 1 + 2 extending back to hind margin of that segment (as in Fig. 239) ..... 205  
 Middorsal depression of syntergite 1 + 2 smaller and shallower, not extending back to hind margin (as in Fig. 238) ..... 212
205. M ending in R<sub>4+5</sub> before reaching wing margin (as in Fig. 191) ..... 206  
 M ending separately in wing margin (as in Fig. 193) ..... 208
206. Proboscis exceptionally long and slender, longer than height of head, and curving forward apically (as in Fig. 110) ..... *Nimioglossa* Reinhard  
 2 spp.; southwestern  
 Proboscis shorter than head height ..... 207
207. Parafacial with short stout setae. Bend of M acute, the part beyond bend sinuous (as in Fig. 203). Proboscis exceptionally short. Face strongly narrowed in frontal view .....  
 ..... *Megaparia* Wulp  
 1 sp., *venosa* Wulp; southwestern  
 Parafacial bare. Bend of M obtuse, the part beyond bend nearly straight. Proboscis and face not so modified ..... *Orestilla* Reinhard  
 1 sp., *primoris* Reinhard; southwestern
208. Proboscis long and slender, longer than height of head (as in Fig. 110) ..... 209  
 Proboscis shorter and stouter, not as long as head height ..... 210
209. Face with a broad, flat-topped carina, completely separating antennae (as in Fig. 84) .....  
 ..... *Prosenia* Lepeletier & Serville  
 1 introduced sp., *siberita* (Fabricius); eastern U.S.A.  
 Face without a median carina ..... *Mochlosoma* Brauer & Bergenstamm  
 5 spp.; widespread; Reinhard 1958b

<sup>46</sup> Included here are all species formerly placed in *Eutheresia* Townsend, *Paratheresia* Townsend, and *Theresia* Robineau-Desvoidy.

<sup>47</sup> Also included here are the species formerly placed in *Ateloglossa* Coquillett, *Carinosillus* Reinhard, and *Vibrissotheresia* Reinhard.

210. Fronto-orbital plate outside of row of frontal bristles almost devoid of setae except near ocellar triangle (Fig. 55). Abdomen strongly pointed apically, especially in male ..... *Zelia* Robineau-Desvoidy<sup>48</sup>  
12 spp.; widespread  
Fronto-orbital plate with setae outside frontal bristles extending forward to below middle of eye. Abdomen rounded apically ..... 211
211. Abdominal tergites 3 and 4 each with weak, recumbent marginal bristles, but without discal bristles. An exceptionally large species, usually longer than 30 mm, with broad, uniformly dark brown abdomen ..... *Trixodes* Coquillett  
1 sp., *obesus* Coquillett; southwestern  
Abdominal tergites 3 and 4 each with strong erect marginal and discal bristles, the latter usually present as two pairs with one situated before the other (Fig. 239). Moderate-sized, about 10–15 mm long. Abdomen narrower, tapering, usually with variegated pruinose pattern ..... *Ptilodexia* Brauer & Bergenstamm  
23 spp.; widespread; Wilder 1979
212. M ending in R<sub>4+5</sub> before reaching wing margin (as in Figs. 192, 198) ..... 213  
M ending separately in wing margin (as in Fig. 193) ..... 214
213. Fused portion of R<sub>4+5</sub> and M shorter than crossvein r-m (Fig. 201); second costal portion (between apices of Sc and R<sub>1</sub>) three or more times as long as costal bristle (as in Fig. 203) ..... *Estheria* Robineau-Desvoidy, in part  
see couplet 194  
Fused portion of R<sub>4+5</sub> and M longer than crossvein r-m; second costal portion less than twice as long as costal bristle (Fig. 202) ..... *Microchaetina* Wulp, in part  
see couplet 101; Reinhard 1942a (in part, as *Hyphenomyia*)
214. Proboscis and palpus both exceptionally short, shorter than arista. Lower part of face, at and below level of vibrissae, narrowed, not protruding (as in Fig. 150). First flagellomere no longer than pedicel ..... 215  
Proboscis and palpus not so modified. Lower part of face not strongly narrowed (as in Fig. 149). First flagellomere distinctly longer than pedicel ..... 216
215. Parafacial with short stout setae. Bend of M acute, exceptionally close to hind margin of wing; the part beyond bend sinuous (Fig. 203). Clypeus long and narrow (Fig. 150). ..... *Megapariopsis* Townsend  
1 sp., *opaca* (Coquillett); southeastern U.S.A.  
Parafacial bare. Bend of M obtuse. Clypeus inverted U-shaped (Fig. 151) ..... *Eumegaparia* Townsend  
1 sp., *flaveola* (Coquillett); western
216. Abdominal syntergite 1 + 2 elongate and strongly constricted to form a cylindrical petiole ..... *Cordyligaster* Macquart  
1 sp., *septentrionalis* Townsend; eastern U.S.A.  
Base of abdomen not petiolate ..... 217
217. Wing strongly patterned, with the veins emphasized with dark brown (Fig. 209). Body predominantly yellow. Abdominal syntergite 1 + 2 without marginal bristles ..... *Euantha* Wulp  
1 sp., *litturata* (Olivier); central and eastern U.S.A.  
Wing unpatterned. Body blue gray. Abdominal syntergite 1 + 2 with one pair of median marginal bristles ..... *Ochrocera* Townsend  
1 sp., *vaginalis* Townsend; northeastern U.S.A., Quebec, Ontario
218. Scutellum with one to three straight nearly erect preapical bristles arising on dorsal surface just anterior to apex (Figs. 187, 188). Anterior margin of postgena with at most a slight genal dilation (Figs. 65–76). Last section of CuA<sub>1</sub> (beyond crossvein dm-cu) between half as long (Fig. 205) and twice as long (Fig. 204) as preceding section ..... 219  
Scutellum without a group of one to three long straight preapical bristles. Anterior margin of postgena usually with well-developed genal dilation. Last section of CuA<sub>1</sub> usually less than half as long as preceding section (as in Figs. 207–214) ..... 235

<sup>48</sup> Also included here are all species of the genera *Metadexia* Coquillett and *Minthozelia* Townsend.

219. Anepimeron with an exceptionally long stout bristle, extending beyond apex of lower calypter (as in Figs. 215, 216) . . . . . 220  
 Anepimeron with at most a short bristle not extending beyond middle of lower calypter (as in Fig. 217) . . . . . 222
220. Ultimate section of CuA<sub>1</sub> twice as long as preceding section (Fig. 204); extension of M beyond bend longer than portion of M between crossvein r-m and bend . . . . . *Goniochaeta* Townsend, in part  
 2 spp.; western  
 Ultimate section of CuA<sub>1</sub> about equal to or shorter than preceding section . . . . . 221
221. Parafacial with two or three long proclinate bristles (Fig. 65). R<sub>1</sub> and CuA<sub>1</sub> without setae dorsally . . . . . *Athrycia* Robineau-Desvoidy  
 1 sp., *cinerea* (Coquillett); widespread  
 Parafacial with only a few short setae below lowest frontal bristle (Fig. 66). R<sub>1</sub>, R<sub>4+5</sub>, and CuA<sub>1</sub> setose dorsally (as in Fig. 200) . . . . . *Hypovoria* Villeneuve<sup>49</sup>  
 2 spp.; widespread
222. M ending in R<sub>4+5</sub> well before wing margin (as in Figs. 198, 202, 212) . . . . . 223  
 M ending separately in wing margin (as in Figs. 193, 205, 209) . . . . . 225
223. Parafacial bristles arising in a row along anterior margin of parafacial, flanked laterally by smaller setae; none arising from a shiny black spot (Fig. 67) . . . . . *Uclesia* Girschner  
 3 spp.; western; Curran 1927a  
 Parafacial bristles arising nearer middle of parafacial; one or more usually arising from a shiny black spot (Figs. 68-70) . . . . . 224
224. Abdominal tergite 4, and usually 3 also, with median marginal bristles . . . . . *Wagneria* Robineau-Desvoidy  
 5 spp.; widespread; Reinhard 1955, in part  
 Abdominal tergites 3 and 4 each lacking differentiated marginal and discal bristles . . . . . *Kirbya* Robineau-Desvoidy<sup>50</sup>  
 5 spp.; widespread; Curran 1927a (as *Hesperophasia*)
225. Parafacial with a single large proclinate bristle arising just below lowest frontal bristle (Fig. 71) . . . . . *Voria* Robineau-Desvoidy  
 1 species complex; widespread  
 Parafacial with a row of proclinate bristles or patch of small decumbent setae (Figs. 72-76) . . . . . 226
226. Eye covered with long dense hairs (Fig. 72) . . . . . *Cyrtophleba* Rondani<sup>51</sup>  
 3 spp.; widespread  
 Eye apparently bare (as in Figs. 73-76) . . . . . 227
227. Sc with bristles ventrally; R<sub>1</sub> usually setose ventrally as well as dorsally, at least at apex (Fig. 205) . . . . . *Chaetoplagia* Coquillett  
 1 sp., *atripennis* Coquillett; widespread  
 Sc and R<sub>1</sub> bare ventrally . . . . . 228
228. Parafacial setae small and short, more or less uniform in length, none distinctly bristle-like (as in Fig. 66) . . . . . 229  
 Parafacial setae composed of bristles and hairs, differing distinctly in size, the bristles usually arranged in a vertical row (Figs. 73-76) . . . . . 230
229. Prementum slender, straight and as long as or longer than height of head; labella reduced, pointed apically (Fig. 148) . . . . . *Plagiomima* Brauer & Bergenstamm  
 10 spp.; widespread in U.S.A.; Aldrich 1926a  
 Prementum shorter than head height; labella usually enlarged . . . . . *Metaplagia* Coquillett<sup>52</sup>  
 6 spp.; widespread

<sup>49</sup> Included here are the two species formerly placed in *Catalinovia* Townsend.

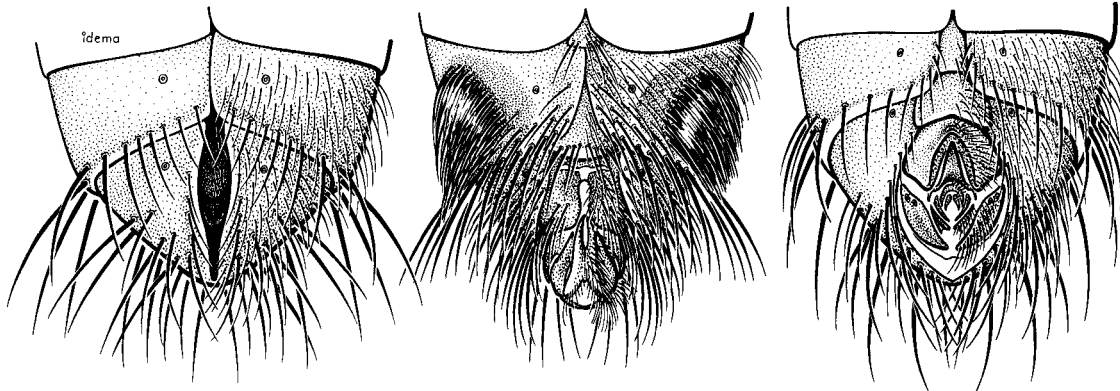
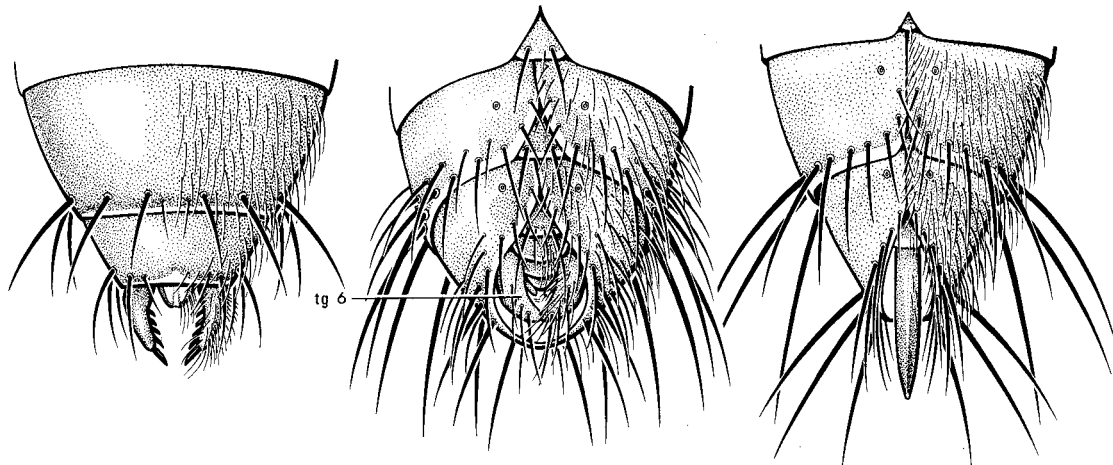
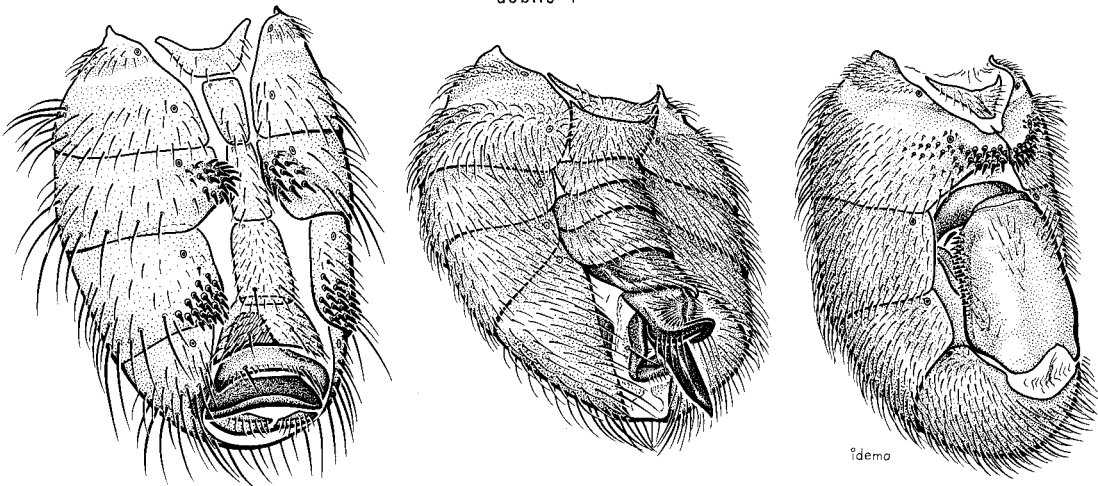
<sup>50</sup> This genus includes all species formerly placed in the tribe Hesperophasiini, viz. *Coleophasia* Townsend, *Hesperophasia* Townsend, and *Hesperophasiopsis* Townsend. The genus belongs to the tribe Voriini.

<sup>51</sup> Also included here is *Eucyrtophleba* Townsend.

<sup>52</sup> Also included here are the species formerly placed in *Anzamyia* Reinhard and *Metavoria* Townsend.

230. Parafacial bristles confined to lower part of parafacial; some of the largest arising on membrane between parafacial and ptilinal suture and on adjacent genal groove, anterior to silvery pruinose area of parafacial (Fig. 73) . . . . . *Menetus* Aldrich  
1 sp., *macropogon* (Bigot); California  
Parafacial bristles all arising from silvery pruinose area of parafacial . . . . . 231
231. Vibrissal axis (length of subcranial cavity) greater than antennal axis (distance from antennal base to back of head). Lower facial margin strongly protruding (Fig. 74). Lateral margins of subcranial cavity pinched in below eye . . . . . *Chaetovoria* Villeneuve  
1 sp., *seriata* (Aldrich); western, alpine  
Vibrissal axis less than antennal axis. Lower facial margin scarcely protruding (Fig. 76) or not visible in profile (Fig. 75). Lateral margins of subcranial cavity straight or convex . . . . . 232
232. Second aristemere elongate, more than 3 times as long as wide (Fig. 131) . . . . . 233  
Second aristemere not more than twice as long as wide . . . . . 234
233. Parafacial bristles arising close to ptilinal suture on a slightly raised ridge, which in profile obscures suture and that part of parafacial between suture and row of bristles. Lower facial margin not visible in profile . . . . . *Psilopleura* Reinhard  
1 sp., *arida* Reinhard; southwestern  
Parafacial bristles more removed from ptilinal suture; portion of parafacial between bristles and suture distinctly visible in profile (Fig. 76) . . . . . *Euptilopareia* Townsend  
2 spp.; widespread
234. Genal area greatly enlarged; subvibrissal ridge and subcranial margin together with about 10 or more bristles (Fig. 75). Arista thickened nearly to apex . . . . *Cockerelliana* Townsend  
1 sp., *capitata* Townsend; southwestern  
Genal area much smaller; subvibrissal ridge and subcranial margin with about five bristles (as in Fig. 76). Arista thickened on at most basal two-thirds . . . . . *Meleterus* Aldrich  
2 spp.; eastern and southwestern
235. Parafacial setose on lower half or more (as in Figs. 89-97) . . . . . 236  
Parafacial bare at least on lower half . . . . . 271
236. M ending in  $R_{4+5}$  well before wing margin; the united petiole at least half as long as that part of M beyond bend (Figs. 198, 211) . . . . . 237  
M ending separately in wing margin or in  $R_{4+5}$  very close to margin (Fig. 195) . . . . . 251
237. Arista pubescent (as in Fig. 125) . . . . . 238  
Arista bare . . . . . 239
238. M joining  $R_{4+5}$  nearly at right angles; wing mostly or entirely darkly pigmented (Fig. 4.75) . . . . . *Melanophora* Meigen (see Rhinophoridae, Ch. 109)  
M joining  $R_{4+5}$  at an acute angle; wing transparent . . . . . *Orthosimyia* Reinhard  
2 spp.; California
239. Abdominal tergites 3 and 4 lacking differentiated marginal and discal bristles. Small shining black species with fronto-orbital plate and all of parafacial shining black contrasting with thickened orange brown arista and antennal base (Fig. 77) . . . . . *Euscopolia* Townsend  
1 sp., *dakotensis* Townsend; widespread  
Abdominal tergite 4, and usually 3 also, with median marginal bristles. Parafacial usually pruinose . . . . . 240
240. Ocellar bristles reclinate (as in Figs. 2-4). Antennal bases separated from one another (as in Fig. 86). Calypter exceptionally large, white, extending over basal third of abdomen (Fig. 217). Apex of female abdomen with pincers-like cerci opposing one another horizontally, each with sharp apex and inner margin armed with peg-like setae (Fig. 249) . . . . . *Leucostoma* Meigen, in part<sup>53</sup>  
9 spp.; widespread; Reinhard 1956  
Ocellar bristles proclinate or absent. Antennal bases contiguous. Calypter not exceptionally large. Abdomen of female without modified pincer-like cerci . . . . . 241

<sup>53</sup> Also included here is *Calyptrosomus dapsilis* Reinhard.

246 *Hyphantrophaga blanda* ♀247 *Blepharipa pratensis* ♂248 *Phorocera webberi* ♀249 *Leucostoma simplex* ♀250 *Pseudopachystylum debile* ♀251 *Spathidexia clemonsi* ♀252 *Medina barbata* ♀253 *Phasia fenestrata* ♀254 *Besseria brevipennis* ♀

Figs. 110.246–254. Apices of abdomen: ventral views of (246) *Hyphantrophaga blanda* (Osten Sacken), (247) *Blepharipa pratensis* (Meigen), and (248) *Phorocera webberi* (Smith); (249) dorsal view of *Leucostoma simplex* (Fallén); ventral views of (250) *Pseudopachystylum debile* (Townsend) and (251) *Spathidexia clemonsi* Townsend; oblique ventral view of (252) *Medina barbata* (Coquillett), (253) *Phasia fenestrata* (Bigot), and (254) *Besseria brevipennis* (Loew). Abbreviation: tg, tergite.

241. Second aristemere three or more times as long as wide (Figs. 78, 79, 89) ..... 242  
 Second aristemere scarcely longer than wide ..... 245
242. First aristemere nearly as long as the second, both of them four or five times as long as wide (Fig. 89). Lower facial margin protruding beyond bases of vibrissae. Acrostichal bristles absent or hair-like ..... *Periscepsia* Gistel, in part<sup>54</sup>  
 8 spp.; widespread; Reinhard 1955 (as *Wagneria*, in part)  
 First aristemere less than half as long as the second. Lower facial margin not protruding. Acrostichal bristles well-developed ..... 243
243. Parafacial and fronto-orbital plate densely covered with bristles, each arising from a small tubercle (Fig. 78). Arista thickened almost to apex. Third flagellomere of male with basal bulge at point of insertion of arista. Abdominal tergite 3 lacking strongly differentiated median marginal bristles ..... *Paradmontia* Coquillett  
 2 spp.; widespread  
 Parafacial and fronto-orbital plate less densely covered with bristles, each arising flush with surface (Fig. 79). Arista tapering beyond midpoint to slender apex. Third flagellomere of male not swollen at base. Abdominal tergite 3 with distinct median marginal bristles ...  
 ..... 244
244. Anepimeron bare, except for a single large bristle accompanied by one or two smaller ones at its base ..... *Mauromyia* Coquillett  
 2 spp.; widespread in U.S.A.  
 Anepimeron with a group of small bristles ..... *Periscepsia* Gistel, in part  
 see couplet 242
245. Arista long and slender, of uniform thickness nearly to apex. Parafacial with a single vertical row of strong bristles arising very close to ptilinal fissure (Fig. 85) .....  
 ..... *Hypertrophocera* Townsend<sup>55</sup>  
 1 sp., *parvipes* Townsend; New Mexico  
 Arista thickened on basal three-fourths or less. Parafacial not as described ..... 246
246. Abdominal tergites 3 and 4 with median discal bristles (as in Fig. 237) ..... 247  
 Abdominal tergites 3 and 4 without discal bristles ..... 249
247. Prementum slender and elongate, 1.5 times head height, and curved forward (Fig. 110); labella minute, appearing as a continuation of prementum. Abdominal tergite 3 with two pairs of discal bristles, one ahead of the other and set far forward on the segment; hind margin of tergite 2 concave ..... *Trochilodes* Coquillett  
 2 spp.; widespread  
 Prementum not longer than head height; labella enlarged. Abdominal tergite 3 with a single pair of discal bristles ..... 248
248. Parafacial setae few, small, often only one present, confined to lower fourth of parafacial (as in Fig. 2) ..... *Loewia* Egger  
 1 introduced sp., *foeda* (Meigen); northeastern U.S.A., southern Ontario; Wood and Wheeler 1972  
 Parafacial setae long and erect, forming a row extending along entire length of parafacial (Fig. 90) ..... *Periscepsia* Gistel, in part  
 see couplet 242
249. Parafacial with scattered short decumbent setae .....  
 ..... *Phyto* Robineau-Desvoidy (see Rhinophoridae, Ch. 109)  
 Parafacial with row of erect bristles along anterior edge, sometimes flanked with shorter finer hairs (as in Fig. 95) ..... 250
250. Eye setose. Parafacial wider than width of first flagellomere in profile. Wing with long costal spine and dark anterior margin ..... *Muscopteryx* Townsend, in part<sup>56</sup>  
 10 spp.; widespread; Reinhard 1944a  
 Eye bare. Parafacial narrower than width of first flagellomere. Wing with short costal bristle and scarcely any dark pigment ..... *Paradidyma* Brauer & Bergenstamm, in part  
 see couplet 97

<sup>54</sup> Also included here is *Petinarctia stylata* (Brauer & Bergenstamm).

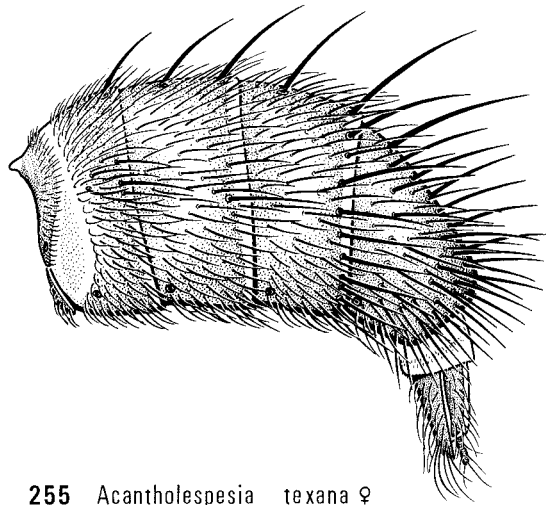
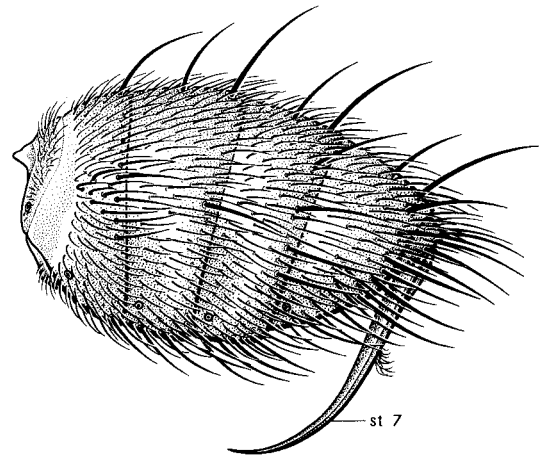
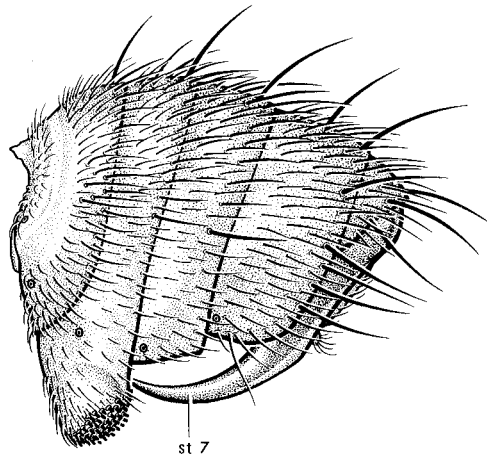
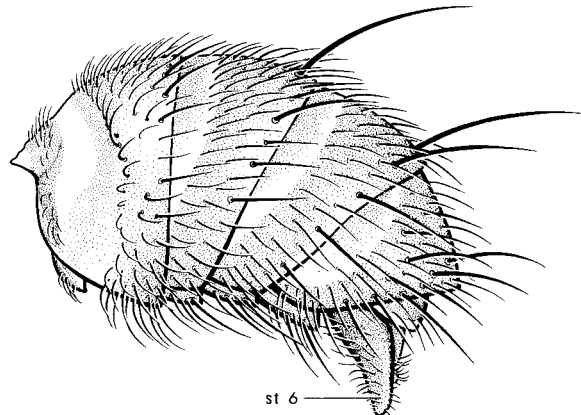
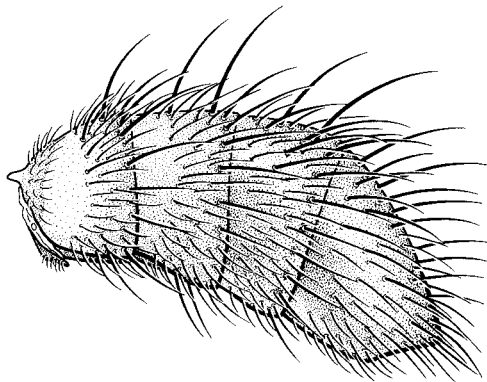
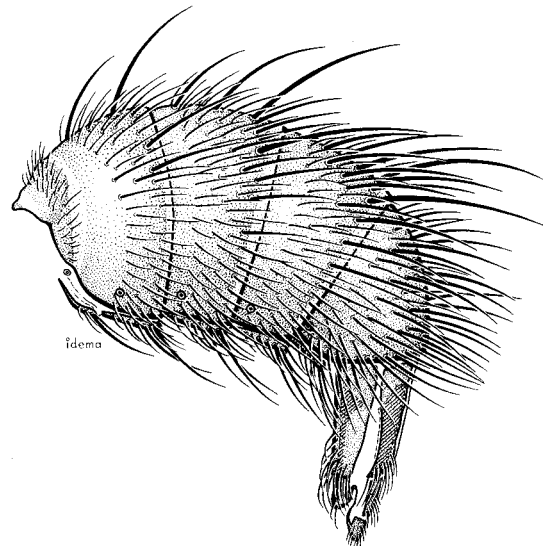
<sup>55</sup> Included here is *Euthyprosopa petiolata* Townsend.

<sup>56</sup> Included here, in addition to those species treated by Reinhard, are *Tarassophorus evexus* Reinhard and *Websteriana costalis* (Coquillett).

251. M gradually and evenly curved, without an abrupt bend (Fig. 206). Parafacial forming a narrow band encircling lower margin of eye, ending at its posteroventral corner . . . . .  
 . . . . . *Freraea* Robineau-Desvoidy  
 1 sp., *montana* (Coquillett); widespread
- M with a distinct bend (Figs. 207–214). Parafacial not encircling lower margin of eye, ending before posteroventral part of eye . . . . .252
252. Anterior border of postgena rather straight or concave, without pronounced genal dilation, meeting ventral cranial margin behind middle of head; genal groove thus rather extensive (as in Fig. 121) . . . . .253
- Anterior border of haired part of gena convex anteriorly, curving anteriorly to form a small to moderate genal dilation extending forward to a point anterior to middle of head; genal groove consequently much narrower (as in Figs. 4–6) . . . . .260
253. Median surface of fore coxa almost entirely covered with short appressed black setae (as in Fig. 153). Height of eye about half total height of head. Antenna small, recessed into small deep oval facial cavity (Fig. 82). Lower part of face long and narrow, with four or five pairs of large subvibrissal bristles above lower facial margin . . . . .254
- Median surface of fore coxa with setae confined to anterolateral edge. Height of eye more than half total height of head. Antenna and face not highly modified as above . . . . .255
254. Abdomen stout, polished black; tergite 3 usually with more than one pair of median marginal bristles . . . . .*Megaprosopus* Robineau-Desvoidy<sup>57</sup>  
 1 sp., *regalis* (Reinhard); Arizona
- Abdomen less stout, tessellated; tergite 3 with one pair of median marginal bristles . . . . .  
 . . . . .*Microphthalma* Macquart  
 4 spp.; widespread; Aldrich 1926c
255. Parafacial with a single row of bristles (Fig. 33) . . . . .  
 . . . . .*Paradidyma* Brauer & Bergenstamm, in part  
 see couplet 97
- Parafacial irregularly covered with setae of varying sizes . . . . .256
256. Ultimate section of CuA<sub>1</sub> twice as long as preceding section (Fig. 204); extension of M beyond bend longer than portion of M between crossvein r-m and bend. Parafacial with vertical row of short bristles . . . . .*Goniochaeta* Townsend, in part  
 see couplet 220
- Ultimate section of CuA<sub>1</sub> about equal to or shorter than penultimate section (as in Figs. 207–214) . . . . .257
257. Parafacial setae usually of two sizes, namely a single row of larger bristles along anterior margin of parafacial sometimes even arising from membrane anterior to it, flanked by smaller and finer setae laterally (Fig. 92). Integument of body of most species rather shiny, bluish or greenish black. Abdomen more than half as wide as long; tergite 6 and syntergosternite 7 + 8 exposed. Eye facets in male slightly larger on upper two-thirds of eye, and when densely haired, hairs longer above than below . . . . .*Gnadochaeta* Macquart  
 15 spp.; widespread; Townsend 1915 (as *Myiophasia*)
- Parafacial setae not so differentiated into two series. More slender species with narrower gray pruinose, transversely banded abdomen; tergite 6 and syntergosternite 7 + 8 mostly concealed beneath tergite 5. Eye facets not enlarged dorsally in male . . . . .258
258. Lower margin of head, when viewed in profile, almost as long as distance from antennal base to back of head; parafacial broad, with uniformly small setulae (Fig. 96). Prementum straight and slender, nearly as long as fore tibia; palpus minute, except in *californicus* (Coquillett) . . . . .*Meledonus* Aldrich<sup>58</sup>  
 6 spp.; western
- Lower margin of head less than two-thirds as long as distance from antennal base to back of head; parafacial with setae increasing in length ventrally (Fig. 93). Prementum less than half as long as fore tibia; palpus variable . . . . .259

<sup>57</sup> This species was described in the genus *Cochisemyia* Reinhard.

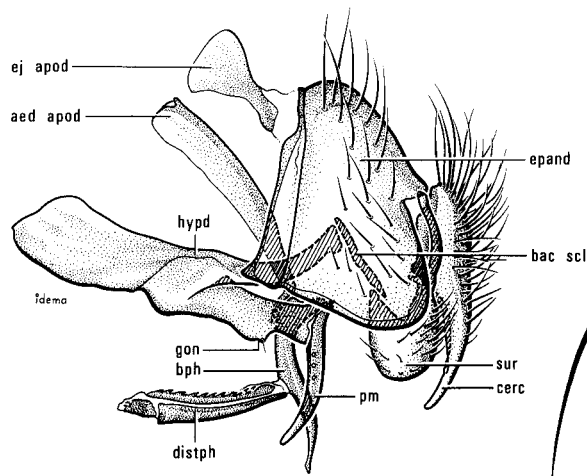
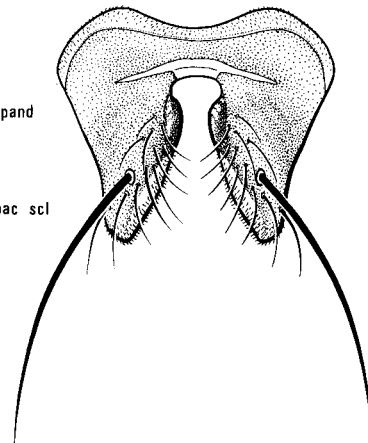
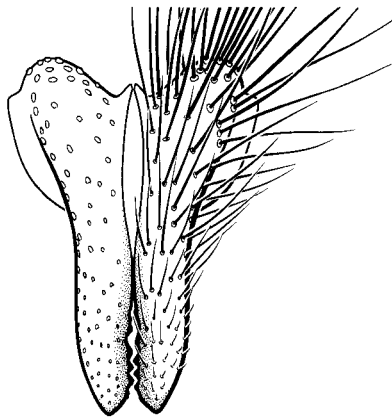
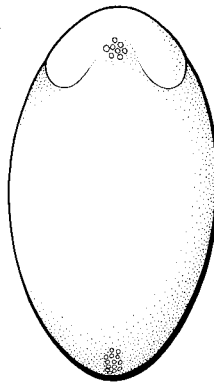
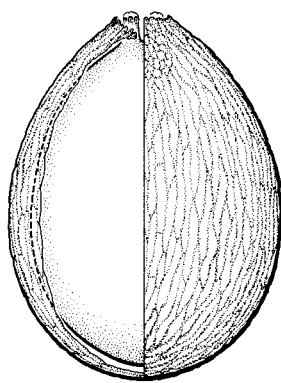
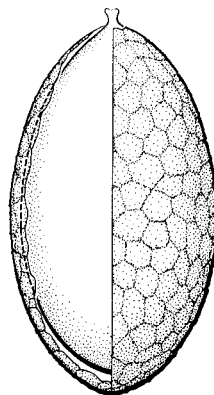
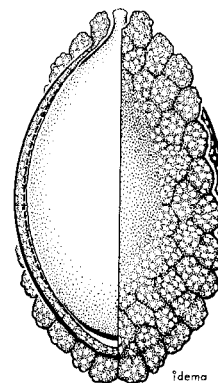
<sup>58</sup> Also included are the species formerly placed in *Athanatus* Reinhard and *Dyscolomyia* Reinhard.

255 *Acantholespesia texana* ♀256 *Eucelatoria texana* ♀257 *Celatoria diabroticae* ♀258 *Phyllophilopsis nitens* ♀259 *Dolichotarsus griseus* ♀260 *Steleoneura novemmaculata* ♀

Figs. 110.255–260. Lateral views of abdomen: (255) *Acantholespesia texana* (Aldrich & Webber); (256) *Eucelatoria texana* (Reinhard); (257) *Celatoria diabroticae* (Shimer); (258) *Phyllophilopsis nitens* (Coquillett); (259) *Dolichotarsus griseus* Brooks; (260) *Steleoneura novemmaculata* Wood.

Abbreviation: st, sternite.



261 *Eriothrix penitalis* ♂262 *Lixophaga variabilis* ♂263 *Phebellia epicydes* ♂264 *Parasetigena silvestris*265 *Phorocera webberi*266 *Euexorista futilis*267 *Eumasicera* sp.268 *Eumasicera coccidella*

Figs. 110.261–268. Male terminalia and eggs: (261) lateral view of left side of male terminalia of *Eriothrix penitalis* (Coquillett); (262) ventral view of sternite 5 of *Lixophaga variabilis* (Coquillett); (263) posterior view of cerci of *Phebellia epicydes* (Walker); dorsal views of egg of (264) *Parasetigena silvestris* (Robineau-Desvoidy) and (265) *Phorocera webberi* (Smith); dorsal views of microtype egg, with portion of dorsal surface removed, of (266) *Euexorista futilis* (Osten Sacken), (267) *Eumasicera* sp., and (268) *Eumasicera coccidella* Townsend.

Abbreviations: aed apod, aedeagal apodeme; bac scl, bacilliform sclerite; bph, basiphallus; cerc, cercus; distph, distiphallus; ej apod, ejaculatory apodeme; epand, epandrium; gon, gonopod; hypd, hypandrium; pm, paramere; sur, surstylus.

259. Anepimeron with one bristle extending back to hind margin of upper calypter. Female with tergite 6 longitudinally divided into two halves (Fig. 250). Male with unhinged aedeagus and well-developed gonopod (as in Figs. 2.138-2.141) . . . . . *Pseudopachystylum* Mik 1 sp., *debile* (Townsend); central and eastern  
 Anepimeron with hairs only. Female with tergite 6 undivided. Male with hinged aedeagus; gonopod reduced (as in Fig. 261) . . . . . *Phyllomya* Robineau-Desvoidy<sup>59</sup> 5 spp.; widespread
260. Middorsal depression of abdominal syntergite 1 + 2 extending back to hind margin of that segment (as in Figs. 231, 239); syntergite 1 + 2 lacking median marginal bristles . . . 261  
 Middorsal depression not extending back to hind margin of syntergite 1 + 2, usually not more than halfway back; syntergite 1 + 2 with median marginal bristles and sometimes with median discal bristles as well . . . . . 265
261. Palpus greatly reduced, parallel-sided, usually shorter than pedicel (Fig. 101) . . . . . *Linnaemya* Robineau-Desvoidy, in part<sup>60</sup> 8 spp.; widespread; Brooks 1944b (as several genera)  
 Palpus clavate, normal in length, longer than pedicel . . . . . 262
262. Bristles on lower part of parafacial reclinate, curved dorsally, forming an evenly spaced row that is continuous with frontal bristle row, and evidently an extension of it extending ventrally nearly to lower margin of parafacial (Fig. 104). First flagellomere of male sometimes divided longitudinally into two or three branches (Fig. 2.45) . . . . . *Dichocera* Williston, in part<sup>61</sup> 7 spp.; widespread  
 Bristles on lower part of parafacial proclinate, curved ventrally, separated from reclinate lowermost bristle of frontal row at level of insertion of arista . . . . . 263
263. Aristomeres 1 and 2 elongate, all three subequal in length (Fig. 132). R<sub>1</sub> and R<sub>4+5</sub> each setose dorsally along most of their length . . . . . *Triarthria* Stevens 1 introduced sp., *spinipennis* (Meigen); west coast, Newfoundland, Massachusetts  
 Aristomeres 1 and 2 scarcely longer than wide, much shorter than aristomere 3. R<sub>1</sub> bare and R<sub>4+5</sub> setose only at base, or bare . . . . . 264
264. Antennal bases widely separated by low facial carina (Fig. 86). Parafacial with fine hairs only. Antenna dark . . . . . *Ursophyto* Aldrich 1 sp., *nigriceps* (Bigot); western  
 Antennal bases contiguous or nearly so, and face without median carina. Parafacial with some bristles on lower part, as well as hairs. Antenna orange . . . . . *Lypha* Robineau-Desvoidy, in part see couplet 104
265. Wing patterned as in Fig. 210; bend of M extremely obtuse. Integument yellowish, translucent . . . . . *Chiricahuia* Townsend 1 sp., *cavicola* Townsend; Arizona  
 Wing unpatterned, transparent; bend of M more acute. Integument dark brown or black, opaque . . . . . 266
266. Parafacial with a single evenly spaced row of long, stout setae, increasing in size ventrally, usually also with some shorter finer hairs laterally (Fig. 95) . . . . . 267  
 Parafacial with scattered setae not arranged in a row . . . . . 269
267. Aristomere 2 three or more times as long as wide; aristomere 1 also longer than wide (as in Fig. 135). Subvibrissal ridge entirely separated from genal dilation by a branch of genal groove that extends ventrally to subcranial margin and is continuous with membrane supporting proboscis (as in Figs. 118, 142). Scutellum with long nearly equal lateral and subapical bristles as well as minute apical bristles (as in Fig. 185, except that lateral and subapical bristles more parallel to each other, and apicals smaller) . . . . . *Coloradomyia* Arnaud 1 sp., *eucosmaphaga* Arnaud; Colorado, Utah

<sup>59</sup> Included here are all species placed in *Gibsonomyia* Curran, *Pseudomorinia* Wulp, and *Dexia sensu* Sabrosky and Arnaud (1965: 1021) not Meigen.

<sup>60</sup> Also included are all species formerly assigned to *Bonnetia* Robineau-Desvoidy, *Nigrobonellia* Brooks, and *Thompsonomyia* Brooks.

<sup>61</sup> Also included are all species formerly placed in *Cacozelus* Reinhard, *Metamyia* Arnaud, and *Neodichocera* Walton; *orientalis* (Coquillett) and *tridens* Walton are distinct species and Fig. 2.45 is of the latter species.

- Aristomere 2 no more than twice as long as wide (as in Figs. 126, 128). Aristomere 1 minute. Subvibrissal ridge and genal dilation forming a continuous sclerite, only partially divided by a branch of genal dilation, and subvibrissal ridge with single even row of bristles extending back along lower cranial margin of postgena. Scutellum with long divergent lateral bristles and moderately long crossed apical bristles (as in Fig. 183) . . . . . 268
268. Aristomere 3 strongly swollen only on basal fourth or less, tapering abruptly to apex (as in Fig. 118). First flagellomere no longer than 1.5 times length of pedicel. Vibrissa arising above level of lower facial margin . . . . . *Muscopteryx*, in part see couplet 250
- Aristomere 3 thickened on basal third or more before tapering to apex. First flagellomere two or more times length of pedicel. Vibrissa arising at level of lower facial margin . . . . . *Blepharomyia* Townsend<sup>62</sup>  
3 spp.; widespread
269. Eye with short sparse hairs; each hair no longer than combined diameter of two or three facets . . . . . *Goniocera* Brauer & Bergenstamm  
1 sp., *io* (Aldrich); eastern
- Eye densely covered with conspicuous long hairs . . . . . 270
270. Pedicel with dense patch of stout erect bristles, each about as long as width of pedicel at point of attachment (Fig. 97). Longest parafacial hairs more than half as long as arista . . . . . *Metopomuscopteryx* Townsend  
3 spp.; western
- Pedicel with few, sparse hairs and one or two bristles, most shorter than width of pedicel (Fig. 94). Parafacial hairs at most less than one-third as long as arista . . . . . *Macquartia* Robineau-Desvoidy, in part<sup>63</sup>  
4 spp.; Canada and Alaska
271. Scutum without bristles except for one pair of each of the following: presutural supra-alar, posteriormost presutural dorsocentral, postsutural supra-alar, postsutural intra-alar, postsutural dorsocentral, and postsutural acrostichal; usually only one katepisternal bristle present, in posterodorsal corner (Fig. 171). Abdominal tergites without dorsal bristles . . . . . 272
- Scutum with two or more additional pairs of postsutural supra-alar, dorsocentral, and acrostichal bristles; katepisternum with two or more bristles (as in Figs. 172-178). Abdominal tergites usually with at least one pair of marginal bristles . . . . . 276
272. Hind tibia with dorsal longitudinal row of long flattened blade-like setae, each as long as width of tibia at its point of attachment, flanked by a second row of similarly shaped but much shorter setae (Fig. 224) . . . . . *Trichopoda* Berthold  
6 spp.; widespread
- Hind tibia lacking rows of long flattened setae . . . . . 273
273. Palpus minute, much shorter than pedicel (as in Fig. 96). Abdomen orange red without dark markings, convex dorsally, twice as long as wide, and covered with prominent recumbent black hairs, none of which is enlarged or bristle-like; apex of abdomen of female folded ventrally; ventral edges of tergite 2 studded with spine-like setae (Fig. 254) . . . . . *Besseria* Robineau-Desvoidy, in part<sup>64</sup>  
3 spp.; widespread
- Palpus well-developed, longer than pedicel and usually longer than antenna. Abdomen, if orange red, with dark markings; apex of abdomen of female not folded ventrally and not opposed by spine-like setae on ventral side of tergite 2 . . . . . 274
274. Abdomen flattened dorsally, distinctly longer than wide, usually dark colored, but if pale in ground color, then densely pruinose . . . . . *Phasia* Latreille<sup>65</sup>  
24 spp.; widespread; Brooks 1945*b*, as several genera
- Abdomen hemispherical dorsally, scarcely longer than wide, orange red in ground color, usually with dorsal dark markings, sometimes almost black in female . . . . . 275

<sup>62</sup> Included here are those species formerly assigned to *Ictericoephyto* Townsend.

<sup>63</sup> Included here are those species formerly assigned to *Alaskophyto* Townsend and *Myioclonia* Reinhard.

<sup>64</sup> Also included here are the species formerly placed in *Apinops* Coquillett and *Apostrophus* Loew.

<sup>65</sup> Also included here are the species formerly placed in *Alophorella* Townsend, *Hyalomya* Robineau-Desvoidy, *Paraphoranthella* Townsend, *Phasiomyia* Townsend, and *Phoranthella* Brooks.

275. Apex of scutellum without bristles; apical pair so widely separated and short that they appear as lateral bristles and cannot cross at their apices. Abdomen shiny, orange red with black markings, or sometimes entirely black, with short hairs each arising from a raised base, giving abdomen a somewhat rugose appearance. Pedicel and first flagellomere in most species elongate, extending to level of vibrissa (Fig. 87) ..... *Gymnosoma* Meigen<sup>66</sup>  
6 spp.; widespread; Brooks 1946, in part (as several genera)
- Apex of scutellum with the usual crossed pair of apical bristles (as in Fig. 190). Abdomen usually golden tomentose (in male) or gray tomentose (in female); intertergal sutures distinct. Pedicel and first flagellomere short, not extending to level of vibrissa (Fig. 88) .....  
..... *Gymnoclytia* Brauer & Bergenstamm  
6 spp.; widespread; Brooks 1946, in part (as several genera)
276. Postmetacoxal area sclerotized, i.e. posterior edges of metepimera extending posteromedially to meet each other at midline between hind coxae and base of first abdominal sternite, forming a postmetacoxal bridge (Fig. 230) .....277  
Postmetacoxal area membranous, distinctly paler in color than adjacent metepimera...279
277. Hind margin of eye indented (as in Fig. 111). Ocellar triangle extending forward to lunule as a polished brown strap-like sclerite (Fig. 58) ..... *Hemyda* Robineau-Desvoidy  
1 sp., *aurata* Robineau-Desvoidy; widespread
- Hind margin of eye straight or evenly convex. Ocellar triangle normal in shape, not dividing frontal vitta .....278
278. Palpus present. Vibrissae arising distinctly above lower margin of face. Legs yellowish basally, darkened apically ..... *Xanthomelanodes* Townsend  
5 spp.; widespread
- Palpus absent. Vibrissae level with lower margin of face. Legs entirely dark .....  
..... *Cylindromyia* Meigen<sup>67</sup>  
18 spp.; widespread; Aldrich 1926b
279. M ending in R<sub>4+5</sub> well before wing margin (Figs. 211, 212) .....280  
M ending in wing margin or in R<sub>4+5</sub> near margin (Figs. 213, 214) .....290
280. Ocellar bristles laterocline or slightly reclinate (as in Fig. 108). Calypter usually white, exceptionally large, extending beyond middle of syntergite 1 + 2 (Fig. 217). Apex of female abdomen with pincers-like cerci, each with sharp apex and peg-like setae on inner margin (Fig. 249) ..... *Leucostoma* Meigen, in part  
see couplet 240
- Ocellar bristles procline or absent. Calypter not extending back to middle of syntergite 1 + 2. Apex of female without pincers-like cerci (except in *Cinochira* and *Clairvillia*) .....281
281. Wing slender, usually darkened with whitish apex. M beyond bend meeting R<sub>4+5</sub> at right angles; R<sub>4+5</sub> + M twice as long as portion of M beyond bend (Fig. 211) .....  
..... *Catharosia* Rondani<sup>68</sup>  
5 spp.; widespread
- Wing not as described above; M not so abruptly bent anteriorly .....282
282. Large species, over 10 mm in length, slender, black, pepsid-like, with entirely black wings. Facial ridge with recumbent hairs (Fig. 98); upper part of parafacial with several mediocline setae ..... *Penthosia* Wulp  
1 sp., *satanica* (Bigot); Arizona, Mexico
- Smaller species, not entirely black with black wings, not resembling a pepsid wasp...283
283. Wing patterned with brown spots, bars, and triangles (Figs. 212, 214) .....284  
Wing transparent, unpatterned .....285
284. Face with prominent oval central tubercle or carina (Fig. 122). Antenna long, cylindrical; pedicel and first flagellomere each as long as arista. Lunule without setae. Thorax black. Apex of cell r<sub>4+5</sub> dark (Fig. 212) ..... *Euthera* Loew  
3 spp.; widespread; Brooks 1945a

<sup>66</sup> Also included here is *amplifrons* (Brooks), placed in *Cistogaster* Latreille by Sabrosky and Arnaud (1965).

<sup>67</sup> Also included here is *Ichneumonops mirabilis* Townsend.

<sup>68</sup> Also included here are the species formerly placed in *Procatharosia* Villeneuve.

- Face with at most a low indistinct keel-like carina between antennae. Antenna short; length of pedicel and first flagellomere together no longer than arista. Lunule, in some species, with setulae (Fig. 59). Thorax yellow or pale brown. Apex of cell  $r_{4+5}$  transparent (Fig. 214) ..... *Oestrophasia* Brauer & Bergenstamm<sup>69</sup>  
4 spp.; widespread
285. Proboscis extremely long and slender, curving forward, longer than height of head (Fig. 112). Face pruinose, with thickened flat-topped carina separating very short antennae. Tergite 7 of female divided medially into two spine-covered lobes ..... *Imitomyia* Townsend  
1 sp., *sugens* (Loew); central and western  
Proboscis not exceptionally long, shorter than height of head. Face without a prominent carina. Tergite 7 of female abdomen without spine-covered lobes ..... 286
286. Eye very large, occupying almost all of side of head; gena reduced to a narrow band less than one-tenth height of head (Fig. 99) ..... *Strongygaster* Macquart, in part<sup>70</sup>  
4 spp.; widespread; Brooks 1942 (as *Clistomorpha*)  
Gena much wider, one-sixth height of head or more ..... 287
287. Eye covered with conspicuous dense hair. Facial ridge with setae on lower two-thirds or more; the uppermost of these setae situated at level of lowest frontal bristles; frontal bristles extending ventrally below level of base of arista (Fig. 100) ..... *Mactomyia* Reinhard  
1 sp., *fracida* Reinhard; western  
Eye bare. Setae of facial ridge, if present, well below level of lowest frontal bristle; frontal bristles not descending to level of base of arista ..... 288
288. Inner vertical bristles long and stout, more than two-thirds as long as height of eye (Fig. 107) ..... *Vanderwulpia* Townsend<sup>71</sup>  
2 spp.; southwestern  
Inner vertical bristles much less than one-fourth as long as height of eye, or absent ... 289
289. Antennae separated at base by a distance at least equal to width of scape (as in Figs. 80, 86). All abdominal setae rather weak and uniform in size, not distinctly differentiated into bristles and hairs ..... *Rondania* Robineau-Desvoidy  
1 sp., *dimidiata* (Meigen); Alaska, northwestern Canada  
Antennae contiguous at base. Abdominal setae distinctly differentiated into marginal and discal bristles and much shorter hairs; these hairs no longer than one-third the length of the bristles ..... *Clastoneuriopsis* Reinhard, in part  
see couplet 117
290. Eye almost entirely covered with long hairs ..... 291  
Eye apparently bare ..... 308
291. Ocellar bristles posterolaterally inclined (Fig. 108); facial ridge with row of stout erect evenly spaced bristles. Proepisternum with pale hairs (as in Fig. 166) .....  
..... *Campylochaeta* Robineau-Desvoidy  
11 spp.; widespread; Reinhard 1952, Sabrosky 1975 (as *Chaetophlepsis*)  
Ocellar bristles proclinate or absent; facial ridge bare or with recumbent setae on lower half. Proepisternum bare ..... 292
292. Palpus reduced, parallel-sided, usually shorter than pedicel (Fig. 101) .....  
..... *Linnaemya* Robineau-Desvoidy, in part  
see couplet 261  
Palpus clavate, normal in length, longer than pedicel ..... 293
293. Body and most of head metallic green or blue .....  
..... *Gymnocheta* Robineau-Desvoidy, in part  
see couplet 7  
Body and head yellowish brown or black, not metallic green ..... 294

<sup>69</sup> Also included here are the species formerly placed in *Cenosoma* Wulp.

<sup>70</sup> Included here are all species formerly placed in *Clistomorpha* Townsend and *Hyalomyodes* Townsend.

<sup>71</sup> Also included here are the species formerly placed in *Catemphrys* Townsend.

294. Middle basal bristle of postpronotum displaced anterolaterally, arising between anterior bristle and outer basal bristle or lateral to a line between them, and forming a nearly right-angled triangle with outer and inner basal bristles (as in Figs. 157, 159) . . . . . 295  
 Middle basal bristle of postpronotum in line with outer and inner basal bristles (as in Figs. 158, 160) . . . . . 299
295. Face convex, visible in profile; lower margin protruding anterior to vibrissal angle (Fig. 102) . . . . . 296  
 Face flat or deeply concave; neither central part nor lower margin visible in profile . . . . . 297
296. Scutellum with three or more pairs (basal, lateral, and subapical) of divergent bristles, and usually also with a small pair of crossed apical bristles (as in Fig. 185) . . . . . *Panzeria* Robineau-Desvoidy<sup>72</sup>  
 28 spp.; widespread; Tothill 1921 (as *Ernestia*), Brooks 1943 (as several genera)  
 Scutellum with only two pairs (basal and subapical) of scutellar bristles, both pairs divergent (as in Fig. 186) . . . . . *Neosolieria* Townsend  
 1 sp., *sila* (Reinhard); California, Utah
297. Abdominal tergite 5 orange, contrasting with dark preceding tergites; tergites 3 and 4 each with two pairs of discal bristles, with one pair anterior to the other (as in Figs. 235, 239) . . . . . *Hineomyia* Townsend  
 1 sp., *setigera* (Coquillett); eastern  
 Abdominal tergites concolorous; tergites 3 and 4 each with one pair of discal bristles or none . . . . . 298
298. Large species, over 8 mm, shiny black or dark reddish brown, with yellow upper and lower calypteres and wing base. Antenna black . . . . . *Melanophrys* Williston<sup>73</sup>  
 2 spp.; widespread  
 Small species, less than 6 mm, grayish brown to blackish, pruinose, with white calypteres and wing base. Antenna orange . . . . . *Hyalurgus* Brauer & Bergenstamm<sup>74</sup>  
 2 spp.; central and eastern
299. Anepimeral bristle well-developed, extending back well beyond middle of lower calypter (Fig. 216) . . . . . 300  
 Anepimeral bristle shorter, not extending to middle of lower calypter . . . . . 303
300. Arista thickened nearly to apex (as in Figs. 127, 128) . . . . . 301  
 Arista thickened on less than basal half, tapering before middle to long thread-like apex . . . . . 302
301. Frontal bristles extending ventrally, in an evenly spaced row, nearly to lower margin of parafacial (Fig. 104). First flagellomere of male sometimes divided longitudinally into two or three branches (Fig. 2.45) . . . . . *Dichocera* Williston, in part see couplet 262  
 Frontal bristles extending ventrally only to level of base of first flagellomere (as in Fig. 105); parafacial with a few hairs below lowest frontal bristle. Antenna of male undivided . . . . . *Ostracophyto* Townsend  
 1 sp., *aristalis* Townsend
302. Vibrissae arising distinctly above level of lower facial margin; facial margin protruding forward, visible in lateral view (Fig. 106) . . . . . *Spilochaetosoma* Smith  
 1 sp., *californicum* Smith; western  
 Vibrissae arising at same level as lower margin of face; facial margin not visible in lateral view . . . . . return to 104
303. Middorsal depression on abdominal syntergite 1 + 2 extending back to hind margin of syntergite (as in Fig. 231) . . . . . 304  
 Middorsal depression scarcely extending back beyond middle of syntergite . . . . . 306

<sup>72</sup> Included here are all species formerly placed by Sabrosky and Arnaud (1965) in *Appendicia* Stein, *Melinocera* Townsend, *Mericia* Robineau-Desvoidy, *Metaphyto* Coquillett, *Promericia* Brooks, and *Pseudomeriana* Brooks—almost all the members of the tribe Ernestiini. Although *Ernestia* Robineau-Desvoidy is a more familiar generic name, this name was synonymized with *Panzeria* by Robineau-Desvoidy himself. Relationships with Palaeartic species now placed in *Ernestia*, *Eurithia* Robineau-Desvoidy, and *Fausta* Robineau-Desvoidy remain to be ascertained.

<sup>73</sup> Included here is *Atropharista insolita* (Walker).

<sup>74</sup> Included here are the species formerly placed in *Xanthocera* Townsend.

304. Anterior and posterior lappets of posterior thoracic spiracle nearly equal in size; each lappet composed of a row of plumose hair-like extensions (as in Fig. 169). Lower margin of face not protruding beyond vibrissal angle ..... *Uramya* Robineau-Desvoidy<sup>75</sup>  
7 spp.; widespread
- Anterior and posterior lappets unequal in size; posterior lappet subcircular (as in Fig. 170). Lower margin of face protruding well beyond vibrissal angle (Fig. 116) ..... 305
305. Distance between eye and lower cranial margin three or more times width of parafacial (Fig. 116). Arista strongly thickened on at least basal third. Palpus slender, not abruptly clubbed. Ocellar setae of female, and of both sexes of *arctica* (Sack), latero-clinate .....  
..... *Trafoia* Brauer & Bergenstamm<sup>76</sup>  
2 spp.; widespread
- Distance between eye and lower cranial margin about equal to width of parafacial. Arista slender, even at base. Palpus clubbed apically. Ocellar setae of female proclinate .....  
..... *Eriothrix* Meigen  
1 sp., *penitalis* (Coquillett); eastern
306. Base of R<sub>4+5</sub> without setae, dorsally or ventrally. Scutellum with lateral, subapical, and apical bristles all more or less equivalent in size; apical bristles parallel or divergent (Fig. 189). Antennal axis of head 1.5 times that of vibrissal axis (Fig. 118) .....  
..... *Cleonice* Robineau-Desvoidy<sup>77</sup>  
3 spp.; widespread
- Base of R<sub>4+5</sub> with setae both dorsally and ventrally. Scutellum with stout divergent lateral bristles, short weak subapical bristles, and stout crossed apical bristles. Antennal axis of head less than 1.5 times that of vibrissal axis ..... 307
307. Genal groove relatively large, triangular, formed by separation of parafacial and genal dilation from vibrissal angle (Fig. 94). Eye height about two-thirds height of head. Three postsutural intra-alar bristles present ..... *Macquartia* Robineau-Desvoidy, in part  
see couplet 270
- Genal groove nearly obliterated by the meeting of genal dilation, parafacial, and vibrissal angle (Fig. 119). Eye height about four-fifths height of head. Two postsutural intra-alar bristles present .....  
..... *Dufouria* Robineau-Desvoidy  
1 sp., *americana* (Reinhard); Ohio, Northwest Territories
308. Palpus minute, shorter than pedicel, or absent ..... 309  
Palpus well-developed, longer than pedicel ..... 312
309. Hind margin of eye indented (Fig. 111). Prementum slender, elongate, more than twice as long as height of head. Abdomen orange red, slender, contrasting with dark wings .....  
..... *Beskia* Brauer & Bergenstamm  
1 sp., *aelops* (Walker); southern
- Hind margin of eye straight or evenly convex. Prementum shorter than height of head. Abdomen and wings not as above ..... 310
310. Larger species, 10 mm or more in length. Head and body mostly yellowish or pale brownish pruinulent. Abdomen slender, pointed apically. Apical scutellar bristles about half as long as subapical scutellar bristles; lateral scutellar bristles undeveloped .....  
..... *Ervia* Robineau-Desvoidy  
1 sp., *triquetra* (Olivier); eastern U.S.A.
- Smaller species, under 7 mm in length. Head and body mostly black or gray. Abdomen black. Apical scutellar bristles as long as lateral scutellar bristles; subapical scutellar bristles reduced (as in Fig. 181) ..... 311
311. Abdominal sternites unsclerotized; edges of tergites widely separated midventrally, connected by pale membrane, with terminalia tucked into resulting cavity (Fig. 254); intersegmental junction between tergites 4 and 5 more prominent than between tergites 2 and 3 or tergites 3 and 4. Cell r<sub>4+5</sub> opening at apex of wing (as in Fig. 199) .....  
..... *Besseria* Robineau-Desvoidy, in part  
see couplet 273

<sup>75</sup> Included here are all species included by Sabrosky and Arnaud (1965) in the tribe Uramyiini, viz. *Anaporina* Townsend, *Paraporina* Townsend (mistakenly regarded as Nearctic), *Pseudeuanta* Townsend, and *Uramya* Robineau-Desvoidy. *U. aldrichi* Reinhard, although not considered as occurring north of Mexico, evidently occurs in Arizona and Texas.

<sup>76</sup> Also included here is *Tenuirostra arctica* (Sack).

<sup>77</sup> Included here are all species formerly placed in *Grisdalemyia* Curran.

- Abdominal sternites fully sclerotized; connecting edges of tergites with little or no membrane exposed; intersegmental junctions between tergites 2-5 all equally well-defined. Cell  $r_{4+5}$  ending before apex of wing ..... *Pseudapinops* Coquillett  
2 spp.; widespread
312. Ocellar setae inclined laterally or posterolaterally (as in Fig. 108) .....313  
Ocellar setae proclinate or absent .....314
313. Proboscis long and slender (as in Figs. 110-112). Frons (at antennal bases) and lower facial margin prominent in lateral view. Cerci of female minute, unmodified .....  
..... *Evidomyia* Reinhard  
1 sp., *infida* Reinhard; California
- Proboscis no longer than height of head. Frons not prominent and lower facial margin scarcely visible in lateral view. Cerci of female strongly sclerotized, forming a pincers-like organ for grasping host (as in Fig. 249) ..... *Clairvillia* Robineau-Desvoidy  
3 spp.; western
314. M nearly straight, extending to wing margin without an abrupt bend (thus resembling a muscid or acalyptate, as in Fig. 206). Abdomen of female long, slender, and tapering; cerci forming a pincers-like organ for grasping host (as in *Leucostoma* and *Clairvillia*, Fig. 249)  
..... *Cinochira* Zetterstedt  
1 sp., *mitis* (Reinhard); Texas
- M with a distinct angular bend. Abdomen broader; female without pincers-like organ for grasping host .....315
315. Medial surface of fore coxa entirely covered with appressed setulae (as in Fig. 153) .....  
..... *Thelaira* Robineau-Desvoidy  
2 spp.; widespread
- Medial surface of fore coxa bare (as in Figs. 154, 155); appressed setulae confined to anteromedial surface with bare area medially .....316
316. Lower proepimeral bristle well-developed, directed anteroventrally, in opposite direction to upper proepimeral bristle (Fig. 167) ..... *Neaera* Robineau-Desvoidy<sup>78</sup>  
4 spp.; central and eastern U.S.A.
- Lower proepimeral bristle absent, or reduced in size and directed dorsally, parallel to upper proepimeral (as in Fig. 166) .....317
317. M not reaching wing margin, ending about where bend should be (Fig. 4.74) .....318  
M reaching wing margin, with bend in usual position .....319
318. Facial ridge and vibrissal angle exceptionally prominent, extending forward as a fold or flange (Fig. 109); facial ridge with an irregular row of short decumbent setulae .....  
..... *Bezzimyia* Townsend  
1 sp., *americana* (Curran); southern
- Facial ridge bare; vibrissal angle not exceptionally prominent .....  
..... *Besseria* Robineau-Desvoidy, in part  
see couplet 273
319. Vibrissa not distinctly differentiated; genal groove exceptionally large; postgenal margin rather straight and vertical, ending below eye (Fig. 121) .....320  
Vibrissa distinctly differentiated (as in Fig. 120); postgenal margin extending forward below eye forming a distinct genal dilation (as in Figs. 122-124) .....321
320. Katepisternum with two bristles; in some specimens a small third bristle present anterior to anteriormost large bristle (Fig. 172); two postsutural supra-alar bristles present .....  
..... *Eutrixia* Coquillett  
2 spp.; widespread
- Katepisternum with only one bristle (as in Fig. 171); three postsutural supra-alar bristles present .....  
..... *Isidotus* Reinhard  
1 sp., *incanus* Reinhard; Arizona

<sup>78</sup> Included here is *Acronarista mirabilis* Townsend, and the species formerly placed in *Acronaristopsis* Townsend, *Dichaetoneura* Johnson, and *Euryceromyia* Townsend.



321. Prosternum inflated (Fig. 155) ..... *Ormia* Robineau-Desvoidy  
7 spp.; widespread, U.S.A., southern Canada; Sabrosky 1953a, 1953b (as *Ormia* and *Euphasiopteryx*  
Townsend)  
Prosternum normal ..... 322
322. Face convex, visible in lateral view, at least on lower half (Figs. 114, 115, 120) ..... 323  
Face concave at least on upper half, not visible in profile except sometimes at vibrissal angle  
..... 329
323. Mid tibia with only one anterodorsal bristle or none (as in Fig. 221) ..... 324  
Mid tibia with two or more anterodorsal bristles (as in Fig. 222) ..... 327
324. Pleuron with dense tufts of long white plumose hairs (Fig. 168) ..... *Leskiopsis* Townsend  
1 sp., *thecata* (Coquillett); eastern U.S.A.  
Pleural hairs not plumose and not especially long or dense ..... 325
325. R<sub>4+5</sub> setose more than halfway to crossvein r-m (as in Fig. 199). Postpronotum with a small  
anterolateral bristle in addition to the basal bristles (Fig. 161) ..... *Genea* Rondani<sup>79</sup>  
7 spp.; widespread; James 1947 (as several genera)  
R<sub>4+5</sub> with a few setae at base only. Postpronotum lacking an anterolateral bristle (as in Fig. 160)  
..... 326
326. Mid tibia with one anterodorsal bristle ..... *Leskia* Robineau-Desvoidy<sup>80</sup>  
3 spp.; widespread  
Mid tibia without an anterodorsal bristle ..... *Drepanoglossa* Townsend<sup>81</sup>  
2 spp.; western
327. Arista short plumose along its entire length; longest hairs longer than greatest width of arista  
(as in Figs. 125, 134) ..... *Trochiloleskia* Townsend  
1 sp., *loriola* (Reinhard); southern Texas  
Arista bare, or nearly so; the longest hairs shorter than width of arista (Fig. 133) ..... 328
328. Arista thickened on basal two-thirds or more, tapering abruptly to slender apex (Fig. 133).  
Prementum longer than fore femur ..... *Aphria* Robineau-Desvoidy  
2 spp.; widespread  
Arista thickened on less than basal half, tapering gradually and uniformly to apex (Fig. 134).  
Prementum shorter than fore femur ..... *Solieria* Robineau-Desvoidy<sup>82</sup>  
5 spp.; widespread
329. Prementum long and slender, often curved posteriorly, at least as long as height of eye, and  
in most species longer than height of head (Figs. 113-115); labella minute, pointed, scarce-  
ly wider than apex of prementum ..... 330  
Prementum shorter than height of eye; labella normal, pad-like ..... 332
330. Posterior margin of eye slightly concave (Fig. 114). Antenna arising near level of middle of  
eye; first flagellomere no longer than half height of eye. Scutellum with well-developed lateral  
bristles (as in Fig. 179) ..... *Epigrimyia* Townsend  
2 spp.; central and eastern U.S.A.  
Posterior margin of eye convex (Figs. 113, 115). Antenna arising near upper margin of eye;  
first flagellomere large in both sexes, as long as height of eye. Scutellum lacking lateral  
bristles (as in Fig. 186) ..... 331
331. Membrane between lower facial margin and clypeus with a pair of convex subtriangular sclerites  
(as in Fig. 152). Aristomere 2 elongate, two or more times as long as wide; first flagellomere  
truncate, widest beyond middle (Fig. 113) ..... *Clausicella* Rondani<sup>83</sup>  
8 spp.; widespread; Reinhard 1946c (as *Siphophyto*)

<sup>79</sup> Also included are all species formerly assigned to *Dejeaniopalpus* Townsend, *Jaynsleskia* Townsend, *Leskiella* James, *Leskiomima* Brauer & Bergenstamm, and *Siphoclytia*, including *pavonacea* (Reinhard).

<sup>80</sup> Included here are all species formerly assigned to *Eumyobia* Townsend, *Myobiopsis* Townsend, and *Sipholeskia* Townsend.

<sup>81</sup> Also included is *Philocalia tenuirostris* Reinhard.

<sup>82</sup> Included here is *Solieriopsis boreotis* Reinhard, and, provisionally, the species included in *Apachemyia* Townsend, *Neofischeria* Townsend, *Parademoticus* Townsend, and *Parafischeria* Townsend. Although the four latter species might better be placed in *Demoticus* Macquart, no ready distinction between the genera seems possible, and a study of world genera of the tribe Aphriini is needed.

<sup>83</sup> Also included here are the species formerly placed in *Coronimyia* Townsend.

- Membrane between lower facial margin and clypeus without above-mentioned such sclerites.  
Aristomere 2 minute, no longer than wide; first flagellomere rounded apically, widest before middle (Fig. 115) . . . . . *Crocinosoma* Reinhard  
1 sp., *cornuale* Reinhard; southern
332. Arista plumose, with the longest hairs longer than greatest width of arista (as in Figs. 64, 125, 134) . . . . . 333  
Arista bare, or nearly so, with the longest hairs shorter than greatest width of arista . . . . . 336
333. Arista hairs much longer at base of arista than at apex, arising all around arista (as in Fig. 64).  
Parafacial with minute pale hairs. Midleg of male about twice as long as foreleg or hindleg  
. . . . . *Cholomyia* Bigot  
1 sp., *inaequipes* Bigot; eastern and southwestern U.S.A.  
Aristal hairs as long at apex of arista as on base (as in Figs. 125, 134). Parafacial bare. Midleg  
of male not exceptionally long . . . . . 334
334. Genal dilation extending anteriorly to vibrissal angle and parafacial, reducing genal groove to  
a sulcus (Fig. 146). Small shiny brown species with little pale pruinosity . . . . .  
. . . . . *Anthomyiopsis* Townsend  
1 sp., *cypseloides* Townsend; northern  
Genal dilation separated from vibrissal angle and parafacial by a distinct triangular pruinose  
genal groove. Species with extensive pale pruinose areas . . . . . 335
335. Scutellum with well-developed lateral bristles in addition to basal and apical bristles (as in  
Fig. 183, except that lateral bristles are parallel or convergent). R<sub>4+5</sub> setose at least to cross-  
vein r-m. Facial ridge usually with a few pale hairs above vibrissa. Female with sword-like  
ovipositor protruding from apex of abdomen (Fig. 251), except in *elegans* (Reinhard) . .  
. . . . . *Spathidexia* Townsend<sup>84</sup>  
7 spp.; widespread; Arnaud 1960, in part  
Scutellum with well-developed basal and apical bristles only; lateral setae hair-like (as in  
Fig. 186). R<sub>4+5</sub> with one bristle at base. Facial ridge without pale hairs. Ovipositor tubular  
. . . . . *Chaetonopsis* Townsend  
1 sp., *spinosa* (Coquillett); central and eastern U.S.A.
336. Scutum with only one pair of presutural acrostichal bristles, the posteriormost pair, which is  
situated anterior to scutellum . . . . . 337  
Scutum usually with two pairs of presutural and two pairs of postsutural acrostichal bristles  
. . . . . 338
337. Scutellum without well-developed lateral bristles. Back of head convex . . . . .  
. . . . . *Euclytia* Townsend  
1 sp., *flava* (Townsend); widespread  
Scutellum with well-developed lateral bristles as well as basal and apical bristles. Upper third  
or more of back of head concave (Fig. 61) . . . . . *Opesia* Robineau-Desvoidy  
1 sp., *atrata* (Coquillett); northern
338. Eye, viewed in profile, occupying almost entire side of head, more than half as long (front to  
back) as high, thus reducing parafacial and gena to narrow bands (Fig. 99) . . . . .  
. . . . . *Strongygaster* Macquart, in part  
see couplet 286  
Eye, viewed in profile, less than half as long (front to back) as high; parafacial, gena, and postgena  
more extensive (Figs. 46, 49) . . . . . 339
339. Lateral scutellar bristles lacking (Fig. 186) . . . . . 340  
Lateral scutellar bristles well-developed (as in Figs. 184, 185) . . . . . 342
340. Mid tibia without a ventral bristle. Abdominal sternite 7 of female a sharp slightly curved piercer  
sheathed in a spout-like sternite 6 (Fig. 258) . . . . . *Phyllophilopsis* Townsend, in part  
see couplet 148  
Mid tibia with well-developed ventral bristle. Ovipositor tubular, without piercer . . . . . 341

<sup>84</sup> Also included here, in addition to those treated by Arnaud, are the species placed in *Gymnopalpus*, including *elegans* (Reinhard), described in the genus *Minthodexiopsis* Townsend. Females lack the long, sword-like piercer, but are otherwise indistinguishable from *Spathidexia*.

341. Aristomeres 1 and 2 elongate (Fig. 135). Apical scutellar hairs crossed. Abdomen reddish. Ovipositor reduced to concentric sclerites, not protrusible . . . . . *Impeccantia* Reinhard 1 sp., *claterna* Reinhard; southwestern U.S.A.  
 Aristomeres 1 and 2 minute. Apical scutellar setae divergent. Abdomen of female gray or brown pruinulent, slender and somewhat laterally compressed. Ovipositor long slender telescopic, normally fully concealed within abdomen (Fig. 259) . . . . . *Dolichotarsus* Brooks, in part see couplet 149
342. Arista lateromedially flattened, knife-like; aristomere 3 dilated at one-third distance from base (Fig. 136). Ocellar bristles laterocline (as in Figs. 21, 108). Scutellum with two or more straight preapical bristles arising anterodorsal to apical scutellar bristles and inclined at 45° (as in Fig. 187) . . . . . *Germaria* Robineau-Desvoidy 1 undescribed sp.; Yukon  
 Arista cylindrical. Ocellar bristles proclinate. Scutellum without straight preapical bristles . . . . . 343
343. First flagellomere with sharply pointed apex (Fig. 126). Scutellum short and broadly rounded, with crossed apical bristles and divergent lateral bristles arising rather far back between lateral and subapical position (as in Fig. 183) . . . . . *Acemya* Robineau-Desvoidy<sup>85</sup> 5 spp.; widespread  
 First flagellomere rounded apically. Scutellum more triangular with truncate apex; subapical scutellar bristles long and divergent, arising from corners of truncate apex (as in Fig. 184) . . . . . 344
344. Mid tibia without a ventral bristle. Abdomen of female arched ventrally, with telescopic ovipositor directed ventrally (as in Fig. 260) . . . . . *Trigonospila* Pokorny, in part see couplet 164  
 Mid tibia with well-developed ventral bristle. Abdomen of female not modified and ovipositor directed posteriorly . . . . . 345
345. Frons with row of proclinate orbital setae extending anteroventrally to level of lowest frontal bristle (Fig. 52) . . . . . *Euhaliidaya* Walton, in part see couplet 137  
 Frons with not more than two proclinate orbital bristles . . . . . 346
346. Facial ridge thickened, protruding beyond parafacial, thus visible in profile, usually with small appressed setulae on lower half or more. Arista, when orange, thickened nearly to apex (Fig. 128) . . . . . *Phasmophaga* Townsend, in part see couplet 139  
 Facial ridge narrow, without setae. Arista thickened only at base, tapering to long slender apex (as in Fig. 134) . . . . . 347
347. Katepisternum with two bristles . . . . . *Anisia* Wulp, in part see couplet 158  
 Katepisternum with three bristles . . . . . *Opsomeigenia* Townsend, in part see couplet 161

<sup>85</sup> Also included are all species formerly placed in *Hemithrixion* Brauer & Bergenstamm, which differ only in lacking vein M beyond the bend.

## References

- Aldrich, J. M. 1925a. Two new species of the tachinid genus *Lixophaga*, with notes and key (Diptera). Proc. ent. Soc. Wash. 27: 132-136.
- Aldrich, J. M. 1925b. New Diptera or two-winged flies in the United States National Museum. Proc. U.S. natn. Mus. 66 (18): 1-36.
- Aldrich, J. M. 1926a. Notes on muscoid flies (Diptera) with retracted hind crossvein, with key and several new genera and species. Trans. Am. ent. Soc. 52: 7-28.
- Aldrich, J. M. 1926b. North American two-winged flies of the genus *Cylindromyia* Meigen (*Ocyptera* of authors). Proc. U.S. natn. Mus. 68 (23): 1-26, 1 plate.
- Aldrich, J. M. 1926c. American two-winged flies of the genus *Microphthalma* Macquart, with notes on related forms. Proc. U.S. natn. Mus. 69 (13): 1-8.
- Aldrich, J. M. 1928. A revision of the American parasitic flies belonging to the genus *Belvosia*. Proc. U.S. natn. Mus. 73 (8): 1-45.

- Aldrich, J. M. 1931a. North American two-winged flies of the genus *Spathimeigenia*, with descriptions of five new species. Proc. U.S. natn. Mus. 80 (11): 1-10.
- Aldrich, J. M. 1931b. Notes on the tachinid genus *Chaetonodexodes*, with one new species. Ann. Mag. nat. Hist. (10) 8: 205-207.
- Aldrich, J. M., and R. T. Webber. 1924. The North American species of parasitic two-winged flies belonging to the genus *Phorocera* and allied genera. Proc. U.S. natn. Mus. 63 (17): 1-90.
- Arnaud, P. H. 1951. A study of the genus *Paradejeania* Brauer and Bergenstamm (Diptera: Tachinidae or Larvaevoridae). Can. Ent. 83: 317-329.
- Arnaud, P. H. 1960. A review of the genus *Spathidexia* Townsend (Diptera: Tachinidae). Wasmann J. Biol. 18: 1-36.
- Arnaud, P. H. 1963. *Perumyia embiaphaga*, a new genus and species of Neotropical Tachinidae (Diptera) parasitic on Embioptera. Am. Mus. Novit. 2143: 1-9.
- Benewy, D. F. 1963. A revision of the flies of the genus *Lespesia* (= *Achaetoneura*) in North America (Diptera: Tachinidae). Kans. Univ. Sci. Bull. 44: 627-686.
- Brooks, A. R. 1942. *Clistomorpha*, *Psolidopteryx* and allies (Diptera, Tachinidae). Can. Ent. 74: 140-150.
- Brooks, A. R. 1943. A review of the Canadian species of *Ernestia* sens. lat. (Tachinidae, Diptera). Can. Ent. 75: 66-78.
- Brooks, A. R. 1944a. A review of the North American species of *Gonia* sens. lat. (Diptera, Tachinidae). Can. Ent. (1943) 75: 219-236.
- Brooks, A. R. 1944b. A review of the North American species of *Linnaemya* sens. lat. (Diptera, Tachinidae). Can. Ent. 76: 193-206.
- Brooks, A. R. 1945a. New Canadian Diptera (Tachinidae). Can. Ent. 77: 78-96.
- Brooks, A. R. 1945b. A revision of the North American species of the *Phasia* complex (Diptera, Tachinidae). Scient. Agric. 25: 647-679.
- Brooks, A. R. 1946. A revision of the North American species of the *Rhodogyne* complex (Diptera, Larvaevoridae). Can. Ent. (1945) 77: 218-230.
- Brooks, A. R. 1947. A revision of the North American species of *Leschenaultia* sens. lat. (Diptera, Larvaevoridae). Can. Ent. (1946) 78: 169-182.
- Cade, W. H. 1975. Acoustically orienting parasitoids: fly phonotaxis to cricket song. Science, Wash. 190: 1312-1313.
- Crosskey, R. W. 1965. The immature stages and affinities of the tachinid fly *Glaurocara flava*, a parasite of the African bush-cricket *Homorocoryphus nitidulus vicinus*. Proc. zool. Soc. Lond. 144: 203-217.
- Crosskey, R. W. 1973. A conspectus of the Tachinidae (Diptera) of Australia, including keys to the supraspecific taxa and taxonomic and host catalogues. Bull. Br. Mus. nat. Hist. (Ent.) Suppl. 21: 1-221.
- Crosskey, R. W. 1976. A taxonomic conspectus of the Tachinidae (Diptera) of the Oriental Region. Bull. Br. Mus. nat. Hist. (Ent.) Suppl. 26: 1-357.
- Crosskey, R. W. 1977. Family Tachinidae. Pages 586-697 in M. D. Delfinado and D. E. Hardy, eds. A catalog of the Diptera of the Oriental region. III. Suborder Cyclorhapha (excluding Division Aschiza). University Press of Hawaii, Honolulu.
- Crosskey, R. W. 1980. [Chapter] 93. Family Tachinidae. Pages 822-882 in R. W. Crosskey, ed. Catalogue of the Diptera of the Afrotropical region. British Museum (Natural History), London.
- Curran, C. H. 1924. On the genus *Arctophyto* Townsend in North America (Tachinidae, Diptera). Can. Ent. 56: 302-303.
- Curran, C. H. 1925. The American species of the tachinid genus *Peleteria* Desv. (Diptera). Trans. R. Soc. Can., Ser. 3, 19: 225-257, 2 plates.
- Curran, C. H. 1926. The Canadian species of the tachinid genera *Cryptomeigenia* B.B. and *Tachinomyia* Tns. (Dipt.). Trans. R. Soc. Can., Ser. 3, 20: 155-171, 2 plates.
- Curran, C. H. 1927a. Some new North American Diptera. Can. Ent. 59: 290-303.
- Curran, C. H. 1927b. Some new American Tachinidae (Diptera). Bull. Brooklyn ent. Soc. 22: 144-154.
- Curran, C. H. 1927c. Studies in Canadian Diptera. III. The species of the tachinid genera related to *Lydella*, as represented in the Canadian National Collection. Can. Ent. 59: 11-24.
- Curran, C. H. 1932. New American Diptera. Am. Mus. Novit. 534: 1-15.
- Curran, C. H. 1933. The North American species of *Actia* in the American Museum of Natural History. Am. Mus. Novit. 614: 1-7.
- Curran, C. H. 1935. New American Diptera. Am. Mus. Novit. 812: 1-24.
- Curran, C. H. 1939. The dipterous genus *Chrysotachina* Brauer and Bergenstamm (Tachinidae). Am. Mus. Novit. 1021: 1-3.
- Curran, C. H. 1947. New and little known American Tachinidae. Bull. Am. Mus. nat. Hist. 89: 45-122.
- Dugdale, J. S. 1969. A classification of the New Zealand genera of Tachinidae (Diptera: Cyclorhapha) [sic]. N.Z. J. Sci. 12: 606-646.
- Guimarães, J. H. 1966. Taxonomic studies on some Masiphyini (Diptera, Tachinidae) reared from Mantodea. Papéis Dep. Zool. S Paulo 19: 205-232.
- Guimarães, J. H. 1971. 104. Family Tachinidae (Larvaevoridae). Pages 1-333 in N. Papavero, ed. A catalogue of the Diptera of the Americas south of the United States. Departamento de Zoologia, Secretaria da Agricultura, São Paulo, Brazil.
- Guimarães, J. H. 1972. A revision of the genus *Winthemia* Robineau-Desvoidy in America north of Mexico (Diptera, Tachinidae). Archos Zool. Est. S Paulo 22: 27-112.
- Hayes, K. L. 1958. Descriptions of the larva and adult female of *Phorostoma tabanivora* (Hall) and notes on the biology of the species. Ann. ent. Soc. Am. 51: 552-553.
- Heitzmann-Fontenelle, T., and J. H. Guimarães. 1966. Biological observations on some Masiphyini (Diptera, Tachinidae) parasites of Mantodea. Papéis Dep. Zool. S Paulo 19: 233-244.
- Herting, B. 1957. Das weibliche Postabdomen der calyptraten Fliegen (Diptera) und sein Merkmalswert für die Systematik der Gruppe. Z. Morph. Ökol. Tiere 45: 429-461.

- Herting, B. 1959. Revision einiger europäischer Raupenfliegen (Dipt., Tachinidae). *Annln naturh. Mus. Wien.* 63: 423-429.
- Herting, B. 1960. Biologie der westpaläarktischen Raupenfliegen Dipt., Tachinidae. *Monogrn angew. Ent.* 16: 1-188.
- Herting, B. 1963. Ein ungewöhnlich adaptierter Eilegeapparat bei den Raupenfliegen der Gattung *Phorocera* R.D. (Dipt., Tachinidae). *Stuttg. Beitr. Naturk.* 117: 1-6.
- Herting, B. 1984. Catalogue of Palearctic Tachinidae (Diptera). *Stuttg. Beitr. Naturk. Ser. A, Nr. 369*: 1-228.
- James, M. T. 1947. A review of the larvaevorid flies of the tribe Leskiini with the setulose first vein (R<sub>1</sub>). *Proc. U.S. natn. Mus.* 97: 91-115.
- Kamijo, K. 1973. The parasite complex of *Choristoneura diversana* Hübner injurious to Todo-Fir, *Abies sachalinensis* Masters. *Jap. J. appl. Ent. Zool.* 17: 77-83.
- McAlpine, J. F., and D. D. Munroe. 1968. Swarming in lonchaeid flies and other insects, with descriptions of four new species of Lonchaeidae (Diptera). *Can. Ent.* 100: 1154-1178.
- Mesnil, L. 1944-1975. Larvaevorinae (Tachininae). Bd. 8(64g). Pages 1-1435 in E. Lindner, ed. *Die Fliegen der palaearktischen Region*. Schweizerbart, Stuttgart.
- Monteith, L. G. 1955. Host preferences of *Drino bohémica* Mesn. (Diptera: Tachinidae), with particular reference to olfactory responses. *Can. Ent.* 87: 509-530.
- Monteith, L. G. 1956. Influence of host movement on selection of hosts by *Drino bohémica* Mesn. (Diptera: Tachinidae) as determined in an olfactometer. *Can. Ent.* 88: 583-586.
- Monteith, L. G. 1958a. Influence of host and its food plant on host-finding by *Drino bohémica* Mesn. (Diptera: Tachinidae) and interaction of other factors. *X. Int. Congr. Ent. (Montreal, 1956)* 2: 603-606.
- Monteith, L. G. 1958b. Influence of food plant of host on attractiveness of the host to tachinid parasites with notes on preimaginal conditioning. *Can. Ent.* 90: 478-482.
- Monteith, L. G. 1960. Influence of plants other than the food plants of their host on host-finding by tachinid parasites. *Can. Ent.* 92: 641-652.
- Monteith, L. G. 1964. Influence of the health of the food plant of the host on host-finding by tachinid parasites. *Can. Ent.* 96: 1477-1482.
- Morrison, F. O. 1940. A revision of the Americana species of *Gonia* Meigen (Diptera: Tachinidae). *Can. J. Res. D* 18: 336-362.
- O'Hara, J. E. 1982. Classification, phylogeny and zoogeography of the North American species of *Siphona* Meigen (Diptera: Tachinidae). *Quaest. Ent.* 18: 261-380.
- Ravlin, F. W., and F. W. Stehr. 1984. Revision of the genus *Archyatas* (Diptera: Tachinidae) for America north of Mexico. *Misc. Pubs ent. Soc. Am.* 58: 1-59.
- Reinhard, H. J. 1930a. On the genus *Viviania* with the description of two new species from Texas (Tachinidae, Diptera). *Bull. Brooklyn ent. Soc.* 25: 102-107.
- Reinhard, H. J. 1930b. A synopsis of the genus *Macromeigenia* including the description of one new species (Diptera: Tachinidae). *Ent. News* 41: 261-264.
- Reinhard, H. J. 1931. The two-winged flies belonging to *Siphosturmia* and allied genera, with descriptions of two new species. *Proc. U.S. natn. Mus.* 79 (11): 1-11.
- Reinhard, H. J. 1934a. Two new species of the tachinid genus *Siphosturmiopsis* with key and notes (Diptera). *Ent. News* 45: 15-19.
- Reinhard, H. J. 1934b. American muscoid flies of the genera *Ceratomyiella* and *Paradidyma*. *Proc. U.S. natn. Mus.* 83 (2973): 9-43.
- Reinhard, H. J. 1934c. Revision of the American two-winged flies belonging to the genus *Cuphocera*. *Proc. U.S. natn. Mus.* 83 (2974): 45-70.
- Reinhard, H. J. 1935. North American two-winged flies of the genus *Doryphorophaga* (Tachinidae, Diptera). *Jl N.Y. ent. Soc.* 43: 387-394.
- Reinhard, H. J. 1942a. New North American Tachinidae belonging to the genera *Microchaetina* and *Hypenomyia* with key to the known species (Diptera). *Can. Ent.* 74: 88-91.
- Reinhard, H. J. 1942b. A new species of *Oedematocera* with notes and key (Tachinidae, Diptera). *Ent. News* 53: 106-108.
- Reinhard, H. J. 1944a. New North American Tachinidae belonging to the genus *Muscopteryx* (Diptera). *Ann. ent. Soc. Am.* 37: 352-358.
- Reinhard, H. J. 1944b. New muscoid Diptera from the United States. *J. Kans. ent. Soc.* 17: 57-72.
- Reinhard, H. J. 1946a. The tachinid genera *Pseudochaeta* and *Phaenopsis* in North America (Diptera). *Can. Ent.* 78: 111-121.
- Reinhard, H. J. 1946b. The genus *Minthozelia* in the United States (Diptera, Tachinidae). *J. Kans. ent. Soc.* 19: 52-59.
- Reinhard, H. J. 1946c. A review of the tachinid genera *Siphophyto* and *Coronimyia* (Diptera). *Proc. ent. Soc. Wash.* 48: 79-92.
- Reinhard, H. J. 1952. Muscoid flies of the genus *Chaetophlepsis* (Diptera). *J. Kans. ent. Soc.* 25: 13-21.
- Reinhard, H. J. 1954. Parasitic flies of the genus *Prosenoides* (Tachinidae, Diptera). *Can. Ent.* 86: 408-413.
- Reinhard, H. J. 1955. North American tachinid flies of the genus *Wagneria* (Diptera). *J. Kans. ent. Soc.* 28: 49-59.
- Reinhard, H. J. 1956. A synopsis of the tachinid genus *Leucostoma* (Diptera). *J. Kans. ent. Soc.* 29: 155-168.
- Reinhard, H. J. 1958a. Notes on *Spathimeigenia* with description of four new species (Diptera, Tachinidae). *Proc. ent. Soc. Wash.* 60: 207-212.
- Reinhard, H. J. 1958b. Parasitic flies of the genus *Mochlosoma* (Tachinidae, Diptera). *Can. Ent.* 90: 97-110.
- Reinhard, H. J. 1968a. New World species of *Erynnia* (Tachinidae, Diptera). *J. Kans. ent. Soc.* 41: 501-508.
- Reinhard, H. J. 1968b. A review of the genus *Macromyia* (Tachinidae: Diptera). *Can. Ent.* 100: 1280-1287.
- Rettenmeyer, C. W. 1961. Observations on the biology and taxonomy of flies found over swarm raids of army ants (Diptera: Tachinidae, Conopidae). *Kans. Univ. Sci. Bull.* 42: 993-1066.
- Robineau-Desvoidy, J. B. 1863. *Histoire naturelle des diptères des environs de Paris*. 2 vols. Paris.

- Rowe, J. A. 1931. A revision of the males of the Nearctic species in the genus *Fabriciella* (Tachinidae). *Ann. ent. Soc. Am.* 24: 643-678.
- Sabrosky, C. W. 1953a. Taxonomy and host relations of the tribe Ormiini in the Western Hemisphere. I (Diptera, Larvaevoridae). *Proc. ent. Soc. Wash.* 55: 167-183.
- Sabrosky, C. W. 1953b. Taxonomy and host relationships of the tribe Ormiini in the Western Hemisphere. II (Diptera, Larvaevoridae). *Proc. ent. Soc. Wash.* 55: 289-305.
- Sabrosky, C. W. 1969. A review of the genus *Juriniopsis* Townsend (Diptera: Tachinidae). *Fla Ent.* 52: 79-90.
- Sabrosky, C. W. 1973. Identification of *Winthemia* of America north of Mexico, with a revised key to the females (Diptera, Tachinidae). *Ann. ent. Soc. Am.* 66: 1035-1041.
- Sabrosky, C. W. 1975. *Chaetophlepsis plathypenae*, a new parasite of the green cloverworm, with a key to *Chaetophlepsis* and *Parahypochaeta* (Diptera, Tachinidae). *Ann. ent. Soc. Am.* 68: 43-50.
- Sabrosky, C. W. 1980. A revised key to the Nearctic species of *Lespesia* (Diptera: Tachinidae). *Ann. ent. Soc. Am.* 73: 63-73.
- Sabrosky, C. W. 1981. A partial revision of the genus *Eucelatoria* (Diptera, Tachinidae), including important parasites of *Heliothis*. *Tech. Bull. U.S. Dep. Agric.* 1635: 1-18.
- Sabrosky, C. W., and P. H. Arnaud, Jr. 1965. Family Tachinidae (Larvaevoridae). Pages 961-1108 in A. Stone *et al.*, eds. *A catalog of the Diptera of America north of Mexico*. U.S. Dep. Agric., Agric. Res. Serv., Agric. Handb. 276.
- Sellers, W. F. 1943. The Nearctic species of parasitic flies belonging to *Zenillia* and allied genera. *Proc. U.S. natn. Mus.* 93: 1-108.
- Teskey, H. J. 1969. Larvae and pupae of some eastern North American Tabanidae (Diptera). *Mem. ent. Soc. Can.* 63: 1-147.
- Thompson, W. R. 1963. The tachinids of Trinidad. V. Siphosturmiines and Masiphyiines. *Can. Ent.* 95: 1292-1320.
- Tinbergen, N. 1958. *Curious naturalists*. Chapter 9. *Bark with wings*. Country Life Ltd., London.
- Tothill, J. D. 1921. A revision of the Nearctic species of the tachinid genus *Ernestia* R. D. (Diptera). *Can. Ent.* 53: 199-205, 226-230, 247-252, 270-274.
- Tothill, J. D. 1924. A revision of the Nearctic species in the genus *Fabriciella* (Tachinidae). *Can. Ent.* 56: 257-269.
- Townsend, C. H. T. 1915. Revision of *Myiophasia*. *Proc. ent. Soc. Wash.* 17 (3): 107-114.
- Townsend, C. H. T. 1934-1942. *Manual of myiology in twelve parts*. Charles Townsend & Filhos, Itaquaquecetuba, São Paulo, Brazil.
- Webber, R. T. 1941. Synopsis of the tachinid flies of the genus *Tachinomyia* with descriptions of new species. *Proc. U.S. natn. Mus.* 90 (3108): 287-304.
- Wilder, D. D. 1979. Systematics of the Nearctic *Ptilodexia* Brauer & Bergenstamm (Diptera: Tachinidae). *Proc. Calif. Acad. Sci.* 42: 1-55.
- Wood, D. M. 1972. A revision of the New World Exoristini (Diptera: Tachinidae) I. *Phorocera* subgenus *Pseudotachinomyia*. *Can. Ent.* 104: 471-503.
- Wood, D. M. 1985. A taxonomic conspectus of the Blondeliini of North and Central America and the West Indies. (Diptera: Tachinidae). *Mem. ent. Soc. Can.* 132: 1-130.
- Wood, D. M., and A. G. Wheeler, Jr. 1972. First record in North America of the centipede parasite *Loewia foeda* (Diptera: Tachinidae). *Can. Ent.* 104: 1363-1367.