

T A REVIEW OF THE OLD WORLD GENERA  
OF LAUXANIIDAE (DIPTERA)

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## ABSTRACT

This paper presents in key form a review of the Old World genera of Lauxaniidae. Thirteen new genera are erected, three genera are placed in synonymy, four subgenera are given generic status, and one genus is transferred from the Heleomyzidae. The development of lauxaniid generic classification is reviewed and a total of 126 recognised genera is obtained. An account is given of the regional distribution of Lauxaniidae; three main faunal aggregates are distinguished, namely the Neotropical, Holarctic and Old World tropical. The validity of certain characters for generic classification is discussed, and the suggestion is made that trigonometopine forms have evolved polyphyletically as adaptations for life in grass and comparable vegetation types. A division of the family into major groups of genera is considered, and a subfamily Homoneurinae is established. The validity of characters used to distinguish Cestrotus and Turriger is examined; a failure to find reliable characters results in the synonymy of the latter genus. Illustrated descriptions are given of the type-species of new genera.



## INTRODUCTION

The present study had its origin in a monograph of the Lauxaniidae of the Ethiopian Region and adjacent islands which I commenced nearly twelve years ago. Work on that project quickly ground to a halt because of many difficulties I experienced in decisively recognising and delimiting described genera. I found, for example, that particular suites of characters, especially those relying primarily on chaetation, used for defining certain genera in other faunal regions, not infrequently brought together African species so different in habitus and sometimes even fundamental features of structure that they obviously could not be accepted as congeneric. The limits of many genera seemed vague and ill-defined, particularly certain of the older and larger ones in which have accumulated many of the species described by workers in the nineteenth century.

Such difficulties have been aggravated by a lack of synoptic work. The only reasonably comprehensive key was published in 1925 and dealt with 74 genera: at the time when I started studies on the family about 109 genera were recognised in the literature. Clearly a revision of the genera had to be done first, but this required access to comprehensive collections. What was needed obviously was an examination of material of type-species as far as possible, and not a discussion of original descriptions. Opportunities for study overseas came in 1965 and 1966, and enabled me to accomplish much research towards that end, first at the Naturhistorisches Museum in Vienna where historically important material is located and the collection used by Hendel is housed, then at the British Museum (N.H.) in London where there is a remarkably complete collection of Lauxaniidae containing a wealth of type-specimens and rare taxa. The results are presented here.

It was originally my intention to revise all the genera; however, I came to realise, for reasons explained below, that the systematics of the New World Lauxaniidae



is not germane to the original purpose of this work, namely to be a background study for a monograph on the lauxaniids of Subsaharan Africa and adjacent islands. The project thus came to be restricted to the scope indicated in the title of this paper.

This study revealed a great deal accomplished in lauxaniid classification, but also much unsatisfactory taxonomy. Work on postabdominal structures in particular has been minimal, and this will have to be done, in conjunction with a reassessment of the value of many chaetic characters, before the classification of the family can be considered to be on a sound footing. The development of lauxaniid taxonomy started with the Palaearctic fauna and it is there that new revisional studies should begin. Modern students of Czerny's (1932) monograph of the Palaearctic Lauxaniidae may gain an impression that little research remains to be done on that fauna: such an impression would be false.

The Lauxaniidae exhibit an extraordinary morphological plasticity which is reflected in the welter of described genera. In this respect they are more or less the acalyptrate equivalent of the orthorrhaphous Stratiomyidae. This plasticity comes out well when the family is contrasted, for example, with the Agromyzidae. According to Spencer (1969: 14) the 1 939 known agromyzid species are distributed among 30 genera: there is no accurate count available of lauxaniid species but the number certainly is less, yet there are over four times as many genera.

Very little has been published on Lauxaniidae in the past three decades. This probably has been due in part to the slight economic significance of the family, but nevertheless the wane of interest is undeserved. These almost omnipresent, easily caught, often abundant flies offer limitless opportunities for morphological, taxonomic and evolutionary studies, and the immature stages of only a minute fraction of the species are known. Some of the tropical genera are attractive because of their bizarre and spectacular species, and in every tropical fauna there is a plenitude of undescribed taxa. The extratropical representatives of the family may be more prosaic, but they are equally rewarding subjects for research.

## EXPLANATION OF SOME TERMS AND ABBREVIATIONS

1. In view of the taxonomic importance attached to the place at which the row of small spines terminates on the costa, and the frequency with which I must refer to this condition, I propose the following two adjectives:

sapromyziform - with the costa as in Sapromyza, i.e. the spinules diminish in size and then stop between the ends of the second and third veins, not reaching the apex of  $R_{4+5}$  (figs. 1, 13).

homoneuriform - with the costa as in Homoneura, i.e. the spinules reach or very nearly reach the apex of  $R_{4+5}$  where they stop abruptly without marked prior diminution in size (figs. 2, 12).

2. The names of the macrochaetae are abbreviated in the usual way, as follows:

|               |                    |                |                                 |
|---------------|--------------------|----------------|---------------------------------|
| <u>acr</u>    | = acrostichal      | <u>ph</u>      | = posthumeral<br>(= presutural) |
| <u>ant or</u> | = anterior orbital | <u>post or</u> | = posterior orbital             |
| <u>dc</u>     | = dorsocentral     | <u>pp</u>      | = propleural                    |
| <u>h</u>      | = humeral          | <u>pvt</u>     | = postvertical                  |
| <u>ia</u>     | = intra-alar       | <u>sa</u>      | = supra-alar                    |
| <u>mp</u>     | = mesopleural      | <u>sc</u>      | = scutellar                     |
| <u>np</u>     | = notopleural      | <u>st</u>      | = sternopleural                 |
| <u>oc</u>     | = ocellar          | <u>vte</u>     | = outer vertical                |
| <u>or</u>     | = orbital          | <u>vti</u>     | = inner vertical                |
| <u>pa</u>     | = postalar         |                |                                 |

For the purposes of this study, Madagascar and the Mascarene Islands are considered to form a zoogeographic region separate from the Ethiopian. The names of the regions are abbreviated as follows:

|                    |                   |
|--------------------|-------------------|
| AUS = Australasian | NEO = Neotropical |
| ETH = Ethiopian    | OC = Oceanic      |
| MAD = Madagascar   | OR = Oriental     |
| NEA = Nearctic     | PAL = Palaearctic |

Other abbreviations are:

|                           |                         |
|---------------------------|-------------------------|
| <u>ad</u> = anterodorsal  | <u>d</u> = dorsal       |
| <u>av</u> = anteroventral | <u>post</u> = posterior |



F1 T1 = fore femur and tibia  
 F2 T2 = middle femur and tibia  
 F3 T3 = hind femur and tibia

3. In describing the male postabdomen and genitalia I have used mostly well-known terms; all those used are illustrated in figs. 3 - 7. The following require explanation:

Protandrium: Suggested by Steyskal (1957) for the sclerotic complex formed by the partly or completely compounded and circumverted sclerites of segments seven and eight. In Lauxaniidae this follows the usually unmodified sixth tergite and sternite. In its most complete form (as in fig. 4, pt) it is a roughly annular sclerite always associated with the seventh pair of spiracles (sp 7); in some species the ventral portion may be partially lost (as in fig. 3, pt, where there are two persisting ventral fragments) or completely lost (fig. 7, pt). The seventh spiracles usually are located within the protandrium but in cases where reduction has proceeded beyond the lateral points at which the spiracles are situated, the spiracles are in membrane. Sometimes, especially in tropical genera, the dorsal part of the protandrium is narrow and completely concealed; in other genera it is relatively broader, even equalling the sixth tergite in width, and in such cases it usually is exposed and pruinose, even sometimes setulose or setose. Differences in the development, exposure and vestiture of the protandrium do not appear to have been used in lauxaniid taxonomy.

Surstylar extension (s. ex): The epandrium projects downwards on each side into a lobe-like portion which may be modified preapically or apically into a surstylus, or on which the surstylus articulates; this portion is referred to as the surstylar extension (figs. 5, 7).

Aedeagal complex: I am following Hennig (1948) in using the terms gonopod (gp) and ring sclerite (rs) for structures associated with the aedeagus (ae) along with the aedeagal apodeme (ae. ap) and ejaculatory apodeme (see fig. 65, ea).



4. Wing-vein indices: the 4th vein index is obtained by dividing the length of the apical section of that vein by the length of the preapical section; the r-m index is obtained by dividing the length of the preapical section of the 4th vein by the length of the section basad of the r-m crossvein.

## KEY TO THE OLD WORLD GENERA OF LAUXANIIDAE

The only published key covering a substantial number of genera is that of Hendel (1925) which included all known at the time, totalling 74 of which 35 had been described by Hendel himself. His key starts with a sometimes impracticable character, namely the form of the face, whether flat or concave as opposed to swollen, convex or angularly produced, and this divides the genera in an artificial way into two groups containing 33 and 41 respectively. This feature can be difficult to use, for example in some cases where one has to decide between 'concave' and 'angularly produced'; also, many lauxaniids have a face not truly flat but slightly though definitely tumid in the transverse plane, and in some such cases one is hard put to decide whether 'convex' is appropriate or not. The lack of suitable characters for other major dichotomies soon becomes evident in Hendel's key, and many genera have to be dealt with individually. At rubric 42 a sometimes equivocal feature is used, the form of the frons, whether angled in profile or not. After passing couplet 59 which offers a dichotomy on the basis of one or two sternopleural bristles, the user is perplexed on arrival at couplet 67 to find the same alternatives.

The key offered below is both diagnostic and descriptive. Diagnostic characters are cited first, then descriptive ones are given between square brackets. In the latter category are characters that perhaps are not applicable equally to all species in a particular genus, or which may be difficult to describe unequivocally, or which I am not sure are possessed by the type-species in cases where I have not seen it, or are important in a general rather than diagnostic sense. For some genera a fairly extensive description is given, either because the included species are rare, little-known, remarkable in some way, or on other grounds deserving such full treatment. The regional distribution of each taxon is given as well as the name of the type-species. For many



of the genera a note is provided in all cases where these have been described, and for a few genera there are keys to species-groups. The data given for each genus are derived from as many included species as I have been able to study, and not only from the type-species.

In this key the primary dichotomy distinguishes genera with homoneuriform costa from those with sapromyziform costa. Users will soon notice that, as in Hendel's key, there are few characters beyond the primary one useful for segregating large groups of genera, and that many genera have to be dealt with individually. The key thus is tedious to use, especially for Palaearctic genera many of which are in the last two tenths, but this seems unavoidable.

1. Small black spines on costa reaching apex of third vein ( $R_{4+5}$ ), or very nearly reaching it, and there stopping abruptly (figs. 2, 12) .. .. . 2
- Small black spines on costa not attaining apex of third vein, but diminishing in size and stopping between second and third veins (figs. 1, 13) .. 22
2. Mesopleuron with an extra bristle, which may be rather weak, close to or somewhat below middle, sometimes in company with some setulae; 1+3 dc and acr bristles, these subequal and almost erect; F1 without av comb of minute black spines; at least one conspicuous bristle a little beyond middle of av surface on F3; tergal marginal bristles long, erect, often surrounded by grey spots, abdominal setulae when present also erect. Mostly small, dark species with rather rounded head and heavily patterned wings (figs. 11-13) and body; arista with small, fine hairs, shortly plumose in a few species. .. .. . 3
- Without this suite of characters .. .. . 4
3. Extra mp bristle strong, usually directed downwards, always obviously stronger than neighbouring setulae when these are present. AUS. OR. ETH. MAD.

Type T. guttata Tonn. & Mall. (1926)

Trypaneoides Tonnoir & Malloch (1926)

Note: Species of this genus occur mainly in humid, forested areas, and some of the African and Madagascan species are nocturnal. A study of type specimens shows that the Fijian species described by Bezzi (1928) as Sapromyza cirrhicauda, caniventris and leucosticta, belong in Trypaneoides, as does S. perpunctata Lamb (1912) of the Seychelles though it is abnormal in some respects (see note to Holopticanter, couplet 77).

- This bristle usually not strong, though obviously larger than adjacent setulae when these are present and not placed distinctly anterior to them, also inclined somewhat posteriorly. Mostly exceptionally small species, with wing length as little as 2,2 mm.7 NEA. NEO.

Type Sapromyza stictica Loew (1863)

(part) Trypetisoma Malloch (in Malloch & McAtee, 1924)

Note: Despite Malloch's (1929a: 24) statement to the contrary, all known species of Trypetisoma have a small, usually weak discal mp bristle, and the genus is poorly distinguished from Trypaneoides. I maintain them as distinct genera only because Trypetisoma has priority and in synonymy would replace Trypaneoides, a name much used and attached to many Old World species. After a detailed study of sticticum and two apparently undescribed Paraguayan species, and considering information on shewelli Arnaud and eutretoides Arnaud provided by Dr. G.E. Shewell, I conclude that the only characters separating the New World species as a group are the nature of the mesopleural chaetation and in three of the five species the sapromyziform costa. Subgeneric status would be appropriate for Trypetisoma. Those species with sapromyziform costa are dealt with at couplet 69.

4. Frons almost flat, very broad (in male almost twice width of an eye), uniformly covered with closely-set,



very small hairs; or set far back, close to one another, small, ant or reclinate and about at middle of frons; ocelli on vertex, oc rather weak, directed outwards and a little forwards; acr bristles developed, usually 0+3, sometimes 1+3; tibiae and tarsi slender, specially those of fore legs, metatarsus on all legs longer than other tarsomeres together; Fl without av row of small black spines; darkened apical tarsomeres flattened, especially on fore legs.  $\sqrt{\text{Pale}}$  yellowish or testaceous-yellow species with clear or partly clouded wings.  $\sqrt{\text{OC}}$ . Society Islands.

Type A. nebeculosa Mall. .. Arnomyia Malloch (1929b)

Note: Sapromyza taitensis Frauenfeld (1867) = A. nebeculosa Mall. (1929b); in terms of Article 23(h) of the Code, S. taitensis is a nomen oblitum. Material of Frauenfeld's species, labelled by Schiner, is in the Vienna Museum.

- Without this combination of characters .. .. 5

5. Anal lobe of wing undeveloped, wing narrowing basally (fig. 4), anal vein reduced to a very short stump; post or placed far forwards on frons, near apex of orbital plate, recurved and strong, ant or minute, situated close to post or and barely one-tenth of length of that bristle.  $\sqrt{1+2}$  dc; frons very broad; oc long; pvt small, Fl with av comb of small, stiff setulae on apical half; wing patterned, pale fumose with milky-white spots.  $\sqrt{\text{ETH}}$ .

Type K. variipennis Hendel.. Katalauxania Hendel (1925)

Note: This genus, based on a specimen collected on Kilimanjaro Mountain in 1904, has not been recorded since its description. In material lent to me by the Commonwealth Institute of Entomology is a specimen (Nairobi, April 1937, Van Someren), severely damaged by psocids and fungus, which has been labelled by J.R. Malloch as 'Katalauxania'; after cleaning and slide-mounting the remains I established that this is a Katalauxania though one not conspecific with the type species. Hendel diagnosed the genus as

having the costa reaching to the end of  $R_{4+5}$ , squama and alula absent, only one or present, and oc absent. A study of the Nairobi specimen shows that the costa is homoneuriform, the conspicuous costal spinules stopping abruptly at the end of  $R_{4+5}$  and giving an impression that the costa itself ends there. Hendel is correct in describing the wing as tapering basally; however this is due to the absence of an anal lobe, and the alula in fact is present though not easily seen because it folds upwards against the wing. Apparently Hendel's type was damaged, for he noted the accidental loss of the or bristles and stated that the oc bristles were absent; the Nairobi specimen has a pair of long oc bristles, and the post or positioned far forward on the frons as described by Hendel, but also has a minute ant or present just before the post or. Other features of the Nairobi specimen are: orbital plates fairly broad, swollen at anterior end into a distinct tubercle supporting post or; minute ant or recurved, positioned just anterior to and a little inward of post or; pvt small, slender, not quite cruciate, situated just behind ocellar tubercle which is at vertex and is quite prominent; oc porrect, long, reaching anterior edge of frons; bristles in order of length are vti, post or, oc, vte; frons breadth about twice length; arista basal; eye longest in vertical axis, markedly narrowed below by sinuous shape of posteroventral part of orbit; face rather small, almost vertical, a little curved as in many Homoneura species;  $Sc$  and  $R_1$  close together and subparallel throughout their length; wing pale fumose due to dense clothing of microtrichia which are absent in the milky-white spots; fourth vein index 1,5,  $r-m$  index 1,0, wing length 3,6 mm.

- Not with this combination of the anal lobe lacking and



- the orbital bristles positioned and proportioned as described .. .. . 6
6. Oc bristles directed outwards, sometimes also slightly forwards; frons with many scattered small hairs, especially anteriorly .. .. . 7
- Oc bristles proclinate; frons without many small hairs except in Teratocranum (couplet 10) and Prosopomyia (couplet 13) .. .. . 10
7. Head unusually broad and shallow, frons and face exceptionally broad; frons setulose, descending steeply into same plane as face, or almost so; face unmarked; eye elongate-oval, markedly narrow below, hind margin concave; oral cavity large. Arista short-haired in female, pubescent or very short-haired in male. Fl with av comb. [Aberrant species with strong sexual dimorphism: male has, in three species, a long, forwardly curving, median spine arising from lower edge of frons, and a forwardly-projecting, large, median process on oral margin, in one species this epistomal process furcate and frontal spine lacking; both pairs or very long, ant or inclinate, post or eclinate; a group of strong bristles on anterior genal angle and other on underside of head adjacent to oral cavity. Female with long or, though not as long as in male, ant or slightly inclinate, post or reclinate, frontal spine and epistomal process absent; face shallowly keeled, a slight triangular projection where keel meets oral margin. Usually yellowish species with vittate thorax, banded abdomen, spotted wings.] AUS. Solomons, New Ireland, Bismarck, Buru, Guadalcanal, New Guinea.
- Type M. monstrosa v.d. Wulp
- Monocera v.d. Wulp (1898)
- Head not unusually broad, either of normal proportions or produced anteriorly; frons longer than broad; face spotted or vittate; eye not elongate; or reclinate, not exceptionally long, usually relatively rather short; without the sexual characters described above .. .. . 8

8. Frons descending to meet face in an obtuse angle, only slightly longer than broad, not flat and horizontal; ia bristle present; eye longest in vertical axis. Fl with av comb. /Face with distinct central swelling below which is a transverse impression; greyish-brown species, wings fuscous with some small, pale markings and hind margin narrowly whitish./ OR.

Type E. maculosa Mall.

Euprosopomyia Malloch (1929a)

- Frons flat, horizontal, markedly longer than broad; ia absent; eye longest in horizontal axis .. .. 9

9. Face conically produced forwards very strongly, projecting well ahead of the oral cavity, without a transverse epistomal suture; face marked by two lateral vittae, an apical spot, and a dorsal vitta or trace of one. Fl with av comb. /Dark species with rather narrow, dark wings and elongate, conical head./ AUS.

Type C. tenebrosus Walk. .. Cephaloconus Walker (1861)

Note: Redescriptions of this genus are given by Malloch (1939) and Lower (1953). Callistorhina Bigot (1878), type C. vittigera Bigot, and Ichthyomyia Meij. (1913), type I. cyprinus Meij., are synonyms. Malloch (1929a: 41), referring to cyprinus, is incorrect in describing the costa as sapromyziform.

- Face not conically produced but with laterally compressed, keel-like projection, and a distinct transverse impression above oral margin; face not vittate but spotted. Fl without av comb. /Generally yellowish-brown species with narrow, brownish wings./ AUS.

Type Australina geniseta Mall.

Australinina Strand (1928)

Note: Formerly Australina Malloch (1925b) nec Clarke (1912).

10. Second antennal segment with a prominent, thumb-like projection above, which bears five or six strong, erect, black, spine-like bristles, lower edge with a



row of short, black spines.  $\sqrt{\text{Head}}$  very broad and shallow, eye vertically elongate, narrow; frons very broad, descending steeply, face very short and much broader than high, antennae placed low on head; along each eye margin for almost entire length of frons is a narrow, raised, transversely striate plate which passes between eye and both pairs of or, crosses vertex between vti and vte where it narrows, continues onto occiput and bends laterad, widening again and terminating abruptly, its end rounded. Small, yellowish-brown species with broad head.  $\sqrt{\text{AUS.}}$

Type T. beckeri Kert. .. Teratocranum Kertész (1899)

Note: Closely related to Monocera, couplet 7.

- Second antennal segment and head not as described ..11
- 11. Third antennal segment (fig. 15) elongate and narrow except at base, about 3x as long as height of enlarged basal part and 5x as long as height at beginning of narrow portion just anterior to base of arista, apex of this segment truncate, arista long plumose; frons elevated above upper eye margin, orbital plates broad and shining, about one-third of frons width; parafacials projecting obliquely forwards, ridged, inner side adjacent to face sloped inwards being outer side of subantennal depression; face vertically elongate, epistome broad (fig. 16). Wing (fig. 18) unusual in that hind margin is undulant, being re-entrant at apex of first posterior cell shortly anterior to apex of fourth vein, and at apex of fifth vein; fork of veins 2 and 3 very deep, radial-sector short and weak;  $R_1$  lying close to Sc; fork of veins 4 and 5 also deep, discal cell consequently long, also rather narrow; second vein arched forwards and closer to costa than to third vein; apical part of third vein moderately arched; vein Cu+A very short; second basal cell relatively very small; veins aetose. Fl without av comb, T2 with two spurs, chaetation otherwise unremarkable.  $\sqrt{\text{Type species}}$  moderately large (body 5 mm), robust, brownish-yellow, with four small, dark spots on face, a dark ocellar

spot, a dark spot against orbit at apex of orbital plate, a dark mesonotal vitta which bifurcates on scutellum, entire lateral border of mesonotum dark-striped, two horizontal dark stripes on pleura, upper one of which continues along lateral margin of tergites; parafacials brownish-orange but in dorsal view silvery-pruinose; wing boldly patterned in brown and dark brown; abdomen laterally compressed, tergal marginals absent over steeply curved median portion of tergites except on tergite 1+2, tergites 5 and 6 with lateral marginal bristles as well. <sup>7</sup> OR.

Type P. fasciatus Frey .. .. Poichilus Frey (1927)

Note: I have been able to study a paratype male of fasciatus. Frey gives a false and misleading impression of the genus by stating that it has much in common with the Palaearctic Mycterella and is also near the Australian Rhagadolyra. In fact the type species has a homoneuriform costa, and I consider it is related to Oriental Cestrotus - Dioides stock. Frey states that the oc bristles are 'sehr kurz und fein', but in the specimen I examined they are large, porrect and extending between the ant or bristles. He gives the body length of the type species as 6 mm, but it measures 5 mm in the paratype seen by me.

- Head, antenna and wing not of that conformation .. 12
- 12. Head elongate in vertical axis, face and buccae ventrally extended; buccae and sometimes lateral portions of epistome very broad beneath eye, together at least half, usually more than two-thirds, even exceeding, height of eye; eye always longest in vertical axis, usually narrowed below; frons humped or strongly and often abruptly curved over lower section at right-angle to upper one; ocelli often far forwards, distant from vertex; face convex, usually strongly protuberant, its most swollen part close to or below level of lower edge of eye; usually at least one strong genal bristle below eye, and a row of setulae along inner edge of parafacial. Wing



- patterned except in Prosopomyia.7 .. .. 13
- Head not of that form, if ventrally produced then not to that degree, buccae and lateral portions of epistome not widened beneath eye, or if widened then not to that extent; frons not humped, variously formed, usually curving gradually forwards; if face is strongly convex in profile, its apex is well above lower edge of eye .. .. 17
13. Wing without a pattern. Fl with av comb. /Face tumid slightly below centre, without longitudinal ridge; parafacials very broad, at level of upper setula in parafacial row about one-half width of face at that level; frons setulose; radial veins asetose above; arista short plumose; greyish species with yellowish-brown head.7 PAL.
- Type P. pallida Loew .. .. Prosopomyia Loew (1856)
- Wing patterned .. .. 14
14. Fl without av comb of small black spines. /Arista hairs short, length about twice diameter of basal segment of arista; frons slightly humped; radial veins asetose above.7 OR. AUS.
- Type D. pictipennis Kert. Dioides Kertész (1915)
- Note: Related to Cestrotus, in particular having a resemblance to those species formerly placed in Turriger; head and wing figured by Kertész (1915), description also by Malloch (1940: 134).
- Fl with av comb of small black spines .. .. 15
15. Wing (fig. 21) with a simple pattern, brownish on anterior half (due to staining of membrane), greyish-hyaline posteriorly. /Face with long, rounded median ridge (figs. 19, 20) starting between antennae and increasing in depth towards epistome; parafacials narrow, at level of upper setula in parafacial row only about one-quarter or less of face width at that level; ocelli close to vertex, ocelli about midway between vti and post or; arista very shortly plumose; frons curving over rapidly to vertical plane; spines in av row on Fl rather longer than usual, this row commencing at about middle of femur; T2 with only one

strong spur; 2 st, anterior one much weaker than other; radial veins asetose above; rather small, slender, generally dull greyish species, antennae largely dull orange, a narrow, transverse, orange mark above antennae.<sup>7</sup> OR.

Type P. deemingi n. sp. .. .. Procestrotus NEW GENUS

Note: Named in honour of Mr. J.C. Deeming who did much valuable work on the lauxaniid collection in the British Museum (N.H.) during his employment there. This interesting species clearly is derived from Cestrotus stock, and the only characters that adequately distinguish it generically are the simple wing pattern, shortness of the arista hairs and single strong spur on T2.

- Wing with more complex pattern (figs. 22, 23), usually brownish or greyish with enclosed pale spots, vittae or other marks, sometimes also the hind margin narrowly pale, or at least with a definite trace of such a pattern .. .. . 16

16. Arista pubescent or very short haired; legs elongate, slender, especially fore and middle pair whose femora are attenuated apically.  $\sqrt{\text{Fairly}}$  large species with narrow wings; head in both known species showing remarkable sexual dimorphism, buccata Meij. male has the genae angularly produced, and a median process on lower margin of face (Malloch, 1929a: fig. 17), male of undescribed species in British Museum (N.H.) with long, porrect horn on clypeus; short hairs present on disc of scutellum in type-species.<sup>7</sup> OR.

Type Prosopophora buccata Meij. (1910)

Prosopophorella Meijere (1917)

Note: Formerly Prosopophora Meijere (1910) nec Douglas (1892). I have not seen the type-species and base the above account partly on a new species assigned to the genus by Dr. G.E. Shewell and collected in Nepal by the late Mr. R.L. Coe who told me that he found it on boulders along a mountain stream.



- Arista plumose; legs not unusually elongate or slender.  
Mostly greyish or brownish species with bold pattern; wing always with well-developed pattern (figs. 22, 23), held in tectiform posture at rest; some species (formerly considered typical Cestrotus) have a broad, deep, tumid face, and a striking cephalic ornamentation comprising a bare, shining pre-ocellar callus, black band across lower frons, two pairs of silvery-grey spots, and a pair of orange supra-antennal spots (fig. 24); also species (formerly those in Turriger) lacking this ornamentation and having frons humped in various degrees, sometimes very prominently, face much extended ventrally, and with distinct, elongate subantennal depressions.<sup>7</sup> ETH. MAD. OR.

Type Cestrotus turritus Loew .. Cestrotus Loew (1862)

Note: Turriger Kertész (1904), type T. frontalis

Kert., is considered to be a synonym (see discussion below). The question of the type-species of Cestrotus is somewhat confused. Becker (1895: 254) named as 'Die typische Art' Cestrotus turritus Loew, but this was ignored by Hendel (1908: 12) who made Turriger a junior subjective synonym of Cestrotus and cited T. frontalis as the type-species, a designation invalid in terms of Article 67(f) of the Code. Subsequently Hendel (1920) separated these genera again and cited Cestrotus megacephalus Loew as the type-species of Cestrotus alone, a designation he repeated in 1925 (p.104). Becker's designation of turritus satisfies Article 69(a)(iii) of the Code and therefore must be accepted. Unfortunately this would present a nomenclatural difficulty if Cestrotus and Turriger are kept separate generically, because turritus is an undoubted Turriger; Cestrotus would have to replace Turriger and a new generic name would be needed for the remaining species formerly in Cestrotus. However, it transpires, as I explain below, that no characters have been found that

satisfactorily separate these groups of species as genera, so the difficulty is avoided.

17. Frons short, broader than long; face with a glossy bulbosity which may be moderately or strongly protruding, sometimes also a transverse tumidity beneath this; arista unequally feathered, hairs longer on upper side; oc strong, longer than ant or; pale preapical rings on tibiae, at least on T2 and T3; wing brown, patterned with whitish spots and an apical or preapical fascia. /Dark species, somewhat suggestive of the sphaerocerid genus Leptocera; most of the species have bicolored antennae, the pale apical segment contrasting with very dark second and basal segments; mesonotal bristles strong, backwardly directed; Fl with av comb; scutellum somewhat flattened, rather shallow. / OR.

Type Lauxania lunifera Meij. (1910)

Phobeticomyia Kertész (1915)

Note: See Malloch (1929a: 22) for data on the species of this genus; Lamprogaster punctata Walker (1856a), placed in 'Ortalides', type in the British Museum (N.H.), is a species of this genus, NEW COMBINATION. Hendel (1925: couplet 31) says that the lunule is half-moon-shaped and free, but what he evidently saw is a pale yellowish mark of that shape on the anterior edge of the frons; the lunule is not free.

- Without this combination of characters .. .. 18

18. Ant or strongly or moderately inclinate, closer to post or than latter are to vti; antennae elongate, third segment linear, truncate apically, about twice length of basal and middle segments together; small acr bristles present, including presutural pair; arista long plumose;  $R_{2+3}$  markedly sinuous, curving forwards over its basal half towards costa, then curving away from it, marginal cell thus narrow in basal half; all other longitudinal veins slightly undulant; r-m well beyond middle of discal cell; wing



dark brownish with two pale fasciae apicad of discal cell. Smallish, dark, often variegated species; in varimana and variegata T1 is strongly flattened laterally and F1 has a ventral linear brush of bristles over its apical half which lie to posterior side of femur; in variegata and splendida apical part of costa (between veins 3 and 4) is a little inward of wing margin and  $M_{1+2}$  thus appears to be very abruptly bent forwards to end at apex of  $R_{4+5}$  (see Bezzi 1928: figs. 39, 40). 7 AUS.

Type E. variegata Bezzi .. .. Eucyclosis Bezzi (1928)

Note: Steganopsis solomonensis Curran (1936) and Steganopsis varimana Malloch (1940) belong in this genus, NEW COMBINATIONS.

- Ant or not inclinate but reclinate; some of the other characters may be present but not in this combination .. .. . 19
- 19. Face with a projecting median keel obvious in lateral view. Wing patterned. .. .. . 20
- Face without median longitudinal keel, though there may be a rounded longitudinal, midline swelling .. 21
- 20. Head dorsoventrally rather compressed, frons meeting face in an angular projection extending well beyond eye; face with a sharp, protruding keel on upper half only (fig. 25); third antennal segment elongate, almost 3x as long as broad at base, densely fringed except below with short, black hairs; arista white, unequally feathered, longer hairs above; second antennal segment with long, dark hairs below; 2 st. Darkly patterned, silvicolous species; wings (fig. 17) held in tectiform posture at rest. 7 ETH.

Type C. delta n. sp.

Cainohomoneura NEW GENUS

- Head not dorsoventrally compressed, and without projecting fronto-facial angle on which antennae are borne; frons longer than broad; face with median keel extending to oral margin; length of third antennal segment not more than twice its width at base; arista plumose but not white; second antennal segment without many hairs below; 1 st., or also a weak anterior one.

Czerny (1931: fig. 1) illustrates the head and wing of maculipennis Czerny.<sup>7</sup> OR.

Type C. nigra Frey .. .. Caeniopsis Frey (1927)

21. Face modified, having a broad, convex, median swelling longitudinally down its entire length, projecting beyond epistome as a short lobe covering or partly covering clypeus (figs. 26-28), this swelling densely silvery, sericeous pruinose, remainder of face comprising a small, subtriangular ventro-lateral portion on each side. Wing unpatterned; 2 st; mesonotum pruinose, largely sepia with greyish or silvery-grey borders.<sup>7</sup> MAD.

Type Z. argentifrons n. sp. .. Zanjensiella NEW GENUS

- Face not thus formed, instead flat, or somewhat concave or slightly convex, occasionally (as in Poecilomyza, a subgenus of Homoneura) with rounded median ridge on upper part between subantennal depressions. Large, morphologically diverse genus; some species without av comb of small spines on Fl.<sup>7</sup> All Regions except South America.

Type H. picea v.d. Wulp .. Homoneura v.d. Wulp (1891)

Note: Genera in synonymy are - Drosomyia Meij. (1904), type D. picta Meij.; Sapromyzosoma Malloch (1920), type Sapromyza citreifrons Mall., as a subgenus of Sapromyza, nec Liroy (1864); Mallochomyza Hendel (1925), type S. citreifrons Mall., n. name for Sapromyzosoma Mall.; Cnematomyia Hendel (1925), type Lauxania quinquevittata Meij. (1910), NEW SYNONYMY. Apparently the only description Hendel gave of Cnematomyia is the one at couplet 31 of his key, where he distinguishes it by the shape of the wing, the 'schulterlappen' (squama) being much reduced, the alula almost atrophied, the remaining characters being in contrast to Phobeticomyia which is in the other section of the couplet. De Meijere in his account of the type-species put it in section 15 of his key which reads 'Flügel von gewöhnlicher Gestalt'. Frey (1927: 25) seems to have been doubtful about



the genus, and Malloch (1929a) does not mention it and keys out the type-species at couplet 117 of his key to Homoneura species. Possibly Hendel misidentified guinguevittata; de Meijere's fig. 59 on pl.7, of the wing, does show it to be a little narrow at the base, without a definite anal lobe, but this alone hardly rates as a generic feature, so Hendel's genus is not accepted.

Key to subgenera of Homoneura v.d. Wulp

Note: Tarsohomoneura Hendel (1933), type Sapromyza americana Wied., is not recognised because it is based on characters of the male only.

- A. T2 with some bristles in row on p surface .. .. B
- T2 without differentiated p bristles .. .. D

- B. Two sa bristles present of which anterior one Malloch's 'prealar'; 1929a: 41, couplet 1) is long and strong; p bristles on T2 strong, equal to, or longer than, tibial diameter.

Type Lauxania semibrunnea Meij. (1916)

Chaetohomoneura Malloch (1927a)

Note: Malloch (1935) records the presence of an ia bristle in an OR species of this subgenus, viz. gedehi Meij.

- One sa bristle present, or if prealar present it is weak; p bristles on T2 sometimes strong but usually shorter than tibial diameter .. .. C
- C. Dorsal preapical bristle absent on T3; T1 compressed laterally in male, quite sharp on d surface.  $\sqrt{\text{Darkly}}$  patterned species; head height much greater than width.<sup>7</sup>

Type Phobeticomyia boettcheri Frey

Poecilomyza Malloch (1929a)

- Dorsal preapical bristle present on all T; T1 normal in male.

Type Sciomyza orientalis Wied.

Neohomoneura Malloch (1927a)

Note: What might be Wiedemann's type specimen of orientalis in the Vienna Museum has a weak bristle both before and behind the normal ..

- D. Ia bristle present .. .. . E  
 - Ia bristle absent .. .. . F
- E. Two sa bristles present, anterior one ('prealar' of Malloch) shorter than posterior one but strong;  $M_{1+2}$  slightly curved forwards at apex.  
 Type Homoneura leveri Mall. Solomonina Malloch (1940)  
 - One sa present; venation normal.  
 Type Lauxania parvinotata Meij. (1914)  
Minettioides Malloch (1929a)
- F. Oriental-Australian species having 1+2 dc. (Note that some Palaearctic species have three pairs of dc of which the anterior pair is at or before the transverse sutures, e.g. consobrina Zett. and limnea Beck.; this is a feature of some undescribed African species too. The geographical qualification is used as I have not seen species of these subgenera and cannot re-characterise them satisfactorily for the purpose of this key. .. .. . G  
 - Not thus characterised .. .. . H
- G. Central portion of face about three times as wide at lower margin as distance from its edge to eye margin (after Malloch). Wing patterned.  
 Type Lauxania ornatipennis Meij. (1910)  
Euhomoneura Malloch (1927c)  
 - Width of central portion of face about equal to distance from eye to lateral edge of central portion (after Malloch). Wing unpatterned.  
 Type Homoneura testacea Mall.  
Xenohomoneura Malloch (1927c)
- H. Fourth wing vein strongly to noticeably curved forwards at apex (Malloch, 1929a: figs. 37, 38).  
 Type Griphoneura testaceipes Kert. (1900)  
Griphoneuroides Malloch (1929a)  
 - Fourth vein not curved forwards at apex, usually straight and almost parallel with third vein or gradually convergent with it over entire apical section.  
 Type H. picea v.d. Wulp .. Homoneura v.d. Wulp s. str.



22. Wing distinctive (figs. 29, 30), rounded, second vein curving forwards and arching, thus lying close to costa, marginal cell unusually narrow; antennae very elongate, basal segment at least as long as second segment, arista plumose; face prominently protruding, glossy.  $\angle \bar{W}$  often somewhat leathery, capable of downward flexure across a line from apex of Sc to apex of anal cell, underside slightly concave; smallish, glossy, rather compact species with long antennae and sloping frons, macroscopically suggestive of little beetles.  $\angle$  .. .. . 23

Note: Steganopsis divergens Frey (1927) is stated to have the second vein not closer to the costa than to the third vein; in this character it may be intermediate between Steganopsis and Pachycerina. I have not seen the species and am unsure of its generic location.

- Without such a wing conformation combined with elongate antennae and protruding face .. .. . 25
23. Ant or reclinate.  $\angle \bar{R}_1$  continuous to costa, though with an abrupt change of colour beyond middle where flexure line crosses this vein; first posterior cell almost of even width beyond discal cell; face with central convexity separated from lateral parts by obliquely descending depressions from parafacial margin to epistome; orbital plates narrowing anteriorly and somewhat convergent; antennae exceptionally long and linear; postsutural setulae lateral to dc rows arranged in several imperfect series.  $\angle$  NEA. NEO.

Type Lauxania latipennis Coquillett (1898)

Steganolauxania Frey (1913)

Note: Hendel (1925) and Curran (1934) are incorrect in describing the ant or as inclinate. Malloch (1929a: 12; 1933: 354) and Shewell (1965: 705) consider this taxon a subgenus of Steganopsis (next couplet), a view not accepted here.

- Ant or inclinate.  $\angle \bar{R}_1$  suddenly kinked at about apical third where line of flexure crosses and results in a v-shaped inflexion into marginal cell, apical portion

of this vein weaker. 7 .. .. . 24

24. 1+3 dc; second vein relatively short, ending before wing tip (fig. 30).  $\sqrt{\text{Orbital}}$  plates broad and glossy, contrasting with narrow, matt-black frontal stripe; vertex (see fig. 31) very sharp; face not evenly convex but with an impression on each side starting at eye corner and descending obliquely to midline; clypeus large and glossy; scutellum shallow with a sharp marginal rim; mesonotum devoid of setulae except for a few weak ones in acr rows; oc absent; third and fourth veins moderately diverging to apex of first posterior cell; vein 2A present and normal; apical part of fifth vein strong up to margin of wing where there is no well-developed notch; type and only known species is shining blackish-brown, only lower occiput and sides of face dark brownish-yellow; patches of silvery pruinescence against orbit on lower occiput and at upper and lower ends of orbital plates; fore legs multicoloured. 7 OR.

Type L. calopus Frey .. .. Lyperomyia Frey (1927)

Note: Frey (op. cit.: 6, 14) contradicts himself in his key to genera and description of Lyperomyia, with regard to the nature of the orbital plates and frontal stripe; his description, quoted in part by Malloch (1929a: 15), is correct, the orbital plates being broad, the frontal stripe relatively narrow. The wing and head figured (figs. 30, 31) are from a paratype kindly loaned by Dr. W. Hackman.

- No presutural dc present, second vein ending close to wing tip (fig. 29).  $\sqrt{\text{Orbital}}$  plates of variable width, sometimes poorly differentiated, usually very broad and parallel on inner margins, frontal stripe linear (in buruensis Malloch the orbital plates fused together along entire length); face usually evenly convex, though variously formed; scutellum flattened but without a sharp marginal rim; oc usually present though very weak; postsutural setulae lateral to dc rows confined to an ia series or absent; first



posterior cell usually broadened beyond discal cell by opposite curves in  $R_{4+5}$  and  $M_{1+2}$ , thereafter narrowing slightly; fifth vein weak at apex and ending in a small, concave fold in membrane at edge of wing which is re-entrant at that point; vein 2A absent or only faintly visible. 7 OR. AUS.

Type S. pupicola Meij. Steganopsis Meijere (1910)

Note: Malloch (1933: 354) described a Neotropical species, edwardsae, in this genus, for which he erected a subgenus Lauxanostegana; after a study of the type material I conclude that Malloch's species is not a true Steganopsis but shows convergence in many features, so his subgenus merits generic status.

25. Face prominently convex, swollen, protruding, glossy and bare; antennae elongate to very elongate, basal segment at least as long as second segment (fig. 32). 7 Arista plumose, sometimes thickly and conspicuously. 7 (If post or situated far forwards, near end of orbital plate, and ant or very small and a very short distance in front of post or, proceed to couplet 29. If smallish, dark-bodied flies with exceptionally long antennae, from PAL and NEA regions, check Lauxania and Lauxaniella at couplet 82) .. .. . 26
- Without this combination of very convex, glossy face and unusually elongate antennae (except Micropachycerina, couplet 31, which has the orbital bristles as described above) .. .. . 29
26. Fl with av row of small spines on apical half; ant or inclinate; 1+3 dc, presutural pair as strong as others; antennae elongate, basal segment about equal to second and with some hairs below at apex; arista basal, white, short-plumose. 7 Fore tarsi long, reduced to 1-3 bristles on distal half; frontal plates broad and shining, very close together in varipes Mall., broadening anteriorly in leucochaeta (Meij.); dark-bodied species with long, slender antennae and unpatterned wings. 7 OR.

Type Pachycerina leucochaeta Meij. (1914)

Melanopachycerina Malloch (1927a)

Note: The first published account of this genus is in Suppl. Ent. 15: 103, April 1927, in which Malloch refers to his description 'in press' which appeared in May 1927 in Ent. Mitt. 16: 162. The various Oriental species assigned to Camptoprosopella, viz. C. angustilimbata Meij. (1914), notatifrons Brun. (1913) and albiseta Hendel (1907), may belong here; they were rejected as members of Camptoprosopella by Shewell (1939) who considers the genus to be exclusively New World. Malloch (1929a: 21) considers angustilimbata a synonym of albiseta which he places in Melanopachycerina.

- Without this suite of characters. Face conspicuously glossy and bulbous; ant or inclinate; mesonotal setulae lateral to dc lines confined to ia row; arista like a slender, dark feather, its shaft tapering to a fine point from broadened base, densely and symmetrically haired .. .. . 27

27. 0+3 dc, sometimes a weak presutural dc present as well; third antennal segment elongate, clearly much longer than first and second together, apically truncate; arista subbasal. Usually no spot between antenna and eye, but two spots on face and a large, velvety-black ocellar spot; fore tarsi elongate in many species; thorax deep, mesonotum much arched. 7 All Regions. Type Lauxania seticornis Fall. (1820)

Pachycerina Macquart (1835)

- 1+2 dc; basal antennal segment very elongate (Hendel, 1908: fig. 37) to elongate (fig. 32), longer or only slightly shorter than third segment which is oval to somewhat pointed oval; arista median to subapical 28
28. Mesopleuron without supernumerary bristles near lower anterior corner. No spots on face, but a large, velvety-black spot between antenna and eye; in some species eye margin indented at lower part of frons within black spot; frons somewhat sunken medially,



ocelli not visible in lateral view in some species; oc bristles very small or absent. 7 OR. AUS.

Type C. longicornis Hend. .. Cerataulina Hendel (1907)

- Mesopleuron with some small bristles near lower anterior corner. 7 Black spot present between eye and antenna and on face; arisal feathering of constant length to apex of arista; lower parafacial margin with a few strong, porrect bristles; oc minute; d preapical on all T; spur on T2 very long and strong; tergal marginal bristles quite long, semi-erect; 1 st; intra-dorsocentral setulae biseriate; basal antennal segment aetose; ocellar spot confined to triangle; type species almost uniformly yellowish-brown apart from black spots on head. 7 OR.

Type C. boettcheri Frey Calliclypeus Frey (1927)

Note: I am doubtful that this genus can satisfactorily be maintained as distinct from Cerataulina; future collecting may well bring to light intermediate species. The unique holotype was sent to me for study by Dr. W. Hackman; see fig. 32.

29. Post or situated far forwards on frons, near apex of orbital plate; ant or very small, situated immediately in front of post or which is a strong, reclinate bristle (see figs. 33, 35). (The following three couplets contain the four lauxaniid genera known to have this feature; all have the arista plumose, in three of them it is thickly haired) .. .. 30
- Orbital bristles not thus arranged and proportioned 33
30. Costa homoneuriform. 7 Wings fumose with milky-white spots; frons without dark ocellar spot. 7 ETH.  
See couplet 5 .. .. Katalauxania Hendel
- Costa sapromyziform. 7 Wing unpatterned; frons usually with black ocellar spot. 7 .. .. 31
31. Wing strongly narrowed towards base over about basal half, anal lobe undeveloped, alula much reduced (fig. 34); frons with large, velvety-black spot reaching from pvt to level of post or which are far forward;

ocelli far from vertex, spaced very widely apart, hind ocelli much nearer to orbits than to one another, all ocelli entirely enclosed by black spot, oc bristles also widely separated; face (see fig. 33) convexly arched in horizontal plane, glossy translucent; 0+2 dc; intradorsocentral setulae confined to acr rows; acr bristles absent; setulae lateral to dc rows confined to an ia series.  $\sqrt{\text{Small, slender, narrow-winged species with thickly-haired arista; related to } \underline{\text{Pachycerina}}, \text{ couplet 27.7 MAD.}}$

Type M. stenoptera n. sp. .. Micropachycerina NEW GENUS

- Wing of normal conformation, anal lobe developed; frons not as described above, ocelli and oc bristles always close together; face not prominently convex; 0+3 dc; mesonotal setulae multiseriate, prescutellar acr bristles present .. .. . 32

- 32. Vein 2A diverging from wing margin; arista thickly feathered, dorsal series of long hairs relatively shorter (see Malloch, 1933: fig. 67c); first antennal segment with at least six setulae on upper anterior edge; oc strong and long, much longer than pvt;  $R_1$  clearly distant from Sc over entire length, costal cell about 3,3x length of subcostal cell.  $\sqrt{\text{Fulvous species with black ocellar spot, densely haired arista, and unpatterned wings.7 NEO.}}$

Type N. aristata Mall. .. Neopachycerina Malloch (1933)

Note: The characters used here to separate

Parapachycerina from Neopachycerina are relatively trivial. Some African and Madagascar species of the former genus are very like aristata but I hesitate to consider them congeneric as the Neotropical species differs in small ways in various features that are relatively constant in all the Parapachycerina species. Furthermore, the distribution of Parapachycerina is internally consistent though wide over the Old World tropics, whereas Neopachycerina is still known only from Uruguay. I suspect this is a case of convergence, but a



better knowledge of Neotropical Lauxaniidae is needed before a clarification of relationships can be obtained.

- Vein 2A running close and subparallel to wing margin (fig. 35); first antennal segment with usually not more than 2-3 setulae above; oc relatively smaller and weaker, about equal to pvt or smaller;  $R_1$  ending relatively close to Sc, length of subcostal cell only about one-fifth length of costal cell.  $\sqrt{\text{Rather small. slender, usually brownish-yellow or reddish-brown species, nearly always with a black ocellar spot, wing unpatterned; } \underline{\text{post or long, almost equal to } \underline{\text{vti.}}}$  OR. ETH. MAD.

Type P. munroi n. sp. .. Parapachycerina NEW GENUS

Key to species groups of Parapachycerina n. gen.

- A. Vertex sharp, pvt directed almost backwards; antennae close together, basal segments touching, ocelli in triangle with sides longer than base, placed about its own length forward of vertex; orbital plates raised, contrasting in colour and sclerotisation with remainder of frons; no black ocellar spot present, ocellar tubercle and very narrow surrounding area dark brown, concolorous with orbital plates. Zululand.  
undescribed species
- Vertex rounded, pvt inclined obliquely upwards; antennae separated; ocelli in triangle with different shape and position; orbital plates not conspicuously raised and coloured; black ocellar spot present .. B
- B. Ocelli placed far forwards, away from vertex, about at middle of frons and roughly in equilateral triangle; ocellar spot correspondingly large, broadly elliptical, meeting ocellar triangle between front and rear ocelli, and enclosing pvt; third antennal segment obviously narrowed beyond arista base, relatively more elongate and acutely pointed. (Oriental species)

hirsutiseta group

Note: The Oriental species Lauxania hirsutiseta Meij.

(1910) = Sapromyza koshunensis Mal. (1929a) (see Hennig, 1948), seems to belong in Parapachycerina,

NEW COMBINATION. I have studied a Ceylonese specimen of what appears to be this species, from which the characters given above were taken.

- Ocelli close to or at vertex, in triangle with base longer than sides; ocellar spot smaller; third antennal segment relatively shorter, deeper and less acutely rounded .. .. . C

C. Black ocellar spot confined to triangle enclosed by ocelli. One African and all Madagascar species  
undescibed species

- Black ocellar spot extended posteriorly onto vertex, touching inner sides of pvt. African species  
munroi group

33. Face swollen, evenly convex; antennae short, third segment rounded apically and about twice length of second segment; arista characteristic, median, lanceolate, thickly and evenly haired on both sides with fine, dark hairs (see Hendel, 1908: fig. 35); 1+2 dc; 1 st. Not seen. AUS.

Type Pachycerina flaviceps Kert. (1899)

Kertesziella Hendel (1908)

- Without this combination of characters .. .. 3 $\frac{1}{2}$

- 3 $\frac{1}{2}$ . Wing with a distinctive brownish pattern like or close to that in figs. 36 and 37, a feature of which is presence of paired brown stripes crossing marginal and submarginal cells from costa to  $R_{4+5}$ , veins usually with alternating dark and pale patches caused by these bands, clear strips within each pair about half as wide as clear areas between pairs of brown stripes; sometimes these brown stripes partly fused, leaving an almost enclosed pale spot over second vein, sometimes a row of darker brown spots along posterior edge of  $R_{2+3}$ ; acr bristles present, 1+3 or 2+3; 1+3 dc; mesonotal bristles and setulae generally erect, oc and pvt long; T3 with two unequal, strong, curved, rather blunt av spurs placed close together (rather weak in Sciasmomyia dichetophora Hend.) and a very long, slender, hair-like d preapical.  $\sqrt{\text{Pale yellowish or$



- tawny flies with reticulate wing pattern, very broad frons, some species with vittate thorax, one genus lacking the row of black spinules on the costa.<sup>7</sup> .. 35
- Without this suite of characters, in particular T3 spurs and preapical not of that kind .. .. 36
35. Costa with usual row of small, black spines; ant or reclinate; ocellar tubercle hardly raised; pvt separated from posterior ocelli by about length of ocellar triangle; scutellum not concave on hind margin; arista sparsely feathered.  $\sqrt{\text{Vertex}}$  acute, face and frons more or less in one curving plane; mesonotal hairs stiff and (like the bristles) erect; third antennal segment short, rounded apically; costal cell without, or with only a faint, brownish band.<sup>7</sup> PAL. OR. Type S. meijerei Hendel .. Sciasmomyia Hendel (1907)
- Costa without row of small black spines; ant or gently inclinate; a distinct ocellar tubercle developed; pvt situated immediately behind tubercle; scutellum concave between post sc bristles which stand on small tubercles; arista short-haired.  $\sqrt{\text{In}}$  most species third antennal segment about twice as long as first two together and tapering apically; costal cell crossed by two or three brownish stripes one of which is over humeral cross-vein; species remarkable for the abundant hairs which on entire insect including legs are generally long, stiff and erect, often groups of such hairs on frons and parafacials; mesonotal and scutellar bristles erect; some mesonotal, scutellar and cephalic bristles strikingly lanceolate or laterally compressed in some species including type species, without this feature in species formerly placed in Amphicyphus.<sup>7</sup> OR. AUS. ETH. Type D. horrida Loew .. .. Drepanephora Loew (1869)
- Note: Amphicyphus Meijere (1908), type Ensina reticulata Doleschal (1856), is a synonym (see Stuckenberg, 1963).
36. Wing venation characteristic, second vein curving forwards and running quite close to costa, also irregularly undulant; r-m and m well beyond middle of wing and rather close together, discal cell very long,

r-m at about apical quarter of discal cell,  $R_{4+5}$  re-entrant at r-m, anal vein long, tapering, terminating just before wing margin, fully as long as vein 2A. Vertex acute; frons flat and broad, descending steeply, ocelli at vertex; face glossy, short, much broader than high, with a small protuberance between antennae beneath which face is transversely concave then evenly convex; clypeus large, glossy, ant or inclinate.

Antennae short, third segment about twice as long as deep, rounded, arista sparsely and shortly feathered; mentum of proboscis rather large, troughlike, well-sclerotised; palps flattened and broad; wing membrane in submarginal cell with irregular, sometimes blister-like contortions concave ventrally, in some species discal cell also with this feature; oc minute or absent; blackish or brownish-black species with brownish wing marked by an oblique whitish preapical fascia passing apicad of r-m and basad of  $m_7$  AUS.

Type D. atrata Mall.

Depressa Malloch (1929b)

- Without the characters of this aberrant Australian genus .. .. . 37

37. Head distinctively shaped (figs. 39, 40), face and frons very broad, vertex usually very sharp (sometimes shallowly emarginate on each side of ocelli), frons descending very steeply and continuing into same plane as face (only in an undescribed Assam species have I seen vertex rounded and not a ridge), head increasing uniformly in thickness ventrally; genae broad, lower part of occiput extending broadly beneath eye, epistome also wide laterally, anteriormost part of face in profile is below lower end of eye; orbital plates usually broad, glossy and obvious in many species, but dull and poorly differentiated in some, inner edges parallel; face glossy and evenly though only moderately convex; posterior ocelli at vertex or very close; occiput concave above over entire width of head; eye vertically elongate, narrowed below. Acr bristles present, including one or more presutural pairs except in aberrant specimens; oc absent except in some



- Oriental species; both pairs or short, in some species small and very fine; arista sparsely feathered; preapical bristle on all T, quite long and fine but still bristle-like. 7 .. .. . 38
- Head not of that form .. .. . 39
38. Propleural bristle absent; propleuron with a small, conical projection above fore coxa; fourth vein conspicuously curved down from near middle of its apical section, first posterior cell fully twice as wide at apex as at m crossvein. 1Oc absent; vertex biemarginate; 1-2+3-4 dc, 2+4 acr; testaceous-yellow species with yellowish wings. 7 Not seen. OR.  
Type P. curvinervis Mall. Pleurigona Malloch (1929a)
- Propleural bristle present, in some species on a small conical projection above fore coxa; second and third veins not markedly divergent, instead subparallel or the fourth vein slightly downcurved over its apical section. 1Oc absent in African and present in some Oriental species; usually 1+3 dc, 0+3 in a few species, 1-2+3-4 acr; ant or slightly to moderately inclinate; thorax deep, mesonotum strongly arched; wings usually tinged with yellow and with two small, dark marks, one at apex of Sc, other on r-m (or r-m darker than other veins); pale yellowish, yellowish-brown or testaceous-yellow species. 7 ETH. OR. MAD.  
Type X. basiguttata Walker Xangelina Walker (1856b)  
Note: Afrolauxania Curran (1938), type A. bequaerti Curran, is a synonym, NEW SYNONYMY. The type specimen of bequaerti has been examined; it is in the American Museum of Natural History, New York.
39. Posthumeral bristle absent .. .. . 40
- Posthumeral bristle present .. .. . 44
40. Ant or inclinate, sometimes erect, slightly curved and inclined a little both inwards and backwards, if absent (female Diplochasma monochaeta Knab) then pvt also absent; 0+3 dc .. .. . 41
- Ant or reclinate, always present; 1+2 or 0+3 dc .. 42
41. Face with prominent median keel down entire length,

quite sharp on upper part, slightly receding below; third antennal segment pointed apically; some porrect bristles present on lower margin of parafacial; occiput markedly concave, vertex quite sharp, head fitting closely against thorax. [Head distinctively shaped, frons flat, horizontal, eye as long as or slightly longer than high, fronto-facial angle slightly acute, occiput deep beneath eye; orbital plates contrasting in colour with remainder of frons, usually reaching to anterior margin of frons and relatively broad; frons setulose anteriorly, usually on and along margins of orbital plates, supra-antennal setulae in a somewhat inclinate group on each side of midline, upper part of parafacial also with some setulae; pvt present in some African species, absent in others and in type-species; oc always present though small or minute in African species, absent in type-species; usually a dark spot between antenna and eye.] ETH. OR. MAD.

Type Trigonometopus monochaeta Hendel (1909)

Diplochasma Knab (1914)

Note: Sauteromyia Malloch (1927a), type S. alboapicata Mall., is a synonym (see Hennig, 1948: 419).

- Face flat, not keeled, not visible in lateral view; third antennal segment rounded apically; marginal setulae on parafacials all small, none bristle-like; vertex rounded, occiput only slightly concave, head not fitting closely against thorax. [Fronto-facial angle acute; eye broadly suboval, almost as high as long; male basal tergites strongly curved over, lateral edges of tergite 3 almost touching in midventral line, edges of succeeding tergites progressively wider apart, a cavity thus formed in apical half of abdominal venter in which much enlarged surstyli are enclosed; oc and pvt present; frons very sparsely setulose anteriorly; arista bare; mesopleuron with some small bristles additional to normal mp; T3 d preapical small; type species uniformly dull yellow-brown.] AUS.

Type P. unicolor Hend.

Paranomima Hendel (1907)



horizontal diameters about equal; head shape distinctive, frons rather short, horizontal, face long, flat, fairly broad, descending at a right-angle or slightly acute angle to frons, retreating a little below; head noticeably short in longitudinal body axis but high, genae broad with strong setulae, antennae carried on fronto-facial angle at dorsal plane of head; vertex rounded, occiput only moderately concave, head not fitting very closely against thorax; oc usually strong; 1+2 dc; scutellum broader than long; parafacial setulae very small.  $\sqrt{\text{Relatively stout, compact species with unmarked, fairly broad wings.}}$  7 AUS.

Type Trigonometopus fuscifrons Mall.

Neotrigonometopus Malloch (1929a) NEW STATUS

Note: Formerly a subgenus of Trigonometopus Macq. (next couplet).

- Without this combination of characters; eye not of that shape but elongate horizontally; genae without bristly setulae distinct from those in lower end of parafacial row (if these are present); oc very small or absent 43
- 43. Head not subtriangular in lateral view (Malloch, 1935: fig. 8), face flat, not retreating, not visible in profile; 1+2 dc; claws of fore leg of male minute and hidden beneath enlarged and flattened pulvilli in some species, more normal in other species; basitarsus laterally compressed in contrast to apical three tarsomeres which are dorsoventrally flattened, apical tarsomere very noticeable flattened; legs rather stout, especially femora.  $\sqrt{\text{Eye horizontal, elongate, bluntly rounded anteriorly and posteriorly; d preapical long on T2 and T3; lower part of occiput and genae broadly exposed beneath eye, without bristles there or on parafacial edge; anterior part of frons sparsely haired, these hairs erect or proclinate.}}$  7 GC. Marquesas Islands.

Type C. bilineatus Mall. Chilocryptus Malloch (1933b)

- Head subtriangular in profile, shape quite widely variable between species but fronto-facial angle always acute and projecting ahead of eye; face long,

retreating below, keeled in some species; usually 0+3 dc; 1+2 dc in a few species; usually several strong bristles along lower parafacial edge, directed forwards; anterior part of frons always haired, these hairs proclinate; legs not as in Chilocryptus, without noteworthy features. (A heterogenous and probably not natural assemblage of species; being broadly defined, this genus appears to have a wide distribution.) All Regions.

Type Tetanocera frontalis Meig. (1830)

Trigonometopus Macquart (1835)

Key to subgenera of Trigonometopus Macquart

Note: The subgenera Dichozyrhina Hendel (1938) and Tetroxyrhina Hendel (loc. cit.) are not recognised; they are based on selected combinations of st bristles and rows of intradorsocentral setulae, but these features occur in several other combinations and it appears that they are of value only for diagnosing species.

- A. Gena with a row of hairs along middle that reaches upwards on parafacial almost as far as do the marginal hairs. OR.

Type T. bakeri Bezzi (1931) Luzonomyia Malloch (1929a)

- Gena without such a row of hairs along middle. All Regions.

Trigonometopus s. str.

44. Ant or inclinate. (Note that some species of Lauxaniella - couplet 82 - have the ant or curving in a plane between reclinate and inclinate; flies with such a feature and very elongate antennae and a single st should be checked there.) .. .. 45
- Ant or reclinate .. .. 52
45. Strongpresutural dc present, thus 1+3 dc. [Australasian genera only; species small, usually brownish or dark, boldly marked by two broad, greyish-white, sublateral stripes on mesonotum and scutellum, similar but narrower stripes bordering frons.] .. .. 46
- 0+2 or 0+3 dc .. .. 47
- 1+2 dc .. .. 50



46. Face moderately convex, glossy; arista white except basally. New Zealand only.

Type Lauxania bilineata Hutton (1901)

Poecilohetaerella Tonnoir & Malloch (1926)

- Face flat, not or only slightly shining; arista dark brown. Australasian.

Type Sapromyza decora Schiner (1868) = schineri Hendel

Poecilohetaerus Hendel (1907)

Note: Hennig's (1948: 428) discussion of the distribution of this genus requires modification in respect of the species albolineatus Hendel (1910) which was described on a specimen alleged to have come from 'Südafrika, Victoria, 1888'. There is a series of this species in the Vienna Museum along with a considerable number of undoubtedly Australian Lauxaniidae, all labelled simply 'Victoria, 1888'; as Hendel's type apparently came from the same lot of specimens, there is nothing to conflict with the view that his species is an Australian one.

47. An ia bristle present, or two bristles on line between sa and post dc, if one present it is usually near the sa, if two present they are about equidistant, in a few species these ia bristles only a little longer than the rather long adjacent setulae; female preabdomen consisting only of segments 1+2, 3 and 4, postabdomen (fig. 98) with unusual modifications as described below in type species; surstyli articulated (fig. 94); face flat (fig. 44). Species of large to moderate size, wing length 4,7-7,5 mm, usually robust with relatively deep thorax, stout abdomen and rather small head; always glossy, sometimes metallic or almost so, brightly colored in shades of orange or yellow with dark green, blue-black or brown; head Sapromyza-like, vertex rounded arista almost bare, only finely haired; ant or strongly inclinate and also inclined forward in various degrees, placed close to post or, varying in length specifically, in some species so long as to cross at tips; oc quite small to moderately strong;

series of semi-erect, sometimes bristly setulae in acr rows in addition to normal prescutellar bristles; O+3 dc set far back, in some species with extra, much weaker bristles anterior to these; 2 st; 1 mp; F1 without av comb; T2 with one spur; wing often yellowish but never patterned. 7 ETH.

Type P. viridiventris n. sp. Prosamyza NEW GENUS

Note: Occurring in natural forest and bush in humid, relatively cool parts of South Africa only.

These large, brightly coloured, rather sluggish flies are a conspicuous component of the local lauxaniid fauna.

- Ia bristle absent; female preabdomen composed of at least the first five segments .. .. . 48

48. Head shaped as in Trigonometopus (couplet 43), frons flat and horizontal, eye elongate oval in almost horizontal plane, fronto-facial angle acute, face retreating below; ant dc at suture. [According to Malloch (1925, 1929a) this genus is separated from Trigonometopus largely on the presence of the ph bristle; material apparently of the type species in the Vienna and British (N.H.) Museum confirms the relationship; face not visible in lateral view, only slightly keeled, third antennal segment short, rounded, anterior half of frons sparsely haired, row of setulae reaching not more than half way up parafacial; oc stronger than in most Trigonometopus species; a black spot present between antenna and eye. 7 AUS. ? OR.

Type Oxyrhina binotata Thomson (1868)

Trigonometopsis Malloch (1925a)

Note: The lack of clarity in our understanding of the limits and relationships of the Trigonometopus-like genera is especially evident here.

Trigonometopsis was not satisfactorily distinguished by Malloch and later he made the delimitation of his genus even more uncertain by including a Philippine species with reclinate ant or (Malloch, 1929a: 37); perhaps this species belongs in Protrigonometopus (couplet 66).



- Head not of that form .. .. . 49

49. Arista finely pubescent, almost bare; basal antennal segment short and inconspicuous, antennae generally short; face narrow, almost flat or quite prominently convex or with a moderate keel. AUS.

Type Sapromyza maculifrons Macq. (1850)

Incurviseta Malloch (1925b)

Note: Malloch's description of this genus leaves much to be desired; he relates it to Camptoprosopella and Poecilohetaerus, and mentions some of the characters of these two genera but neglects to state the nature of the same features in Incurviseta. Subsequently (1927c: 402) he refers to characters of some further species 'that might be considered of at least subgeneric value', these species apparently being laticeps Mall. (head broad, eyes in frontal view markedly diverging) and flaviceps Mall. (very convex face and deep cheeks). I have seen only the type-species.

- Arista unequally feathered, dorsal hairs much longer than ventral ones, in some species a second dorsal series present subequal in length to ventral ones; antennae usually at least moderately elongate though quite short in some species, third segment up to about 4x as long as its basal depth, length of basal segment ranging interspecifically from almost equal to that of second segment to less than half; face flat, or slightly convex, or with a small median keel, in all species the parafacials broad and transversely inclined. Ant or strongly incurved and situated very close to post or; head somewhat compressed in longitudinal axis; eye broadly oval, usually obliquely placed, genae deep; oc long and strong; fore tarsi somewhat compressed laterally. 7 NEO. NEA.

Type C. melanoptera Hend. (1907) = Pachycerina dolorosa Willis. (1903) .. .. Camptoprosopella Hendel (1907)

Note: This New World genus is included because several Oriental species have been assigned to it.

probably erroneously; see the Note to  
Melanopachycerina, couplet 26.

50. A dark mark present in upper anterior corner of  
sternopleuron .. .. . 51  
- Sternopleuron without such a dark mark. Lower surface  
of stem of proboscis with long, fine hairs, usually  
longer in male. Abdominal tergites with quite long,  
numerous, semi-erect marginal bristles. Frons sloping  
forwards a little to quite markedly, differing much in  
width between species, in some rather narrow, length  
clearly more than twice width at midlength (especially  
in male), in others less than twice this width; eye  
distinctly narrowed below; pale yellowish-brown to  
brownish species, some with vittate thorax, some  
species sexually dimorphic in presence or absence of  
wing markings, and some have wing markings formed by  
clusters of exceptionally well developed microtrichia. 7  
OC. Marquesas Islands only.  
Type Prochaetops tahautae Mall.

Prochaetopsis Malloch (1932) NEW STATUS

Note: After a study of material of the type-species of  
Panurgopsis (= Prochaetops, see next couplet)  
and several of the Marquesas species which  
Malloch placed in that genus, I conclude that  
they are not congeneric; the Marquesas species  
have a different facies and exhibit marked sexual  
dimorphism, bizarre form of the head, and unusual  
trichiation of the wing membrane. For all their  
remarkable diversity, the Marquesas species  
clearly are a monophyletic group, geographically  
located far from the known range of Panurgopsis,  
and I consider them to form a separate genus.  
Malloch's taxon Prochaetopsis becomes the  
nominate subgenus, and a new subgeneric name  
is needed for the species he formerly placed in  
Prochaetops s. str.

Key to subgenera of Prochaetopsis Malloch

- A. Cc bristles absent; ant or much closer to post or than  
to anterior margin of frons. Some small, porrect



hairs present on anterior part of frons; eye not much narrowed below; an elongate, bare strip extends along lower anterior face of F2 from its base almost to apex; arista very long, slender, about as long as height of head, bare; palp broadly flattened.7

Prochaetopsis s. str.

- Oc bristles present; ant or not closer to post or than to anterior margin of frons .. .. . B
- B. Prescutellar acr bristles well developed. Eye not much narrowed below.7

Type Prochaetops armatipes Mall. (1932)

Pseudoprochaetops NEW NAME

Note: I am here renaming the subgenus containing those species formerly placed by Malloch in Prochaetops s. str.

- Prescutellar acr absent. Gena with one or two long bristly hairs on av face; tergal marginal bristles numerous, suberect; eye relatively elongate obliquely, somewhat narrowed below.7

Type Prochaetops atricornis Mall.

Aprochaetops Malloch (1934)

51. A small, dark spot present between antenna and eye; frons more or less flat and horizontal, forming a definite angle with face; antennae placed close to or at upper edge of eye; eye usually longer than high, never obviously the reverse; head dorsoventrally compact. (See Bezzi, 1928: figs. 37, 38.) AUS. OR. MAD.

Type P. flava Kert. .. .. Panurgopsis Kertész (1915)

Note: Prochaetops Bezzi (1928), type P. nigriseta Bezzi, is a synonym (see Malloch, 1929c: 210). Trigonometopus magnificus Bezzi & Lamb (1926), from Rodriguez Island, is a typical species of Panurgopsis, NEW COMBINATION. Marquesas species placed in Prochaetops by Malloch are separated in a new genus Prochaetopsis (preceding couplet).

- No dark spot present between antenna and eye; frons curving forwards to meet face in almost same plane as latter, thus no well-defined angle between them,

antenna placed well below upper edge of eye; face flat, not retreating below; entire head obviously higher than long, vertical diameter of eye exceeding horizontal diameter. Ant or closer to post or than latter are to vti; oc diverging outwards and slightly forwards; anterior part of gena and lower part of parafacial with several strong, porrect bristles; frons and face fairly broad; T2 with strong spur; small, pale yellowish species with broad head and unmarked wings. / OR.

Type C. sternopleuralis Kert.

Chaetolauxania Kertész (1915)

Note: Hendel (1938: 4) considers this genus a synonym of Panurgopsis, a view not accepted here.

52. Two bristles situated at almost equal intervals on line between posteriormost dc and sa bristles, neither of them in line with post pa. / Two hind marginal mp bristles present. / (If ant or absent or represented by a minute hair, see Austrolauxania, couplet 61.) 53
- One bristle, a true ia, situated on or close to line between post dc and sa bristles, about midway between these and more or less in line with post pa. (If ant or absent or represented by a minute hair, see Austrolauxania, couplet 61.) .. .. . 54
- No bristle present between post dc and sa bristles, ia absent .. .. . 58
53. Vertex rounded, occiput convex; head (fig. 45) unremarkable, standing away from thorax; oc very strong, equal to post or; only one h bristle present; arista long plumose; wing unpatterned; T3 without d preapical bristle; mesopleuron without bristle near lower anterior corner. / A somewhat Sapromyza-like species, almost unicolorous brownish-orange on head and thorax, abdomen largely dark brown; T2 with one spur; mesopleuron with two hind marginal bristles, lower one half as strong as upper; thoracic bristles generally long and strong; O+3 dc, anterior pair weak and close to second pair; O+2 acr bristles; mesonotal setulae numerous and strong; tergal marginal bristles long and



strong; female abdomen unusually modified (fig. 81), see description of type-species. 7 MAD.

Type N. biseta n. sp. .. .. Nimettia NEW GENUS

- Vertex sharp, occiput somewhat concave, head fitting quite closely against thorax; oc weak, short, much smaller than either or; one or two extra h bristles present inward of much stronger normal h bristle; arista very short plumose, hairs not much longer than basal diameter of arista; wing with heavy brownish pattern (fig. 48); all T with d preapical; mesopleuron with a small bristle and usually some setulae near lower anterior corner. [Rather large, somewhat elongate, robust flies, brown to dark brown, thorax including scutellum and pleura vittate in type species; head relatively small; frons almost flat to moderately curved, its anterior edge over-hanging first antennal segment, meeting face in an obtuse angle; face short, broad below, almost flat, shallowly impressed on upper part or below antennae; cephalic bristles relatively small, both or of about equal size, reclinate, distance between them about equal to that between post or and vti; postorbital setulae directed almost backwards; 0+3 dc, placed far back, anterior pair almost midway between transverse sutures and scutellum; two hind marginal mp bristles present; mesonotal setulae generally strong, those in acr and dc rows often like small bristles; two sa bristles present, the supernumerary one anterior to and smaller than normal one; two weak bristles inward of and in almost transverse row with ph; 2 st; pp strong; no av comb on Fl; costa quite strongly inflexed at apex of Sc in some species; radial veins asetose above; a small, clear area in membrane around distal end of anal cell. Body length 5,0-5,5 mm, wing 5,2-5,5 mm. 7 ETH.

Ruwenzori-Kivu area.

Type Suillia jeanneli Séguy (1938: 337)

Afrominettia NEW GENUS

Note: I am indebted to Mr. B. Cogan for drawing my attention to the description by Séguy of the

type-species as a member of the Heleomyzidae. There is no doubt that this species and two undescribed congeneric ones that I have seen are lauxaniids. The two new ones resemble to an extraordinary degree in habitus, colouring and some chaetic characters, the Neotropical species Minettia geminata Fabr. and M. verticalis Mall.

54. Fourth vein ( $M_{1+2}$ ) strongly curved forwards at apex, first posterior cell almost or quite closed at margin of wing.  $\sqrt{\text{Face}}$  with two small but pronounced humps on lower half as in Frendelia (couplet 57).<sup>7</sup> OR. Not seen.

Type G. sumatrana Mall. Griphominettia Malloch (1929a)

- Fourth vein not strongly curved forwards at apex 55

55. Mesopleuron with a very strong bristle near lower anterior corner in addition to normal hind marginal mp, this extra bristle as long as np and very much longer than a few scattered setulae also present on mesopleuron; occiput convex, vertex rounded; frons and face intersecting in an angle projecting ahead of eye; a narrow, transverse strip at anterior edge of frons is glossy and slightly upturned; face uniformly slightly convex; arista with very short pubescence.

$\sqrt{\text{Type}}$  species quite large, testaceous, with long, yellowish wings; 1 st; 0+3 dc, set far back, anterior pair midway between transverse sutures and scutellum.<sup>7</sup> OR.

Type M. flava Kert. .. .. Melinomyia Kertész (1915)

- Without this combination of characters; mesopleuron rarely may have one or more small bristles in its lower anterior section, but either these are not nearly as strong as described for Melinomyia and usually are only a little stronger than neighbouring setulae, or they are much stronger than setulae nearby in which case some of the other characters disagree .. .. 56

56. Acr bristles present, 1+4 (sometimes 2+4 when an extra, weak anterior pair is present), second pair at level of transverse sutures; 0+3 dc, anterior pair at sutures;



a small supernumerary bristle present inward of ph.  
 /Type-species is yellowish-brown with vittate mesonotum and scutellum, banded abdomen and spotted wings; subocellifera Walk. is pale yellowish-grey with dark brownish blotching on thorax and abdomen, and has relatively broad wings extensively mottled with brown; bristles generally long and strong, vti extremely strong; arista long plumose; head relatively short in vertical axis, much broader than high; scutellum large, rather flattened above, becoming shallow posteriorly, post sc bristles on slight corners; subcostal cell abruptly broadened beyond apical part of Sc, a strong, brown, stigma-like spot there. / AUS.  
 Type Minettia sexmaculata Mall. (1940)

Mettinia NEW GENUS

Note: Trypeta subocellifera Walker (1859a); Aru Islands) is a species of Mettinia, NEW  
 COMBINATION = Sapromyza pulcherrima Kertész (1900; New Guinea) (see Hardy, 1959: 224).

- Without as many acr bristles, or at least presutural pair not present except in glossy, black Minettiella spp., couplet 57B; extra bristle inward of ph rarely present .. .. . 57
- 57. With the facies of Peplomyza (couplet 71); wing patterned, having a pale yellowish central area surrounded by brown and blackish-grey, crossveins darkened, hind margins clear; a black spot between antenna and eye; mesonotum vittate; 0+2 dc; arista feathered. Not seen. PAL. Tunisia.  
 Type P. striata Szilády Peplominettia Szilády (1943)
- Without this combination of characters, in particular the wing not thus patterned. /Mostly species of conservative habitus, having the frons usually at least as broad as an eye and not shining; wing rarely patterned; probably not a monophyletic entity but an aggregation of species having in common an ia bristle. / All Regions.

Type M. nemorosa Dsv. .. .. Minettia Desvoidy (1830)

Note: I accept the opinion of Collin (1948: 277-8)

regarding the designation of nemorosa as the type-species of this genus, and that Euminettia Frey (1927), type Lauxania lupulina Fabr. (1787), is a synonym. Prorhaphochaeta Czerny (1932), also placed in synonymy by Collin, has no designated type-species and therefore is invalid in terms of Article 13(b) of the Code.

Key to subgenera and some species groups of Minettia Dsv.

- A. Lower part of face with a distinct though slight, rounded swelling on each side. /Often dark brownish or blackish-brown species with base of wing darkened.7  
PAL. OR.

Type Musca longipennis Fabr. (1794)

Frendelia Collin (1948)

Note: Collin (1948: 228) states that the d preapical bristle is missing on T3 in the type species; this bristle is present in some tropical species and I consider the character is best treated as being of specific value only in this subgenus.

- Face without definite swellings below .. .. . B

- B. Frons shining; orbital plates blackish, contrasting with surrounding dark brown colour and very broad, much broader than frontal stripe; 1 st; arista pubescent. /Glossy black species with clear wings and yellowish halteres; 1+3 or 0+2-3 dc; 1+4 or 0+2-3 acr bristles; type-species with discal mp bristle.7 OR.

Type Lauxania atratula Meij. (1924)

Minettiella Malloch (1929a)

- Not such species .. .. . C

- C. Ocelli in equilateral triangle or nearly so, quite widely spaced; oc bristles as wide apart as posterior ocelli and placed forwards so that they are in line or almost in line with hind edge of anterior ocellus. /One or more pairs of eclinate setulae on ocellar tubercle; frons usually broader than an eye; arista short-plumose.7 Most Holarctic and some Oriental species .. .. . Minettia s. str.

- Ocelli in triangle with sides obviously longer than base; oc not as widely separated as posterior ocelli



outer edge of bristle socket inward of outer edge of ocellus, oc also further behind anterior ocellus .. D

- D. 0+2 dc ✓Frons narrower than an eye; arista short-plumose; usually some bristles or at least some setulae in lower anterior corner of mesopleuron, and one or two pairs of weak, outwardly-directed setulae on ocellar tubercle. 7 ETH. .. .. . undescribed species

- 0+3 dc. ✓Without the combination of characters given above. 7 Various Oriental and a few Palaearctic species such as loewi Schiner; not a natural group.

58. 1+2 dc, anterior pair strong and well before sutures; head of distinctive form, frons almost flat and horizontal, face flat and slightly receding; eye suboval and longer than high or irregularly rounded but not higher than long in lateral view; antennae short, situated high up near level of upper edge of eye; gena and lower part of parafacial bordered by strong bristles of which the uppermost are almost porrect. ✓Rather small, narrow flies with unpatterned wings. 7 (Species with 1+2 dc which do not fall in this category are in the genus Lyciella, couplet 76, and may be distinguished by the more normal shape of the head.) 59  
Note: The female of the remarkable Papuan species

Holopticander papuanus Hennig (couplet 77) has a head structure much like that described here and also has strong genal and lower parafacial bristles and a haired frons, but can easily be distinguished by the 0+3 dc.

- Not such flies .. .. . 60

59. Frons longer than wide, with fairly numerous, anteriorly-directed setulae on anterior part; 2 st; basal antennal segment with a short but distinct bristle on outer side of lower surface; occiput concave, head fitting closely against thorax, vertex quite sharp; intradorsocentral setulae quadriseriate. ✓Eye obviously longer than high; wing fairly narrow; form suggestive of some Trigonometopus species. 7 OR.  
Type M. hirticeps Mall. Maquilingia Malloch (1929a)

Note: Dr. C.W. Sabrosky informs me that the paratype and holotype of hirticeps differ in the strength of the ph bristle which is about as strong as the dc in the one but shorter and weak in the other.

- Frons as wide as long, with only very small, fine, erect hairs; 1 (? or 2) st; basal antennal segment without a ventral bristle; vertex rounded, occiput only slightly concave, head fitting quite closely against thorax; intradorsocentral setulae biseriate. Eye suboval in type-species (Malloch, 1929a: fig. 29), irregularly rounded in undescribed New Guinea species in British Museum (N.H.); 3-4 conspicuously strong bristles along genal and lower parafacial margin; pvt positioned far below vertex, oc very small, in undescribed species all other cephalic bristles very long and ant or longer than post or, in type-species post or longer than ant or and vti; face rather short and flat; reddish-testaceous or dull yellowish-brown species with relatively small head and large wings. 7  
OR. AUS. ?MAD.

Type K. maculifrons Mall. Kerteszmomyia Malloch (1929a)

Note: I have two species from Madagascar which perhaps could be included in this genus. One of them agrees with the type-species in all particulars except for the presence of 2 st; the other disagrees in having 2 st, the intradorsocentral setulae very small and arranged in about six rather sparse rows, and the ph bristle small and weak.

- 60. Ant or absent or represented by a minute hair at end of orbital plate; anterior part of frons somewhat upturned transversely; face and frons glossy, latter usually broader than high; oc rather small, widely diverging. Australasian only .. .. . 61
- Without this combination of characters. (If Palaeartic material, proceed to couplet 66.) .. 62
- 61. Arista narrowly lanceolate over more than its basal half, densely fringed above and below with very short, dark hairs; face with a deep .. .. .



across middle which strongly interrupts the profile, above this is a prominent though not large swelling **which** is ridged medially; eye obliquely slanted, in lateral view subrectangular; 0+2 dc set far back; ia absent; T2 with one spur. √Frons obviously changing direction at about lower third, projecting forward as a shelf which in addition is medially depressed so that there are two slightly bulbous, shining lateral parts; first antennal segment a little shorter than second, third moderately elongate, its upper edge slightly concave; arista basal; thorax somewhat elongate, abdomen short, mesonotum and scutellum rather flattened; wing pale yellowish, body dark, head largely orange brown. 7 AUS.

Type C. tetanocerina Hend.

Ceratolauxania Hendel (1925)

- Arista normal, slender, finely but not conspicuously haired; face fairly broad, moderately and evenly convex without a transverse depression; 0+2-3 dc; a strong ia often present, sometimes two bristles in line between post dc and sa; T2 with two strong spurs; eye vertical. √Frons sometimes upturned at anterior end though not projecting far ahead of eye, this feature showing intraspecific and possibly some sexual variation; antenna as in Ceratolauxania, mesonotal setulae strong, semi-erect in some species. 7 AUS.

Type Musca elevata Fabr. (1805)

Austrolauxania NEW GENUS

Note: This genus is erected for the Australasian species that Malloch (1927c) placed in Paralauuxania Hendel (1908); Hendel's genus was based solely on the absence of the ant or bristles in its type-species Sapromyza albiceps Fall., but Collin (1948: 225) has shown that this 'species' is the male of S. decaspila Loew and the cited character to be sexual; a new genus is needed for the Australasian species because they obviously are not congeneric with Sapromyza.

- ahead of eye; face markedly narrow over upper half which also is swollen and protrudes forwards prominently, its lower part projecting only moderately; first antennal segment elongate, equal to or longer than second segment; 1 st; oc very small or absent; a black spot between antenna and eye .. .. 63
- Without this combination of characters .. .. 64
63. A subconical protuberance above front coxa, bearing apically a small tubular extension from which arises a fine hair representing the pp bristle, this protuberance confluent with prosternum which has a deep median groove; 1+4 dc, 2+4 acr; or on small tubercles, anterior pair on base of projecting part of frons; T2 with one weak spur.  $\sqrt{A}$  species of extraordinary appearance, with remarkable head structure; frons broad, slightly widened anteriorly, at lateral part of vertex behind upper corner of eye is a protuberance on which vte stands, vertex biemarginate and vti standing in depression; oc represented by fine hairs; only the basal and second antennal segments preserved, these subequal, rather elongate and slender; facial integument with fine transverse wrinkles; epistomal suture deeply impressed, epistome with wide median emargination bounded laterally by well-defined corners, lower edge of lateral section of epistome more or less straight and horizontal; eye in lateral view subrectangular, obliquely positioned; a deep impression present where epistomal suture runs beneath gena and is joined by a deeply impressed oblique line separating postbucca from epistome; postbucca with a wide, conspicuous furrow on each side of head; middle section of clypeus sloping, its lower margin prominently projecting; sides of scutellum gradually sloping from disc, not as steep as usual, basal sc bristles consequently appearing to be more on disc than is normal; fore and hind legs relatively short and slender; basitarsus longer than other tarsomeres together on all legs; Fl without av comb; d preapical present on all T, rather slender, longest on T3; abdomen shorter than thorax; much of



body irregularly covered with fine, silvery-grey pruinescence; each bristle and setula on thorax and abdomen enclosed by a brown spot; each T with dark brown preapical and narrower, paler mediobasal bands; wing pale yellowish; anal vein reaching more than halfway to wing margin; r-m at about middle of discal cell.<sup>7</sup> AUS.

Type A. atomaria Walk.

Amblada Walker (1859b)

Note: This genus was placed in the Heleomyzidae and does not seem to have been correctly recorded as a lauxaniid. The unique type is in the British Museum (N.H.) and is a male, not a female as described by Walker; it was collected in Celebes by Wallace. NEW FAMILY LOCATION.

- Propleuron without a distinct conical projection over fore coxa; pp strong, standing on a small sclerite which is free of deeply-grooved prosternum; 0+2-3 dc, when three pairs present the anterior pair weak and close to second pair, all set far back; or not on tubercles, ant or not on projecting part of frons; T2 with one or two strong spurs and some weak ones. Antennae elongate, linear, third segment about 6x as long as deep and only slightly less than height of head, 3-4x length of second segment which is slightly shorter than or equal to exerted first segment (see Malloch, 1927b: fig. 2) entire frons shining, its anterior part projecting forwards and extensively declivous laterally; parafacial strongly narrowed against eye margin; scutellum broader than long; arista bare; or bristles relatively small, ant or situated at frons midlength; oc small, weak; 1 st; tergal marginal bristles small, weak; d preapical strong on T1 and T2, small and weak on T3; female abdomen with tergites up to fifth one exposed, tergite 5 conical; very large, robust, rather sciomyzid-like species with fulvous colouring and yellowish wings and leg, type species with glossy black abdomen.<sup>7</sup> AUS.

Type R. handlirschi Hend.

Rhagadolyra Hendel (1907)

Note: Hendelomyza Malloch (1927b), type Sapromyza

tenuicornis Mall., described as a subgenus of

Sapromyza, is a synonym, NEW SYNONYMY. The type-species are not synonymous, and I have seen a female of a third species in the University of Queensland collection.

64. Frons descending steeply, almost flat, vertex fairly acute; face convex, glossy, with a prominent median protrusion which extends downwards to edge of a deep emargination in epistome; oc small, diverging outwards or obliquely forwards; antennae very short, usually orange, third segment rounded, arista basal, bare or pubescent; ant or sometimes weak, both pairs or relatively small; abdomen broad, wider than thorax except in teneral specimens; tergites with scattered setulae and usually without marginal bristles; 0+2 dc.  
 [Small, compact, strongly shining species, glossy black, often with coloured reflections, face glossy black except in an undescribed species with orange head; Fl with av comb present only in some species; 1 st, sometimes a weak anterior one as well; wing unpatterned except for a darkening at the base in some species.] AUS.

Type M. plebeia Mall. .. .. Melanina Malloch (1927c)

- Without the suite of characters possessed by this distinctive Australian genus .. .. 65
65. Head (figs. 46, 47) of extraordinary conformation, very broad and shallow, vertically elongate, eye elongate, upper occiput concave and fitting closely against thorax; vertex very sharp; frons descending steeply, concave in profile; orbital plates short and narrow; face broad and much shorter than frons, antennae thus positioned low on head; antennae as figured, arista with very small hairs; wing (fig. 50) broad, with a flexure line near base (see description of type-species), second vein curving forward to lie quite close to and subparallel with costa,  $R_1$  almost straight, anal veins convergent; oc and d preapical of T3 absent; ant or situated at about frons midlength, small, all other cephalic bristles relatively short; 0+2 dc set far back. [A glossy, bright yellowish and reddish-



orange species with a prominent black spot below eye and two narrow, black vittae on mesonotum; wing dark, smoky brown along leading edge, less strongly brown basally, remainder pale fumose, a long, pale streak in submarginal cell and a short, yellowish streak in middle of costal cell. / ETH.

Type T. cybeplax n. sp. .. Teratolauxania NEW GENUS

- Without the characters of this aberrant South African genus .. .. . 66

66. Head of Trigonometopus-like form (Hendel, 1938: fig. 1), with a definite, acute fronto-facial angle of about  $70^{\circ}$ ; face flat and receding; frons almost horizontal, longer than broad, haired anteriorly; eye broadly suboval, longest in horizontal axis; antennae situated at apex of front-facial angle, first segment exposed and fully as long as second, third segment almost  $1\frac{1}{2}x$  first and second together, bluntly pointed, with a subbasal, thickly pubescent arista; gena and lower parafacial with a series of strong, almost porrect setulae; O+3 dc; oc and ph present, 2 st; intradorsocentral setulae confined to acr rows; d preapical present on all T. / Type-species with a large, black spot between antennae and eye. / PAL.

Type P. maculifrons Hend.

Protrigonometopus Hendel (1938)

Note: A species in the British Museum (N.H.), determined as congeneric by Shewell, has the face almost vertical and hardly retreating below, and the arista almost bare. Hendel (1938) gives a key to some of the Trigonometopus-like genera, in which Protrigonometopus is paired in the same couplet as Trigonometopsis, but Hendel failed to note that in the type-species of the latter genus the ant or are inclinate (see couplet 48).

- Without this combination of characters. (A fronto-facial angle present in Hendelimyza (couplet 85, fig. 61) but not nearly as pronounced as described above, frons somewhat sloped, third antennal segment rounded, arista bare and intradorsocentral setulae

- quadriseriate.) .. .. . 67
67. Presutural dc present, thus usually 1+3, rarely 1+2 dc.  
 (The Nearctic species Lauxania albiseta Coq. is unusual  
 in its genus in having 1+3 dc; species of that genus  
 have very long, slender, linear antennae. See couplet  
 82.) .. .. . 68
- Presutural dc absent .. .. . 77
68. Mesopleuron with a bristle which may be rather weak  
 close to or somewhat below middle, sometimes in company  
 with a few setulae or small bristles; 1+3 dc and 1+3  
acr bristles present, subequal and almost erect,  
 mesonotum with few or no setulae; at least one  
 conspicuous av bristle a little beyond middle, or on  
 apical half, of F<sub>3</sub>; tergal marginal bristles long,  
 erect or nearly so, abdominal setulae when present also  
 erect. [Mostly small species with boldly patterned  
 wings; F<sub>1</sub> without av comb of small spines.] .. 69
- Without these characters in combination .. .. 70
69. Frons (figs. 51, 52) with four narrow longitudinal  
 stripes, outer two being the orbital plates, inner two  
 subparallel anteriorly but diverging posteriorly on  
 account of ocellar triangle; scutellum rounded and  
 glossy; venation (fig. 38) distinctive in that a short  
 apical section of R<sub>2+3</sub> is bent forwards, submarginal  
 cell thus widened apically, and apical section of M<sub>1+2</sub>  
 is obviously arched, first posterior cell consequently  
 narrowed preapically; in male the protandrium very  
 large, broadly exposed and fused to hypandrium. [Wing  
 patterned with smoky-brown and contrasting milky-white  
 streaks of which those abutting on wing margin are  
 elongate and tend to radiate inwards; all sc bristles  
 almost erect; discal mp bristle strong, directed  
 obliquely downwards and outwards, with some adjacent,  
 much weaker bristles.] PAL. OR. AUS.
- Type N. radiata End. .. Noeetomima Enderlein (1937)
- Note: Through the kindness of Dr. H. Schumann of the  
 Humbolt University Zoological Museum, I have been  
 able to study the unique male holotype of radiata



which was collected in China, and I have identified as congeneric two other species. One is represented by a series with both sexes in the British Museum (N.H.) collection, taken at two localities in Nepal; Ulleri, 1 830 - 2 130 m, 19 May 1964; 2 miles SE Sikha, 2 130 - 2 420 m, 23 May 1964 (all coll. J. Quinlan); it is very similar to radiata, differing in small details of wing and body patterning, in having relatively enormous, laterally flattened tergal marginal bristles, white instead of black arista, and in small details of setation, mostly notably in having two instead of three av bristles on F3. The other species is represented by a female from the University of Queensland collection: Australia, Brisbane, 26 April 1946 (coll. F. Kleinschmidt); it differs from the other two species in a number of features - head rounded and without fronto-facial angle present in other species, third antennal segment rounded instead of pointed, arista sparsely pubescent and not tapering instead of finely but thickly haired and somewhat tapering. The Australian species presents a somewhat different appearance as all the macrochaetae are relatively smaller and weaker, and the body coloration is quite different; it has only one av bristle on F3. The scutellum of both the Nepalese species and radiata has a uniformly sparse covering of minute brown hairs which do not conceal the glossy integument and are not apparent in posterodorsal view; the Australian species has a glabrous scutellum. The remarkable form of the male abdomen prompted the dissection of a Nepalese specimen and some surprising features were found; protandrium large, exposed, obliquely downsloped, almost as long as tergites 5 and 6 together, completely fused with hypandrium; surstylar extension a large, straight-edged lobe, the two

extensions enclosing a narrow space in which the unusually small cerci are situated; no surstylar process present, but there is on each side, basad of extension, a long, narrow lobe, this possibly being modified portion of protandrium; along inner side of this lobe lies the gonopod, these two structures closely applied to one another and separable by microneedles only with difficulty; aedeagal apodeme reduced to a small, sclerotised piece directed ventrad from base of aedeagus.

- Frons without such a pattern; scutellum matt pruinose; venation (figs. 12, 13) normal, without the features described above; protandrium not fused to hypandrium. Very small, darkly coloured and patterned species; wing blotched, without milky streaks; see couplets 2 and 3.

New World (part) .. .. Trypetisoma Malloch

70. Arista flattened, rather broad basally, tapering, quite thickly haired, like a slender plume (Czerny, 1932: fig. 20); fronto-facial angle moderately developed, frons somewhat inflated, face flat, distinctly higher than broad; genae deep, a little less than half (7:16) height of eye; eye rather small and set high up on head. Type-species is a yellowish-brown fly with yellowish-tinged wings and fairly strong bristles and setulae; oc long, porrect, 2 st.

Type Pachycerina signatipes Loew (1856)

Paroecus Becker (1895)

- Without this combination of characters .. .. 71
71. Wing (fig. 53) narrow, with characteristic pattern, apex infuscated, this infuscation continuing to wing base in two extensions, one along costal margin, other inward of hind margin, enclosed area and strip bordering hind margin whitish; frons very broad, almost twice as broad as long and half width of head, anteriorly produced to slightly overhang antennae; face rather narrow, with two descending depressions which widen below and unite just above epistome; orbital plates differentiated from remainder of face



convergent; oc bristles longer than either or, situated outside line joining outer edges of front and rear ocelli; a pair of very weak eclinate bristles and some setulae enclosed between ocelli.  $\sqrt{\text{Species with small spots on lower face and three conspicuous dark spots, one at upper end of each parafacial and one between antennae; Fl without } \underline{av} \text{ comb; wings held in tectiform posture at rest.}}$  PAL.

Type Sapromyza litura Meig. (1826)

Peplomyza Haliday (1836)

Note: The type-species has setulae on the upper surface of  $R_{4+5}$  at the base; Hendel (1925: couplet 57) uses this character in his key which therefore will not work for the other known species, discoidea Meig., which lacks these setulae.

- Not such species .. .. . 72
- 72. Either  $R_{2+3}$  or  $R_{4+5}$  setose below.  $\sqrt{\text{Fl with } \underline{av} \text{ comb.}}$  73
- Neither of these veins setose.  $\sqrt{\text{Fl very rarely with } \underline{av} \text{ comb.}}$  .. .. . 74
- 73.  $R_{2+3}$  setose below over nearly its whole length.  $\sqrt{\text{Orbital plates and ocellar triangle subshining, semitranslucent, differentiated from remainder of frons; arista short-haired; male protandrium relatively enormous, strongly downsloped, exposed, setose; macrochaetae generally long, slender, } \underline{oc}, \underline{h}, \underline{ph}, \underline{ant} \underline{np}, \underline{sa} \text{ and hindmost } \underline{dc} \text{ exceptionally so; mesonotal setulae rather sparse but quite long, semi-erect, stiff, those in } \underline{acr} \text{ row bristle-like except for a few anteriorly; setulae absent between } \underline{acr} \text{ rows; smallish pale yellowish, rather slender species.}}$  PAL.

Type Sapromyza praeusta Fall. (1820)

Tricholauxania Hendel (1925)

Note: This taxon and the next one obviously are derivatives of Lyciella and barely deserve generic status. The male of the sole species of Tricholauxania has a dark patch of closely-packed setulae at the apex of T3 on the ventral

surface; this occurs also in the same sex of Paroecus (couplet 70) and Sapromyza quadripunctata (Linn.).

- $R_{2+3}$  not setose, but vein  $R_{4+5}$  setose above and below for part of its length. [One or two dark hairs on pteropleuron.] PAL.

Type Sapromyza multipunctata Fall. (1820)

Eusapromyza Malloch (1923)

74. Third antennal segment subtriangular, broad basally and moderately pointed apically; occiput moderately convex above, vertex fairly sharp, head fitting quite closely against thorax; frons flat or slightly dished medially, sloping forwards quite steeply, a moderate fronto-facial angle present; clypeus relatively large, usually protruding prominently; ant or situated almost at anterior edge of frons; prosternum bare; pteropleuron without minute hairs below infrascapular ridge; male protandrium small, almost or completely hidden, pruinose but not setose or setulose. [Fairly small species with heavily spotted body; third antennal segment abundantly clothed with fine hairs; arista short plumose; all T with d preapical; Fl lacking av comb; costa with a marked kink at junction with subcosta.] ETH.

Type S. multipunctatus Lind.

Spathecerus Lindner (1956)

Note: A study of the type material of multipunctatus has enabled me to identify with certainty as congeneric a new species from Central Africa and another, very closely related, from Mozambique. The characters cited above apply to these three species only. I have several other species, undescribed and collected in South Africa, that are obviously related, but exclude them pending a detailed study of a large aggregate of African and Madagascar lauxaniids having in common  $1+3$  dc. These South African species differ notably in the conformation of the head which may be bizarre, the very broad and



heavily patterned wings, and stout body.

- Third antennal segment unremarkable, usually rounded apically; occiput not concave on upper side, vertex more rounded, head standing away from thorax; frons usually slightly curved, not sloping forwards markedly, fronto-facial angle at most poorly developed, usually undeveloped; clypeus normal, not protruding prominently; ant or not situated so close to anterior margin of frons; prosternum setulose; pteropleuron relatively large, exposed and often setulose or setose .. 75

75. T2 with two spurs; intradorsocentral setulae in six rows.  $\sqrt{\text{Small, blackish species with strongly infuscated wings, blackish along costa.}}$  PAL  
Type Heteroneura muscaria Fall. (1823)

Cnemacantha Macquart (1835)

Note: This genus was not recognised by Czerny (1932) but was resurrected by Collin (1948).

- T2 with one spur; intradorsocentral setulae not more than quadriseriate.  $\sqrt{\text{Mostly yellowish or greyish species, without strongly infuscated wings.}}$  .. 76
76. Sexually dimorphic species with the facies and colouring of many Palaearctic Lyciella species but differing as follows: male hind leg modified, T3 and tarsus unusually stout and short, outer claw produced into a long, upturned spine almost as long as tarsus (Czerny, 1932: fig. 22), last tarsomere with long sensory hairs apically; female third leg normal, but abdomen modified, sclerites of seventh segment greatly enlarged, tergite and sternite fused into a well-sclerotised structure, an impressed lateral line evidently representing line of fusion, tergal section forming a partial tube, sternal section a narrow, deep, V-shaped trough, the whole structure much deeper than broad.  $\sqrt{\text{Male abdomen shorter than thorax, hypopygium relatively large and prominent, long tergal marginal bristles present; Fl without av comb.}}$  PAL.  
Type Sapromyza anisodactyla Loew (1845)

Aulogastromyia Hendel (1925)

given by Czerny (1932: 35) are entirely misleading and convey no accurate idea of the modified seventh segment. In view of the diversity of abdominal structures in Lyciella, there seems little point in maintaining a separate genus for anisodactyla. The nature of the male hind tarsus alone is not sufficient ground for generic separation.

- Species without such structural modifications (note that Lyciella decipiens Loew has in both segments 7 and 8 the tergite and sternite fused and strongly compressed laterally, but of a very different conformation to that of anisodactyla, especially in that the eighth segment protrudes prominently).  
 [Mainly yellowish or greyish flies with unpatterned wings, remarkably uniform in superficial appearance but with an extraordinary variety of form in the male and female genitalia. The type species rorida is unusual in the genus in having a comb of small spines on the distal av face of Fl, and roughly quadriseriate intradorsocentral setulae, characters shared only with some Nearctic species; the aedeagus in rorida is unique in having an enormously elongate apodeme, almost as long as the entire abdomen. In general the species have a rather rounded head, eye of moderate size only, lower occiput large; face small, higher than broad, flat, not evident in lateral view; frons moderately curved forwards and fairly broad, vertex rounded, upper occiput not concave, head standing away from thorax; hind ocelli close to vertex; arista evenly short-haired; antennae unremarkable; prosternum setulose; oc long, porrect; pvt cruciate, situated a short distance below vertex; d preapical on all T; setulae in acr rows often weakly bristle-like, in such cases often two such bristles anterior to sutures; T2 with one spur; dc bristles usually 1+3, in a few species 1+2; male protandrium usually broadly exposed, pruinose, often setulose and sometimes setose.] PAL. NEA.



Type Sapromyza rorida Fall. (1820)

Lyciella Collin (1948)

Note: Formerly Lycia Dsv. (1830) nec Hübner (1823). As here understood, this genus is exclusively Holarctic. I do not consider as congeneric the various unnamed African and Madagascar species which trace to this part of the key mainly on account of having 1+3 dc. In the Note to Sapromyza (couplet 85) I point out that if that genus is to include species with 1+3 dc, like those from Chile and Australia described by Malloch, there is no justification for maintaining Lyciella as a genus.

77. First antennal segment exposed, about as long as second and with a definite though small bristle on ventral surface; epistome very narrow, mostly concealed by genae and not or hardly visible in lateral view; genae with a submarginal row of 6-7 quite strong, obliquely porrect bristles; face narrow, flat, curved under narrowly below; third antennal segment suboval, arista long with fine, very short hairs; legs, especially tibiae and tarsi, elongate and unusually slender; wing unpatterned, second, third and fourth veins subparallel and rather close together. Sexual dimorphism of head considerable; male - eyes approaching one another above, frons very narrow and biconcave, its width at middle  $\frac{1}{16} - \frac{1}{24}$  width of head, facets in upper two-thirds of eye about twice as large as those in lower third; ocellar tubercle prominently raised, ocelli exceptionally large; or represented by post pair only which are reduced to setulae not much higher than ocellar tubercle from which they are separated by less than their own length; frons sparsely setulose; oc absent; pvt small, equal to uppermost setula of postorbital series; vte and vti unusually small; apical tarsomeres somewhat enlarged with strong claws and dark sensory hairs dorsally. Female - frons fairly narrow, width of head  $3\frac{1}{2}x$  width of frons at midlength, parallel-sided, eye facets uniform, ocellar tubercle

and ocelli normal; both pairs or present, ant or near middle of frons and obviously smaller than post or which are about equal to vte; pvt twice as large as in male, situated far below vertex; oc present, proclinate, small; anterior half of frons setulose.

[A rather small species, wing 3,0-3,4 mm, plain brownish; pp unusually long; scutellum flattened, Fl without av comb.] AUS. Papua.

Type H. papuanus Hennig      Holoptocander Hennig (1968)

Note: The British Museum (N.H.) has material of the type-species from Papua: Mafulu, 1 220 m, December 1932 (coll. L.E. Cheeseman). The curious head structure of the male suggests crepuscular or nocturnal habits. Concerning the locality Mafulu, Miss Cheeseman records in her autobiography, Things Worth While (Hutchinson, London, 1957: 225), that her collecting was done at a clearing on a mountainside overlooking forest; she writes, 'For night work it was admirable. Insects rose in myriads from the tree-tops below and across the wide river valley at the bottom of the 4 000-foot slope.' The species Trypaneoides perpunctata (Lamb), originally found in the Seychelles, I have collected in Madagascar and Natal only at lights in the evening; it has very similar modifications of the head in the male, differing essentially only in that the frons is not quite so narrow and both pairs of orbital bristles are present though small.

- Without the suite of characters possessed by this aberrant Papuan species      .. .. 78

78. A recurving horn formed by two strong, appressed bristles on inner corner of middle trochanter (relatively larger in male); all acr bristles absent; legs robust in both sexes, all F stout, this particularly evident in male which also has T1 obviously swollen apart from narrow basal part, anterior coxae also stout; tarsomeres, except



basitarsus, of fore legs dorsoventrally flattened; frons with proclinate setulae anteriorly, some of these between orbits and orbital plates; orbital plates clearly differentiated, apruinose and somewhat shining, slightly tumid except midway between ant or and post or, fairly narrow; in male orbital plates and ocellar triangle dark brown, contrasting strongly with yellowish frons, in female these pale and not contrasting; scutellum subtriangular, unusually exposed, reflexed under abdomen (suggestive of a Lonchoptera male), hypandrium large with conspicuously projecting, narrow, elongate surstyli fringed with a fan of about seven long, sinuous setae; Fl without av comb; F3 with 2-3 strong av bristles on apical half and one preapical ad bristle about in line with outer av; wing (fig. 43) plain, R<sub>1</sub> almost straight, second, third and fourth veins subparallel over much of their length. [As Frey says, the type species has the facies of a Scaptomyza; a rather narrow species with reddish-yellow head and thorax and dark brown abdomen, head more or less Sapromyza-like; face a little dished; third antennal segment broadly suborbicular; clypeus narrow but projecting; d preapical on all T, in male very long, especially that of T3.] OR.

Type H. scaptomyzina Frey      Himantopyga Frey (1927)

Note: Frey's description, repeated by Malloch (1929a: 86), omits some important features. The type species is distinctive and warrants its own genus, though there are sexual differences in some of the generic characters. The peculiar nature of the orbital plates is striking in the male. I have examined specimens from the type-series, donated by Frey to the Vienna Museum.

- Not such species .. .. . 79
79. Orbital bristles very unequal in size (fig. 55), post or only half as long as ant or; wing (figs. 58, 59) very narrow basally, rounded apically, alula reduced to a narrow strip, anal lobe narrow and without angle, vein 2A absent, r-m far distad of middle of discal



cell; antennae diverging in horizontal plane away from one another over third segment (figs. 56, 57), though closely adjacent over basal and second segments; arista long plumose above and below; second antennal segment with two long, prominent, somewhat crooked ventral bristles, outer one longer than inner; all acr bristles absent; ant dc at transverse sutures; both pa relatively weak, post pa only half size of ant pa; av comb of small spines present on F1, d preapical absent on T3, present and strong on T2, absent or weak (a specific feature) on T1; T2 with two spurs of which the anterior one is very long and strong. [Rather small, slender, boldly coloured, drosophilid-like species with fairly broad head and frons, and conspicuously patterned wing.] OR. Philippines.

Type N. palawanensis n. sp. .. Noonamyia NEW GENUS

Note: A very distinctive genus, the nature of the antennae, orbital bristles and wing being most unusual. In Hendel's (1925) key the two species described below come out at Cnematomyia Hendel which I have included in the synonymy of Homoneura at couplet 21. A study of De Meijere's (1910) description of quinquevittata, the type-species of Hendel's genus, reveals that it is in no way similar to either species of Noonamyia. The peculiarly modified antennae in Noonamyia - diverging over the third segment and with long ventral bristles on the second one - presumably reflect an ethological specialisation. Some specimens of both species are labelled as having been caught at lights so these species may be nocturnal, and it is tempting to suggest for the long antennal bristles a tactile function akin to that of mammalian Vibrissae. A curious feature of palawanensis is that its antennae, macerated, unstained and balsam-mounted, show no sign of a sacculus organ in the third segment; this structure usually is well preserved and easily seen in lauraniid antennae prepared in that way.

- Without this suite of characters .. .. 80



80. Two stump veins on apical section of  $M_{1+2}$ , projecting into second posterior cell (fig. 49); anal vein very long, ending only a short distance before wing margin, apical two-thirds much more slender than basal third; 0+2 acr bristles, anterior pair often unequally developed; d preapical on all T, strong and laterally flattened on T2; tergite 1+2 with two or three long marginal bristles laterally, these especially long and strong in female; female tergite 3 much longer than succeeding tergites (fig. 67) and devoid of setulae except medially.  $\sqrt{F1}$  without av comb; T2 with one spur; subcostal cell about one-third length of costal cell; frons broad and about half width of head, vertex sharp, frons sloping down fairly steeply (fig. 60); antennae relatively small, arista finely pubescent; mesonotum strongly arched. Type-species mainly yellowish-brown with a dark, narrow stripe down middle of frons and four narrow mesonotal vittae of which the two dc ones continue over lateral borders of scutellum; wing (fig. 49) patterned, a fine, brownish mottling in marginal and submarginal cells.<sup>7</sup> ETH. South Africa. Type D. oraria n. sp. .. .. Dyticomyia NEW GENUS

Note: This species was found in low, rather scrubby vegetation growing on sandy and calcareous terrain fringing the beach. Rainfall at both localities is very low (100-300 mm p.a.) but atmospheric humidity is continuously high. Abdomens of a male and a female macerated in KOH have the gut packed with finely divided, rather heterogeneous material, apparently of vegetable origin, as several different pollen grains seem to be present; this is responsible for the extensive, dark, postmortem blotching of the abdomen mentioned in the description. The antennae are somewhat unusual in that the sensilla trichodea and sensilla basiconica are about equally numerous, the latter being in the form of highly refractive, subcircular plates bearing a minute, central, peg-like projection;

usually the trichoid sensilla are more numerous.

- Not such flies .. .. . 81
- 81. Antennae exceedingly long, slender, linear, all segments elongate, basal one equal to, longer than or about half as long as second, third segment about 4x as long as second and about 8x as long as deep.  $\sqrt{\text{Vertex}}$  sharp, frons descending steeply, orbital plates usually broad and glossy, rarely matt; ocelli at vertex; face usually glossy, bulging; parafacial straight-edged; rather smallish, dark-bodied flies with yellowish-tinged wings. 7 .. .. . 82
- Antennae not nearly as elongate as described, or (rarely) as elongate but not as slender .. .. . 83
- 82. 2 st; 0+3 dc (1+3 in one species), anteriormost postsutural pair not weak and situated close to sutures and not close to second postsutural dc. PAL. NEA. Type Musca cylindricornis Fabr. (1794)

Lauxania Latreille (1804)

Note: For the present I do not consider this genus to be represented outside the regions indicated; all extralimital species require restudy. The following data on the morphology of the type-species is derived from English specimens. Frons very broad, diverging a little below, at midlength about half width of head; face glossy, bulging, but with an obliquely descending impression on each side, descending from near lower corner of eye to near middle of epistomal margin; male protandrium relatively large, broadly exposed, longer than tergite 6, down-curved; male genitalia (see Shewell, 1938: figs. 51-53) remarkable in several respects; surstyli articulated on epandrium, each comprising a swollen basal part produced into a long, slender, slightly curved, apically pointed projection, basal part with a narrow, weak apodeme presumably for muscle attachment; aedeagal complex with very deep ring sclerite, what appear to be the gonopods are directed



dorsally as powerful, incurved arms bearing apically a major and a minor point; ventrally is a compact row of 7-9 stout, spine-like setae one against the other and graded in size, smallest on the inner end; aedeagal lobes with some small serrations on lower edge. Female genitalia characterised by a small but elongate tergite 8 separated from 7 by a long membrane, sternite 8 much longer than corresponding tergite, elongate, strongly sclerotised; dorsal to sternite 8 is a large, complex sclerite extending basad far into intersegmental area, medially grooved; cerci small and narrow, enclosed below by a U-shaped sclerite, apparently sternite 9 or a compound sclerite.

- 1 st; 0+3 dc, anteriormost weak to very weak and situated close to second dc. [In some species, e.g. signatifrons Coq. and femoralis Loew, the ant or are curved in a plane intermediate between reclinate and inclinate; the same species have whitish tibiae and tarsi and lack the d preapical bristle on T3.] NEA. OR.

Type Lauxania femoralis Loew (1861)

Lauxaniella Malloch (in Malloch & McAtee, (1924)

Note: This genus is predominantly Nearctic but has a Formosan species assigned to it, viz. L. tenuicornis Malloch (1927a).

- 83. Face glossy with a moderate convexity on upper part; orbital plates broad, glossy, contrasting with matt frontal stripe. [Anterior part of frons usually upturned a little over entire width or at least differentiated by being glossy, remainder of frons sloping moderately to quite steeply; vertex sharp to moderately rounded; 0+2-3 dc; male protandrium quite broadly exposed, pruinose; male with a conspicuous patch of black setulae apically on v surface of T3, as in Tricholauxania and Paroecus. Usually blackish, rather thickset flies.] PAL. NEA.
- Type Lauxania scutellata Meig. (1826) = aenea Fall. (1820)

Note: Lauxania, subgenus Calliope Westwood (1840) nec Gould (1836); Halidayella Hendel (1925) nec Dalla Torre (1897), new name for Calliope; Calliopum Strand (1928), new name for Calliope. The definition of this genus may require revision after a number of African species with somewhat similar head structure but rather different body facies and coloration have been studied in detail.

- Face not of this nature, usually flat or concave .. 84
- 84. Face moderately glossy, markedly concave, its upper part forming a distinctly projecting though not prominent angle with frons (Czerny 1932: fig. 19); frons slightly upturned anteriorly; arista white, appearing thickened by fine, dense hairs; antenna moderately elongate, slightly longer than height of eye, basal and second segments subequal, third segment almost linear beyond arista, about 5x as long as deep just anterior to arista; ant or situated at about middle of frons.  $\sqrt{\text{Vertex}}$  rounded; entire frons glossy, orbital plates and ocellar triangle contrastingly coloured; usually 0+3 dc, sometimes 0+2; 2 st.<sup>7</sup> PAL. Type M. jovis Kert. .. .. Mycterella Kertész (1912)
- Face flat and glossy; arista not appearing thickened due to dense fringing hairs; frons not at all upturned anteriorly .. .. . 85
- 85. Frons (fig. 61) anteriorly somewhat tumid, rising away from descending orbit, almost flat, anterolaterally steeply declivous above parafacial; anterior part of frons, up to level of ant or (which are about at frons midlength), with numerous, obvious, porrect hairs; third antennal segment almost circular, antennae very close, together, first segment exerted but shorter than second; abdominal tergite 1+2 posterior to its transverse seam without setulae on a little less than basal half, distally with strong, erect setulae including two sublateral concentrations against hind margin in which the setulae are shorter than those more anteriorly situated but are .. .. .



being closely aggregated, this tergite also with quite long, erect, lateral bristles directed outwards in dried specimen; oc bristles widely diverging.  $\sqrt{\text{Vertex}}$  rounded, upper occiput only very slightly concave, head standing away from thorax; ocelli situated a little forwards, line joining post or passing just behind anterior ocellus; eye in lateral view obliquely positioned but not narrowed below, lower occiput broadly convex; face flat; humeral calli strongly protuberant; mesonotum a little humped anteriorly, scutellum flat; abdomen relatively short, tergites strongly transverse, male protandrium as long as tergite 6, setose; or bristles relatively small, apical tarsomeres flattened; arista evenly fringed with minute hairs; 0+3 dc; only prescutellar acr bristles present; intradorsocentral setulae quadriseriate; 2 st, all T with d preapical, T2 with one spur, F1 without av comb; wing rather narrow, about 3x as long as broad, length 3,0 mm; veins 2 and 3 subparallel with each other and over much of its length with costa, vein 4 slightly convergent over its apical section with vein 3; m crossvein a little sinuous; fourth vein index 2,5, r-m index 0,8; small, uniformly brownish species.<sup>7</sup> OR.

Type H. pubifrons Frey .. .. Hendelimyza Frey (1927)

Note: Frey considered that some of the Australian species described by Malloch in Sapromyza might belong in Hendelimyza, but this properly was queried by Malloch (1929a: 33) who stated that he could not understand this point of view as Frey had compared Hendelimyza with Trigonometopus and placed it next to that genus. Malloch considered Frey's genus to be poorly distinguished from Sapromyza. After a study of the unique type specimen I conclude that it has no relationship with Trigonometopus, the hairing of the frons and slight fronto-facial angle not indicating affinity but only some convergence. There are several undescribed South African and Madagascar species similar to pubifrons in size, colouring

habitus and features of chaetation, and future study may show that they are congeneric but may also reveal that there is no satisfactory way of maintaining Hendelimyza distinct from Sapromyza.

- Without that set of characters; frons often with minute hairs anteriorly, but not conspicuously hairy; third antennal segment not rounded; oc bristles porrect, not more than moderately diverging; tergite 1+2 without vestiture like that described above. [This genus contains many Palaearctic and Nearctic species which collectively exhibit a fairly uniform facies but a wide range of differences in small details and in particular show much diversity in the form of the genitalia of both sexes. In addition, many species in other regions have been located in the genus. Because of the superficial state of knowledge of the morphology of Sapromyza species, I propose to describe some characteristics of the type species, flava, of which I have seen British specimens. It should be noted that the type species is unique in some respects, particularly in some characters peculiar to the male. S. flava: head broad, near  $1\frac{1}{2}x$  as wide as high; upper occiput sloping, only slightly convex, lower occiput deep, broadly exposed, head standing away from thorax; genae deep, together with epistome a little less than half height of eye; eye relatively small, a little higher than wide; frons broad, slightly wider than half width of head, much wider than long (about 9:11), shallowly emarginate medially on anterior edge, sparsely and irregularly setulose; face concave, not visible in lateral view, subantennal depressions present, middle part of face slightly ridged at upper end between these depressions; arista with short hairs; male legs robust, especially femora T3 with a dilation on underside at apex where there is also a dense patch of black setulae, and with a flattened, slightly curved spur; male basitarsus of hind leg somewhat thickened and clothed on entire ventral surface with a dense mat of dark setulae; female legs also robust but without



these features on the hind leg, spur of T3 somewhat flattened; d preapical absent on T3, present on other legs; T2 with one spur; apical tarsomere flattened, especially in male, fringed apically with conspicuous sensory hairs; male abdomen broad, flattened dorsally in dried specimens, tergites abruptly curved over laterally; female abdomen with tubular termination formed by sclerites of segment 7, within which genital segment and proctiger are retracted; oc long, strong, porrect, reaching beyond ant or which are situated a little beyond middle of frons; chaetae strong, mesonotal setulae numerous, strong, semi-erect, in dc row usually one or two small, presutural bristles, anterior smaller than posterior if two are present; intradorsocentral setulae quadriseriate; one or a few small setulae on pteropleuron; male abdomen with marginal bristles on all tergites, especially strong on tergite 3; female abdomen with marginal bristles on all tergites, especially strong on tergite 3, male abdomen with marginal bristles strong on T3, weaker on succeeding tergites, on tergite 1+2 present only on sides. Male genitalia, sternite 6 with a wide, irregular emargination in posterior edge, partly withdrawn into abdomen along anterior edge; protandrium reduced to a narrow, irregular, rather indefinite, suboval structure incompletely fused with hypandrium, its ventral part widely V-shaped, lying in membrane and strengthening the pouch in venter into which genitalia are retracted; hypandrium remarkable, deep, truncate on its two ventral edges, surstyli well developed, articulated on hypandrium, in lateral view in form of large, simple, somewhat irregular lobes, in dorsal view two strong, incurved, subapical teeth apparent on each surstylus, one near dorsal edge, other near ventral edge; aedeagal complex with rudimentary aedeagal apodeme smaller than ejaculatory apodeme; ring sclerite highly modified through development of gonopods as large, broad, blunt, valve-like lobes; aedeagus semi-membranous, strongly upcurved at base and projecting

upwards between gonopods, as figured. Female genitalia, tergite and sternite 7 fused into a broad, tubular sclerite into which proctiger and genital sclerites are withdrawn; segment 8 separated by a fairly wide intersegmental membrane about half as long as segment 7; sternite 8 elongate, setose apically, tergal area semi-membranous but setose posteriorly; cerci fused, underlain by a small, setose sclerite; three sub-spherical spermathecae. Palaearctic Sapromyza species in general do not have the male hind leg modified as in type species; frons usually curved forwards slightly from rounded vertex; eye usually rounded oval but long oval in a few species; face flat or concave, usually at least very shallow subantennal depressions present; prosternum invariably with fine setulae and anterior part of frons with minute hairs; 0+2-4 dc, intradorsocentral setulae 2-, 4- or 6-seriate, sometimes (especially in biseriate species) these setulae long and bristly; 2 st. PAL. NEA.

Type Musca flava Linn.(1758) = S. obsoleta Fall. (1820)

Sapromyza Fallén (1810)

Note: It is obvious that Sapromyza and Lyciella are very closely related and in fact probably represent an unnatural division of a large group of species on the basis really of nothing more than the presence or absence of a presutural dc bristle. That this is so can be seen by comparing the descriptions of these genera given by Czerny (1932: 40, 47). Collin (1948: 266) says, 'In view of the unreliability of the character of the presutural dorsocentral bristle in Minettia, doubt might well arise concerning the validity of the genus Lyciella, which is distinguished from Sapromyza by the presence of this bristle. At present, however, no case is known in which the position of a species in either genus is doubtful, if the size and position of this particular bristle be noted.' Nevertheless, this is a tenuous distinction, and



the type species of Sapromyza itself seems not infrequently to have one or two presutural dc bristles which, while admittedly smaller than the postsutural ones, represent an intermediate condition. Malloch never placed any species in the genus Lyciella or ever even referred to it, and described in both the Neotropical and Australian faunas species with 1+3 dc which he located in Sapromyza. The chaotic character is the only one, at least currently in use, that separates Lyciella and Sapromyza, so Malloch created an anomalous situation, for if Sapromyza contains species with a presutural dc, obviously there is no basis for retaining Lyciella as a genus. As I explain above, the difficulty is sidestepped in this study through the explicit exclusion of all the Australian and Neotropical 'Sapromyza' species of Malloch.

Key to subgenera of Sapromyza Fallén

- A. Mesopleuron with one or two strong bristles near middle.  
OR.

Type Lauxania cinctipes Meij. (1910)

Xenosapromyza Malloch (1929a)

- Discal mp bristles absent .. .. . B

- B. Oc bristles situated on each side of anterior ocellus, outside a line joining outer edge of front and rear ocelli. PAL

Type Sapromyza tibialis Macq. (1835) = Musca

= Musca quadripunctata L. (1766)

Sapromyzosoma Liroy (1864) NEW STATUS

Note: This taxon was not recognised by Czerny (1932) but was revived as a genus by Collin (1948).

I consider this feature of the oc bristles too trivial to be the basis for a genus.

- Oc bristles placed within line joining outer edges of front and rear ocelli .. .. Sapromyza Fallén s. str.

A NOTE ON THE GENERA CESTROTUS AND TURRIGER

There has been a measure of disagreement and unsureness in the literature as to the generic distinctiveness of Cestrotus Loew (1862), originally based on three South African species, and Turriger Kertész (1904), described for an Oriental species. Hendel (1908, 1910) at first considered Turriger to be a synonym, but later (1920, 1925) he accepted it as a valid genus, a decision queried by Malloch (1929a) but receiving the approval of Lindner (1956). Turriger has been considered to include those species with a pronounced hump on the frons, the ocelli situated close behind the summit of the hump and far from the vertex, and the orbital plates parallel or almost so with the orbits. Cestrotus was taken to include species with only a slight frontal protuberance, the ocelli not far from the vertex, and the orbital plates convergent so that the anterior orbital bristles are not in line with the posterior orbitals. In both genera the costa is homoneuriform; Malloch (1929a: 40; 1940: 134) was in error in twice stating that Oriental species of Turriger have a sapromyziform costa.

This matter is complicated by two invalid designations of type-species for Cestrotus by Hendel (1908; 1920), details of which are given in couplet 16 of the key where it is pointed out that the designation by Becker (1895) of Cestrotus turritus Loew as the type-species of the genus must be accepted, and that this makes Turriger a synonym of Cestrotus. A new generic name thus may be required for the species usually placed in Cestrotus. In the discussion following I am using the concepts of Cestrotus and Turriger applied by most past authors, in particular those of Hendel (1920) and Lindner (1956).

Up to the present Cestrotus has been exclusively an African genus with 10 species (this total includes Ephydra pictipennis Wied. and Tripeta polygramma Walker, whose types have proved to be species of Cestrotus); Oriental species referred to the genus have since been placed in Turriger (Malloch, 1929a: 40). At present three African and four Oriental species of Turriger are known.



The problem of the validity of Turriger requires a consideration of many undescribed species which have been discovered. From Madagascar alone I have nine new species belonging to this complex, only one of which is an undoubted Cestrotus. I have material of over 30 African species most of which clearly belong to Cestrotus, the remainder being in various degrees atypical, and I regularly am finding further new ones in South Africa. I also have several new African species in or close to Turriger.

In this large array of species there are two obvious clusters. One, Cestrotus, comprises many species, mostly South African, with a distinctive habitus and coloration; typically the head (see fig. 24) is of a characteristic form, with a large, broad, tumid face, and conspicuous ornamentation of a bare, shining callus anterior to the ocellar triangle, a black band across the lower frons, two pairs of silvery-grey spots (between eye and antenna, and at base of ant or), and a pair of orange spots above the antennae; the frons is not humped, the ocellar triangle usually is not more than about twice its length from the vertex, and the orbital plates are anteriorly convergent so that the ant or are not in line with the post or. The other cluster centres on turritus and the Oriental species of Turriger; these also have a distinctive habitus and patterning, and they are easily recognised by the prominent, turret-like hump on the frons, the remoteness of the ocelli from the vertex, the greater vertical elongation of the face, the presence of facial grooves beneath the antennae, and the lie of the orbital plates parallel with the orbits.

The distinction between these groups breaks down when the undescribed Madagascar species and some of the South African ones are considered. Firstly, there are some species which obviously are allied to typical Cestrotus species by virtue of their habits, habitus and patterning, but which lack the characteristic head ornamentation. Secondly, a number of new Turriger species show different developments of the frontal hump, and grade in an almost complete range from a form in which the frons is almost smoothly curved and unhumped, to the extreme form as exhibited by the Oriental species and African turritus.



of Cestrotus the orbital plates are only slightly convergent, and in some Turriger species the subantennal impressions on the face are weak and inconspicuous.

Thus, while most of the species in this complex can be assigned to either Cestrotus or Turriger at a glance - the habitus of both being patent to an experienced eye - the criteria usually used to distinguish these segregates seem to have been invalidated. In some ways this is a pity because interesting biological differences tend to support the division, though in this respect too there is overlap. Cestrotus species are exclusively saxicolous, crawling about on rocks, especially shaded and lichenous ones. Nearly all the Turriger species I have collected occurred on tree-trunks in forested areas; the exceptions, turritus and two undescribed Madagascar species, are saxicolous and frequent stones in shade in forest. However, a determined effort to find constant diagnostic characters has failed. At best it can be said that most Turriger species have the posterior ocelli anterior to a line between the post or bristles, whereas most Cestrotus species have the anterior ocellus on or posterior to that line; but a few species in both groups have the line joining the post or passing between the anterior and posterior ocelli, so the position of the ocellar triangle cannot be used to distinguish these segregates as genera. Turriger therefore falls as a synonym of Cestrotus.

The species in this complex can be segregated into groups in the following way:

1. Species having both  $R_1$  and  $R_4$  setose above:
  - (a) Species of Cestrotus conformation, most of them having the characteristic cephalic ornamentation described above, and all of them the broad, large, tumid face; Africa and S.W. Arabia, mainly South Africa, one species in Madagascar.
  - (b) Species of Turriger conformation, having a frontal hump variously developed from quite prominent to almost absent; face with definite, vertical subantennal depressions; frons never ornamented by a combination of bare, shining callus, and silvery and orange spots; only Madagascar species.



- (c) Species of Turriger conformation, with weakly developed frontal hump, differing from the group of Madagascar species in (b) above, in having the face of a different shape and darkly spotted; tropical Africa.
2. Species with  $R_1$  and  $R_s$  setose above. Only Cestrotus turritus Loew of subsaharan Africa.
  3. Species with only  $R_1$  setose above. Only the two species Cestrotus oculatus Hendel and Turriger hennigi Lindner, both African; oculatus lacks the typical head ornamentation of most Cestrotus species and in features of pattern, form and behaviour is more a Turriger though it is saxicolous.
  4. Species lacking setae on upper surface of all radial veins.
    - (a) All Oriental species; these have a prominently humped frons.
    - (b) Some tropical African species, mainly of Turriger conformation but with only a moderately developed frontal hump; face spotted; pilosus Hendel in this group.

## DESCRIPTIONS OF NEW SPECIES

Genus Cainohomoneura n. gen.Cainohomoneura delta n. sp.

Diagnostic Characters: A species with a known wing-length range of 3,1-4,0 mm; body darkly patterned; wings with an obvious transverse brownish fascia and an adjacent narrower clear one, held in tectiform posture at rest. Face with strong median keel on upper half; antennae elongate, on a projecting fronto-facial angle, dark but with whitish arista; surstylus a narrow, rather finger-like structure, borne on inner face of surstyler extension and not visible when epandrium is in lateral view.

Male and female (South African specimens only)

Head: Shaped as in fig. 25, its height small in relation to body size, dorsoventrally compressed, in longitudinal axis short in relation to width (22:34), width about equal to that of thorax; occiput irregularly convex, on upper side curving over into frons, no sharply-defined vertex; frons almost horizontal, a little wider at post or than long (15:11), projecting forward of eye and forming with parafacials a distinct fronto-facial angle on which antennae are borne; anterior edge of frons curving forwards on sides, medially with shallowly V-shaped emargination; orbital plates slightly convergent anteriorly, diverging from orbits at level a little anterior to post or; anterior edge of frons quite broadly glabrous in a roughly chevron-shaped area of about equal width throughout, commencing at anterior edge of orbital plates. Ocelli on slightly elevated hump, arranged in triangle with sides longer than base, situated between vtl and post or. Face relatively small, higher than broad, with a strong median keel on about upper half, keel narrow, jutting forwards, prominent in lateral view.

Antenna as figures, first segment short cylindrical, second a little longer and considerably broader apically; third segment elongate, gradually narrowing apically, apex rounded, length about three times width at middle, appearing thicker because of a dense marginal fringe of short, dark



hairs; second segment with a suberect bristle dorsally and a group of procurved bristles ventrally of which the longest reaches midlength of third segment; arista arising from a basal swelling on dorsal edge, stem pale testaceous basally, remainder almost white, bearing quite long pale hairs in fairly dense dorsal and ventral series, and a dorsal series of less numerous, more widely spaced, larger dark hairs, which decrease in size towards apex of arista.

Thorax: Morphologically unremarkable, mesonotum quite strongly curved in longitudinal axis; length of scutellum in relation to that of mesonotum 10:23.

Abdomen: Relatively a little short, male genitalia inconspicuous.

Chaetation: Both or recurved, quite strong; pvt and oc almost as long as post or; pvt distant from posterior ocelli by about length of ocellar triangle; a few weak bristles directed downwards on lower buccal margin; 0+3 dc, all long and slender, anterior pair just behind sutures; long, slender h, ph, two np; very long, slender sa, two pa, one pair prescutellar acr; intradorsocentral setulae in about eight rows; one mp, two st of which anterior one is somewhat weak; scutellum with normal four bristles, long and slender; hind tergal marginal bristles relatively long, directed backwards; all T with preapical dorsal bristle; F2 with some strong bristles on apical half of a face; T without differentiated p bristles; ventral spur on T2 strong; F1 with av comb of minute black setulae on apical third; radial veins not setose above.

Coloration: Upper half of face, including most of keel, velvety blackish-brown, this colour also extending narrowly down parafacial borders and on parafacials themselves; lower half of face, buccae and a strip along lower hind orbit, pale yellowish slightly-brown tinged pruinose; lower section of occiput fuscous, upper half dark brownish with thin greyish-sepia pruinescence, this area separated from lower fuscous area by an irregular dull yellowish extension of pale pruinescence along lower hind orbit; shining brown ground colour showing through at bases of vti and vte, also



along orbital plates and broadly along glabrous area bordering anterior part of frons; orbital plates with thin scaly pruinescence of reddish-brown patchily distributed; two silvery-greyish markings on upper occiput, narrowing ventrally, bordering a dark blackish-brown mark which extends forward to enclose pvt; interfrontal area blackish, interrupted medially at upper end by a broadly V-shaped wedge of yellowish-grey pruinescence before anterior ocellus, extending backwards on each side of ocellar triangle and ending quite abruptly at about level of posterior ocelli which are separated from black stripes by other yellowish-grey pruinose patches which have lateral extensions that narrowly separate interfrontal blackish from vertex blackish-brown. Antennae mostly dark. black-brown, contrasting with white arista stem and its short white hairs; basal swelling supporting arista paler. Clypeus brownish, palpi blackish, proboscis pale brownish. Mesonotum quite densely mottled with sepia-brown and greyish scaly pruinescence, brown predominating, little definite pattern apparent apart from a suggestion of presutural median and dorsocentral brown vittae, and a tendency for mesonotal setulae to be on brown spots; adjoining upper anterior edge of humeral callus is a horizontally narrow silvery-grey pruinose mark; scutellum mainly brownish basally, becoming dull pale yellowish apically, with thin overlying pruinescence almost concolorous. Pleura brownish, irregularly darkened. Legs about concolorous with pleura, except tarsi 2 and 3 pale yellowish and Fl yellowish-brown over basal two-thirds except on d surface. Haltere knob infuscated, stem dull pale yellowish. Abdomen dark brownish with scaly, dull greyish pruinescence; hind tergal margins quite narrowly bordered with dull yellowish-brown.

Wing (fig. 17): Fairly broad, venation normal,  $M_{1+2}$  slightly undulant, changing direction at intersections with r-m and m and at outer edge of clear fascia; pattern well developed, formed by variable concentration and distribution of dark and pale microtrichia on a slightly creamy membrane, the two colour forms of microtrichia not intermixed anywhere but mutually exclusive in distribution: basal half of wing



largely brownish and variegated with pale streaks, followed by a stronger brown fascia extending right across wing and terminating on posterior margin at apex of  $M_{3+4}$ ; dark fascia succeeded by a narrow, clear fascia also right across wing, this succeeded by a variegated portion occupying about apical quarter on which there is a short, somewhat vermicular, preapical pale fascia between  $R_{2+3}$  and  $M_{1+2}$ ; in basal half of wing there are short, pale streaks as shown in figure; veins brown except where transversed by pale markings, r-m entirely pale, also basal section of Sc, all of humeral and Cu apart from a short section bordering second basal cell; m inconspicuous even though in darkest part of wing; fourth vein index 2,2; r-m well beyond middle of discal cell, index 0,43.

Male genitalia (figs. 62-66): Sixth tergite and sternite unmodified and in preabdomen; protandrium symmetrical, subcircular, essentially a narrow, sclerotised ring flattened below, flattened portion projecting slightly posterior to plane of remainder, a fairly broad, weakly sclerotised strip around upper half on posterior edge; seventh spiracle on each side in lower part of protandrium where it curves into flattened ventral portion. Epandrium as figured, more or less U-shaped, cerci protruding prominently, not centrally situated but near ventral edge of membranous area; cerci and epandrium with numerous erect setae; surstylar extension of epandrium abruptly terminated, surstylus borne on inner surface of extension and not visible when epandrium is in lateral view, formed as shown in fig. 64, bearing apically 5-7 short, stout setae of almost arrowhead form; on both inner and outer surfaces of surstylar extension is one strong, blade-like seta (see fig. 63). Aedeagal complex as figured, gonopods in form of slightly sinuous arms widely diverging; ring sclerite with a short projecting lobe in ventral midline, covering bifurcation of aedeagal apodeme.

Female genitalia: Unspecialised, retractable sclerites being only 7th and 8th sternites, 8th and 9th tergites, and proctiger; three subspherical spermathecae present.

Variation: A series from Rhodesia shows some constant

Occiput and vertex with similar pattern but less dark, occipital patches sepia coloured, surrounded by pale greyish pruinescence. Mesonotum pale greyish pruinose with much less heavy brown patterning which is confined to small circular marks surrounding many of the bristles and setulae; two narrow stripes present within dc rows and an equally narrow median stripe, these three stripes most clearly apparent at anterior edge of mesonotum, not extending much behind second pair of dc and tending to be blurred through coalescence with brown markings at bases of intradorsocentral setulae; also an imperfect sublateral stripe in line with upper corner of scutellum; abdomen much more extensively yellowed, in most specimens the tergites brownish with quite broad, brownish-yellow, ill-defined hind margins; pleura and legs also paler, being light brownish.

Wing length: South African specimen - male 3,2, female 3,1 - 3,6 mm: Rhodesian specimens - male 3,5 - 3,6, female 3,7 - 4,0 mm.

Material studied: Holotype female, paratopotype male, Ngoye Forest, between Eshowe and Empangeni, Zululand, February 1957 (B.R. Stuckenberg): paratypes - 1 female (teneral) Dhlinda Forest, Eshowe, Zululand, 5-6 April 1960 (B. & P. Stuckenberg); 1 female Umhlanga Rocks coastal bush, north of Durban, Natal, May 1961 (B. & P. Stuckenberg); 2 male, 5 female, Chrinda Forest, Mt. Selinda, Rhodesia, 25 January 1955 (B.R.S. & P.G.), 6-8 January 1957 (A. & C. Smithers). Holotype in Natal Museum (No. 1284).

Notes: Specimens of this species seem prone to greasiness after death and most of the ones available have become greasy in varying degree, the best specimen being the female selected as the holotype. So far delta has been found only in subtropical evergreen indigenous forest, as altitudes ranging from near sea level at Umhlanga Rocks to about 1 070 m at the escarpment forest at Mt. Selinda in the eastern highlands of Rhodesia.



Genus Dyticomyia n. gen.

Dyticomyia oraria n. sp.

Diagnostic characters: A species of moderately large size (wing 3,3-4,5 mm), easily recognised by two supernumerary stump veins that project from the apical portion of the fourth vein into the second posterior cell; coloration mainly yellowish-brown, wing patterned, frons with a narrow, brown median stripe down entire length, mesonotum with four narrow vittae; male with setose protandrium and unusually distinctive aedeagus; female abdomen unusual in large size of tergite 3 and its lack of setulae except in a median strip, also in extensive intersegmental membrane between sclerites of segments 7 and 8, and in the absence of marginal bristles on tergite 1+2 except on extreme sides where a few very strong bristles are present.

Male and female

Head (fig. 60): About three-quarters as high as wide; upper part of occiput moderately concave, fitting quite closely against thorax; vertex sharp; frons descending at a fairly steep angle, in profile almost flat, very slightly wider at anterior end, at midlength its width one-half width of head and about  $1\frac{1}{2}x$  (20:13) its length; orbital plates very narrow, hardly differentiated from surrounding integument, moderately convergent; integument of frons apruinose, subshining, a very fine, reticulate microsculpture present which dulls the surface; anterolaterally the frons is not clearly differentiated from the parafacials, instead the frons curving over gradually and entirely continuous with the rather broad parafacials; ocellar tubercle poorly developed, ocelli in triangle with sides slightly longer than base, hind pair very close to vertex; face rather narrow, almost flat, with a slight, irregular, transverse concavity at middle; eye elongate, irregularly suboval, obliquely positioned; genae fairly deep, with epistome about one-third height of eye. Antennae proportionately small, quite widely separated, first segment very short but setulose dorsally, second segment short with marginal setulae and a small, eclinate dorsal bristle, third segment short, bluntly rounded, length : height ranging from 8:5 to



7:6; arista subbasal, microscopically pubescent. Clypeus strongly sclerotised and fairly large.

Thorax: Mesonotum deeply arched, in lateral view its greatest depth relative to that of remainder of thorax is 12:20, anterior declivity abrupt, precipitous and large. Scutellum relatively small, length compared to that of mesonotum 10:27, in shape obcordate with moderately acute apex. Legs robust.

Abdomen: Showing considerable sexual dimorphism. Male: of relatively normal conformation; tergite 1+2 about twice as long as tergite 3, tergites 4 and 5 subequal, each a little shorter than tergite 3; tergite 6 very narrowly exposed; proterandrium broadly exposed, about three-quarters length of tergite 5, unusual also in being setose. Female (fig. 67): usually has only the tergites up to 5 exposed, 6 sometimes only very narrowly visible, these sclerite differing greatly in length and proportions, tergites 1+2, 3, 4 and 5 measuring in length on one specimen in micrometer units 13:16:6:9; tergite 1+2 declivous anterior to transverse seam, posterior part wide with prominent 'shoulders' anterolaterally; tergite 3 narrower (see fig. 67) than 1+2, and tapering posteriorly; tergite 4 very much shorter than 3, strongly transverse; tergite 5 quite different to tergite 4, about  $1\frac{1}{2}x$  as long but narrower basally and tapering quite strongly so that its somewhat rounded end has a width relative to basal width 10:17. Tergite 3 also unusual in being entirely devoid of setulae laterally and laterodorsally, its setulae confined to a median strip which is slightly wider distally.

Chaetation: Orbital bristles relatively small, ant or only about one-quarter head height; both or reclinate, ant or a little apicad of middle of frons and separated from post or by a distance about equal to that between post or and vti; anterior part of frons with a variable number of minute hairs, these sometimes very sparse; vti about twice as long as post or, vte longer than post or; oc porrect, a little divergent, about equal to post or but finer; pvt almost on vertex, directed obliquely backwards, cruciate at tips; lower occiput with numerous setulae. gena beneath eye also



setulose, and a few setulae in series on lower part of parafacial margin. Thoracic macrochaetae quite long and strong; h long, situated on lower end of callus and directed horizontally; 2n, long ph, very long sa, 2 pa; 0+3 dc, about equally spaced, anterior pair set back from sutures, 0+2 acr; mesonotal setulae numerous and quite strong; intradorsocentral ones in about 6 rows, those lateral to dc rows in about five series, a few setulae on humeral callus almost large enough to be considered weak bristles; all sc bristles long, slender, post pair subparallel; d preapical present on all T, on T2 this bristle very strong and laterally flattened; F1 without av comb; T2 with one strong y spur; F3 with small ad bristle near apex; mp bristle long and strong; 2 st, both strong; meso- and sterno-pleuron with numerous setulae. Abdominal chaetation: male - all exposed tergite with setulae, sides of tergite 1+2 with erect setulae; tergite 1+2 with weak marginal bristles except laterally where there are two or three quite strong ones, tergites 3-5 with normal marginal bristles. Female - tergite 1+2 setulose, setulae on anterolateral 'shoulders' longer than others and erect, marginal bristles not differentiated except on downcurved sides where two or three conspicuously large ones are present, outermost one the strongest and reaching beyond midlength of tergite 3; tergite 3 setulose only medially, without marginal bristles; tergites 4 and 5 setulose and with marginal bristles of which lateral ones are stronger.

Coloration: Head, thorax and legs generally brownish yellow; ocellae dark brown; frons with narrow (not wider than posterior side of ocellar tubercle) brown median stripe from anterior ocellus to anterior margin; palpi blackish-brown; proboscis dull testaceous. Thorax with yellowish tinging irregularly distributed, ground colour thinly overlain by fine, silvery-grey pruinescence; mesonotum with four narrow, brown vittae, one in each dc row and one starting at inner end of humeral callus, extending just above ph and sa, ending above ant pa, these vittae darkest anteriorly where they are almost blackish-brown, rapidly paling, over posterior half hardly differentiated from adjacent ground



colour and conspicuous because the silvery-grey pruinescence is not present on them; dc vittae continuing into scutellum where they form its dark borders. Abdomen of yellowish-brown with extensive, irregular, blackish blotching due to postmortem changes, female abdomen of mature specimens mostly cadmium-yellow, with irregular brownish and blackish blotching due to drying of contents, yellowish colouring particularly evident on asetulose sides of tergite 3.

Wing (fig. 49): Fairly broadly rounded, about  $2\frac{1}{2}x$  as long as broad; venation unusual in that apical section of  $M_{1+2}$  almost invariably has two stump veins projecting into second posterior cell, these varying in length from almost a third to about a fifth of length of m crossvein, their spacing measured in two specimens being - male 4:7:7:5, female 5:5:6,5:8. Subcostal cell rather large, about one-third length of costal cell. Vein Cu+A unusually long and reaching a long way to hind margin, about  $1\frac{2}{3}x$  length of m crossvein, its apical two-thirds markedly more slender than basal part. Membrane mostly greyish-hyaline, leading margin up to about middle of submarginal cell brownish, in marginal and submarginal cells the brown colour distributed in small, irregular, partly coalescent blotches which give a mottled appearance; brownish clouds also around r-m and m crossveins and both stump veins. Costa sapromyziform; veins asetose, brownish. Fourth vein index, male 1,3-1,6, female 1,5-1,6; r-m index, male 0,7 (four specimens), female 0,6-0,7.

Male genitalia (figs. 68-72): Protandrium represented only by its dorsal half, a fairly broad, arched, setose sclerite; hypandrium as figured, surstylar extension ending in asymmetrically rounded, setose lobe, no discrete surstylus developed; aedeagus of unusual form, having a laterally compressed apical enlargement as figured, within which are many overlapping, sharply-pointed platelets lining inner face of each side piece, aedeagal apodeme with shallow, wide apical fork; gonopods of irregular form figured.

Female genitalia: Characterised by long intersegmented membrane between sclerites of seventh and eighth segments; sternite 8 transverse, broader than tergite; three



relatively small, subspherical spermathecae present, two of them close together on short branches from a common duct, the third remote on a long duct of its own.

Variation: Left ant or bristle absent in one specimen; anterior pair of acr bristles always weaker than prescutellar pair and often unequally developed, rarely one of them absent, often one smaller than the other; outer stump vein vestigial on one wing of one specimen; abdominal colouring variable apart from extensive dark mottling due to drying of gut contents (see Note at couplet 80); in female the strong yellowish colour is variably masked by brown in what appear to be immature specimens.

Wing length: Male 3,7-4,4 mm (mean of seven specimens 4,1 mm); female 3,3-4,5 mm (mean of ten specimens 3,9 mm).

Material examined: Holotype male, par    pes 5 males, 9 females, Strandfontein, Atlantic coast west of Vanrhynsdorp, S.W. Cape Province, 15-17.10.1964; paratypes 1 male, 1 female, Ysterfontein, Atlantic coast south of Saldanha Bay, S.W. Cape Province, 20.10.1964 (all coll. B. & P. Stuckenberg). Holotype in Natal Museum (No. 1285).

#### Genus Micropachycerina n. gen.

##### Micropachycerina stenoptera n. sp.

Diagnostic characters: A small, slender, narrow-winged species, easily recognised by the generic characters given in key above; known wing length in range 2,3-2,8 mm. Apparently derivative from widespread, locally sympatric genus Pachycerina from which it is easily distinguished by the absence of anal lobe on the wing, reduced alula, position and sizes of the orbital bristles, extremely wide spacing of the ocelli and oc bristles, less inflated face, lack of acr bristles, 0+2 dc, small hypopygium and generally small size and narrowness of body.

Male and female

Head (fig. 33): Equal to or slightly broader than thorax; vertex rounded, occiput convex apart from slightly depressed upper median part; frons very broad, width at middle relative to length (measured from vti) about 4:3, twice as

to orbits except anteriorly where orbits curve outwards moderately, stopping anteriorly a short distance before anterior edge of frons; ocelli very widely spaced, ocellar triangle spread over much of frons, distance between posterior ocelli twice distance from each of these ocelli to orbits at their respective sides, sides of ocellar triangle  $\frac{1}{2}$  length of base; distance from posterior ocelli to pvt equal to length of ocellar triangle, anterior ocellus beyond midlength of frons ( $7/12$ ) as measured from vti; ocellar triangle enclosing a distinctly tumid though dorsally rather flattened area, and entirely surrounded by velvety black, broadly oboval mark reaching pvt. Frons meeting parafacials in moderately obtuse angle, parafacials fairly broad, about of even width except for wider upper portion; genal depth about  $\frac{1}{6}$  height of eye; eye a little higher than long ( $17:4$ ), greatest length a little above middle. Antenna as in fig. 33, elongate, set quite high on head; first segment exposed, much broadened apically, equal in length to second, with a small dorsal bristle; second segment slightly more than a quarter length of third ( $3:11$ ), setulose around apex and with a quite long dorsal and two or three unequal ventral bristles; third segment with pronounced upper basal swelling from which arista arises, beyond this much narrower and tapering to a moderately acute tip; arista strong, about twice length of third segment, densely haired above and below and with dorsal feathering of much longer hairs which decrease rapidly in length over graded series. Face fairly small, narrowing above, arched horizontally, also a little curved in side view, appearing moderately bulbous with suggestion of a median angle in upper part, uniformly glossy and translucent, lower margin moderately concave, epistome narrow; clypeus relatively large, palpi narrow, proboscis quite elongate and slender.

Thorax: Generally narrow, mesonotum quite strongly arched and with pronounced hump anteriorly, about  $2\frac{1}{3}$  times length of scutellum; scutellum rather narrow, flattened on disc; legs without noteworthy features.

Abdomen: Slender, about as long as thorax, hypopygium small, inconspicuous.



Chaetation: post or situated far forwards on frons, almost at apex of orbital plate, strong, recurved; ant or represented by a minute, fine bristle not longer than about one-eighth of post or, situated immediately before latter bristle; vti strong, long, in height equal to depth of head, vte one-half as high; oc porrect, widely separated, almost in line with posterior ocelli; pvt slightly longer than oc, cruciate; occiput with a short, sparse postocular series of setulae and 3-4 other setulae forming a very short second series on upper part of occiput; two marginal setulae on lower part of parafacial, and two downwardly directed, weak bristles on lateral epistome margin. 0+2 dc, long and slender, anterior pair a short way back from sutures; 1 h, 1 ph, 2 n, 1 sa, 2 pa, all strong; prescutellar acr absent; intradorsocentral setulae biseriate, arranged in acr rows; extradorsocentral setulae uniseriate, in ia row starting at level of ph bristle, also a few setulae irregularly scattered; normal mp bristle present, above which is a fine, weak second mp, also a few even weaker bristles irregularly distributed on mesopleuron; 2 st, Fl without av comb; all T with d preapical. T2 with strong y spur; apical sc more erect than basal ones, and cruciate; tergal marginals well developed, male with a fan of eight strong marginals on seventh tergite, Radial veins asetose above, costa saproxyziform.

Coloration: Occiput and frons (apart from black ocellar spot) clear yellowish with reddish-brown tinge, anterior part of frons more intensely yellowed, orbital plates subshining translucent; parafacials dull whitish with silvery pruinescence visible in oblique view; face dull, pale, clear yellowish; basal antennal segment brown, second segment brown above, grading to brownish-yellow, third segment broadly darkish brown around arista base, elsewhere brownish-yellow, paler along edges; palps and base of proboscis pale, remainder of proboscis dull brownish. Mesonotum shining brownish-yellow to reddish-yellow, with narrow red-brown to brown median vitta over acr setulae, another narrower and more indefinite stripe along ia row of setulae; notopleural lobe, humeral callus and an adjacent



subtriangular area up to transverse suture clear pale brownish, same colour extending along upper part of mesopleuron and pteropleuron, around spiracle, over all of metapleural epimeral swelling and including narrow lateral parts of metanotum, thus forming a somewhat irregular brownish stripe along side of thorax; most of propleuron, mesopleuron, upper part of sternopleuron, lower part of pteropleuron and all of hypopleuron, are concolorous with yellowed part of mesonotum; a rather narrow and weak brownish stripe runs below this yellowed part of pleura, starting anteriorly around lower edge of propleuron, extending along and overlapping suture between sterno- and meso-pleura, and passing just beneath st bristles before terminating abruptly; legs generally pale yellowish except anterior tibia and tarsus which are uniformly brownish. Abdomen darkish brown, in places with indefinite dull yellowish tinge; sternites pale yellowish, sometimes hidden through complete overlap by tergites during drying after death.

Wing (fig. 34): Relatively long and narrow, tapering strongly in basal half; anal lobe without angle, uniformly narrow, a very short or absent; alula present but narrow, always curved up in dead specimens and thus difficult to see; Sc and R<sub>1</sub> running close together, membrane between their upturned apical parts thickened; first basal cell elongate, narrow, parallel-sided, r-m a little beyond basal third of wing; costa sapromyziform, costal spinules strong, costa up to R<sub>4+5</sub> also with stiff, quite long setulae; membrane largely hyaline, iridescent, with obvious microtrichia; costal cell and apical part of subcostal cell smoky brown, a tinge of this colour also extending narrowly along costa to R<sub>4+5</sub>, 4th vein index, males 1,6-1,7 (mean 1,7), females 1,5-1,8 (mean 1,6); r-m index, males 1,2-1,4 (mean 1,3), females 1,1-1,2 (mean 1,2), r-m thus based of middle of discal cell.

Male genitalia (figs. 73-75): Protandrium in form of incomplete sclerotised ring, being about  $\frac{3}{4}$  circle with flat ventral portion; posteriorly is a weaker bordering strip which tapers on each side and disappears at anterior



corner of epandrium, seventh spiracles ventro-lateral, before lower end on each side. Epandrium distinctive in that the proctiger is attached to inner surface of surstylar extension by means of a pair of irregular, elongate, subrectangular sclerites, one on each side, each sclerite attached to ventral edge of cercus. Cerci prominently protruding. A double surstylar projection on each surstylar extension, a slightly upcurved, narrow extension, microsetose, on posterior corner (not of the same shape on the two sides in specimens examined, finger-like on left side, shorter, stouter and with angle at middle of lower margin, on right side, see fig. 74), and at about middle of lower edge of surstylar extension a shorter process in form of a pointed, flat, asetose blade directed obliquely downwards. Aedeagus a weakly sclerotised, apically bilobed structure, form as in fig. 75; gonopods distinctly shaped, comprising a broad basal portion extended at about gonopod midlength outward in a short, narrow point, and a much narrower, tapering, slightly curved outwards, apical portion; ring sclerite as figured, narrow; aedeagal apodeme hardly bifurcate, ejaculatory apodeme in form of a small rod. Posteriorly the ring sclerite produced on each side into a subtriangular lobe bearing apically two microsetae.

Female genitalia: Without noteworthy features; three subspherical spermathecae present.

Wing length: males 2,3-2,5 (mean 2,4) mm; females 2,4-2,8 (mean 2,6) mm.

Material studied: Holotype male, 6 male 4 female paratopotypes, Station Agricole, Lac Alaotra, Ambatondrazaka District, east-central Madagascar, 24 December 1957 (B.R. Stuckenberg); 1 male 1 female paratypes, Ranomafana (see note on Zanjensiella canifrons n. sp.), eastern Madagascar, December 1955 (B.R. Stuckenberg). Holotype in Paris Museum; specimens donated to Basle and British Museums, remainder in Natal Museum (No. 1286).



Genus Nimettia n. gen.Nimettia biseta n. sp.

Diagnostic characters: Only the female known; a species of moderate size, macroscopically brownish, microscopically the head and thorax dull reddish-brown and brownish-orange, the abdomen dark yellowish-brown; easily recognised by chaetic characters, noteworthy features being very long oc bristles; two ia on each side, and two hind-marginal mp, also the lack of d preapical on T3. Abdominal structure of female peculiar; tergite 7 large, strongly arched in dried specimen, not retracted, apparently longer on lateral edge than in midline, enclosing a large, posteriorly-facing space; tergite 8 strongly sclerotised, largely withdrawn and situated well above cercal structure; sternite (?) 8 with a pair of large, broad, posteriorly-directed lobes in mutual contact along ventral and posterior edges.

## Female

Head (fig. 45): Sapromyza-like, without unusual structural features, wider than high (20:17). Occiput moderately convex, vertex rounded; ocelli at vertex, forming a triangle with sides longer than base, hind ocelli just anterior to line between vti, frons parallel-sided, broader than long (10:7) anterior margin concave above antennae, frons curving forwards evenly; orbital plates narrow, moderately convergent and hence departing from orbits. Antennae relatively small, first segment largely hidden; third segment short suboval, length to height about 8:5; arista subbasal, loosely feathered above and below with series of both long and short rays. Eye a little higher than long (14:12), narrowed below. Face not visible in side view, being almost flat, with slight subantennal depressions, quite broad below, narrowing towards antennae, a transverse epistomal suture right across. Parafacial narrowing moderately beneath eye and about as deep as epistome, both together about one-sixth height of eye.

Thorax: Without unusual features; mesonotum moderately arched; disc of scutellum flat, edge between apical sc bristles only slightly convex; scutellum a little more than one-third (11:31) length of mesonotum. Legs robust.



Abdomen (fig. 81): Slightly short in relation to body, almost equal to length of mesonotum. Unusually structured in that all tergites up to 7 are exposed; tergite 1+2 is longest, about equal to 3 and 4 together which are subequal; 5 and 6 are subequal and a little shorter than either 3 or 4; 7 is about as long as 6 in midline but widens conspicuously on the sides, exposed lateral margin about as long as tergites 5 and 6 together. All sternites well sclerotised, 7 strongly arched, apparently enclosing a pocket within; beyond sternite 8, either attached to it or formed from sternite 8 (this cannot be decided from the unique specimen which I am unwilling to dissect), is a pair of large, flat, subrectangular lobes with rounded corners, directed posteriorly and applied against one another on their ventral and posterior edges.

Chaetation: Both pairs or bristles reclinate, ant or strong and only a little smaller than post or, distance between these pairs about equal to distance between post or and vti, and to that from ant or to anterior margin of frons; ant or a little inward of post or owing to convergence of orbital plates; oc bristles exceptionally long and strong, longer than height of post or (15:13), reaching forwards between and beyond ant or; vti about twice length of ant or; vte about equal to post or; pvt cruciate, about as long as ant or, situated a little more than length of ocellar triangle below hind ocelli; a postorbital series of strong setulae present, inward of which is a second series extending on upperside to behind vti; lower lateral parts of occiput with strong scattered setulae and two strong ventrally-directed peristomial bristles; setulae bordering parafacial extending about to level of lower third of face, becoming finer and weaker upwards. All thoracic macrochaetae strong and long; 1 h, 1 ph (which reaches to level of sa) 2 np, 1 sa, 2 pa, smaller ia bristles, outer longer than inner, situated on line between post dc and sa, these four bristles about equidistant from one another; 0+3 dc, anterior pair only half size of second pair, distance between pairs 1 and 2 about half distance between pairs 2 and 3; 0+2 acr bristles; all sc bristles strong, apical pair directed backward and



parallel; intradorsocentral setulae in 8 rows; numerous other mesonotal setulae present, all stiff, some of them almost long enough to be considered macrochaetae, in particular some in dc rows, one inward of and one anterior to sa bristle, and three inward of and a little behind ph bristle; humeral calli with numerous setulae in addition to usual h; pp bristle unusually long and strong, about equal to post or; mesopleuron with usual hind marginal mp, this a strong bristle, and below is a second smaller one, also a number of quite strong, scattered setulae; 2 st; F1 without av comb; F2 with 6-7 strong bristles on apical half of a face, and one short but strong pv bristle at apex; T2 with one long, strong v spur; F3 with one preapical, rather fine ad bristle, and on apex weak av, ad, d and pd bristles, last two close together; T3 lacking preapical d tergites 2-7, numerous, long and conspicuous, those on tergites 2-6 reaching beyond hind margin of next tergite. Costa sapromyziform, radial veins asetose above.

Coloration: Frons dull reddish-brown, remainder of head dull brownish-orange; first and second antennal segments yellowish-orange, third segment orange basally, becoming infuscated towards apex, dorsal and apical edges dark brown; arista blackish. Entire thorax dull brownish-orange, pleura a little paler than mesonotum, femora concolorous with pleura, remainder of legs dull straw-yellow. Abdomen dark yellowish-brown dorsally, infused with yellow on sides.

Wing: Greyish-hyaline, unpatterned. Venation normal. Fourth vein index 1,6, r-m index 0,9, subcostal cell one-quarter length of costal cell.

Female genitalia: Unique holotype not dissected.

Wing length: 5,1 mm.

Material examined: Holotype female, Ambohitantely Forest, Ankazobe District, Central Madagascar, 1 600 m, 6 January 1958 (B.R. Stuckenberg). See note in description of Zanjensiella canifrons n. sp. Holotype in Paris Museum.



Genus Noonamyia n. gen.

## Key to species

- A. Wing (fig. 58) not crossed just basad of m crossvein by a clear fascia; only one subcircular clear spot in first posterior cell; pleura with a horizontal brown stripe; larger species with markedly diverging antennae .. .. . palawanensis n. sp.
- B. Wing (fig. 59) with a complete clear fascia right across just basad of m crossvein; two subcircular clear spots in first posterior cell; pleura unicolorous or darkened a little above, without a brown stripe; smaller species with less widely diverging antennae.  
lyneborgi n. sp.

Noonamyia palawanensis n. sp.

## Male and female

Head (figs. 55, 56): In lateral view almost rounded, eye relatively large; head broad, about  $2\frac{1}{2}x$  as wide as high (27:11), standing away from thorax; upper occiput slightly concave, vertex moderately sharp; ocellar tubercle a little raised, hind ocelli close to vertex, ocelli in triangle with sides slightly longer than base; frons a little convergent towards antennae, very broad, width at midlength nearly thrice midline length measured from anterior ocellus (11:4), concave on anterior margin above antennae, in profile sloping evenly forwards, no fronto-facial angle present; orbital plates not clearly differentiated, apparently lying along orbits, elevated into small tumidities supporting orbital bristles. Face almost flat, slight subantennal depressions present which extend into the transversely inclined parafacials; face and parafacials not visible in lateral view; epistomal suture shallowly arched; clypeus narrow, projecting a little. Antennae (fig. 57) very close together over basal and second segments; basal segment very short, with minute setulae dorsally; second segment larger, much deeper; third segment inclined strongly outward at about  $45^{\circ}$  or more to longitudinal body axis, its inner surface facing obliquely forwards, in shape tapering quite strongly to subacute apex, almost  $1\frac{1}{2}x$  (5:7) as long as deep

at base, dorsal edge and apex fringed with short, erect, white hairs; second segment ventrally with two long, rather crooked bristles, outer one longer and stronger than inner, reaching almost to epistome, inclined downwards and a little forwards; the four together lying in the same plane, as well as two or three other bristles only half or less as long; dorsal surface of second segment with a quite strong eclinate bristle; arista long plumose, longest rays in dorsal series nearly twice (9:5,5) greatest height of third antennal segment. Eye shape as figured, occupying most of head in lateral view; gena very narrow, only about one-fourteenth height of eye; lower occiput moderately convex; mouth parts fairly small.

Thorax: Mesonotum strongly arched anteriorly where its declivity overhangs neck, about  $2\frac{1}{2}x$  (29:12) length of scutellum, latter shallowly curved on margin between apical sc bristles. Legs rather slender.

Abdomen: Slender, somewhat flattened on dorsum; in male all tergites up to 7 exposed, first three subequal in length (taking 1 and 2 as separated by the transverse seam), 4 slightly shorter, 5 narrowly exposed; in female tergites 1+2-5 roughly subequal in length, remainder very short or telescoped.

Chaetation: or bristles reclinate, very unequal in size, ant or close to anterior edge of frons, twice as long and strong as post or which are almost midway between ant or and vti; vti very long, fully equal to height of head, about  $1\frac{1}{2}x$  ant or; pvt widely separated, closer to vti than to each other, inclinate but not decussate; oc long, porrect, almost reaching anterior edge of frons; postocular setulae uniseriate on upper part of occiput, this series close to orbit and extending along lower genal margin; lower occiput setulose. Most mesonotal macrochaetae long, h and ph exceptionally long, latter reaching beyond base of sa; present are 1 h, 1 ph, 2 np, 1 sa; both pa rather fine, post pa unusually small, being only about half or less size of ant pa; 0+3 dc, anterior pair at sutures, all acr bristles absent; all sc long; intradorsocentral setulae in



about six rows; mesopleuron with normal hind marginal mp, also rather numerous setulae; 1 pp, 2 st. F1 with av comb of small spines on about apical third; d preapical small and rather weak on T1, placed near apex, short but strong and black on T2 where it is also near apex, absent on T3; T2 with two v spurs, anterior one exceptionally long and strong, about  $2\frac{1}{2}x$  as long as apical diameter of T2 and half as long as adjacent basitarsus, posterior spur much smaller, less than diameter of tibia apex; T3 with small v spur; F2 with fringe of semi-erect bristles on av surface along nearly entire length, almost erect bristles in row on apical half of ant face are noticeably strong. Tergal marginals quite strong, recumbent.

Coloration: Frons dull orange, very narrowly greyish pruinose along orbits; first and second antennal segments and basal part of third brownish-orange, remainder of third dark orange-brown with thin, overlying, silvery-grey pruinescence; face indefinitely dark brownish with thin, silvery pruinescence; parafacials dull orange with greyish pruinescence; occiput rather thickly overlain by greyish-yellow pruinescence, this paler on anterior declivity (which is entirely pruinose), humeri and notopleura; disc of mesonotum irregularly somewhat brownish-tinged but none of available specimens is in good enough condition for a judgment as to what extent postmortem changes are involved; pleura distinctly bicolorous, a broad, horizontal, brown stripe extending from propleuron backwards, that part of pleura above this stripe (narrower than stripe itself) grading from pale creamy yellow below humeral callus to pale silk-yellow below wing, lower part of sternopleuron and all coxae dull brownish-yellow; postscutellum, posterior half of hypopleuron and especially inferior pleurotergite (metapleuron auct) silvery-grey pruinose; haltere brownish yellow. All F dull yellowish with admixture of brown; T1 and T2 dull yellowish apically grading to yellowish-brown basally. T3 entirely dull yellowish; all tarsi pale yellowish. Tergites up to 6 dark, shining blackish-brown, tergite 7, protandrium and hypopygium testaceous, contrasting in female the tergites after 6 pale yellowish.



Wing (fig. 58): Strongly narrowed at base, otherwise quite broadly rounded, anal lobe much narrowed, anal angle almost undeveloped, alula reduced to a very narrow strip, squama very small; anal vein reduced to a short stump, vein 2A absent, second basal cell very small, radial-sector short and weak;  $R_1$  ending close to sc, subcostal cell narrow; second and third veins a little divergent apically, submarginal cell thus widened; third and fourth veins divergent; m crossvein far distad of middle of discal cell. Pattern comprising an extensive area brown-stained, pale yellowish-brown stained areas in basal section of marginal cell and in adjacent area enclosed by brown, and a number of clear areas which are transparent in transmitted light and in which the microtrichia are greatly reduced and entirely pale; these clear markings appear shining whitish when obliquely illuminated against a dark background; 4th vein index 3,2, r-m index 0,3.

Male genitalia (figs. 82-84): Protandrium represented only by dorsal half, being an arched sclerite, quite broad in midline but tapering strongly on both sides to a blunt point in which spiracle 7 is situated. Hypandrium as figured, surstylar process relatively complex, comprising on each side a long, slender, slightly curved, pointed projection some distance dorsad of surstylar extension which is produced into a multitoothed plate, the inner tooth of basal pair directed obliquely inwards (specimen figured is asymmetrical in respect of number of teeth, having five on right and four on left); basal corner of surstylar extension rectangular. Aedeagal complex as figured, gonopods rather narrow with upturned tips, lying close to aedeagus; dorsal portions of ring sclerite broad, each with a strong setula; aedeagal apodeme relatively long and deeply forked.

Female genitalia: Not examined.

Wing length: Male 2,8-3,1, mean of four 2.9 mm; female 2,9-3,5, mean of five 3,2 mm.

Material examined: Holotype male, Philippines: Palawan Island, Mantalingajan, Tagabung, 1 150 m, 17.9.1961, caught at mercury-vapour lamp, 19.00-03.30 hours; paratypes 5 males



6 females, same data except some dates 19.9.1961 and 20.9.1961, a female taken on 19.9.1961 taken at m-v light during 18.30-06.00 hours; all specimens collected by Noona Dan Expedition; 1961-62. Holotype and majority of paratypes in Zoological Museum, Copenhagen; two paratypes in Natal Museum (No. 1287).

Noonamyia lyneborgi n. sp.

Male and female

Very similar to *palawanensis* but easily distinguished by the characters given in the key above; the following description is confined to differences between the species.

Antennae less widely diverging; the two long bristles on ventral surface of second antennal segment are relatively longer, extending below level of epistomal margin, longer one twice length of third antennal segment; head relatively not as broad, width : height 11:7; frons width  $2\frac{1}{2} \times$  frons length and nearly half head width; pvt cruciate; d preapical absent on T1 and T3, short but strong on T2; longer spur on T2 very large, half height of eye. Frons mainly brownish, with a reddish tinge anterolaterally and a yellowish median patch on anterior margin; mesonotum dark brown in ground colour, thinly pruinose, this pruinescence appearing dark grey in some positions, brownish in others; pleura thinly whitish-grey pruinose, without horizontal grey band, sternopleuron dull whitish-yellow like coxae, other pleura indefinitely brownish. Only tergites 3-5 dark, shining brown, 1+2 yellowish-brown; tergite 6 and hypopygium brownish-yellow, former with some brown laterally. Wing (fig. 59) with a clear fascia right across just basad of m crossvein, and two subcircular spots in first posterior cell; 4th vein index 4,0, r-m index 0,3. Surstyli (figs. 85-87) differing considerably in form, represented merely by a single, short tooth. Aedeagal complex as figured (fig. 88), differing mainly in form of gonopods which are relatively deeper and obliquely truncated apically with a small point projecting ventrally from apex.

Wing length: Male 2,5-2,7, mean of five 2,6 mm; female 2,3-3,0 mm.



Material examined: Holotype male, Philippines: Palawan Island, Mantalingajan, Pinigisan, 600 m, 1.9.1961, at Petromax light; paratypes 4 males 1 female, same data except dates in September are 7, 8, 10 and 22; paratypes 1 male 1 female, same data as holotype except Tagembung, 1 150 m, 19.9.1961; all taken during Noona Dan Expedition 1961-2. Holotype and majority of paratypes in Zoological Museum, Copenhagen; one paratype in Natal Museum (No. 1288). Named in honour of Dr. L. Lyneborg of Copenhagen.

Genus Parapachycerina n. gen.

Parapachycerina munroi n. sp.

Diagnostic characters: Easily distinguished by the generic characters, the forward position of the post or bristles and their great length (almost equal to vti) together with the nearness and small size of the ant or bristles, being obvious and distinctive; the arista is quite thickly feathered, and there is a dark spot covering the ocellar tubercle and extending behind it up to the pvt bristles. There are a number of species of Parapachycerina in tropical Africa, all undescribed, and these will be dealt with fully in a forthcoming monograph. This, the type species, for the present is best distinguished on the basis of the male genitalia.

Male and female

Head (fig. 35): Relatively broad in relation to height (26:17); occiput almost flat above foramen, slightly impressed; vertex rounded; frons curving forward evenly, slightly divergent towards antennae, width at midlength almost twice (11:16) length measured from anterior ocellus, considerably wider than eye (11:7:5), anterior margin shallowly concave except on sides; orbital plates narrow, slightly raised, subshining, slightly convergent inwards, departing from orbits over most of plate length, anteriorly moderately raised in a small tubercle bearing post or. Eye rather rounded, vertical diameter slightly larger than horizontal one (13:11), a little narrowed below. Antennae borne a little above level of middle of eye; first segment exposed, rather short; third segment (see fig. 35) with a



pronounced basal hump on upper edge, on which arista is situated, segment much narrower beyond this; arista strong, quite thickly haired above and below, in addition feathered on dorsal surface by a second series of hairs much longer than the others, decreasing in length apicad. Lateral part of epistome very narrow, but gena deep beneath eye, epistome and gena together a little less than half (13:6) height of eye. Parafacials fairly broad, their inner margin involved in subantennal depressions. Face fairly narrow, tapering only a little towards antennae, on each side with a definite depression which goes almost all the way to epistome; . between these depressions the face protrudes angularly a little just beneath antennae, towards the epistome more broadly and shallowly curved; in lateral view the face appears flat in profile and projects only a little. Proboscis quite long and slender.

Thorax: Quite strongly humped anteriorly, a quite extensive declivous face at anterior end of mesonotum; scutellum moderately flattened on disc, apical edge only shallowly arched between apical bristles, length relative to that of mesonotum 7:17. Legs without noteworthy features.

Abdomen: Slender in both sexes, without special features; hypopygium rather small, usually concealed in dried specimens, consequently sexing of some individuals is not easy.

Chaetation: Post or situated beyond middle of frons, relatively long, strong, recurved, only a little shorter than vti; ant or placed a short distance (about one-third its own length) before post or, exceptionally short and rather fine, about a little less than one-third length of post or, reclinate, its tip approaching post or quite closely; oc quite long and strong, extending forwards beyond post or; vti subparallel to post or, recurved; vte much more slender than vti and barely half as long; pvt cruciate, situated a short distance below vertex; a single, rather sparse row of postorbital setulae present on occiput; two fine, downwardly-directed bristles near epistome; parafacial setulae very small, only about five on each side. On thorax 1 h, 2 np, ph, 1 sa, 2 pa, all well formed; 0+1 dc, equally



spaced, all strong, anterior pair just behind sutures; prescutellar acr bristles present, rather small; intradorso-central setulae in about eight somewhat indefinite rows; all sc bristles strong, apical pair cruciate; pp weak, absent (perhaps accidentally) in some specimens; 1 mp, 2 st; Fl without av comb; all T with preapical dorsal; T2 with two v spurs, anterior one twice as long as posterior one.

Coloration: Occiput and frons pale yellowish-orange, a subrectangular, silvery-white pruinose patch on occiput above patch of microsetulae over foramen; ocellar tubercle covered by a brownish-black spot which extends backwards up to pvt which it touches on their inner side; antennae dull orange, arista dark brown; lower occiput, parafacials, face, proboscis and palps, rather pale yellowish, face moderately shining; a strip of thin silvery-white pruinescence on parafacial, bordering orbits, widening on upper part of parafacial; some very thin whitish pruinescence on lower occiput and gena. Thorax generally brownish-orange to dull yellowish-orange; mesonotum with two narrow brown vittae on acr bristles and continuing as a slightly broader stripe over scutellum where a very narrow pale streak is enclosed in the midline; these vittae are covered by a thin greyish pruinescence, best apparent in oblique lighting, which forms a fairly extensive prescutellar patch behind middle dc bristles. Legs dull pale yellowish, tarsomeres slightly browned. Abdomen dull brownish-yellow. Halteres pale yellowish.

Wing (fig. 42): Greyish-hyaline with iridescent reflections; venation without special features; anal lobe relatively broad; setulae on costa much longer than black spinules; 4th vein index male 1,8, 1,9, female 1,3, 1,6, 1,8; r-m index male 0,8, 1,0, female 0,9, 0,9, 1,0.

Male genitalia (figs. 89-92): Protandrium a simple, narrow, deeply arched sclerite, irregularly a little broadened at each end where spiracle 7 is situated. Epandrium as figured, narrowed over upper half where depth is much less than at surstylar extension; surstylus unusually positioned, directed almost posteriorly instead of ventrally, also a



little inclined inwards; each surstylus is a rather short blade with a dorsally reflexed tip, tapering moderately from base, and with 10-8 microsetae. Cerci well sclerotised, brown in macerated specimens (in contrast to other sclerites which become very pale), abundantly microsetose. Aedeagal complex as figured; ring sclerite simple, narrow; gonopods quite broad, straight, simple, tapering, blade-like, moderately acute apically, with a small seta on ventral surface; aedeagal apodeme elongate, as long as aedeagus itself, apical bifurcation short.

Female genitalia: Without special features; three subspherical spermathecae.

Wing length: Male 2,6, 2,7 mm; female 3,0 mm (3 specimens).

Material examined: Holotype male, 2 male, 6 female paratopotypes, Nangweshi, Zambesi River, Zambia, 21 July 1952 (Carp Expedition: coll. H.K. Munro); taken by sweeping. Holotype and three paratypes in South African National Insect Collection, Department of Agriculture, Pretoria; remaining paratypes in Natal Museum (No. 1289).

Genus Procestrotus n. gen.

Procestrotus deemingi n. sp.

Diagnostic characters: An almost uniformly greyish species, the only contrasting colour provided by the antennae and the orange crescentic mark on the anterior edge of the frons; wing bicoloured, anterior half brownish, this colour giving way between veins 3 and 4 to a dull greyish; distinguished from other species with homoneuriform costa by the combination of characters summarised in couplets 12-15 of the key.

Female

Head (figs. 19, 20): General shape very like that of many species in the Cestrotus megacephalus group, characterised in particular by the steeply curving, broad frons, the very broad face which is ventrally produced and has a rather nose-like median projection, and the deep genae. Occiput concave, head fitting quite closely against thorax; vertex quite sharp; frons almost in horizontal plane at vertex, but curving over to vertical plane very rapidly, frons anterior

to post or facing forwards or almost so; ocellar tubercle slight, wider at vertex, ocelli in triangle with base slightly shorter than sides; frons parallel-sided, wider than long (14:11) and wider than an eye (14:10); orbital plates diverging anteriorly from orbits only slightly; a slight supra-antennal depression in anterior part of frons. Eye longest in vertical axis (18:8,5), only a little narrowed below; anterior edge of frons at about level of middle of eye. Gena and lateral part of epistome broad, together one-half as high as eye. Face widening strongly away from antennae, with shallow but long subantennal depressions between which is a long, steeply rounded median ridge which increases in height ventrad, its most prominently projecting part just below level of bottom edge of eye. Antennae relatively short, first segment very small, third segment apically rounded and about twice as long as high; both aristae damaged, basal portions with short, rather sparse feathering.

Thorax: Without special features; mesonotum not much arched; scutellum of normal shape, mesonotum  $2\frac{1}{2}x$  as long as scutellum. Legs unremarkable; all F are somewhat flattened on a and p surfaces, but this may be to some degree a postmortem feature.

Abdomen: Slender, tergites 1-7 visible, without noteworthy modifications.

Chaetation: Both orbital bristles and vti about equidistant from one another and in line, ant or slightly inward of post or, both orbitals recurved; vti almost twice length of vte; oc proclinate and diverging; pvt cruciate, directed obliquely backwards; one strong genal bristle; setulae in parafacial row very small; mesonotum with 0+3 dc, equally spaced, anterior pair only a short distance behind sutures; h, ph, 2 sa rather short; 2 pa and all sc quite long and slender; intradorsocentral setulae in six rows; prescutellar acr bristles present; 1 mp, 2 st; Fl with av comb of small, black spines, these rather longer and stronger than usual, this row starting at about middle of femur but not present on narrowed apical portion; all T with d preapical, rather



fine on T3; T2 with only one strong y spur; abdominal chaetation unremarkable; costa homoneuriform, radial veins asetose above.

Coloration: Frons, face and entire thorax more or less uniformly dull ashy grey pruinose, this colour more intense on thorax, in oblique view a tinge of brown from the ground colour becomes perceptible; a narrow, subcrescentic orange mark present on anterior edge of frons above antennae, not extending laterally above parafacials. Antennae dull orange on second segment and basal half of third segment except along upper and lower margins which together with remainder are brownish; arista dark brown. Abdomen dark brown, tergal hind margins very narrowly pale; traces of greyish pruinescence suggest the abdomen may once have been coloured like the thorax; Femora pale yellowish-brown apically, brown elsewhere, with overlying, rather thin, dark greyish pruinescence; all T and tarsi pale yellowish-brown.

Wing (fig. 21): Fairly narrow, length 2,8x greatest width; venation normal;  $R_1$  ending quite close to sc. Membrane strongly smoky brown over about anterior half, this colour replaced between veins 3 and 4 by greyish hyaline, a tinge of brown extending along posterior side of apical half of apical section of vein 4, and also in an indefinite, faint cloud around m crossvein; 4th vein index 2,0, r-m index 1,0.

Female genitalia: Not dissected.

Wing length: 3,2 mm.

Material examined: Holotype female, Cameron Highlands, Pahang, Malaya, 1 525 - 1 830 m. 9 June 1935 (H.M. Pendlebury); ex F.M.S. Museum. In British Museum (N.H.), acc. B.M. 1955-354.

Genus Prosamyza n. gen.

Prosamyza viridiventris n. sp.

Diagnostic characters: A large, stout-bodied lauxaniid with a known wing length in the range 6,5-7,1 mm; readily distinguished from related, still undescribed South African species by the generally darker coloration in dorsal view,

the macroscopically dark bluish appearance of the mesonotum and abdomen, contrasting with the yellowish pleura and middle and hind legs; microscopically the abdomen is uniformly a shining, intense dark green.

Male and female

Head (fig. 44): In general of Sapromyza-like form, relatively small, not wider than thorax; occiput convex, slightly flattened transversely above, vertex rounded; frons sloping forward gradually, its anterior third or a little less transversely a little raised from one side to other and slightly uptilted but downcurved on sides; anterior edge of frons projecting a little, curved laterally; frons about parallel-sided, about  $1\frac{1}{2}$  times (12:17) wider than long and wider than an eye (17:11); ocelli close together on small tubercle, in triangle with sides obviously longer than base, hind ocelli a little forward of vertex and line joining vti; orbital plates quite wide basally, about parallel on inside margins, outer margins diverging from orbits at about level of post or, each plate thus asymmetrically narrowed anteriorly, median frontal stripe of about constant width throughout. First antennal segment short, covered dorsally by projecting anterior edge of frons, its ventral and lateral portions visible; second segment short, a little less than one-third length of apical segment; third segment bluntly suboval, its greatest depth shortly before middle, length : depth about 17:10; arista almost basal, with short, fine hairs; eye slightly higher than long, moderately narrowed below; gena narrow, about one-sixth eye height; parafacial over most of its length on same transverse plane as face, narrowed below; face almost flat, narrowing strongly towards antennae; proboscis stout, ventral sclerite strong and glossy.

Thorax: Relatively large and thick, height of head relative to height of thorax about 18:40; scutellum broader at base than long, relatively short, in relation to mesonotum length about 10:35, legs strong, without noteworthy features.

Abdomen: Male abdomen much inflated, stoutly subovoid in most specimens; tergites 1+2, 3 and 4 very wide, 5 somewhat



well sclerotised and glossy; pleural membrane extremely wide, spiracles quite far removed from tergal margins; sternites 2-5 relatively small, pale after maceration, 2 asetose, 3 with some small setae, 4 and 5 with quite long marginal setae and some small discal setae; sternite 6 strikingly different, strongly sclerotised, dark, distinctively shaped, having a roughly cordiform exposed part which is produced at anterior-end into a rectangular extension which passes through abdominal membrane (at the middle of a transverse fold) and becomes internal for most of its length, overlapping posterior portion of tergite 4 by about half length of rectangular extension. Female abdomen stout, shaped much as in male, unusually modified in that there is a definite preabdomen composed of only tergites 1+2, 3 and 4 (this providing an easy way of separating the sexes, the male having tergites 1+2-6 exposed), tergites 3 and 4 exceptionally long; corresponding sternites much reduced and isolated in broad pleural membrane, 3 and 4 quite widely separated by a membranous area in which are two oval muscle attachment scars; remainder of abdomen forming a discrete postabdomen which is not visible in dorsal view being enclosed above and on sides by tergite 4, and lying in a pocket in pleural membrane, tergites and sternites 5, 6 and 7 forming a series of closely aggregated sclerites which are directed downward in repose.

Chaetation: Orbital bristles relatively small in relation to head and body size, placed quite close together, distance between them about one-half distance between post or and vti; ant or incurved and procurved, just crossing one another, thus diverging from post or which are reclinate and slightly eclinate; some irregularly disposed setulae on orbital plates, mostly between orbital bristles and on outer side of post or; vti is largest of head bristles, its height almost equal to that of eye and much greater than post or; vte also larger than post or; oc about as long as but finer than ant or, suberect and divergent; pvt strong, about equal to post or, cruciate; occiput with three complete series of postorbital setulae and a fourth series (innermost) on lower half only; two strong subgenal bristles; some setulae on and behind



ocellar tubercle. Propleural bristle long and slender; on mesonotum h, ph, 2 np, sa, 2 pa all long; 0+3 dc of which anterior pair are well back from suture and only half as long as second pair; in acr rows about 10 setae, 4+6, the anteriormost not much longer than adjacent setulae, succeeding ones increasing in size gradually before then rapidly after the suture, prescutellar acr are strong bristles; dc rows anterior to bristles occupied by a series of semi-erect setulae; one ia present, rather weak, on line between sa and post dc, also another, even weaker bristle between ia and sa; between acr and dc rows is a row of strong setulae which are longer towards scutellum, hindmost are about half length of prescutellar acr; lateral to dc rows are quite numerous, scattered setulae, also a group on anterior face of humeral callus; inward of ph bristle are two much weaker bristles, the three in a line, sc bristle long, slender, apical pair a little divergent; 2 mp, 2 st, mesopleuron and sternopleuron sparsely setulose; F1 without av comb; all T with d preapical; T2 with one strong v spur; tergites quite thickly setulose, marginal bristles rather small, those on sides stronger. Costa sapromyziform, veins asetose above.

Coloration: Occiput brown, with a yellow tinge variably developed, irregularly blackish-brown over upper part to vertex; frons dark, shining reddish-brown, frontal stripe darker than adjacent orbital plates; ocellar tubercle blackish; frons, except for anterior transverse portion, very thickly yellowish-brown pruinose, this apparent only in very oblique view; lower sides of occiput thinly whitish pruinose; genae brownish; parafacials pale egg-yellow with quite thick silvery pruinescence; face dark, dull brown, a little paler medially; palps and proboscis brownish; antennae dark brown, third segment indefinitely paler basally; arista blackish. Mesonotum largely (bright) reddish brown with strong bluish reflections which, macroscopically seen, tend to hide the underlying colour; anterior declivity, humeral calli and surrounding area, notopleuron and adjacent area up to ph bristle and posteriorly to transverse suture, bright yellow.



scutellum dark brown with strong bluish reflections. Pleura, postscutellum, middle and hind legs concolorous bright yellowish; apical three tarsomeres of aforementioned legs brownish; forelegs dark brownish except yellow coxae and trochanters. Abdominal tergites uniformly glossy bottle-green; hypopygium and retractable tergites of male and postabdomen of female, blackish-brown. Haltere pale yellowish.

Wing: Membrane uniformly pale pruinose, with overlying yellowish tinge which apparently is the colour of the microtrichia; veins uniformly and strongly yellow-brown; black costal spinules strong. Venation without special features;  $R_1$  ending some distance from costa, subcostal cell quite long; its length along costa about two-thirds that of costal cell; apical part of 5th vein ( $M_{3+4}$ ) very short; a little less than half  $m$  crossvein; 4th vein index - male 1,0-1,2 (mean of 10 specimens 1,1); female 1,1-1,3;  $r-m$  index - male 0,9-1,3 (mean of 10 specimens 1,1), female 1,1.

Male genitalia (figs. 93-97): Protandrium heavily . . . sclerotised, being a strong, black ring a little deeper than wide, its posterior edge over upper half bordered by a flange-like strip which narrows strongly on each side and is well sclerotised, glossy and coloured like the preceding tergites; ventrally on posterior-side of ring, protandrium is produced into a downwardly directed, strong, median projection which tapers moderately before ending bluntly and irregularly, this projection passes through abdominal wall membrane near base and thus is almost entirely internal, its shape having some resemblance to the pouring tip of a jug; on upper, anterior edge of protandrium, not median but to right side, is a powerful, elongate subrectangular flange projecting cephalad, passing beneath tergite 6, darkly coloured except for pale apex; seventh spiracle in membrane immediately adjacent to protandrium at its middle.

Epandrium relatively short, much broader than long, dorsally very widely V-shaped, cerci weakly sclerotised, rather small; on each side is a dorsolateral elongate subtriangular flange projecting from rim, that on right side broader than



other, these flanges projecting beneath edge of protandrium. Surstyli (figs. 93, 94) articulated, each surstylus with membranous connection to inner surface of surstyler extension and directed posteroventrally; apical half of ventral edge of surstylus curved inwards through a right angle; each surstylus has a basal extension lying in membrane ventrolateral to cerci, apparently a structural device causing the surstyli to converge in a clasping action when cerci are retracted; in membrane beneath each cercus is an irregular, dark, sclerotised muscle attachment site. Aedeagal complex (figs. 96, 97) highly distinctive; in repose apical part of aedeagus rests in tongue-like ventral extension of protandrium and its surrounding membrane which forms a shallow pouch; ring sclerite broad, produced on each side into a flat, anteriorly directed plate projecting over inner surface of protandrium; gonopods highly modified, each comprising an irregular, broad basal part from which arise three strong, curved spines, i.e. a short spine directed dorsally and two longer ecurved ones, an inner above dorsal edge of aedeagus, and an outer projecting outwards; aedeagus strongly sclerotised, fairly elongate, both portions strongly upcurved at apex; aedeagal and ejaculatory apodemes as figured.

Female genitalia (fig. 98): Sternite 5 dark, in repose largely concealed within pocket of membrane and beneath sternite 4; tergite 5 coloured like preceding ones, strongly arched, enclosing remainder of postabdomen posteriorly and laterally; tergites and sternites 6 and 7 narrow, closely fitting together, enclosing an almost square area, the anterior (morphologically ventral) half of which is covered door-like by a broad, flat sternite 8, other half filled by proctiger and tergite 8 of which only the rim, framing the proctiger, can be seen. Hypandrium with plumose setae. Three subspherical spermathecae present, small relative to size of abdomen.

Variation: Teneral and young specimens have the mesonotal bluish reflections not as strong, and therefore the underlying brown colour is more apparent.



Wing length: Males 6,5-6,8 (mean of 10, 6,6) mm; females 6,5-7,1 (mean of 4, 6.9) mm.

Material studied: Holotype male, 6 female paratopotypes, Indumeni Forest, Cathedral Peak area, Natal Drakensberg, 23 March 1955, 1 January 1954 (B.R. Stuckenberg); 1 male 2 female paratypes, Lions Bush (indigenous forest), near Nottingham Road, Natal, 9 August 1954 (B.R. Stuckenberg); 4 male paratypes, Karkloof, Natal, 1 April 1956, 8 January 1954, 4 September 1960 (B. & P. Stuckenberg); 12 male 1 female paratypes, Cathkin Peak area, Natal Drakensberg, July 1933 (W.M. Marriott), coll. Plant Protection Research Institute, Pretoria, 4 males retained in Natal Museum. Holotype in Natal Museum (No. 1290).

Genus Teratolauxania n. gen.

Teratolauxania cybeplax n. sp.

Diagnostic characters: A distinctive species easily recognised by its unusual head structure, together with the nature of the wing and chaetic characters as described in the key above.

#### Male

Head (figs. 46, 47): Very broad, width : height 5:4, much flattened in longitudinal axis; occiput concave above neck, head fitting closely against thorax, ventral to neck the occiput convex and curving forwards away from thorax; vertex very sharp, frons descending at an extremely steep angle, upper part of head exceptionally shallow; frons concave in profile, at its lower end curving forwards to form a moderate hump projecting a little ahead of eye, orbits diverging a little towards antennae, frons width at midlength nearly half head width (18:40), a little broader than long (18:15), anteriorly curving over to merge with parafacials without any clear division between them apart from change in slope; ocelli small, ocellar tubercle undeveloped, triangle about equilateral, hind ocelli at vertex; orbital plates narrow, converging a little, departing from orbits over almost entire length because of divergence of orbits, plates stopping at about frons midlength; eye very elongate, its major axis steeply



inclined and almost twice (23:13) greatest horizontal diameter; antennae quite widely separated, situated below level of middle of eye, first segment partly overhung by frons, shorter than second segment, third segment fairly narrow, its length nearly twice depth at arista base (75:40), tapering moderately and apically rounded; arista subbasal with fine, small hairs. Face obviously broader than high, transversely concave, with a moderate, rounded, median tumidity on upper section between antennae; epistomal suture deeply impressed, continuous across face, arched, epistome narrow; parafacials broad but short owing to low position of antennae; genae quite deep, together with epistome a little less than one-third (7:23) height of eye. Oral cavity relatively large, but mouthparts small except clypeus which is strongly sclerotised and flattened on anterior face.

Thorax: Mesonotum deeply arched transversely, anteriorly with an extensive, quite abrupt, steep declivity; in lateral view dorsal edge of mesonotum quite strongly curved, continuing into profile of scutellum which is obcordate with lateral margins curving to narrowly rounded tip, disc of scutellum moderately flat; mesonotal length about  $2\frac{1}{2}x$  that of scutellum (37:13). Legs strongly formed, femora especially robust.

Abdomen: About as long as thorax, tergites up to 6 exposed; in dried specimen abdomen flattened dorsally, tergites quite sharply folded under on sides, the lateral area beneath decreasing progressively posteriorly; hypandrial sternite apparently bilobed on posterior margin.

Chaetation: Cephalic bristles small; ant or very small, only about as long as greatest depth of second antennal segment, situated at apex of orbital plates at midlength of frons; post or twice as long as anterior pair but relatively small and weak for so robust a fly; vti and vte close together on vertex edge just in from eye, former inclinate, latter eclinate; pvt slightly smaller than post or, decussate at tips; a single postocular series of setulae present, extending from vertex only to widest part of head, a few scattered setulae inward of this series; lower occiput and genae and parafacial margin with weak, pale, sparse setulae



apart from two strong, downwardly directed eistomal bristles. Mesonotal macrochaetae fairly slender, setulae strong, black and numerous; 1 h, 1 ph, 2 np, 1 sa, 2 pa present, the h long; anterior to sa is a small bristle which could be considered a second sa; dc bristles set far back, anteriormost about in line with ant pa, damaged on right side, on left side there are two of which ant is only half as strong as post, between these a setula comparable in size to neighbouring ordinary setulae and probably not a modified macrochaeta, thus probably 0+2 dc; prescutellar acr bristle present, about as long as post pa; intradorsocentral setulae in about six rows; in each dc row is a line of strong, equally spaced setulae more erect than those adjacent; outside of dc rows there are 3-4 series of setulae, but lateral declivities free of setulae. Mesopleuron with one long hind marginal mp and some small, pale setulae; pp present, 2 st; all sc bristles subequal, apical pair subparallel; T3 without d preapical and with a small v spur, other T with d preapical, T2 with strong v spur; F1 without av comb of small spines. Tergal marginal bristles weak over broad, flattened part of abdomen but longer and stronger on sides and undercurved parts.

Coloration: Head bright, glossy, slightly brownish yellow, except for a reddish-brown midline streak down entire length of frons, this streak widening at upper end to width between hind ocelli against which it terminates, at lower end tapering to a point, and except for a large, conspicuous, velvety-black spot present on lower part of parafacial, adjacent to orbit; clypeus pale brownish; antennae orange, arista dark brown. Thorax glossy reddish-orange with tinge of yellow irregularly distributed; mesonotum with two bold, rather narrow black vittae roughly in line with acr bristles, starting on anterior declivous face and fading out quite abruptly at about three-quarters of mesonotum length, widest just anterior to transverse sutures where they span about three setula rows. Legs and abdomen slightly brownish yellow, glossy, F1 brown over apical fifth, all T blackish-brown over short distance at apex; dorsum of abdomen with some irregular pale brown marks, probably due to postmortem



Wing (fig. 50): Both wings folded down so that they are appressed against the broad, flat abdomen, each wing being flexed near the base in a line running from apex of anal cell (where there is a clear patch in adjacent membrane) across distal end of second basal cell, median vein with a narrow break just before its fork into  $M_{1+2}$  and  $M_{3+4}$ , a small, clear area in membrane at this point, flexure continuing across first basal cell to vein  $R_s$  which is narrowly broken just basal of its fork, the basal part of fork swollen and conspicuously thicker than  $R_s$  itself, thereafter the flexure changing direction, very obliquely extending across  $R_1$  at about its midpoint where there is a weakness marked by a minute clear spot in adjacent membrane, then continuing along outer side of upcurved apical part of  $Sc$ . Wing broad, length : breadth about 2:1 (36:17), apex broadly rounded, anal lobe deep; venation with some unusual features,  $R_1$  extending obliquely to costa and almost straight, only slightly arched, subcostal cell one-quarter as long as costal cell;  $R_{2+3}$  strongly arched forwards, its basal section almost parallel to  $R_1$  thereafter subparallel to  $Sc$ , marginal cell much narrower than submarginal cell which is broadest opposite r-m; first posterior cell slightly narrowed apically,  $m$  crossvein slightly curved owing to a flexure trough in membrane running whole length of discal cell, microtrichia reduced in this trough; veins A and 2A approaching one another closely. Wing patterned as in figure, dark smoky brown along leading edge, an elongate yellowish streak in centre of costal cell; vein  $R_{2+3}$  bordered with very narrow pale strips; in submarginal cell an elongate longitudinal pale streak which ends abruptly before costa, anterior to this streak the membrane smoky brown, posterior to it palely fumose as is remainder of wing, proximal to basal flexure line the membrane is brownish; two irregular clear patches present, one in base of marginal cell, other in base of subcostal cell. Veins brownish, both anal veins pale.

Female genitalia: Unique holotype not dissected.

Wing length: 3,6 mm.



Material examined: Holotype female, Pretoria, South Africa, September 1948 (H.K. Munro); in the South African National Insect Collection, Department of Agriculture, Pretoria.

Genus Zanjensiella n. gen.

The type-species argentifrons, and another new species canifrons, both from Madagascar, are described below.

Zanjensiella argentifrons n. sp.

Diagnostic characters: Easily recognised by the generic characters, the form of the face being unmistakable; separated from canifrons by the silvery-pruinose frons, more extensive ventro-lateral portions of the face, and relatively narrower silvery middle portion of the face which tapers over its apical half but only slightly so, and has a somewhat truncated apex in anterior view; also the less extensive but more intense sepia mesonotal patch and bordering silvery-grey, the position of the ant or at about midlength of frons, the different form of the gonopods, and relatively much larger and differently shaped aedeagal apodeme; only male sex known, this with a known wing length range of 3,2-3,6 mm.

Males

Head: Shaped as in figs. 26, 27, eye obviously longest in vertical axis, height about  $1\frac{1}{2}x$  greatest horizontal diameter which is about at upper one-third of height; in lateral view eye appearing somewhat narrowed below; occiput moderately convex below middle of eye level, above this slightly concave; vertex quite sharp; frons curving strongly forwards as in fig. 26, parallel-sided, almost as long as wide (about 15:18); ocelli in triangle with sides longer than base, hind ocelli at vertex edge; orbital plates very narrow, separated from orbit by about their own width and about parallel with them, stopping anteriorly only a very little anterior to midlength of frons; parafacials rather narrow, not much narrower beneath eye than elsewhere; face clearly in three portions - a middle portion occupying entire length, convexly elevated, at lower end projecting beyond epistomal margin as a bluntly rounded lobe, in lateral view forming a



in lateral view over its entire length, widest at point where it meets parafacial edge (which is at about half its length), below this level narrowing gradually apicad - and two ventro-lateral portions, one on each side, subtriangular, bounded by epistome below, laterally by curving parafacial margin. Antennae short; first segment narrow, short, largely hidden, with some dorsal setulae; second segment short, much higher than long; third segment height at base about 70% of length, bluntly rounded, upper edge almost straight, lower edge moderately curved; arista subbasal, with long feathering, upper hairs longer than those in lower series. Proboscis fairly slender, mentum somewhat elongate; palpi unremarkable.

Thorax: Deep, mesonotum in lateral view appearing quite strongly arched, anteriorly curving over strongly to a fairly long steeply declivous part; scutellum about one-third mesonotal length, rather flattened, shallowly rounded between apical sc bristles. Legs unremarkable.

Abdomen: Fairly slender, about as long as, or slightly shorter than, thorax; genitalia small.

Chaetation: Both pairs or recurved, ant or about midway between anterior ocellus and anterior edge of frons, relatively somewhat short; oc porrect, quite elongate, longer than post or; pvt rather small, a short distance below hind ocelli; vte elongate, clearly much longer than other head bristles, vte only half as long; a distinct postocular series of small bristles present from vertex to beginning of parafacial, terminating in a genal bristle slightly stronger than preceding one; on upper half of occiput a second postocular series present inward of first series, its bristles weaker and inclined inwards (in opposite inclination to adjacent bristles of outer series); ventro-lateral parts of occiput with scattered bristles of which two near buccal margin are longer and stronger; setulae in parafacial series fairly long, 6-8 in number. Second antennal segment with erect dorsal bristle and some procurved ventral bristles reaching beyond midlength of third segment. Thoracic bristles generally long and slender; h, ph and ant



np of about equal size, post np shorter, sa very long, both pa and all sc long, ia absent, 0+3 dc of which anterior pair just behind sutures, weak pair prescutellar acr, intradorso-central setulae in 8-9 rows; mp long 2 st, mesopleuron setulose, pp slender. All T with d preapical; T2 without differentiated p bristles; F2 with series of 5-6 ant bristles on apical half; F1 with av comb of fine black setulae on apical third. Radial veins asetose above; costa homoneuriform.

Coloration: Occiput largely densely pale greyish pruinose, shading to an admixture of pale brownish in asetose area, in places irregularly yellow-tinged, a non-pruinose rectangular brown patch above foramen; frons, except along orbits, uniformly covered with dense, shining, silvery-grey pruinescence, slightly yellow-tinged at anterior edge of frons, this best viewed frontally, in postero-dorsal view the silvery sheen disappearing and an underlying pattern visible comprising a tawny yellow patch across anterior quarter of frons, remainder of interfrontal area seal-brown, ocellar tubercle and narrow surrounding area ashy-grey; parafacials a curious dark egg-yellow, this colour extending inward at upper end of parafacial into a small subtriangular projection, and continuing along orbit in a strip of narrow but almost constant width almost to vertex, passing between orbital plates and orbits; antennae pale yellowish with thin whitish dusting, third segment weakly infuscated apically and along lower margin, arista blackish; middle section of face pale whitish-yellow densely covered with shining silvery sericeous tomentum, this best seen in antero-frontal view; ventro-lateral portions of face and adjoining parts of epistome shining brownish; clypeus brownish, palps and proboscis yellowish-brown. Mesonotum boldly though simply patterned in dense pruinescence, this best seen in antero-dorsal lighting, there being a large median patch of uniform sepia brown quite sharply defined, starting anteriorly just behind beginning of declivity, extending backwards to scutellum, laterally a little way outside dc lines, with constrictions where upper ends of transverse sutures enter and midway between 2 dc and 3 dc, broadening laterally to



end against margin of postalar callus; this sepia patch bordered laterally and anteriorly by silvery ash-grey; humeral callus, notopleural lobe and small area around transverse suture pale dull yellowish; anterior declivity of mesonotum apruinose in a large, irregular, shining brown area. Scutellum about concolorous with mesonotum, disc largely darkish sepia, dark grey borders confined to lateral declivous parts. Pleura mostly pale yellowish with indefinite brownish tinge irregularly distributed, and very thin silvery pruinescence. Legs pale yellowish, slightly more intense on tarsi. Abdomen dark brownish, hind tergal margins very narrowly paler, all tergites brownish pollinose.

Wing (fig. 54): Uniformly hyaline with coloured reflections, veins pale yellowish-brown, black costal spinules providing only contrasting colour; venation normal, 4th vein index 1,7-1,9, r-m index 0,82-1,02, in three of four specimens r-m beyond middle of discal cell.

Male genitalia (figs. 76-78): Sixth tergite and sternite unmodified and in preabdomen; protandrium incomplete, only dorsal half present, roughly semicircular, essentially a thin arch along anterior margin of tergal area, bordered by a much wider, finely setulose strip which might be very weakly sclerotised, seventh spiracle enclosed within each end of arc; epandrium as in fig. 76, roughly V-shaped, cerci protruding prominently; surstylar extension curved as shown, its ventral edge produced into a short, subtriangular, asetose lobe; surstylus an elongate, curved, finger-like, finely setose organ, arising from elongate subtriangular flange on inner surface of surstylar extension, projecting about half its length; aedeagal complex as in fig. 78, aedeagus in form of flattened clog, weakly sclerotised, with a slight median ridge over apical half forming a small apical point; gonopods simple, flattened arms, irregularly a little tapered over apical third, apex blunt; ring sclerite simple, a narrow band only a little curved, aedeagal apodeme as figured, strongly formed, only a little shorter than aedeagus, arms much shorter than stem; ejaculatory apodeme a short, irregular rod with several minute, highly refractile projections on distal end.



Wing length: 3,2-3,6 mm.

Material studied: Holotype male, 3 male paratopotypes, Montagne d'Ambre, Diego-Suarez District, northern Madagascar; one paratopotype collected 21 May 1958 (F. Keiser), others collected at 1 000 m, 23 November 1957 (B.R. Stuckenberg). Holotype in Paris Museum, other specimens in Natal (No. 1292) and Basle Museums.

Notes: Probably confined to the upper parts of the forest-capped, isolated, volcanic d'Ambre massif which, though not older than pliocene, is an obvious and well-known endem-centre for the Malgache forest fauna (see discussion by Paulian, 1961, pp. 321-2).

Zanjensiella canifrons n. sp.

Diagnostic characters: Very similar to argentifrons but readily distinguished by the greyish-pruinose frons, smaller ventro-lateral portions of the face, relatively much wider silvery middle portion of face which moreover tapers over its apical two-fifths and is apically broadly V-shaped in anterior view, also the more extensively brownish and less definitely patterned mesonotum, more anterior position of ant or, and relatively smaller and differently shaped aedeagal apodeme. Only the features in which these species differ are described below.

Males

Head (fig. 28): Middle portion of face, that part covered with dense silvery pruinescence, relatively broader, bordering parafacials for about three-fifths of total length of face, from parafacial margin converging quite strongly towards apex of projecting apical lobe which is broadly V-shaped, its tip somewhat rounded; height of ventro-lateral portion about equal to length of projecting apex of middle portion and only about one-third of distance from highest point it reaches on parafacial margin to top of parafacial (in argentifrons it is two-thirds of that distance and more than twice length of projecting apical lobe, of middle portion of face). Epistome pale yellowish. Ant or situated at two-thirds distance from anterior ocellus to anterior margin of frons; vte relatively stronger, a little longer

than half vti. Frons thinly greyish pruinose, indefinitely dull yellowish in a supra-antennal patch and median line, pruinescence almost reaching orbits, very narrowly separated by rather indefinite pale line; upper part of parafacial finely silvery pruinose. Four setulae in parafacial row.

Thorax: Mesonotum more extensively but less intensively sepia brown, less definitely patterned, median brown area occupying a greater part of surface and not sharply demarcated laterally, extending about to level of ph and sa bristles, upper part of anterior declivity and supra-alar declivity greyish pruinose; humeral callus, notopleural callus and area between this and ph bristle, dull pale yellowish.

Wing: 4th vein index 1,9 and 2,1; r-m index 0,89 and 0,91, r-m thus beyond middle of discal cell.

Male genitalia: Protandrium as in argentifrons, epandrium also very similar, projecting lobe on lower corner of surstylar extension not as prominent; aedeagal complex as in fig. 79, differing from that of argentifrons mainly in form of gonopods which are relatively broader and quite abruptly narrowed apicad through angle in inner margin, and in form of aedeagal apodeme which is much more slender, much shorter than aedeagus, and has arms almost equal to length of stem; ejaculatory apodeme of similar form, but very small.

Variation: A specimen from Ranomafana differs in some respects from the two described above; frons with denser, more silvery-grey pruinescence, indefinite yellowish anterior part smaller and very pale; pruinescence not reaching orbits, separated by a narrow strip of dull pale orange; lobe terminating lower end of middle part of face short, broadly rounded, hardly projecting, not concealing clypeus; lateral declivous parts of mesonotum pale whitish-grey pruinose, a similar colour dusted over pleura. 4th vein index 2,0, r-m index 0,90. Aedeagus as in fig. 80.

Wing length: 3,3 and 3,5 mm; Ranomafana specimen 3,7 mm.

Material studies: Holotype male, paratopotype male,



Ambohitantely Forest, Ankazobe District, central Madagascar, 1 600 m, 6 January 1958 (B.R. Stuckenberg); 1 male, Ranomafana, eastern Madagascar, 28 July 1958 (F. Keiser), in Basle Museum. Holotype in Paris Museum.

Notes: The type locality is a relic patch of upper montane forest situated at  $18^{\circ} 10' S$ ,  $47^{\circ} 17' E$ , on an undulant high plain. Ranomafana is a village in hilly country below 300 m, 30 km west of Andavoranto on the east coast, and about 200 km from the type locality. The specimen from Ranomafana I consider to be conspecific on account of its agreement in the form of the aedeagal apodeme; it may represent a subspecies, but it is impossible to be certain about this because the country between the two localities is forested in many places and populations with intermediate features might exist.

A REVIEW OF THE DEVELOPMENT OF LAUXANIID  
GENERIC CLASSIFICATION

The first notable review of lauxaniid genera was given by Westwood (1840) (quoted by Hendel, 1908); seven genera were listed of which however only five contain Lauxaniidae as currently understood. Becker (1895) presented a careful, original and thorough discussion of the generic classification, particularly in relation to the European fauna, in which extensive use was made for the first time of chaetic characters on an organised basis. He recognised 10 genera, five of which contained mostly Palaearctic species (Sapromyza, Lauxania, Pachycerina, Paroecus and Prosopomyia), one was African (Cestrotus), one Oriental (Drepanephora), and two Neotropical (Griphoneura and Physogenua, sic = Physegenua). In Sapromyza he included species later to be segregated in Minettia and Lyciella. In addition, Becker listed Xangelina (based on an Oriental species) as a doubtful lauxaniid genus, along with five other genera which have since been rejected as Lauxaniidae. Thus 11 genera were known by that time; to this number could be added Cephaloconus and Amblada, not then recognised as members of the family.

The first synoptic contribution to the taxonomy of the Lauxaniidae was that of Hendel (1908) whose volume in the Genera Insectorum series summarised what was known to that date, has admirable illustrations and provided a sound basis for future work. Hendel listed 474 species; if the first described lauxaniid species is accepted as being Musca flava Linn. (1758), this total was achieved in 150 years. He recognised 22 genera and six subgenera, one of the latter being Sapromyza (which Hendel ranked as a subgenus of Lauxania) with no less than 341 species or 72% of the total. Exactly half of the 22 genera were monotypic. Adding names retrieved from synonymy and genera transferred from other families, I arrive at a total of 35 generic and subgeneric names out of all those listed by Hendel, which are currently recognised.

The next major contribution to the generic classification of



was again by Hendel (1925) who published a key to all the known genera, in which he included 18 new ones. In that work he recognised 74 genera. Since then no synoptic study of the genera has been published though their number has increased considerably. Excluding the fossil genera Chamaelauxania and Hemilauxania of the Baltic Amber fauna, described by Hennig (1965), the total number currently standing in the literature I count as 111, with 21 described subgenera. Numerical growth of the genera can be summarised as follows and is illustrated graphically in fig. 8.

|            |               |        |
|------------|---------------|--------|
| 1 genus    | - Latreille   | - 1804 |
| 5 genera   | - Westwood    | - 1840 |
| 11 genera  | - Becker      | - 1895 |
| 35 genera  | - Hendel      | - 1908 |
| 74 genera  | - Hendel      | - 1925 |
| 111 genera | - this review | - 1969 |

The graph illustrating this table has some interesting features. The steep, almost linear and quite sudden rise in the line from the closing years of the last century to the period just prior to the second world war is noteworthy, as is the abrupt decline thereafter. Only four genera, Haakonia, Holopticer, Peplominettia and Spathecerus, have been described since 1940.

In the present study 13 new genera are erected, three genera are placed in synonymy, four subgenera are given generic status, and one genus is transferred from Heleomyzidae, a net increase of 15 genera, giving a total of 126 genera recognised without any revision of the Neotropical ones. Fig. 8 suggests the form of a rough sigmoid curve likely to level out between 140 and 160 genera.

On fig. 8 I have given the names of four workers who made especially significant contributions to lauxaniid generic taxonomy, and have indicated the span of time in which each accomplished this. Kertész, starting in 1899, described seven genera; his descriptions are excellent, with few but pertinent and well-executed illustrations. Frey's main contribution was made in 1927 when he described six new Philippine genera; earlier (1918) he had described two genera in the Neotropical and Nearctic faunas. Unfortunately

his work is seldom illustrated.

In 1907 Hendel published the first of his many papers on Lauxaniidae, containing descriptions of nine new genera. From then until his last new genus was named in 1938, he made known a total of 38 genera and four subgenera, more than any other worker on the family. Employed at the Vienna Museum where he amassed a vast collection of Diptera, he was one of the leading specialists on the order and particularly on the Acalyptrates. Like most entomologists of his generation, his work with small insects was hampered to a certain extent by the inadequate optical equipment available at the time. In checking his type specimens with his descriptions I occasionally found errors, mostly minor, which apparently were the result of deficiencies in the resolving or magnifying powers of his microscopes.

Working contemporaneously with Hendel was Malloch. In a much shorter period, 1923-35, he described no less than 30 genera (excluding two he named in co-authorship with Tonnoir) and 15 subgenera, as well as very many new species. He made pioneering contributions to the classification of the Lauxaniidae of many parts of the world, his 1929 paper on the Philippine fauna being a milestone in the study of Oriental Lauxaniidae in general, and he did most of the basic work available for the Australian fauna. Malloch's production of papers on Diptera during the 1920s and 1930s was prodigious, and it is hardly surprising that work done with such rapidity (as it must have been) is not always without unsatisfactory features or free of error. A mistake he made curiously often, considering the importance of the character, was describing a homoneuriform costa as sapromyziform.



## THE REGIONAL DISTRIBUTION OF LAUXANIIDAE

The regional distribution of lauxaniid genera

Although the use of conventional zoogeographic regions to outline the distribution of lauxaniid genera is not entirely satisfactory, there is a sufficiently large measure of agreement between the overall distribution of genera and the limits of these regions to obtain by their use a meaningful idea of the geography of diversification at the generic level. Fig. 9 shows diagrammatically the number of genera recorded in each of the regions and the extent to which there is overlap between adjacent regions.

In some regions genera have been recorded on the basis of species which future study is likely to show to be not congeneric with the extralimital type-species. It is usually genera with Palaearctic type-species that are involved, notably Sapromyza, Minettia and Lauxania and perhaps Trigonometopus, which appear to be widely distributed because they are broadly or vaguely defined and have been the 'dumps' of the family in which species of doubtful and indeterminate affinity have accumulated. Where there is such doubt, the names of the genera concerned have been put in inverted commas in the lists given below. A few genera, such as Homoneura, Pachycerina, Trypaneoides and Drepanophora, being clearly defined, can accurately be described as widespread.

The Oriental Region: The following 36 genera are known to occur here -

|                       |                          |                         |
|-----------------------|--------------------------|-------------------------|
| <u>Caenionsis</u>     | <u>Homoneura</u>         | <u>Parapachycerina</u>  |
| <u>Calliclypeus</u>   | <u>Kerteszmomyia</u>     | <u>Phobeticomyia</u>    |
| <u>Cerataulina</u>    | <u>Lauxaniella</u>       | <u>Fleurigona</u>       |
| <u>Cestrotus</u>      | <u>Lyperomyia</u>        | <u>Poichilus</u>        |
| <u>Chaetolauxania</u> | <u>Maquilingia</u>       | <u>Procestrotus</u>     |
| <u>Dioides</u>        | <u>Melanopachycerina</u> | <u>Prosopophorella</u>  |
| <u>Diplochasma</u>    | <u>Melinomyia</u>        | <u>'Sapromyza'</u>      |
| <u>Euprosopomyia</u>  | <u>Noeetomima</u>        | <u>Steganopsis</u>      |
| <u>Griphominettia</u> | <u>Noonamyia</u>         | <u>'Trigonometopus'</u> |
| <u>Hendelimyza</u>    | <u>Pachycerina</u>       | <u>Trypaneoides</u>     |
| <u>Himantopyga</u>    | <u>Panurgopsis</u>       | <u>Xangelina</u>        |

Ten of these genera are homoneuriform, the largest number known in any region. Interestingly, generic diversity apparently is not as great on the Oriental mainland as it is in the fringing and more distant archipelagoes such as the Philippines and Indonesia. Intergrading with adjacent faunas is relatively limited; nine of the genera also occur or are recorded in the Australasian Region -

|                      |                    |                       |
|----------------------|--------------------|-----------------------|
| <u>Drepanephora</u>  | <u>Noeetomima</u>  | <u>Steganopsis</u>    |
| <u>Homoneura</u>     | <u>Pachycerina</u> | <u>Trigonometopus</u> |
| <u>Kerteszmomyia</u> | <u>Panurgopsis</u> | <u>Trypaneoides</u>   |

and seven in the Palaearctic Region, but nearly all of these are widespread genera -

|                   |                    |                       |
|-------------------|--------------------|-----------------------|
| <u>Homoneura</u>  | <u>Pachycerina</u> | <u>Sciasmomyia</u>    |
| <u>Minettia</u>   | <u>Sapromyza</u>   | <u>Trigonometopus</u> |
| <u>Noeetomima</u> |                    |                       |

There is also intergrading with the Ethiopian Region (see below).

The Australasian Region: The following 33 genera are recorded, of which six are homoneuriform -

|                       |                          |                          |
|-----------------------|--------------------------|--------------------------|
| <u>Amblada</u>        | <u>Holopticander</u>     | <u>Panurgopsis</u>       |
| <u>Australinina</u>   | <u>Homoneura</u>         | <u>Paranomima</u>        |
| <u>Austrolauxania</u> | <u>Incurviseta</u>       | <u>Poecilohetaerella</u> |
| <u>Cephaloconus</u>   | <u>Kertesziella</u>      | <u>Poecilohetaerus</u>   |
| <u>Cerataulina</u>    | <u>Kerteszmomyia</u>     | <u>Rhagadolyra</u>       |
| <u>Ceratolauxania</u> | <u>Melanina</u>          | <u>'Sapromyza'</u>       |
| <u>Chaetolauxania</u> | <u>Mettinia</u>          | <u>Steganopsis</u>       |
| <u>Depressa</u>       | <u>Monocera</u>          | <u>Teratocranum</u>      |
| <u>Dioides</u>        | <u>Neotrigonometopus</u> | <u>Trigonometopsis</u>   |
| <u>Drepanephora</u>   | <u>Noeetomima</u>        | <u>'Trigonometopus'</u>  |
| <u>Eucyclosis</u>     | <u>Pachycerina</u>       | <u>Trypaneoides</u>      |

There are still a number of genera awaiting description. The fauna divides roughly into a northern component characteristic of the New Guinea Subregion, and a highly distinctive southerly one in Australia proper, Tasmania and New Zealand, with some intermixing of the two in tropical Australia. This region intergrades truly only with the Oriental Region, those genera shared with other regions being widespread ones or recorded on the basis of species of doubtful generic location.



Oceanic Genera: Three genera are included in this category, Arnomyia, Chilocryptus and Prochaetopsis. The first, a homoneuriform one, is in the Society Islands and may have affinities with the Australasian fauna; the other two genera are endemic to the Marquesas Islands and are of unknown affinity.

The Ethiopian Region: At present the following 19 genera are known, five of which are homoneuriform -

|                       |                          |                       |
|-----------------------|--------------------------|-----------------------|
| <u>Afrominettia</u>   | <u>Katalauxania</u>      | <u>Prosamyza</u>      |
| <u>Cainohomoneura</u> | * <u>Homoneura</u>       | ' <u>Sapromyza</u> '  |
| ' <u>Calliopum</u> '  | ' <u>Lauxania</u> '      | <u>Spathocerus</u>    |
| * <u>Cestrotus</u>    | *' <u>Minettia</u> '     | <u>Teratolauxania</u> |
| * <u>Diplochasma</u>  | * <u>Pachycerina</u>     | * <u>Trypaneoides</u> |
| * <u>Drepanephora</u> | * <u>Parapachycerina</u> | * <u>Xangelina</u>    |
| <u>Dyticomyia</u>     |                          |                       |

Nine of these (marked\*) occur also in the Oriental Region. Six genera are shared with the Palaearctic Region, Homoneura, Pachycerina, 'Minettia', 'Lauxania', 'Calliopum' and 'Sapromyza'. Homoneuriform forms, though much in a minority generically, are in numbers of species a major component of this fauna, with Homoneura strongly represented and Cestrotus (+ Turriger) a very characteristic element. However, the fauna, with only about 70 species described, is hardly known (I have about 30 new species of Cestrotus alone), and a number of genera await description. I have erected here a few so obviously distinct as not to require detailed comparison with other genera. There are many species which will key out with varying degrees of certainty at Lauxania, Calliopum, Mycterella, Sapromyza, Minettia and Lyciella, and many of the described species are located in Lauxania, but careful studies will be necessary before a decision can be taken on whether these essentially boreal groups really are represented in Subsaharan Africa.

The Madagascar Region: It is surprising that not a single species of Lauxaniidae has been recorded from Madagascar. Bigot (1860) described and assigned to the family an endemic Malgache genus and species, Lauxanacanthis barbipes, but this obviously is no lauxaniid and the genus has been



declared a synonym of Anaphalantus in the Muscidae by Malloch (1924: 274). I have accumulated by collecting and borrowing at least 80 Madagascar species. Most of them are endemic to the island and therefore undescribed. Three new endemic genera are described in this study, and I have identified several other genera, giving the following list of 10 names -

|                     |                         |                        |
|---------------------|-------------------------|------------------------|
| <u>Cestrotus</u>    | <u>Micropachycerina</u> | <u>Parapachycerina</u> |
| <u>Diplochasma</u>  | <u>Nimettia</u>         | <u>Xangelina</u>       |
| <u>Homoneura</u>    | <u>Panurgopsis</u>      | <u>Zanjensiella</u>    |
| <u>Kerteszomyia</u> |                         |                        |

Three of the genera are homoneuriform.

There are quite a few Madagascar species which trace in the key to Lyciella, Sapromyza and Minettia; these must be studied in detail and are likely to require at least a few new genera. A striking feature of this fauna, in keeping with the largely forested nature of the island, is the dominance of the genus Homoneura which is represented on one hand by a number of slender, dull brownish species of a group also common in Subsaharan Africa, and on the other by a lot of brightly coloured and patterned, handsome, sometimes large species which have no African equivalents. A curious feature is the presence of only one typical Cestrotus species but a number of Turriger-like ones. Of the genera listed, five occur also in Subsaharan Africa and seven (all except the endemic three) are shared with the Oriental Region.

The Palaearctic Region: The following 20 genera, of which only two are homoneuriform, are known in this region -

|                       |                      |                          |
|-----------------------|----------------------|--------------------------|
| <u>Aulogastromyia</u> | * <u>Minettia</u>    | <u>Prosopomyia</u>       |
| * <u>Calliopum</u>    | <u>Mycterella</u>    | <u>Protrigonometopus</u> |
| <u>Gnemacantha</u>    | <u>Noeetomima</u>    | * <u>Sapromyza</u>       |
| <u>Eusapromyza</u>    | * <u>Pachycerina</u> | <u>Sciasmomyia</u>       |
| * <u>Homoneura</u>    | <u>Paroecus</u>      | <u>Tricholauxania</u>    |
| * <u>Lauxania</u>     | <u>Peplominettia</u> | * <u>Trigonometopus</u>  |
| * <u>Lyciella</u>     | <u>Peplomyza</u>     |                          |

The fauna is characterised by a large group of species rather arbitrarily divided into the genera Sapromyza, Lyciella, Tricholauxania, Eusapromyza, Aulogastromyia,



Paroecus and Calliopum. Eight of the genera (marked\*) also occur in the Nearctic Region. Species described in Sapromyza, Lauxania, Trigonometopus and Minettia have been recorded in nearly all the other regions, but it remains to be confirmed that these genera do occur there. Typical species of Minettia occur in the Oriental Region where the genera Sciasmomyia and Noeetomima also occur. African species have been placed in Calliopum.

The Nearctic Region: The recently published catalogue of Shewell (1965) facilitates a review of this fauna. There are 23 genera, only two homoneuriform -

|                           |                            |                        |
|---------------------------|----------------------------|------------------------|
| <u>Calliopum</u>          | <u>Neodeceia</u>           | <u>Sapromyza</u>       |
| * <u>Camptoprosopella</u> | * <u>Neogriphoneura</u>    | <u>Steganolauxania</u> |
| * <u>Deutominettia</u>    | <u>Pachycerina</u>         | <u>Trigonometopus</u>  |
| <u>Homoneura</u>          | * <u>Physegenhua</u>       | <u>Trivialia</u>       |
| <u>Lauxania</u>           | * <u>Physoclypeus</u>      | * <u>Trypetisoma</u>   |
| <u>Lauxaniella</u>        | * <u>Poecilominettia</u>   | * <u>Xenochaetina</u>  |
| <u>Lyciella</u>           | * <u>Pseudocalliope</u>    | <u>Xenopterella</u>    |
| <u>Minettia</u>           | * <u>Pseudogriphoneura</u> |                        |

Overlap with the Palaearctic Region is described above. There are four endemic genera, Neodeceia, Trivialia, Steganolauxania and Xenopterella. No less than 10 genera (marked\*) are shared with the Neotropical Region. One genus, Lauxaniella, predominantly Nearctic but shared with the Neotropical Region, occurs also in the Philippines. The genera Minettia, Sapromyza, Pachycerina and Trigonometopus, apart from their recorded range in the Old World, also are recorded from the Neotropical Region but Pachycerina seems the only one reasonably established as occurring there.

The Neotropical Region: With 46 recorded genera this region has the greatest generic diversity. Of that total 32 genera are strictly Neotropical, 10 (as indicated above) are shared with the Nearctic Region, and four (Minettia, Sapromyza, Pachycerina and Trigonometopus) are widespread. The most notable feature of this vast, extensively tropical region is the absence of homoneuriform taxa other than some minute species of Trypetisoma. As I explain elsewhere, that genus contains both homoneuriform and sapromyziform species, and is very closely related to Trypaneoides, a homoneuriform

genus occurring throughout the Old World except in the Palaearctic Region.

The 32 strictly Neotropical genera are the following -

Agriphoneura Hendel (1925)

Allogriphoneura Hendel (1925)

Allominettia Hendel (1925)

syn. Chaetominettia Malloch (1926a)

syn. Tibiominettia Hendel (1932)

Asilostoma Hendel (1925)

Blepharolauxania Hendel (1925)

Celypholauxania Hendel (1914)

Cephalella Malloch (1926a)

Chaetocoelia Giglio-Tos (1893)

Dryomyzoides Malloch (1926a)

Dryomyzotha Hendel (1925)

Dryosapromyza Hendel (1933)

Eriurgus Hendel (1925)

Freyia Malloch (1928)

Griphoneura Schiner (1868)

Haakonia Curran (1942)

Hypagoga Hendel (1907)

Lauxanostegana Malloch (1933)

Neominettia Hendel (1925)

syn. Calominettia Frey (1927) (see Setulina)

syn. Neominettia Malloch (1926a) neg Hendel (1925)

Neopachycerina Malloch (1933)

Ocellominettia Hendel (1933)

Paracetrotus Hendel (1925)

Platygraphium Hendel (1925)

Procrita Hendel (1908)

Rhabdolauxania Hendel (1925)

Ritaewia Frey (1918)

Sciosapromyza Hendel (1933)

Scutolauxania Hendel (1925)

Scutominettia Hendel (1932)

Setulina Malloch (1926a)

syn. Zeugominettia Hendel (1932)

Calominettia Frey (1927) was placed in synonymy by Malloch (1941) but Hendel (1932) had already made it a synonym of Neominettia.



Siphonophysa Hendel (1907)

Stenolauxania Malloch (1926a)

Triconopsis Hendel (1914)

Summary of regional lauxaniid faunas

There appear to be three main assemblages of lauxaniid genera:

1. The genera of the Old World tropics and areas peripheral thereto, i.e. those of the Oriental, Australasian, Ethiopian and Madagascar Regions. The archipelagic Oriental, Wallacean and New Guinea subregions collectively form a significant centre of evolutionary activity in the family. This assemblage is particularly characterised by the radiation of homoneuriform groups. There are two important peripheral subsidiary assemblages, those of the southern, partly warm-temperate to temperate areas of Australia and Africa.

In Australasia the lauxaniid fauna divides into a truly Australian component (including the species of Tasmania and New Zealand), and a northern component ranging over the islands of the New Guinea Subregion and merging to a certain extent with the Oriental lauxaniid fauna in the islands of Wallacea. The Australian component has a number of peculiar genera of unknown or doubtful affinity. It also has a large group of endemic species placed by Malloch, who described most of them, in Sapromyza; this group can be divided roughly into several clusters of species all of which require a ranking outside the genus Sapromyza. In view of the many known examples of sister-group relationships between Australian and temperate Neotropical Diptera, it is tempting to look to southern South America for lauxaniids kindred to these peculiar Australian ones. Such a relationship was claimed for various Acalyptrate families by Malloch (1933a: e.g. 179), and he writes (op. cit.: 360), 'It is also of interest to note the occurrence in this collection [of lauxaniids] of species in which there is a very strong superficial resemblance to certain Australian species.' However, I have been able to study nearly all the described Australasian genera and many of the species and compare them



with the Lauxaniidae of Patagonia and Chile described by Malloch; I could find no evidence of close interregional relationship. This is curious; if groups of Diptera common to these two regions became so as a result of dispersal around the Antarctic continent in climatically more equable times, why was there no exchange of Lauxaniidae? The family is a relatively plesiomorphic one in the Acalyptrata, the main families of which were in existence as long ago as early Tertiary Baltic Amber times (Hennig, 1965). At the moment the only suggestion I can make, an unsatisfactory one, is that there may not have been enough exchange of suitable host plants to make a significant movement of presumably predominantly phytophagous Lauxaniidae possible.

The other subsidiary assemblage, a smaller and less conspicuous one than the Australian, is found in South Africa where there is a considerable variety of species mostly undescribed and not fitting into established genera, usually occurring in relatively cool, humid, montane areas, especially escarpment forest and streamside vegetation. These species seem in the main unrelated to any in tropical Africa, though representatives of genera widespread in the African tropics may be precinctive with these South African endemics. In this paper I describe the genera Prosamyza, Dyticomysia and Teratolauxania for such South African species; more genera will have to be erected for other species still to be studied in detail.

2. The genera of the Neotropical Region. Although this already is a large assemblage, doubtless many genera remain to be described; conversely, some synonymy of genera, especially those founded largely on chaetic characters, may be necessary after a revision of type material or discovery of intermediate species. This fauna has spread north into the Nearctic Region where about 22% of the genera are represented, but it has virtually no kinship with any other fauna, the genera common to Old World regions being few in number and widespread or of dubious zoogeographic significance because of imprecise definitions. As a result of convergence some Neotropical groups of species resemble closely ones occurring in the Old World, but appear to be



generically distinct. Notable counterpart groups of this sort are -

| Neotropics                          | Counterpart                            |
|-------------------------------------|----------------------------------------|
| <u>Lauxanostegana</u>               | <u>Steganopsis</u> (OR. AUS.)          |
| <u>Neopachycerina</u>               | <u>Parapachycerina</u> (ETH. MAD. OR.) |
| certain ' <u>Minettia</u> ' species | <u>Afrominettia</u> (ETH.)             |

3. The genera of the Palaearctic Region, and their representatives in the Nearctic Region. This is a much less diverse assemblage than the other two. Some of its characteristic genera, notably Sapromyza, Minettia, Lauxania and Trigonometopus, are recorded in the other assemblages, but this seems doubtfully correct in most of these cases, and careful study is likely to show that these are essentially boreal groups. A possible extension of this assemblage may occur in South Africa where some species might on future study prove to belong in Lauxania, Calliopum and Mycterella.

The Nearctic Region appears to have at the generic level a largely hybrid lauxaniid fauna, on one hand derived in substantial measure from the Neotropics and on the other shared with the Palaearctic Region, with few endemic genera.

#### The limits of the present study

The original purpose of this study was to provide the basis for a monograph of ~~the~~ Ethiopian Region Lauxaniidae. From what has been said above on the regional distribution of Lauxaniidae, it will be apparent that the taxonomy of the Neotropical fauna requires a separate study as it has no bearing on the classification of other regional faunas except the Nearctic. For that reason the Neotropical Lauxaniidae are excluded from this study. The Nearctic Lauxaniidae are also excluded; for one thing, there is the strong Neotropical component, for another, many of the other genera are Holarctic or widespread and would be included on the basis of their occurrence in Old World regions. A few New World genera are included in the key for special reasons, but otherwise the scope of this revision is limited to the Old World genera.

The many Australasian species described or included in Sapromyza by Malloch (also Harrison, 1959) are explicitly excluded from the scope of this study as well. Malloch

undoubtedly faced a difficult problem in classifying them and escaped it by resorting to a vaguely defined genus often used as a repository for species of indeterminate affinity, regardless of whether he thereby was blurring the distinctiveness of other genera such as Lyciella and Minettia. Apart merely from stating my opinion (based on the study of a large collection from Australia) that none of these species appears to be a true Sapromyza, I can make at present no contribution to an understanding of their generic classification. This group of species should be revised by an Australian worker who has access to Malloch's types and fresh material of undescribed taxa.



NOTES ON SOME CHARACTERS USED IN THE GENERIC  
CLASSIFICATION OF THE LAUXANIIDAE

The generic classification of the Lauxaniidae, like that of other acalyptrate families, developed slowly during the nineteenth century, partly because of the paucity of material from the tropics, partly no doubt because of the difficulty of studying such small insects with the equipment then available, and partly because the usefulness of the characters available in the chaetation was not appreciated. The publication of Osten-Sacken's (1884) essay on chaetotaxy did much to remedy this, and from the turn of the century onwards an increase in the accession of foreign material and gradual improvement of microscopes facilitated the development of acalyptrate systematics in general.

Few really significant characters valuable for the definition of lauxaniid genera have been discovered since 1908. The descriptions of Kertész and the early descriptions of Hendel contain as much, and not infrequently even more, information as can be found in the descriptions of genera in later years. The use of the costal spinules to differentiate homoneuriform and sapromyziform genera is probably the only character of exceptional value found so far in this century. However, useful generic characters probably remain to be discovered in the structure of the abdomen of both sexes, especially the postabdomen. Unfortunately few workers, really only Shewell and occasionally Malloch, described the genitalia of species they were dealing with, and a vast backlog of research remains to be done in this field. It is important that the Palaearctic fauna in particular be restudied because the abdominal structures of the species in many of its genera are extraordinarily complex and interspecifically varied, and their study could well result in both a better understanding of the limits of such important groups as Sapromyza, Minettia and Lyciella, and a better generic classification of this fauna.

Hennig's (1948, 1958) general conclusions regarding postabdominal structures in the Lauxaniidae are in the main



correct, but his work is far short of being comprehensive as he studied too few species. There is greater variation in some features than he states, such as the number of segments comprising the female postabdomen.

Important though the establishment of a system of chaetotaxy was, it came in the hands of some authors to assume undue importance and led to an artificial splitting of genera. Furthermore, the application of certain suites of chaetic characters proposed for genera in one region in many instances has achieved anomalous and unsatisfactory results in the faunas of other regions. The genus Sapromyza is an example of this, and also Minettia which is considered by many authors merely to include species having an intra-alar bristle. The delimitation of such chaetotaxic genera poses a wide range of problems. Some contain species having associated features in other morphological fields which are generically significant, but others embrace species widely differing in habitus and even fundamental features of structure. There is no doubt that many such genera must be revised and the characters of their type-species brought into sharper focus; also a dependence on chaetic characters should be offset or supported wherever possible by characters from other morphological fields.

It is interesting that some workers persistently regarded the presence or absence of certain bristles as generically 'important'. Thus Malloch described several taxa on the strength of little more than the presence of a discal mesopleural bristle, others on the presence of bristles on certain wing veins, and others on the nature of the tibial chaetation. These characters, except perhaps the second, were seldom used by Hendel who however seemed to consider the number of sternopleural bristles and the presence of presutural dorsocentral and intra-alar bristles, to be important. Malloch at times considered the intra-alar bristles generically significant, but not always; he says (1933a: 360) '... when working up the Australian Sapromyzidae I did not regard the presence or absence of the intra-alar bristle as a generic character and described several species in the genus Sapromyza that have this bristle present'.



That this threw into doubt the limits of Minettia in other regions did not seem to occur to him. Collin (1948) emphasised the position of the ocellar bristles in relation to the ocelli as '... a character of considerable importance in this family', and on the basis of nothing else resurrected Sapromyzosoma Lioy for two very different species obviously without close affinities.

Chaetic characters which are of occasionally inconstant or uncertain value are:

1. The number of sternopleural bristles; two are the usual condition, one an exceptional condition. This is a notoriously unreliable character. I have seen several species which were considered by authors to be characterised by the possession of only one st, in which a small second (usually anterior) st was occasionally present, sometimes only on one side of a specimen.
2. The direction of inclination of the scutellar bristles. This sometimes is a valuable character, but care must be exercised in its use as artefact conditions must be recognised and the extent of variation determined by the study of series of specimens.
3. The presence of dorsocentral bristles in excess of three postsutural pairs or anterior to the sutures. These may be entirely constant characters, but unreliability has been demonstrated by Collin (1948) in respect of Prorhaphochaeta Czerny.
4. The presence and relative size of the posthumeral (= presutural) bristle. The absence of this bristle is considered an important feature characteristic of a group of distinctive genera, but I have seen cases where it is well developed in one individual and weak in another apparently conspecific, and other specimens which have it present only on one side. Maquilingia is a case in point: the paratype and holotype of the type-species differ conspicuously in that this bristle is about as strong as the dc in the one but short and weak in the other.

It is evident that the development of supernumerary



bristles may occur in several sites simultaneously. The presence of an ia bristle, for example, may be correlated with a discal mp or a second hind marginal mp and even extra h bristles. In cases where two bristles are present in the ia field, there may be extra sa bristles and bristles in a transverse row inward of the ph bristle. In cases where the presutural dc bristles are present, the acr series may be developed as small bristles or even as macrochaetae and present presuturally.

A multiple evolution of head forms having in various degrees the characteristics of that of Trigonometopus frontalis Meig. has been the cause of some difficulty and uncertainty in the generic classification of certain Lauxaniidae. Typically a trigonometopine head has a flat, almost horizontal frons often haired anteriorly, a pronounced, acute fronto-facial angle on which the antennae are borne, and an eye irregularly suboval and positioned a little obliquely to the horizontal. The arista may be thickly haired, and porrect bristles may be present on the genae and parafacial margin. Associated with this is a narrowness of the body and usually an elongation of the wing. The genus Trigonometopus, originally monotypic for the Palaearctic species frontalis, has come to have a wide distribution as a result of the inclusion of other species with a somewhat similar head structure. Several genera considered to be related, containing species having a trigonometopine head variously developed, have been differentiated, mainly on the basis of chaetic characters; keys to such genera have been published by Malloch (1929a) and Hendel (1933).

The generic classification of Trigonometopus-like species which have no distinctive chaetic characters usually is difficult because the head form varies interspecifically in ways which make precise diagnoses impossible to formulate. Some genera have been erected for species showing only a partial development of a trigonometopine head; an example is Hendelimyza which its author, Frey (1927), described as close to Trigonometopus, but which I consider to be unrelated. In fact, so wide a range of trigonometopine forms can be demonstrated that a polyphyletic evolution of this feature



seems certain to have occurred. A group of genera having 1+2 dc, namely Maquilingia, Kerteszmomyia and Panurgopsis, may constitute one natural trigonometopine line, distinct from Trigonometopus and Diplochasma on the one hand and Protrigonometopus on the other, while marginal forms in genera such as Hendelimyza and Chilocryptus appear to be unrelated and independently evolved. Among the homoneuriform genera there seem to be no comparable forms; Cephaloconus has an elongate head but it is the face that protrudes and not a fronto-facial angle.

Observations have led me to the conclusion that the trigonometopine character syndrome appears to be an adaptation for life in grass or comparable vegetation types having a profusion of slender, erect stems. In Natal the use of a sweepnet in stands of Themeda grass, which may be up to a metre high, always reveals the presence of some species of Diplochasma. Invariably caught in the same habitat are several species of the chloropid genus Pachylophus, all of which have an elongate body, thickly-haired arista and an approximately trigonometopine head form. Often there are also species of Asteiidae in the net, and these too are slender with a flattened, horizontally elongate head. A close inspection of the vegetation reveals that all these flies rest on grass stems with the body parallel and close to them, a posture in which the body form has a moderate degree of appropriate crypsis which may be aided by a yellowish, brownish or strawlike colouring. Grassland is the only type of vegetation in which I have caught trigonometopine-like lauxaniids in Africa and Madagascar, and it will be interesting to ascertain whether such an association exists elsewhere. Collin (1948: 227) observed that Trigonometopus frontalis is not uncommon where reeds (Phragmites) flourish.

In view of the apparently polyphyletic origin of trigonometopine forms, no recognition can be accorded to a family Trigonometopidae suggested or adumbrated by some authors (e.g. Wheeler, 1956: 313).



## THE SUPRAGENERIC CLASSIFICATION OF THE LAUXANIIDAE

No suprageneric classification of the Lauxaniidae appears to have been proposed; Shewell (1965: 695) explicitly did not attempt one for the Catalogue of Nearctic Species. This probably has been due to a lack of synoptic work on the genera and possibly also to the somewhat artificial generic classification in some regions which has made the assessment of relationships difficult and the grouping of genera uncertain. The lack of work on postabdominal structures has also been a handicap.

After a study of the external characters of nearly all the described lauxaniid genera, I conclude that the family divides into two sections; one containing most of the genera having a homoneuriform costa, the other containing the genera with a sapromyziform costa and, doubtfully, Trypaneoides and Trypetisoma. These groups are not equivalent; the sapromyziform moiety probably will prove to be divisible into other segregates with a status equal to that of the homoneuriform group.

The use of apparently so trivial a character as the distribution of the costal spinules to divide the family into major groups raises the question of monophyly and the possibility that convergence in this feature might have occurred. At the moment I can offer in support of the use of this character only my observations that if Trypaneoides and Trypetisoma are excluded from the homoneuriform group, one has an array of genera showing: (1) many subtle similarities of form; (2) an internally consistent zoogeography characterised by radiation in the Old World tropics and limited generic diversification in areas peripheral thereto, as well as absence from the Neotropical Region; (3) several negative features, namely the lack of development of especially elongate antennae, Lauxania-like frons and trigonometopine head; (4) considerable consistence in the presence of a comb of small spines antero-ventrally on the fore femur, this comb being present in about two-thirds of the homoneuriform genera (those without it are small or monotypic) but present in comparatively few



sapromyziform genera.

The position of Trypaneoides and the closely related Trypetisoma is somewhat anomalous. These sister-genera are a distinctive pair morphologically, have unusual distribution patterns, and at least some species of the former are nocturnal or appear to be as they are caught regularly at lights in localities where they are difficult to find in the daytime. Trypaneoides is widely distributed through the Old World except in the Palaearctic Region; all the species that I have seen have a homoneuriform costa. Trypetisoma is confined to the New World and is unique in the family in having both homoneuriform and sapromyziform species; this is not a geographically correlated condition as I have two apparently undescribed species collected at the same locality in Paraguay, one homoneuriform (fig. 12), the other sapromyziform (fig. 13). It is the only genus with homoneuriform species known in the Neotropics.

The ambivalent state in Trypetisoma prejudices the use of the distribution of the costal spinules as a character for defining major taxa. Nevertheless I propose to use it as I am convinced that the homoneuriform genera, apart from the two mentioned, constitute a monophyletic group. For the present I avoid the difficulty posed by Trypetisoma by excluding it and Trypaneoides through the use of a chaetic character; more research and more collecting must be done before the essential features and relationships of these genera can be thoroughly understood. For the genera with a homoneuriform costa and lacking a discal mesopleural bristle, I propose the subfamily Homoneurinae subfam. nov., type genus Homoneura v.d. Wulp (1891)

This subfamily contains the following 19 genera which appear to fall into three groups. Tribal rank would be appropriate for each of these groups, but at present I know of no way of concisely and reliably defining them. Most of the genera in the group two have a similar head structure as described in couplet 12 of the key, but there is such a variety of forms that limits are difficult to draw. The members of group three, except Teratocranum, have the ocellar bristles directed outwards. Group one is a residual group,

containing the type-genus and five small genera independently derived from Homoneura stock.

| Group 1               | Group 2                | Group 3              |
|-----------------------|------------------------|----------------------|
| <u>Homoneura</u>      | <u>Cestrotus</u>       | <u>Monocera</u>      |
| <u>Katalauxania</u>   | <u>Procestrotus</u>    | <u>Teratocranum</u>  |
| <u>Cainohomoneura</u> | <u>Prosopophorella</u> | <u>Euprosopomyia</u> |
| <u>Zanjensiella</u>   | <u>Dioides</u>         | <u>Australinina</u>  |
| <u>Arnomyia</u>       | <u>Poichilus</u>       | <u>Cephaloconus</u>  |
| <u>Eucyclosis</u>     | <u>Caeniopsis</u>      |                      |
|                       | <u>Prosopomyia</u>     |                      |
|                       | <u>Phobeticomyia</u>   |                      |

Fig. 10 represents my view on the probable relationships of the genera. Homoneura, the largest, morphologically most widely distributed genus, is considered to be ancestral to all the other homoneurine lines with the possible exception of the Trypaneoides-Trypetisoma pair. Group two is the result of a major radiation; the genera Prosopomyia and Caeniopsis probably belong in it, and Phobeticomyia may also belong. To express properly the inter-relationships of the group two genera, a three-dimensional matrix would be needed. Cestrotus is the largest and most diverse member, with its major development in Africa and poor representation in the Oriental Region where nearly all the related genera occur. Group three has developed mainly in the Australasian Region.

The difficulty of segregating the sapromyziform genera into groups is apparent in the key below; few characters are available which reliably distinguish large clusters of obviously related genera. The following 14 genera seem to form a natural association with five subdivisions; characters which occur frequently are a bare, glossy integument, bulbous face, very elongate antennae, and sparse mesonotal setulae.

|                          |                     |
|--------------------------|---------------------|
| <u>Pachycerina</u>       | <u>Sciasmomyia</u>  |
| <u>Melanopachycerina</u> | <u>Drepanephora</u> |
| <u>Cerataulina</u>       |                     |
| <u>Calliclypeus</u>      | <u>Pleurigona</u>   |
| <u>Kertesziella</u>      | <u>Xangelina</u>    |
| <u>Micropachycerina</u>  |                     |



ParapachycerinaSteganopsisLyperomyiaSteganolauxania

The type of frons characteristic of the genus Lauxania occurs also in a number of other genera such as Mycterella, Calliopum, Amblada and Austrolauxania. Typically the frons is slightly upturned and glossy over an apical, transverse portion. Often associated with this is an elongation of the antennae, a dense hairing of the arista, glossiness of the orbital plates and sometimes the whole body, straight edge of the parafacial when this is viewed laterally, slight to moderate bulbosity of the face which may be confined to the upper part in which case the face in profile is irregularly concave, and less commonly an elongation of the body. The use of this character is rendered difficult by the existence of some genera in which the frons is entirely glossy and is not or only a little upturned though its anterior margin does project forwards. Nevertheless, future study may show that a natural group can be defined at least partly on the basis of a Lauxania-like frons.

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## REFERENCES

- BECKER, T., 1895. *Dipterologische Studien. II. Sapromyzidae*  
Berl. ent Z. 40 (2): 171-264, 1 pl.
- BEZZI, M., 1928. *Diptera Brachycera and Atherica of the Fiji Islands*. pp. viii+220, 54 figs. Brit. Mus. (N.H.)  
London.
- BEZZI, M. & Lamb, C.G., 1926. *Diptera (excluding Nematocera) from the island of Rodriguez*. Trans. ent. Soc. Lond. 1925: 537-573, 20 figs.
- BIGOT, J.M.F., 1860. *Diptères de Madagascar. Troisième Partie*. Ann. Soc. ent. France: (3) 7: 533-558.
- 1878. *Diptères nouveaux ou peu connus*. Ibid. (5) 8: 31-48.
- BRUNETTI, E., 1913. *Zoological results of the Arbor Expedition. 1911-12. Diptera*. Rec. Indian Mus. 8: 149-190, 1 pl.
- COLLIN, J.E., 1948. *A short synopsis of the British Sapromyzidae (Diptera)*. Trans. R. ent. Soc. Lond. 99 (5): 225-242, 3 figs.
- CURRAN, C.H., 1934. *The families and genera of North American Diptera*. 512 pp., 235 figs., 2 pls. New York.
- 1936. *The Templeton Crocker expedition to western Polynesian and Melanesian islands, 1933. No. 30. Diptera*. Proc. Calif. Acad. Sci. (4) 22: 1-66, 2 pls., 8 figs. (With Alexander, C.P. and Cresson, E.T.)
- 1938. *The African Lauxaniidae (Diptera)*. Amer. Mus. Novit. 979: 18 pp., 13 figs.
- 1942. *American Diptera*. Bull. Amer. Mus. nat. Hist. 80: 51-84.
- CZERNY, L., 1931. *Eine neue Lauxaniiden-Art aus Ceylon*. Konowia 10: 26-27, 2 figs.
- 1932. *Lauxaniidae*. In Lindner, E., *Die Fliegen der Palaearktischen Region* (5) 40: 76 pp., 1 pl., 37 figs.
- DOLESCHALL, C.L., 1856. *Eerste Bijdrage tot de Kennis der Dipterologische Fauna von Nederlandsch Indie*. Natuurk. Tijdschr. v. Nederl. Indie 10: 403-414, 12 pls.



- ENDERLEIN, G., 1937. Acalyptrata aus Mandschukuo (Dipt.)  
Mitt. disch. ent. Ges. 7: 71-75.
- FABRICUS, J.C., 1805. Systema antliatorum secundum ordines,  
genera, species. 373 pp. Brunswick.
- FALLÉN, C.F., 1810. Spec. entomol. nov. Diptera disponendi  
methodum exhibens. 26 pp., 1 pl. Lund.
- 1820. Diptera Orthalides Sveciae. 34 pp. Lund.
- 1823. Agromyzides Sveciae. 10 pp. Lund
- FRAUENFELD, G. VON, 1867. Zoologische Miscell. XI. Verh.  
zool.-bot. Ges. Wien 17: 424-502, pl. 12
- FREY, R., 1918. Mitteilungen über südamerikanische Dipteren.  
Öfvers. finska Ventensk. Soc. Forh. 60A (14): 1-35,  
1 pl.
- 1927. Philippinische Dipteren. IV. Fam.  
Lauxaniidae. Acta. Soc. Fauna fenn. 56 (8): 44 pp.
- GIGLIO-TOS, E., 1893. Diagnosi di nuovi generi e nuove  
specie di Ditteri. 8. Bull. Mus. Zool. Anat. comp.  
Torino 8 (158): 1-14.
- HARDY, D.E., 1959. The Walker types of fruit flies  
(Tephritidae - Diptera) in the British Museum  
Collection. Bull, Brit. Mus. (N.H.) Entom. 8 (5):  
159-242, 16 pls.
- HARRISON, R.A., 1959. Acalyptrate Diptera of New Zealand.  
Bull. New Zealand Dept. sci. ind. Res. 128:  
pp. vii + 382, 437 figs.
- HENDEL, F., 1907. Neue und interessante Dipteren aus dem  
kaiserl. Museum in Wien. Wien ent. Ztg. 26:  
223-245, 1 pl.
- 1908. Diptera Fam. Muscaridae Subfam. Lauxaniinae.  
Genera Insect. 68: pp. 66, 3 pls.
- 1909. Drei neue holometope Musciden aus Asien.  
Wien ent. Ztg. 28: 85-86.
- 1910. Ueber acalyptrate Musciden. Ibid. 29: 101-  
127, 1 pl.
- 1914. Neue amerikanischen Dipteren. Dtsch. ent. Z.  
1914: 151-176.
- 1920. Neue Cestrotus - Arten des ungarischen  
National-museums (Dipt. Lauxaniidae). Verh. zool.-  
bot. Ges. Wien 70: 74-80.
- 1925. Neue Übersicht über die bisher bekannt  
gewordenen Gattungen der Lauxaniiden, nebst  
beschreibung neuer Gattungen u. Arten. Encycl.  
ent., Sér. B. II, Dipt. 2: 103-142. 4 figs.

- HENDEL, F., 1932. Die Ausbeute der deutschen Chaco-Expedition 1925-26. *Diptera*. 30-36. *Sciomyzidae*, *Lauxaniidae*, *Tanypezidae*, *Lonchaeidae*, *Tylidae*, *Drosophilidae*, *Milichiidae*. Konowia 11: 98-110, 115-145, 15 figs.
- 1933. Ueber einige Typen Wiedemann's und Schiner's von acalyptraten Musciden aus Südamerika, nebst einige verwandten arten (*Dipt.*) Rev. Ent. 3: 58-83, 1 fig.
- 1938. *Muscaria holometopa* (*Dipt.*) aus China im Naturhistorischen Reichsmuseum zu Stockholm. Arkiv. Zool. 30: 13 pp., 3 figs.
- HENNIG, W., 1948. Beiträge zur Kenntnis des Kopulationsapparatus und der Systematik der Acalyptraten. IV. *Lonchaeidae* und *Lauxaniidae*. Acta zool. lilloana 6: 333-429, 86 figs.
- 1958. Die Familien der *Diptera* Schizophora und ihre phylogenetischen Verwandtschaftsbeziehungen. Beitr. Ent. 8 (5/6): 505-688, 365 figs.
- 1965. Die Acalyptratae des Baltischen Bernsteins. Stuttgart. Beitr. Naturk. 145: 215 pp., 319 figs.
- 1968. Holopticer, eine neue Gattung der *Lauxaniidae*, mit Bemerkungen über die Gattung *Hypagoga* (*Diptera*: *Acalyptratae*). Ibid. 192: 6 pp., 12 figs.
- HUTTON, F.W., 1901. Synopsis of the *Diptera* Brachycera of New Zealand. Trans. New Zealand Inst. 33: 1-95.
- KERTÉSZ, K., 1899. Verzeichniss einiger, von L. Biró in Neu-Guinea und am Malayischen Archipel. gesammelten *Dipteren*. Természetrázi Füzetek 22: 173-195, 10 figs.
- 1900. Beiträge zur Kenntnis der Indo-Australischen *Sapromyza*-Arten. Ibid. 23: 254-276, 4 figs.
- 1904. Eine neue Gattung der *Sapromyziden*. Ann. Mus. Hungar. 2: 73-74.
- 1912. Über einige *Muscidae acalyptratae*. Ibid. 10: 541-548.
- 1915. H. Sauter's Formosa-Ausbeute. *Lauxaniinae* II. Ibid. 13: 491-534, 17 figs.
- KNAB, F., 1909. The Oriental trigonometopine flies. Insec. Inscit. Mens. 2: 131-133.
- LAMB, C.G., 1912. *Diptera*: *Lonchaeidae*, *Sapromyzidae*, *Ephydriidae*, *Chloropidae*, *Agromyzidae*. Trans. Linn. Soc. Lond. (Zool.) 15: 303-348. pls. 15, 16.



- LATREILLE, P.A., 1804. Tableau méthodique des Insectes.  
Nouv. dict. Hist. nat. 24(3): 129-200.
- LINDNER, E., 1956. Ostafrikanische Lauxaniidae, Tylidae, Neriidae, Sciomyzidae, Psilidae und Heleomyzidae (Dipt.). Jh. Ver. vaterl. Naturk. Württemberg 111(1): 31 - 46, 7 figs.
- LIOY, P., 1864. I ditteri distribuiti secundo un nuovo metodo di classificazione naturale. Atti Inst. Veneto (3) 9: 1087-1126.
- LOEW, H., 1856. Neue Beiträge zur Kenntnis der Dipteren. 4, 57 pp. Progr. Meseritz., Berlin.
- 1861. Diptera Americae septentrionalis indigena. Centuria prima. Berl. ent. Z. 5: 307-359.
- 1862. Birdrag till Kännedom om Afrikas Diptera. Öfvers. Vet-Akad. Förh. 19:
- 1863. Diptera Americae septentrionalis indigena. Centuria tertia. Berl. ent. Z. 7: 1-55.
- 1869. Drepanephora, eine neue Gattung der Sapromyzidae. Ibid. 13: 95-96.
- LOWER, H.F., 1953. Some Lauxaniidae (Diptera) in Queensland collections. Mem. Queensland Mus. 13(1): 71-79, 6 figs.
- MACQUART, J., 1835. Histoire naturelle des Insectes. Diptères, Tome deuxième. 703 pp., 12 pls. In Roret, N.E., Collection des suites à Buffon. Paris.
- 1850. Diptères exotiques nouveaux ou peu connus. Suppl. 4: p. 275. Paris.
- MALLOCH, J.R., 1920. Some new North American Sapromyzidae. Canad. Ent. 52: 126-128.
- 1923. Some new genera and species of Lonchaeidae and Sapromyzidae. Proc. ent. Soc. Washington 25: 45-53.
- 1924. Exotic Muscaridae (Diptera). XIII. Ann. Mag. nat. Hist. (9) 14: 257-274, figs.
- 1925a. Notes on Australian Diptera. 6. Proc. Linn. Soc. N.S.W. 50 (2): 80-97, 12 figs.
- 1925b. Idem 7. Ibid. 50(4): 311-340, 23 figs.
- 1926a. New genera and species of Acalyptrate flies in the United States National Museum. Proc. U.S. nat. Mus. 68(21): 35 pp.

- MALLOCH, J.R., 1926b. Notes on Australian Diptera. 8. Proc. Linn. Soc. N.S.W. 51(2): 31-49, 7 figs.
- 1927a. H. Sauter's Formosa collection: Sapromyzidae (Diptera). Ent. Mitt. 16: 159-172, 2 figs.
- 1927b. Notes on Australian Diptera. 10. Proc. Linn. Soc. N.S.W. 52(2): 1-16, 12 figs.
- 1927c. Idem. 13. Ibid 52(4): 399-446, 15 figs.
- 1927d. Fauna sumatrensis. Sapromyzidae (Dipt.). Suppl. Ent. 15: 102-110, 1 fig.
- 1928. Notes on American two-winged flies of the family Sapromyzidae. Proc. U.S. nat. Mus. 73(23): 18 pp., 5 figs.
- 1929a. Notes on some Oriental Sapromyzid flies (Diptera), with particular reference to the Philippine species. Ibid. 74(6): 97 pp., 6 pls.
- 1929b. Exotic Muscaridae (Diptera). XXVI. Ann. Mag. nat. Hist. (10) 4: 97-120, 7 figs.
- 1929c. Clusiidae (Heteroneuridae) and Sapromyzidae. Insects of Samoa 6: 199-213, 6 figs. Brit. Mus. (N.H.), London
- 1932. New species of Sapromyzidae from the Marquesas. Bull. B.P. Bishop Mus. 98: 3-12, 1 fig.
- 1933a. Diptera of Patagonia and South Chile. Part 6, fasc. 4. Acalyptrata. pp. 177-391, 7 pls., 68 figs. Brit. Mus. (N.H.), London.
- 1933b. Some Acalyptrate Diptera from the Marquesas Islands. Bull. B.P. Bishop Mus. 114: 3-31, 9 figs.
- 1934. Additional new species and other records of Acalyptrate Diptera (Sapromyzidae, Asteiidae, Drosophilidae, Ephydriidae and Trypetidae) from the Marquesas Islands. Ibid. 114: 179-200, 9 figs.
- 1935. Exotic Muscaridae (Diptera). XXXIX. Ann. Mag. nat. Hist. (10) 16: 217-240, 1 fig.
- 1939. The Dipterous Genus Cephaloconus Walker (Family Sapromyzidae). Ibid. (11) 3: 447-449, 2 figs.
- 1940. Some Sapromyzidae (Diptera) from the Solomon Islands and New Caledonia. Novit. Zool. 42(1): 131-146, 1 pl.
- 1941. Venezuelan Diptera. I. Bot. Soc. venez. Ci. nat. 7: 123-131, 3 figs.



- MALLOCH, J.R. & McAtee, W.L., 1924. Keys to flies of the families Lonchaeidae, Pallopteridae and Sapromyzidae of the eastern United States, with a list of the species of the District of Columbia region. Proc. U.S. nat. Mus. 65(12): 26 pp., 2 pls.
- MEIJERE, J.C.H. de, 1904. Neue und bekannte südasiatische Dipteren. Bijdr. Dierkunde 18: 85-117, pl. 8.
- 1908. Studien über südostasiatische Dipteren. II. Tijdschr. Ent. 51: 105-180, 1 pl.
- 1910. Idem. IV. Die neue Dipterenfauna van Krakatau. Ibid. 53: 58-194, pls. 4-8.
- 1913. Résultats de l'expédition scientifique à la Nouvelle Guinée. Dipteren I. Nova Guinea 9: 305-386, pl.
- 1914. Studien über südostasiatische Dipteren. IX. Tijdschr. Ent. 57: 137-275.
- 1916. Idem X. Dipteren von Sumatra. Ibid. (1915) 58 Suppl.: 64-97.
- 1917. Idem XIV. Ibid. 60: 275-369, 2 figs.
- 1924. Idem XV. Dritter Beitrag zur Kenntnis der sumatranischen Dipteren. Ibid. 67: 1-64, 10 figs.
- OSTEN-SACKEN, C.R., 1884. An Essay on Comparative Chaetotoxy, or the arrangement of characteristic bristles of Diptera. Trans. ent. Soc. Lond. 1884: 497-517, fig.
- PAULIAN, R., 1961. La Zoogéographie de Madagascar et des Iles voisines. pp. 485, 122 figs., 3 maps, 23 pls. Inst. Recher. Sci. Mad., Tananarive.
- ROBINEAU-DESVOIDY, J.B., 1830. Essai sur les Myodaires. Mém. présentés Acad. Roy. Sci. Inst. France 2: 813 pp.
- SCHINER, J.R., 1868. Diptera. In Reise der Österreichischen Fregatte Novara um die Erde. Zool., 2(1), B. pp. vi + 388, 4 pls.
- SÉGUY, E., 1938. Diptera I. Nematocera et Brachycera. Miss. Sci. de l'Omo, Tome IV, fasc. 39. Mém. Mus. Hist. nat. (N.S.) 8: 319-380, 55 figs.
- SHEWELL, R.S., 1938. The Lauxaniidae (Diptera) of southern Quebec and adjacent regions. Canad. Ent. 70: 102-110, 111-118, 133-142, 6 pls.
- 1939. A revision of the genus Camptoprosopella Hendel (Diptera, Lauxaniidae). Ibid. 71: 130-144, 145-153, 3 pls.

- SHEWELL, R.S., 1965. Family Lauxaniidae. In Stone, A., Sabrosky, C.W., Wirth, W.W., Foote, F.H. & Coulson, J.R. A catalogue of the Diptera of America north of Mexico. Agric. Handb. Forest Serv. U.S. 276: pp. iv + 1696. (Reference on pp. 695-706.)
- SPENCER, K.A., 1969. The Agromyzidae of Canada and Alaska. Mem. ent. Soc. Canad. 64: 311 pp., 552 figs.
- STEYSKAL, G.C., 1957. The postabdomen of male Acalyptrate Diptera. Ann. ent. Soc. Amer. 50(1): 66-73, 5 figs.
- STRAND, E., 1928. Miscellanea nomenclatorica zoologica et paleontologica. I-II. Arch. f. Naturgesch. (1926) Abt. A. 92(8): 30-75.
- STUCKENBERG, B.R., 1963. A new species of Drepanephora from South Africa (Diptera: Lauxaniidae). Stuttgart. Beitr. Naturk. 105: 5 pp., 5 figs.
- SZILÁDY, Z., 1943. Bemerkungen über Cordyluriden und Lauxaniiden (Diptera). Ann. Hist. nat. Mus. hung. 36: 179-184, 3 figs.
- TONNOIR, A.L. & Malloch, J.R., 1926. New Zealand Muscidae Acalyptratae. Rec. Canterbury Mus. 3: 1 - 26, 2 pls.
- WALKER, F., 1856a. Catalogue of the Dipterous Insects collected at Sarawak, Borneo by Mr. A.R. Wallace. J. Proc. Linn. Soc. Lond. 1: 105-136, 1 pl.
- 1856b. Catalogue of the Dipterous Insects collected at Singapore and Malacca by Mr. A.R. Wallace. Ibid. 1: 4-39, 2 pls.
- 1859a. Catalogue of the Dipterous Insects collected in the Aru Islands by Mr. A.R. Wallace, with descriptions of new species. Ibid. 3: 114-121.
- 1859b. Catalogue of the Dipterous Insects collected at Makassar in Celebes by Mr. A.R. Wallace. Ibid. 4: 90-144.
- 1861. Catalogue of the Dipterous Insects collected in the Barchian, Kaisan and Makian and in Tidon in Celebes by Mr. A.R. Wallace, with descriptions of new species. Ibid. 5: 270-303.
- WESTWOOD, J.O., 1840. An introduction to the modern classification of insects, founded on the natural habits and corresponding organisation of the different families. 2. (Appendix) Synopsis of the genera of British Insects. 158 pp.
- WHEELER, M.R., 1956. Latheticomyia, a new genus of acalyptrate flies of uncertain family position. Proc. U.S. nat. Mus. 106: 305-314, 2 figs.



WIEDEMANN, C.R.W., 1830. Ausereuropäische Zweiflügliche  
Insecten. 2: pp. xii + 684, 5 pls. Hamm.

WILLISTON, S.W., 1903. In Adams, C.F., Dipterological  
Contributions. Kansas Univ. Sci. Bull. 2: 21-47.

WULP, F.M. van der, 1891. Eenige uitlandsche Diptera.  
Tijdschr. Ent. 34: 193-218, 1 pl.

----- 1898. Dipteren aus Neu-Guinea in der Sammlung  
des Ungarischen National-Museums. Természetrajzi  
Füzetek 21: 235-237.

## CAPTIONS FOR FIGURES

- Figs. 1-2. Apical part of wing, showing the terminal sections of the second and third veins and the distribution relative to these of costal spinules in (1) a sapromyziform wing, and (2) a homoneuriform wing.
- Figs. 3-4. Male abdominal structures of Cestrotus spp. n. (3) postabdomen; (4) sternites and protandrium. The number 6 indicates the sixth tergite and sternite; other abbreviations are - ae = aedeagus; cer = cerci; ep = epandrium; pt = protandrium; rs = ring sclerite.
- Figs. 5-7. Male terminalia of Cestrotus spp. n. (5) Hypopygium in dorsal view; (6) aedeagus and associated sclerites in posterolateral view; (7) hypopygium in lateral view. Abbreviations as in figs. 3-4, also ae.ap = aedeagal apodeme; gp = gonopod; s.ex = surstylar extension; sp.7 = seventh spiracle; sur = surstylus.
- Fig. 8. Graph illustrating numerical growth of described lauxaniid genera. The periods during which Frey, Hendel, Kertész and Malloch described genera are indicated.
- Fig. 9. Diagram illustrating generic diversity of Lauxaniidae in the zoogeographic regions and the extent to which adjacent regions have genera in common. The area of each circle is proportionate to the number of genera known to occur in the region named within it. The numbers indicate how many genera occur in each region and how many are shared by adjacent regions.
- Fig. 10. Diagram representing apparent relationships between the genera with homoneuriform costa. These genera, except for Trypaneoides and Trypetisoma, constitute the new subfamily Homoneurinae.
- Figs. 11-13. Wings of (11) Trypaneoides sp., Pietermaritzburg; (12, 13) Trypetisoma spp., Paraguay, former with homoneuriform costa, latter with sapromyziform costa.
- Fig. 14. Wing of Katalauxania sp. n., Nairobi.
- Figs. 15-16. Head in lateral and frontal views of Poichilus fasciatus Frey, male paratype.
- Figs. 17-18. Wing of (17) Cainohomoneura delta sp. n., male paratype; (18) Poichilus fasciatus



- Figs. 19-20. Head in frontal and lateral views of Procestrotus deemingi sp. n., female holotype.
- Figs. 21-23. Wing of (21) Procestrotus deemingi sp. n., female holotype (note that the contrast in the pattern has been exaggerated in the photograph); (22) Cestrotus turitus Loew, Mariepskop, Transvaal; (23) Cestrotus oculatus Hendel, Kranskop, Natal.
- Fig. 24. Head of Cestrotus megacephalus Loew, frontal view. On the specimen the four frontal spots shown as white are silvery, and the two supra-antennal spots are orange. Inset is the outline of the frontal callus in anterodorsal view.
- Fig. 25. Head of Cainohomoneura delta sp. n., female.
- Figs. 26-28. Head of Zanjensiella spp. n. (26, 27) Z. argentifrons male, lateral and frontal; (28) Z. canifrons male, lower part of face in frontal view.
- Figs. 29-30. Wing of (29) Steganopsis sp., Brisbane; (30) Lyperomyia calopus Frey, paratype.
- Fig. 31. Head of Lyperomyia calopus Frey, male paratype.
- Fig. 32. Head of Calliclypeus boettcheri Frey, holotype.
- Fig. 33. Head of Micropachycerina stenoptera sp. n., female paratype.
- Fig. 34. Wing of Micropachycerina stenoptera sp. n.
- Fig. 35. Head of Parapachycerina munroi sp. n., female paratype.
- Figs. 36-38. Wing of (36) Sciasmomyia dichaeophora Hendel; (37) Drepanephora sp., Luabo, Mozambique; (38) Noetomima sp., Nepal.
- Figs. 39-40. Head of Xangelina sp. in frontal and lateral views, Gorongoza Mt., Mozambique.
- Figs. 41-43. Wing of (41) Xangelina sp., Plettenberg Bay; (42) Parapachycerina munroi sp. n., female paratype; (43) Himantopyga scaptomyzina Frey, male paratype.
- Fig. 44. Head of Prosamyza viridiventris sp. n., male paratype.
- Fig. 45. Head of Nimettia biseta sp. n., female holotype.

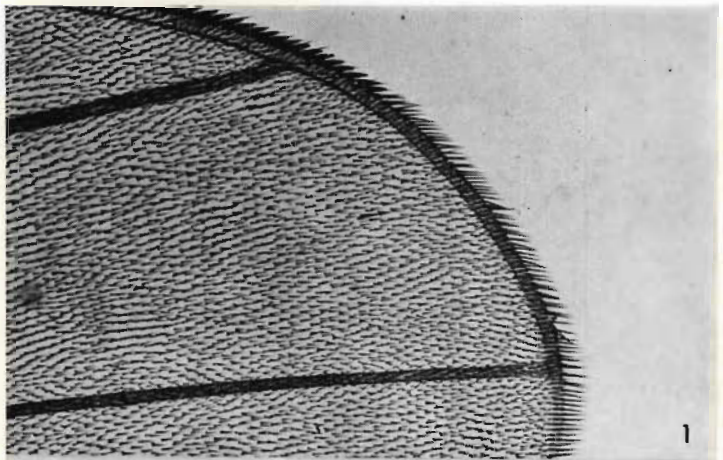
- Figs. 46-47. Head of Teratolauxania cybeplax sp. n., frontal and lateral views, female holotype.
- Figs. 48-50. Wing of (48) Afrominettia jeanneli (Séguy); (49) Dyticomyia oraria sp. n.; (50) Teratolauxania cybeplax sp. n., female holotype.
- Figs. 51-52. Head of Noeetomima radiata Ehderlein, holotype, dorsal and lateral views.
- Figs. 53-54. Wing of (53) Peplomyza litura Meigen, Sweden; (54) Zanjensiella argentifrons sp. n., male paratype.
- Figs. 55-57. Noonamyia palawanensis sp. n. Head in lateral and frontal views, and antennae in dorsal view, male paratype; arisal setae omitted in figs. 56 and 57.
- Figs. 58-59. Wing of Noonamyia spp. n. (58) palawanensis, (59) lyneborgi.
- Fig. 60. Head of Dyticomyia oraria sp. n., female paratype.
- Fig. 61. Head of Hendelimyza pubifrons Frey, holotype
- Figs. 62-66. Male genitalia of Cainohomoneura delta sp. n. (62, 63) Epandrium in dorsal and lateral views; (64) left surstylus further enlarged, inset one of the blade-like setae further enlarged; (65) aedeagus and associated structures; (66) left gonopod, lateral view; ea = ejaculatory apodeme.
- Fig. 67. Female abdomen, Dyticomyia oraria sp. n.
- Figs. 68-72. Male genitalia of Dyticomyia oraria sp. n. (68) Epandrium, dorsal view; (69) surstylar extension, lateral view; (70, 71) aedeagus and associated structures in lateral and dorsal views; (72) detail of microscopic teeth in apical part of aedeagus.
- Figs. 73-75. Male genitalia of Micropachycerina stenoptera sp. n. (73) Epandrium and protandrium, oblique lateral view; (74) epandrium, dorsal view; (75) aedeagus and associated structures, ventral view.
- Figs. 76-80. Male genitalia of Zanjensiella spp. n. (76-78) argentifrons; (76) epandrium, dorsal view; (77) surstylus, lateral view; (78) aedeagus and associated structures; (79) canifrons, aedeagus and associated structures; (80) specimen from Ranomafana, aedeagus and associated structures.
- Fig. 81. Apical part of abdomen of Nimettia biseta sp. n., female holotype; only the macrochaetae



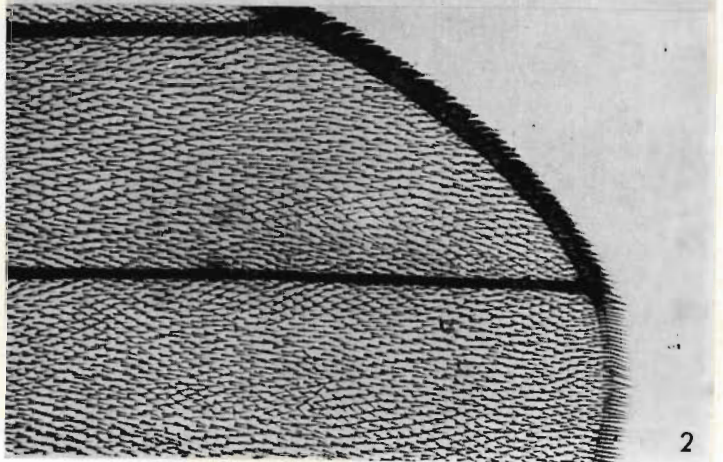
- Figs. 82-88. Male genitalia of Noenamyia spp. n. (82-84) palawanensis; (82) epandrium, dorsal view; (83) epandrium and protandrium, ventrolateral view; (84) aedeagus and associated structures, ventral view; lateral lyneborgi; (85, 86) epandrium, dorsal and (85-88) views; (87) surstylus; (88) aedeagus and associated structures.
- Figs. 89-92. Male genitalia of Parapachycerina munroi sp. n. (89, 90) Epandrium, dorsal and lateral views, latter with protandrium; (91) surstylus; (92) aedeagus and associated structures, dorsal view. Based on a rather teneral specimen.
- Figs. 93-98. Male genitalia of Prosamyza viridiventris sp. n. (93) Epandrium, dorsal view; (94) surstylus and cercus, posterior view, to show connection between them; (95) protandrium, on a smaller scale; (96, 97) aedeagus and associated structures in ventral and lateral views. (98) Female genitalia, ventral view, same species; t = tergite, s = sternite, cer = cercus.

F I G U R E S

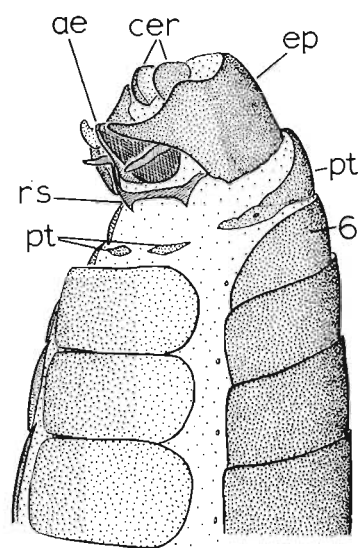




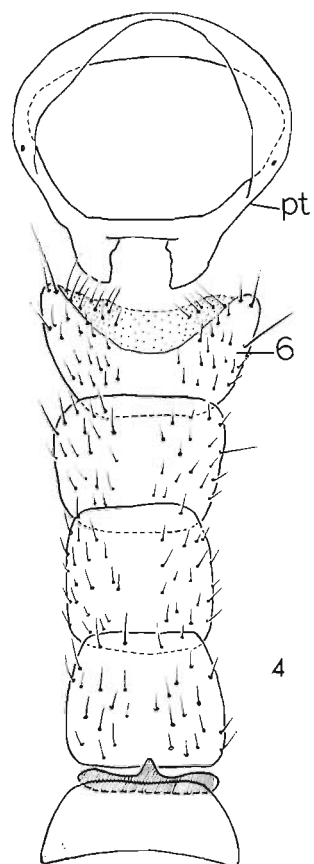
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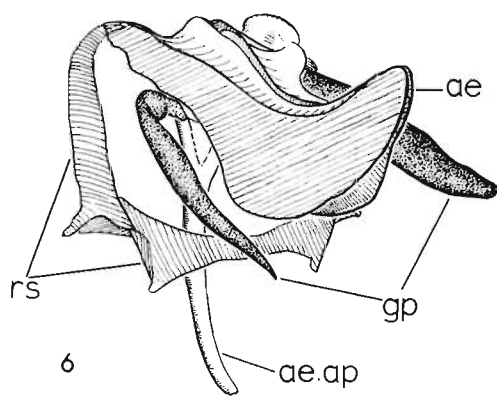
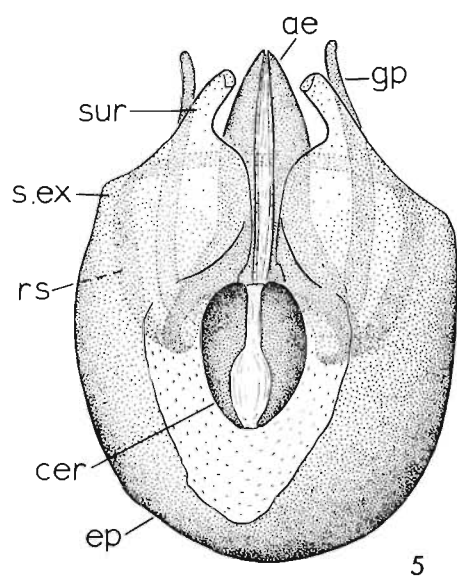
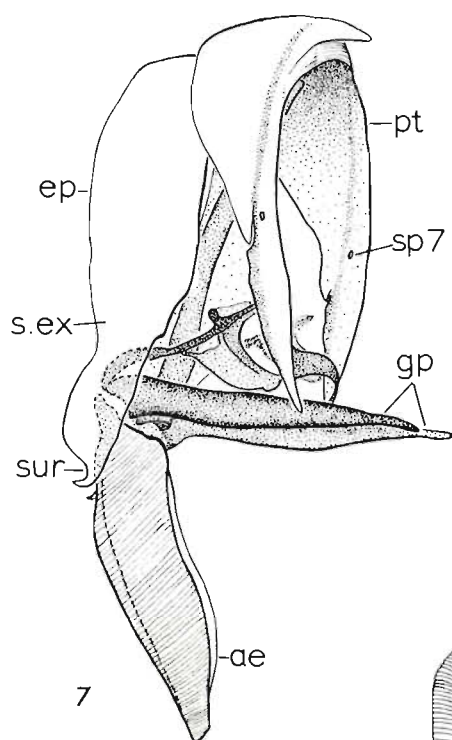


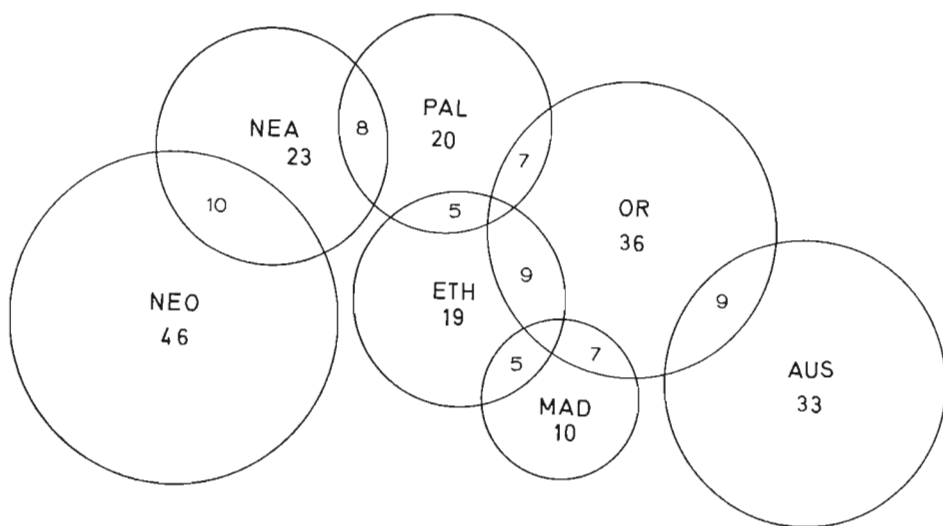
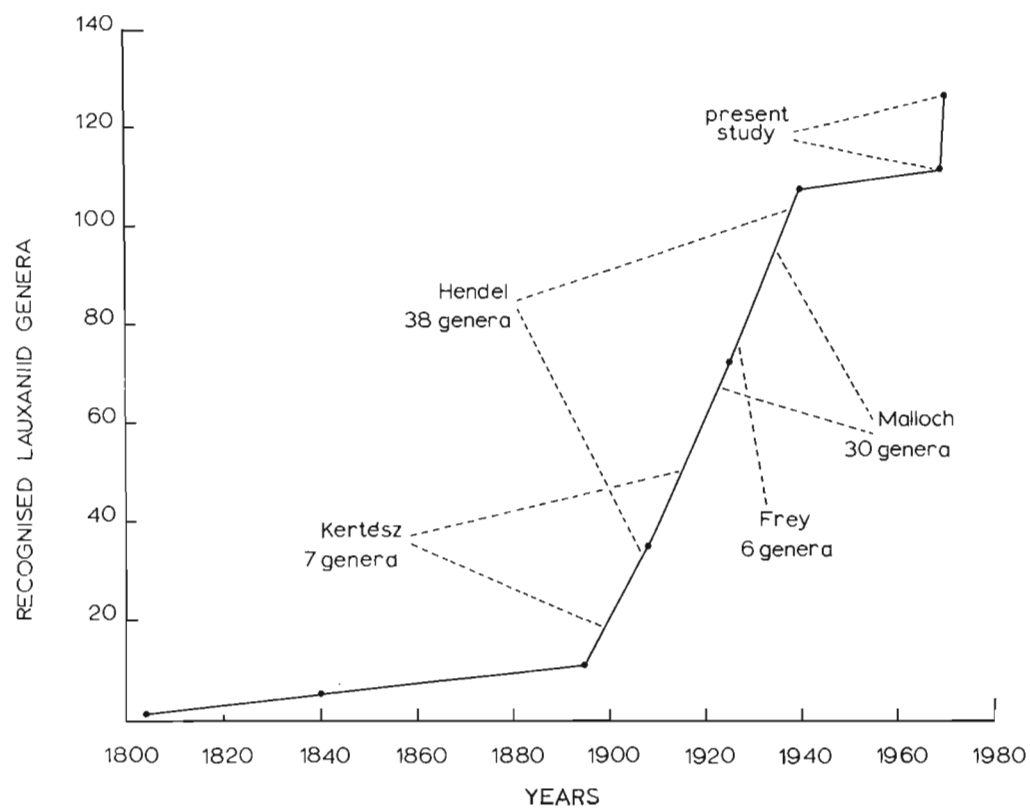
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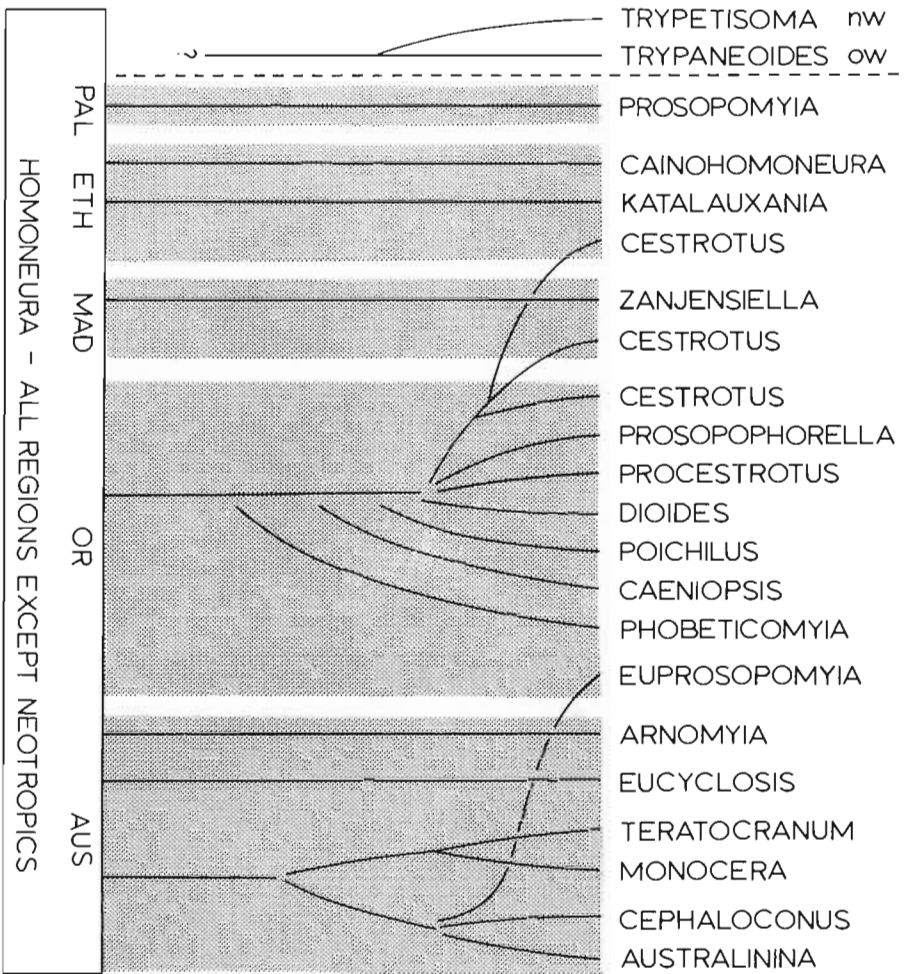
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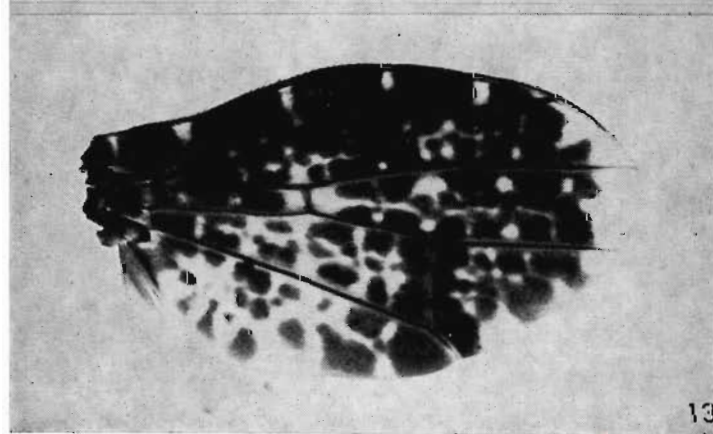
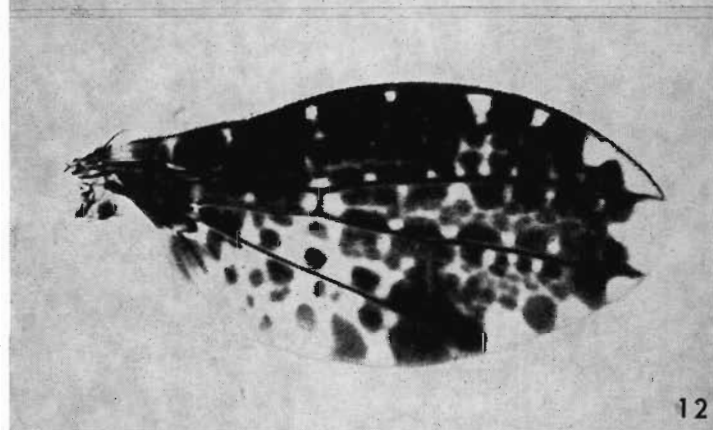
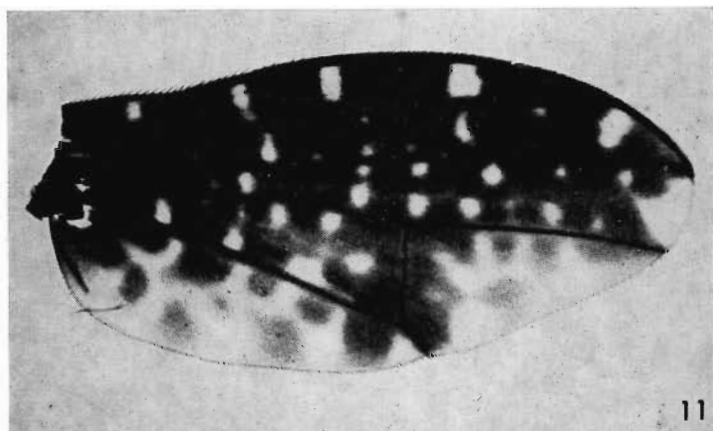




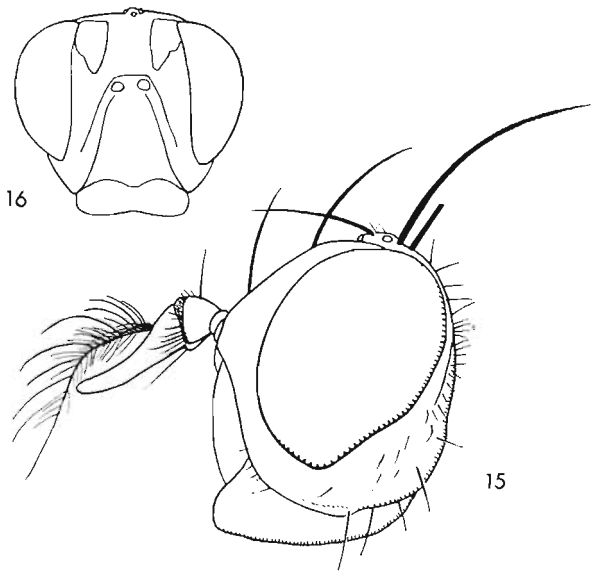
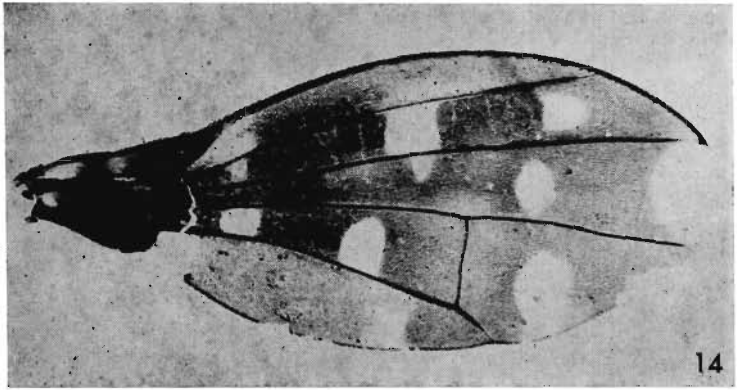


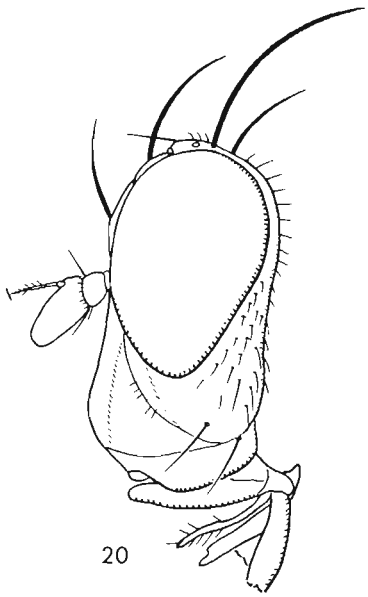
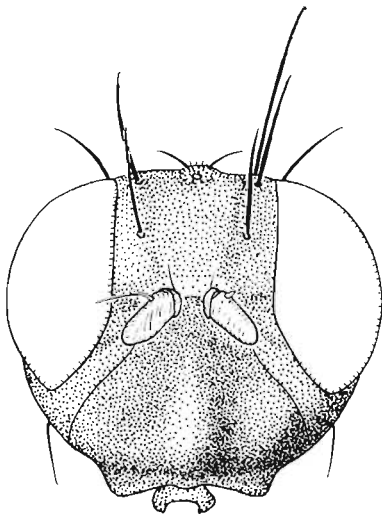
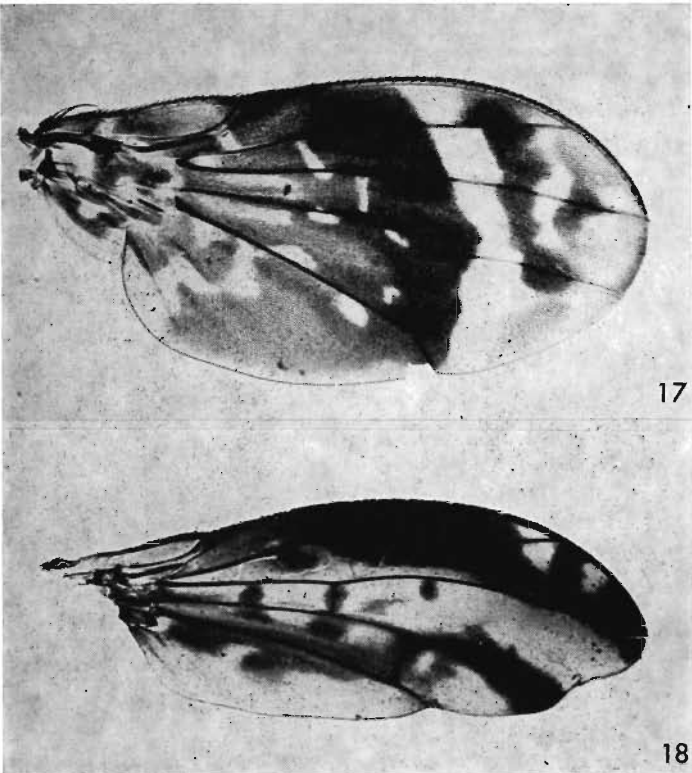




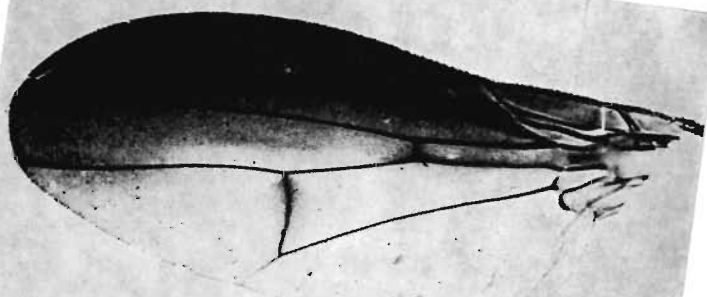












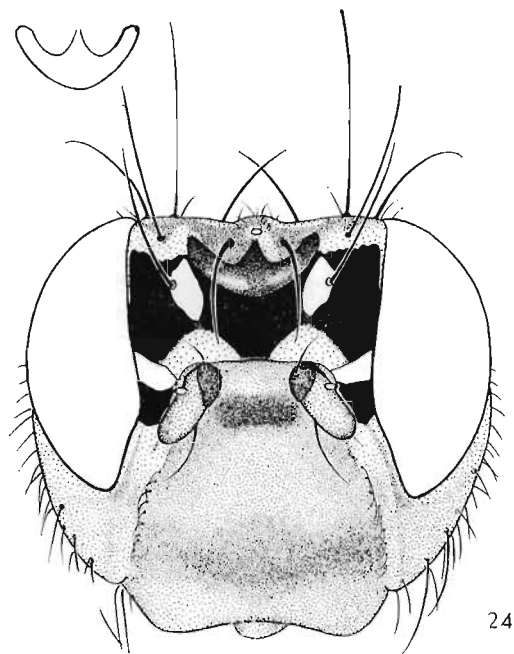
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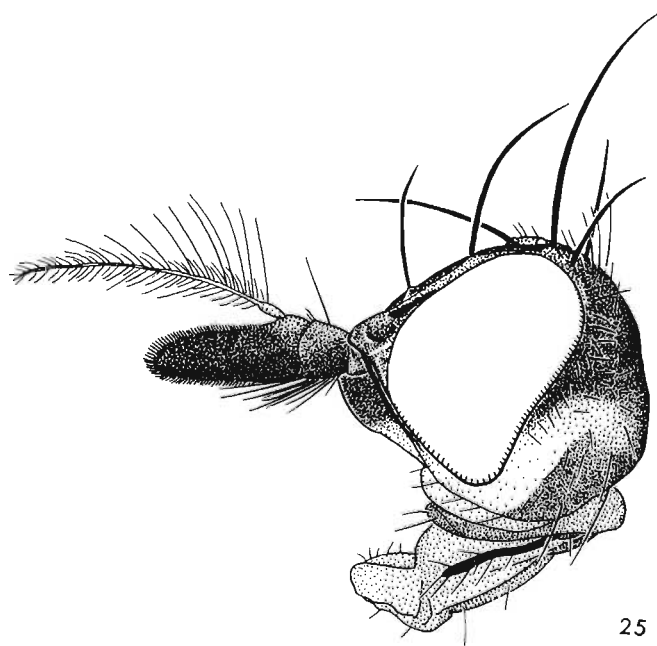
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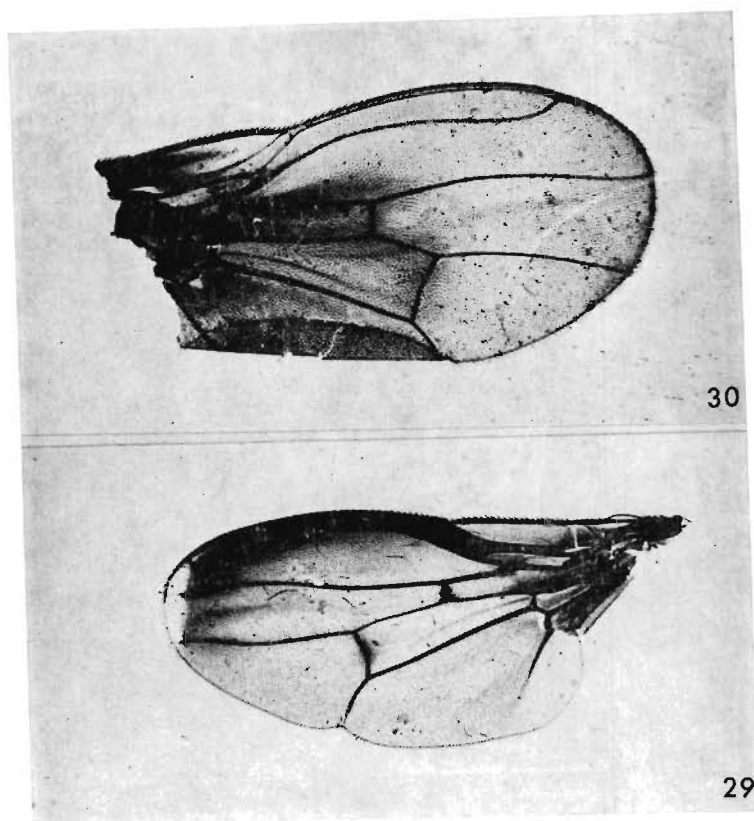
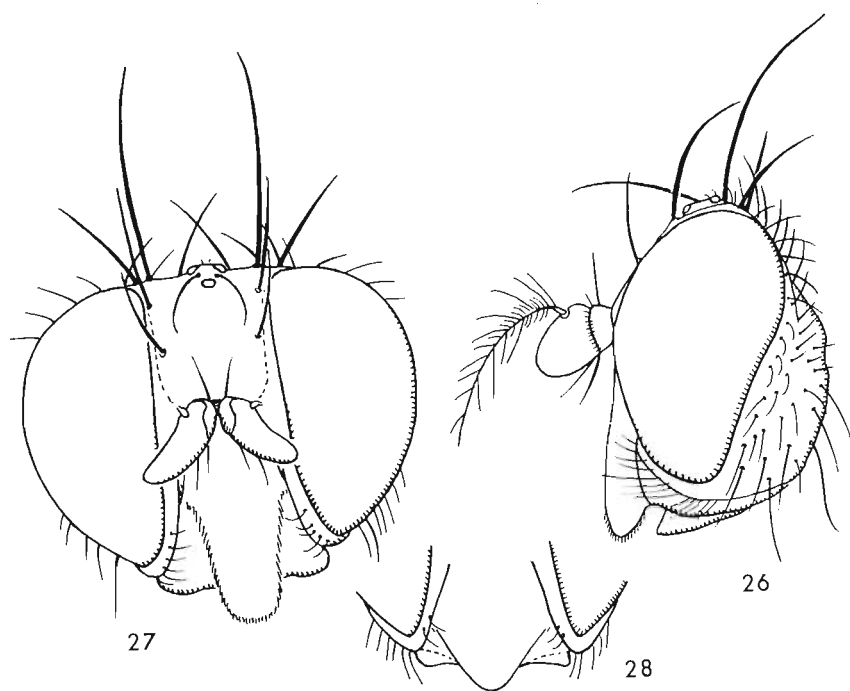


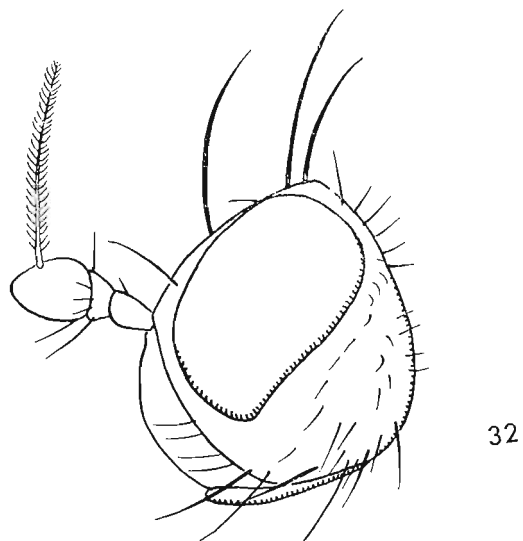
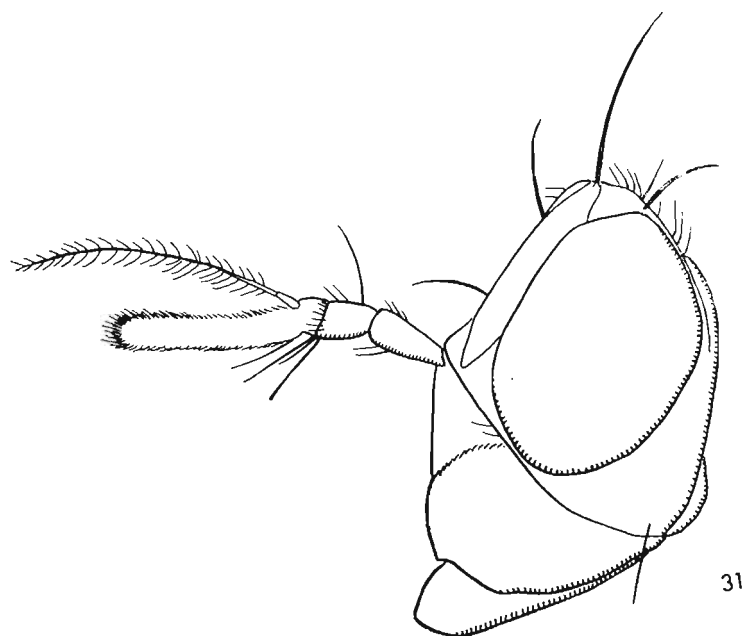
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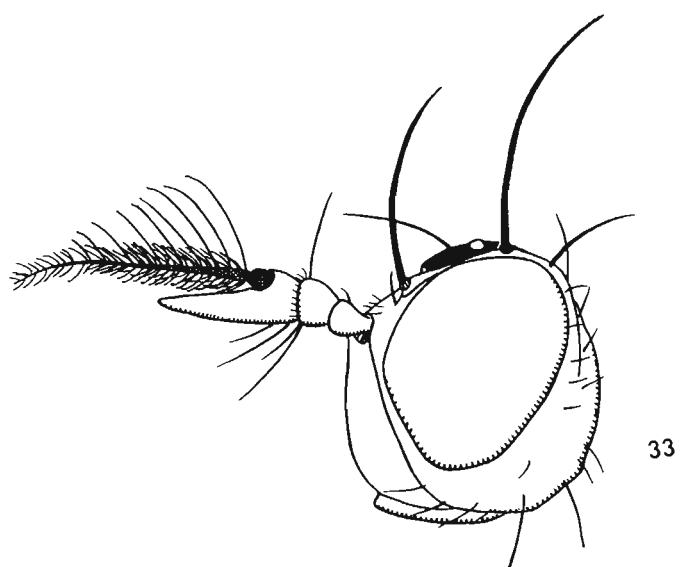
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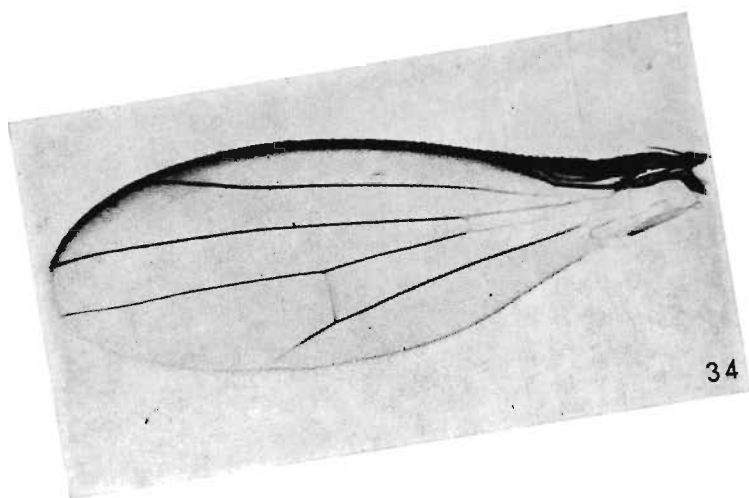




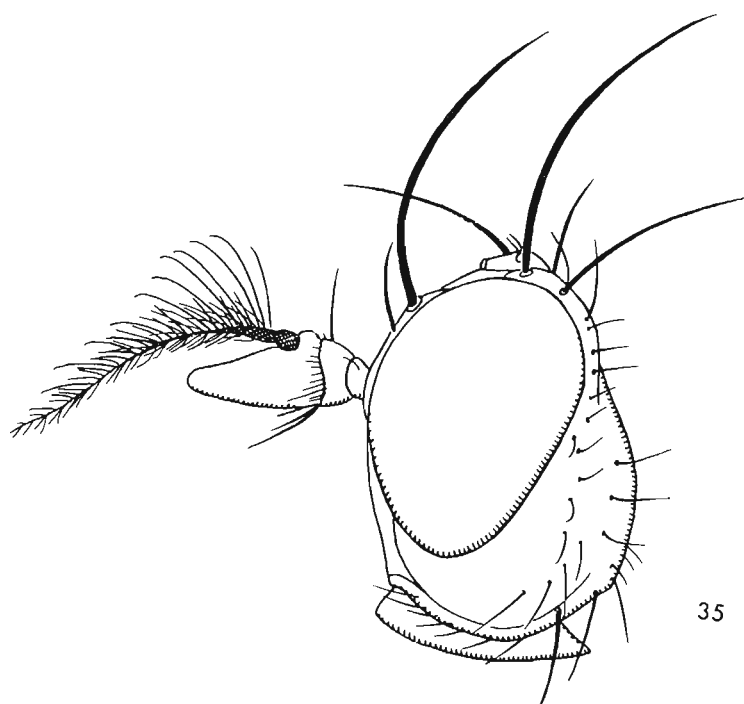




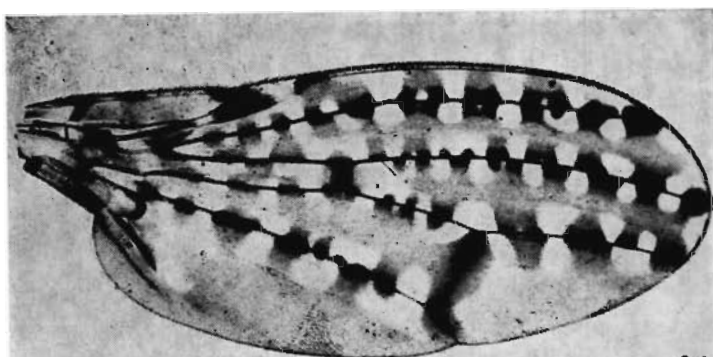
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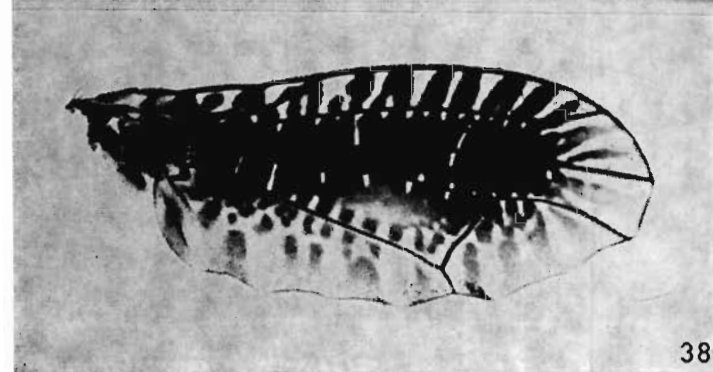




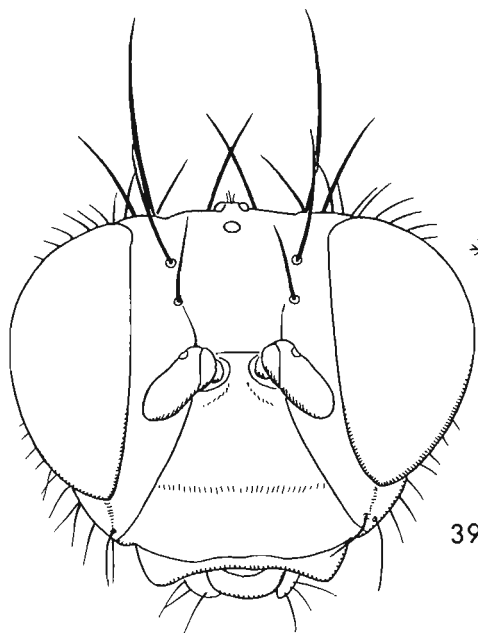
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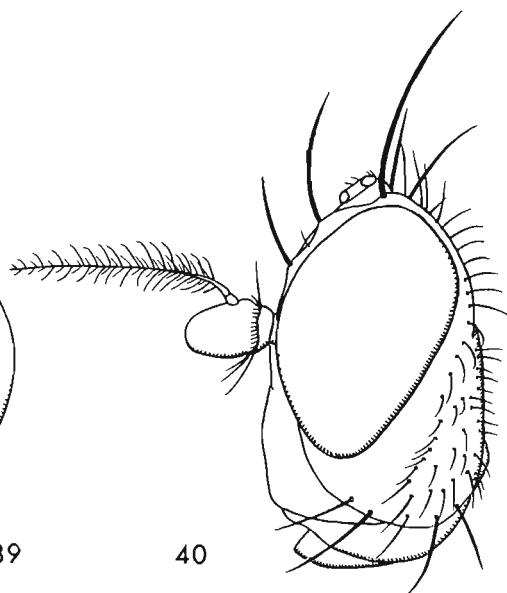
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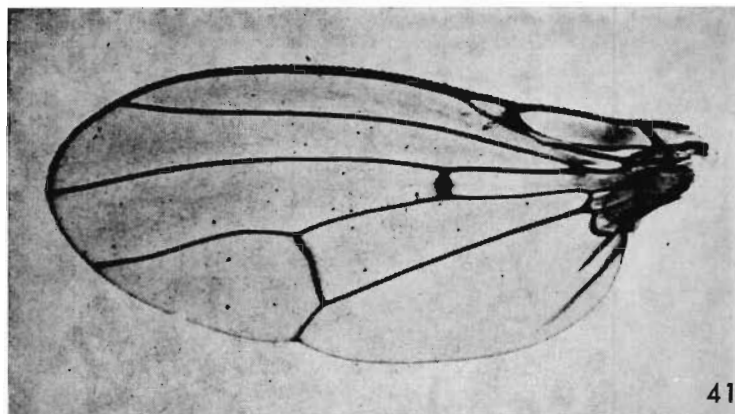


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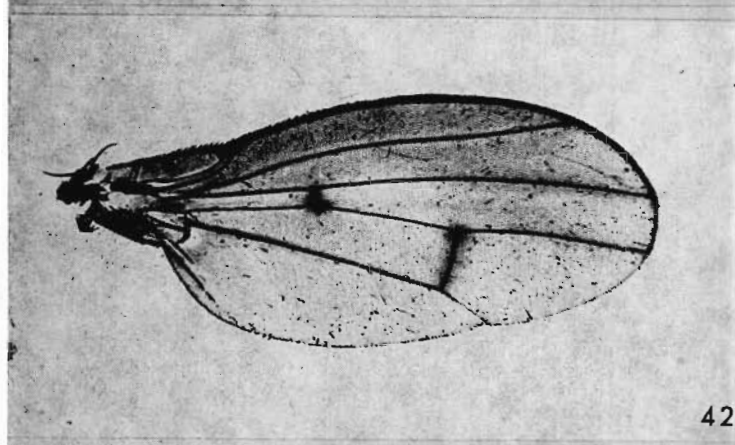


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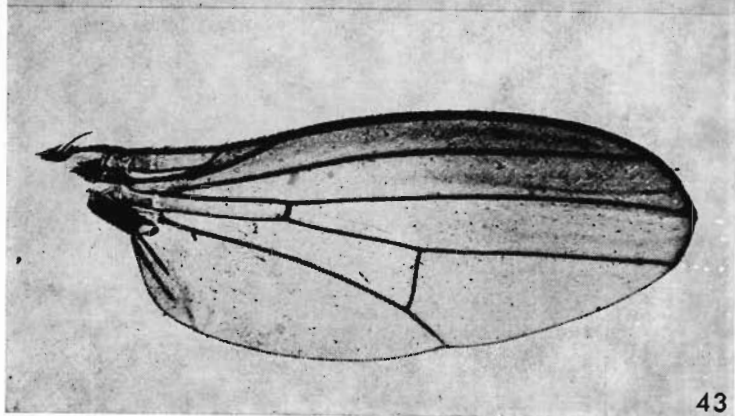




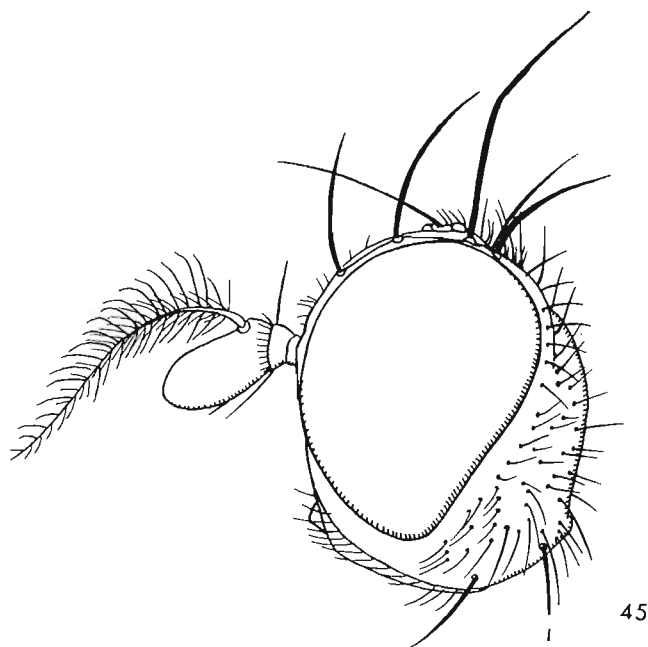
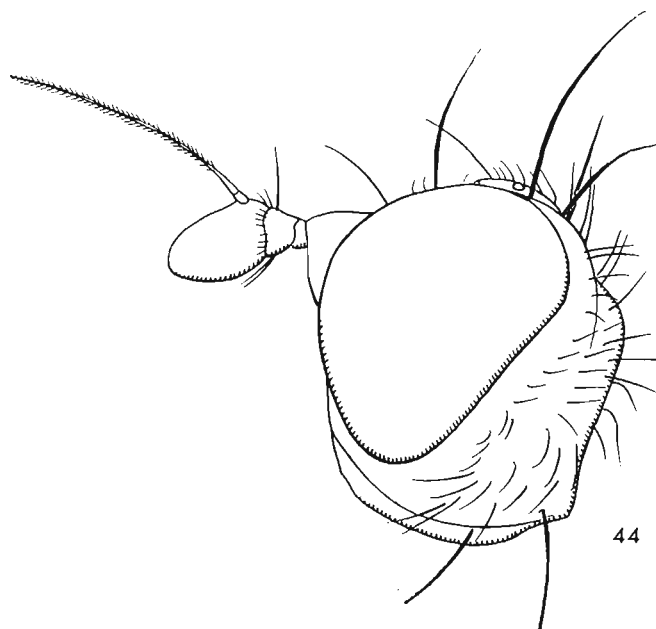
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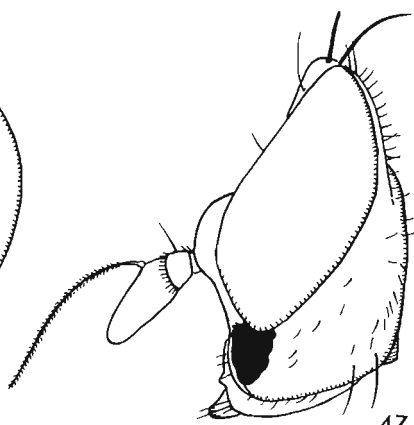
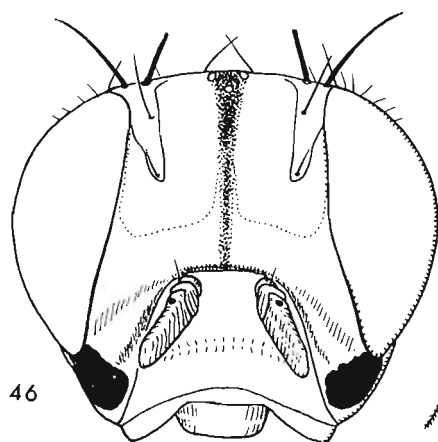
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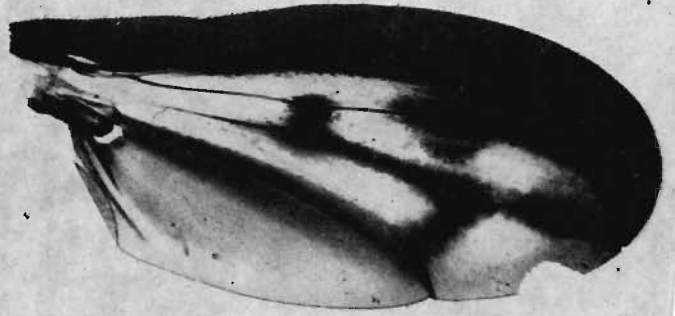


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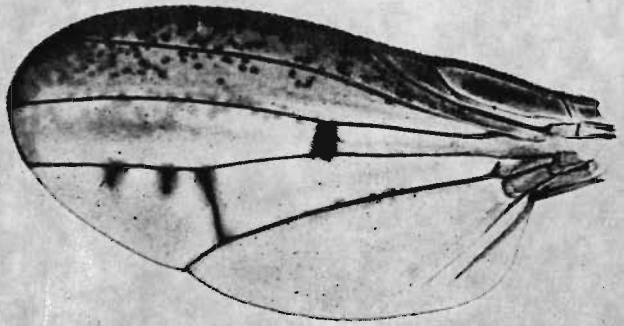




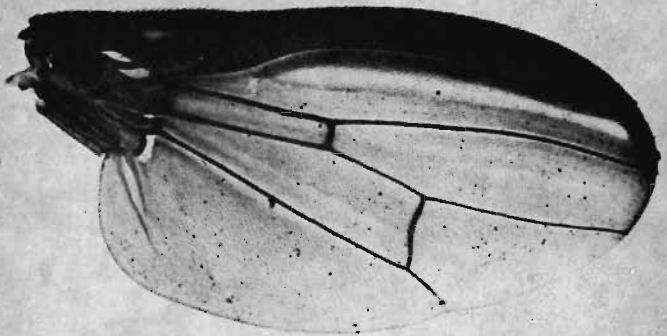




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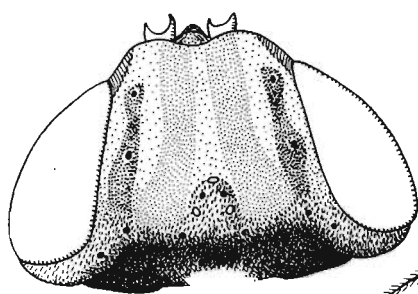


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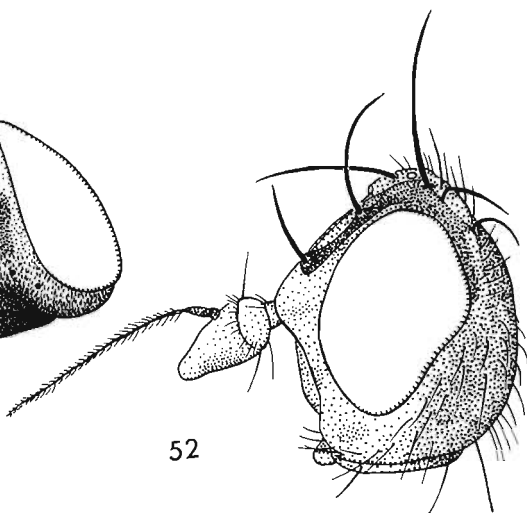


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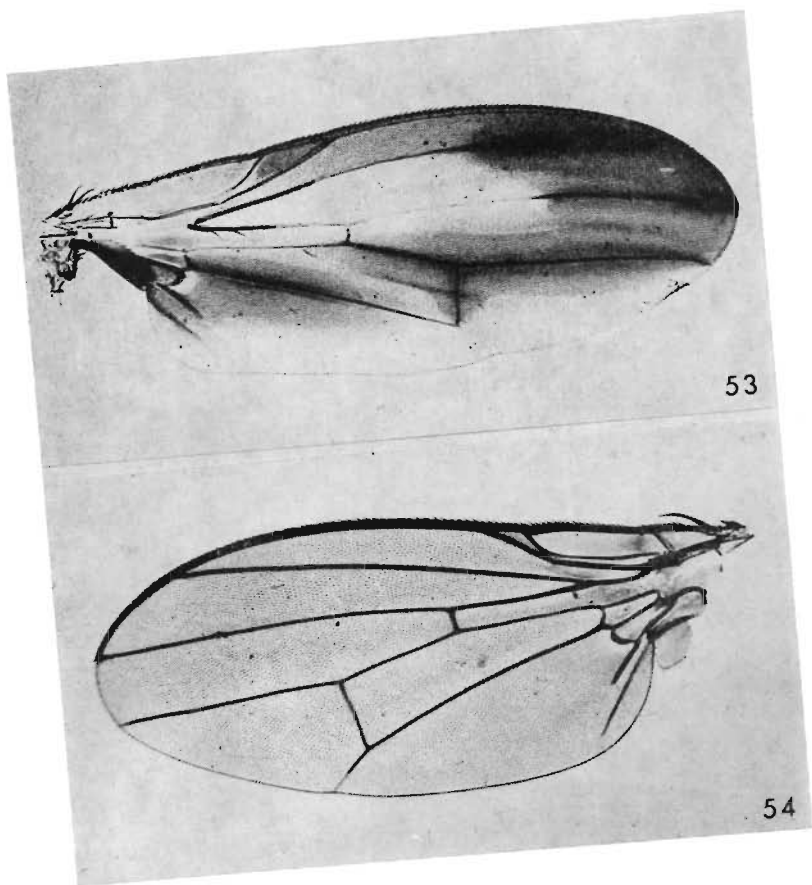




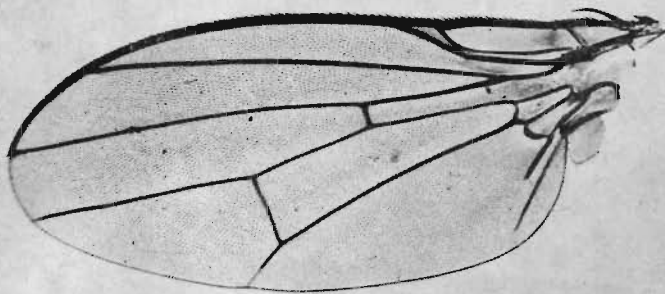
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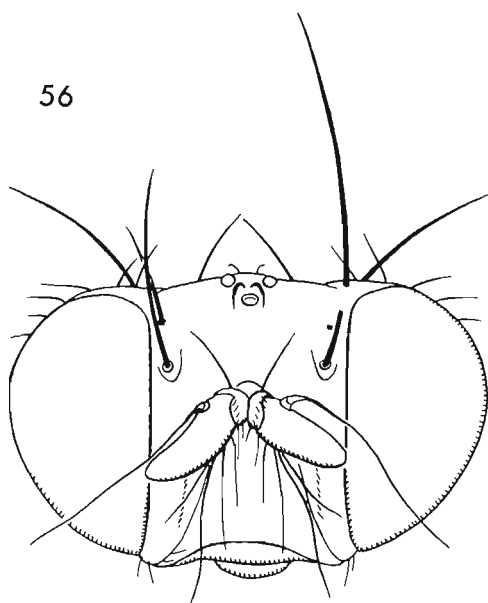


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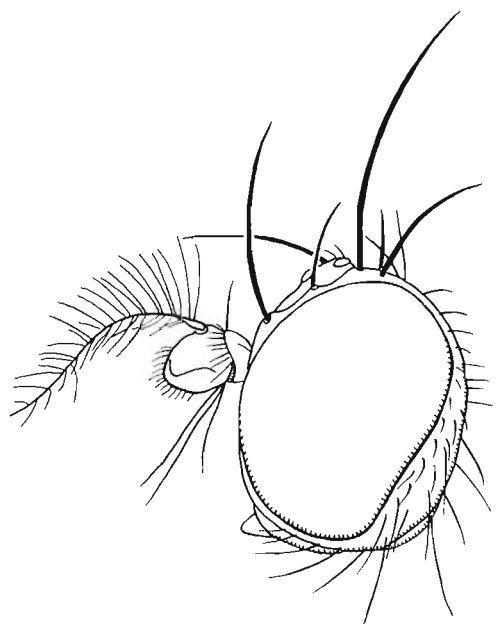


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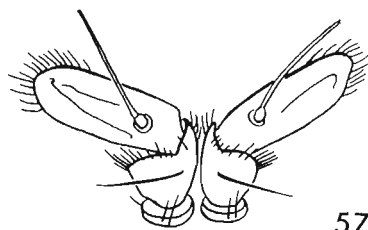
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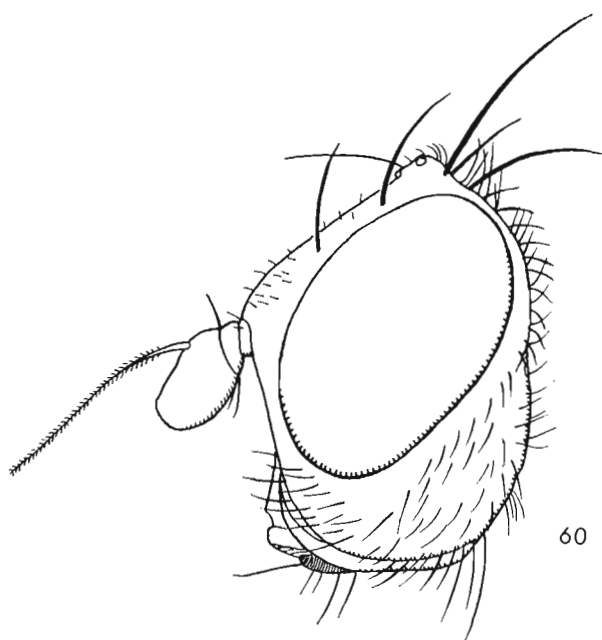
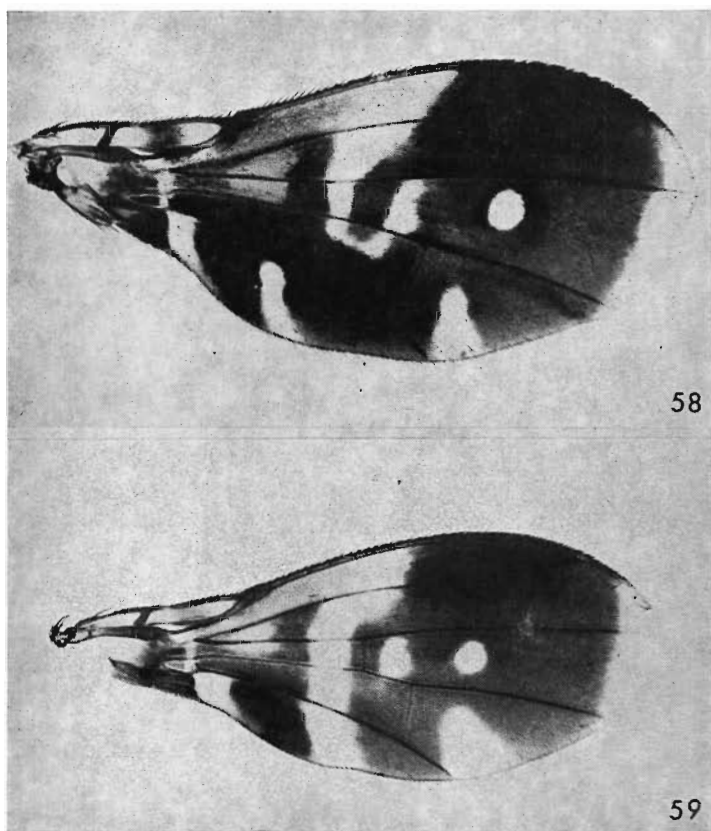
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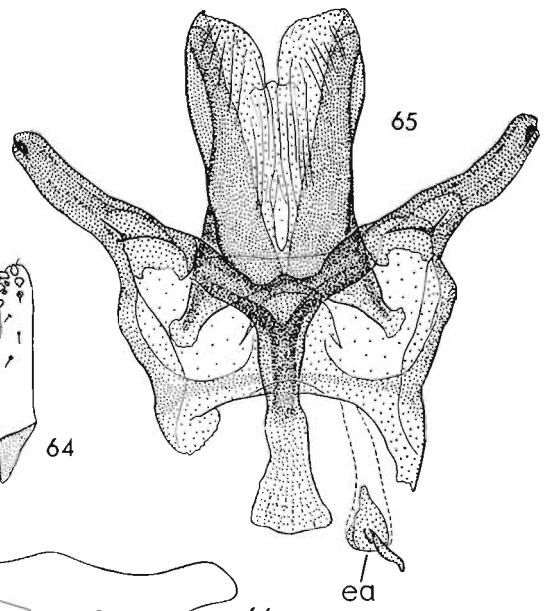
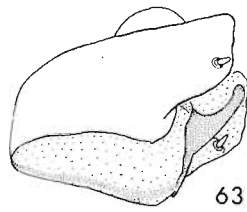
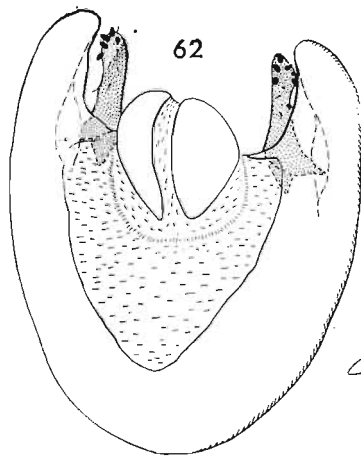
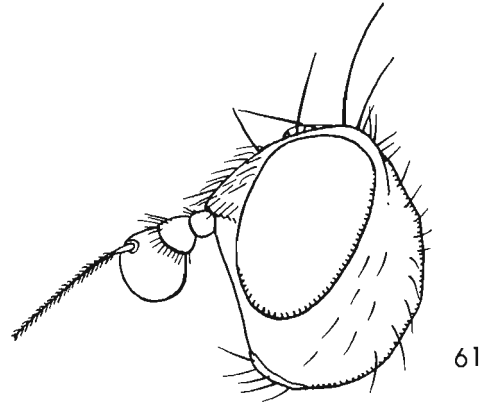


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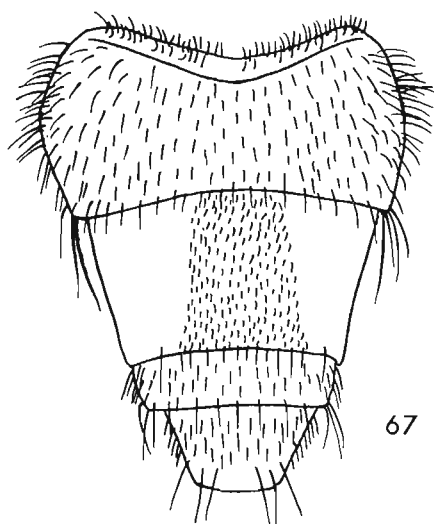




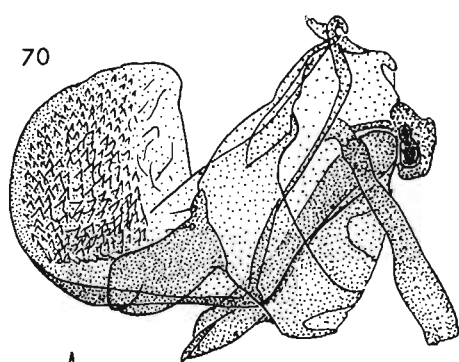




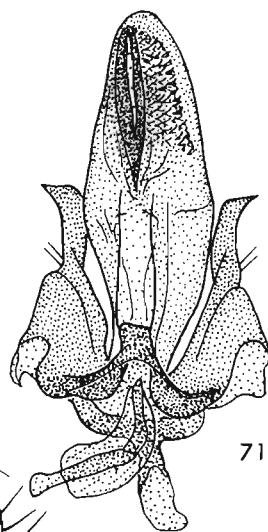




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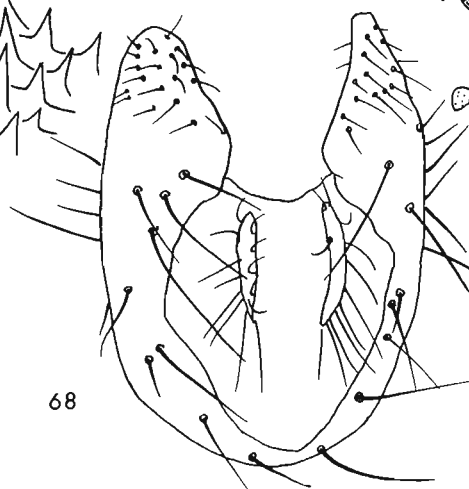
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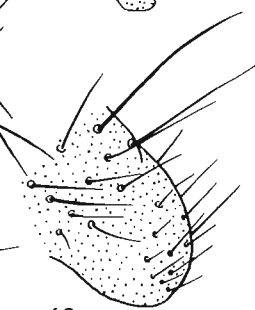
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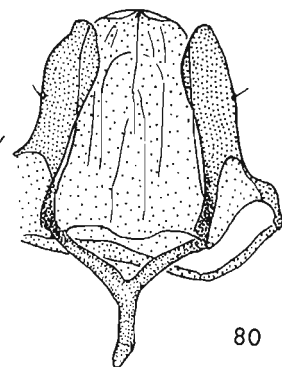
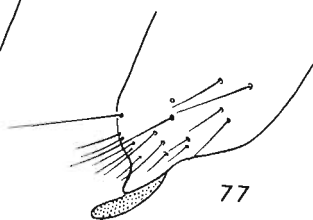
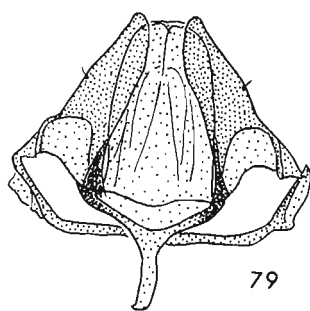
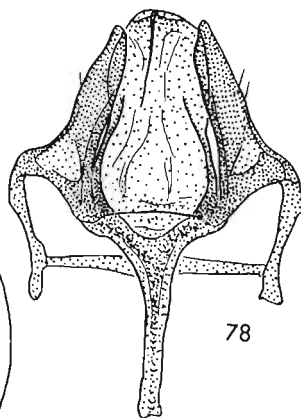
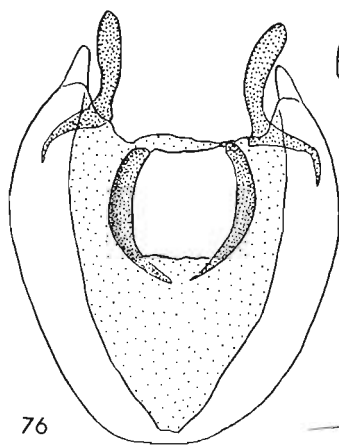
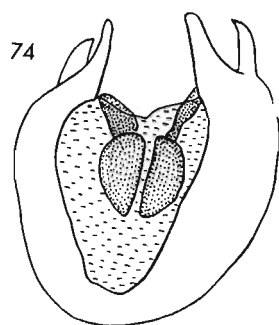
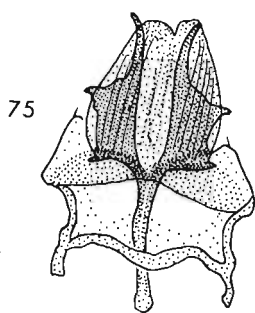
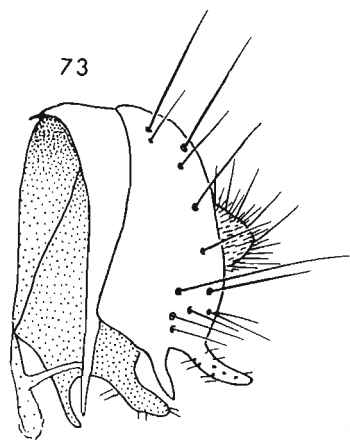
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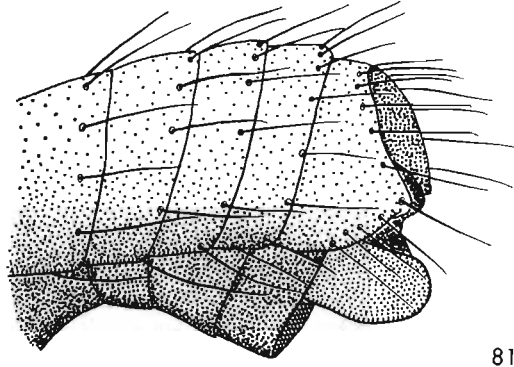
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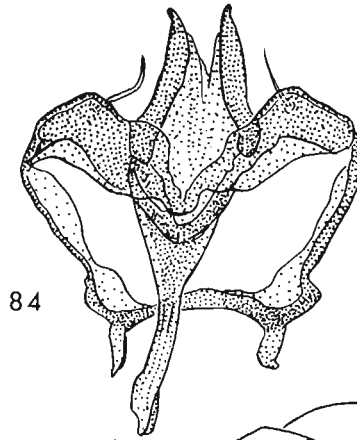
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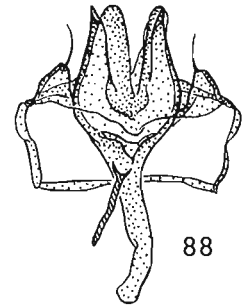




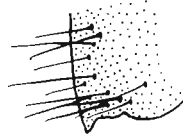
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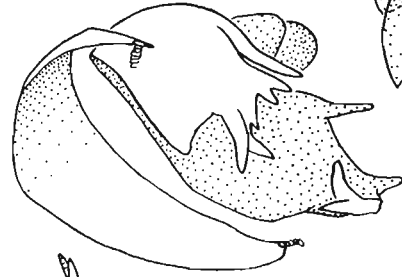
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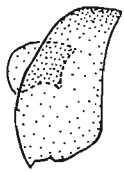
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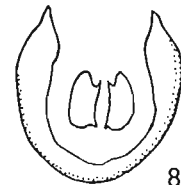
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