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CONTENTS

ENTOMOLOGY VOLUME XVI

DIPTERA FROM NEPAL

BIBIONIDAE

D. ELMO HARDY

AGROMYZIDAE

K. A. SPENCER

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DIPTERA FROM NEPAL

BIBIONIDAE

BY

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AGROMYZIDAE

BY

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Pp. 1–31 ; 61 *Text-figures*

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BIBIONIDAE[1]

By D. ELMO HARDY

SYNOPSIS

This study is based upon sixty-one specimens collected by Ralph L. Coe, British Museum (Natural History) 1961-62 expedition to Nepal, and seventeen specimens collected by L. W. Swan, American expeditions to Nepal 1954 and 1960. The collections contained twelve species in four genera of Bibionidae. Six of the species are apparently undescribed and ten are new records for Nepal. One additional species, *Penthetria indica* (Brunetti), has been recorded from Nepal but was not represented in the collections.

THIS most valuable collection gives us considerable insight into a previously almost entirely unknown fauna and adds materially to our knowledge of the Bibionidae of the Oriental region.

I am indebted to Ralph L. Coe for the privilege of studying the material from the British Museum collection and to Dr. Edward Kessel and Paul Arnaud for the loan of specimens from the California Academy of Sciences. I am also grateful to Mrs. Rogene Radner for preparing the illustrations.

TAXONOMIC ARRANGEMENT OF THE KNOWN BIBIONIDAE OF NEPAL

Subfamily Pleciinae
- *Penthetria atra* (Brunetti)
- *P. indica* (Brunetti)*
- *P. japonica* Wiedemann
- *Plecia mallochi* Hardy ? ♀
- P. sp. ? ♀ *impostor* complex

Subfamily Bibioninae
- *Bibio ablusus* n. sp.
- *B. affiniproximus* n. sp.
- *B. capitaneus* n. sp.
- *B. nigerrimus* Duda
- *B. scaurus* n. sp.
- *B. totonigra* n. sp.
- *Dilophus gratiosus* Bigot
- *D. hirsutus* n. sp.

*Not present in this collection.

KEY TO KNOWN SPECIES OF BIBIONIDAE FROM NEPAL

1 Front tibia lacking spines or spurs. Vein R_{2+3} present (Text-fig. 3). Pleciinae . 2
— Front tibia with large apical spurs (Text-fig. 11) or with a ring of spines at the apex and a row of four spines across the middle (Text-fig. 46). Bibioninae . . . 6
2 Vein R_{2+3} short, oblique or vertical in position (Text-fig. 6). ***Plecia*** Wiedemann . 3
— Vein R_{2+3} elongate, almost horizontal in position (Text-fig. 3). ***Penthetria*** Meigen . 4
3 Thorax entirely rufous . . . ***Plecia mallochi*** Hardy (and related species)
— Pleura black, front margin of mesonotum dark coloured ***Plecia impostor*** Brunetti complex
4 At least posterior half of mesonotum bright orange 5
— Entirely black species . . . . . ***Penthetria atra*** (Brunetti)

[1]Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Technical Paper No. 694.

5 Anterior portion of mesonotum black . . . . . ***P. japonica*** Wiedemann
— Mesonotum entirely rufous . . . . . ***P. indica*** (Brunetti)
6 Front tibia with a row of apical spines and with four spines across the middle (Text-fig. 46). ***Dilophus*** Meigen 7
— Front tibia with apical spurs. ***Bibio*** Geoffroy 8
7 Basal section of radial sector very short, about one-fifth as long as the *r-m* crossvein (Text-fig. 50). Body and legs densely black pilose. Spines of front tibia arranged as in Text-fig. 49 . . . . . ***D. hirsutus*** n. sp.
— Basal section of radial sector nearly one-half as long as *r-m* (Text-fig. 47). Body and legs sparsely yellow pilose. Spines of front tibia arranged as in Text-fig. 46 ***D. gratiosus*** Bigot
8 Spurs of front tibia sharp pointed (Text-figs. 18 and 22) 9
— Outer spur of front tibia rounded, blunt at apex (best seen from lateral view) (Text-fig. 30). Ninth tergum of male with a U-shaped hind margin (Text-fig. 33). Antenna 10-segmented. Large subopaque black species . ***B. nigerrimus*** Duda
9 Wings entirely hyaline, except for the stigma ; posterior veins colorless . . 10
— Wings distinctly infuscated, darker on the anterior margin ; posterior veins darker than the membrane 11
10 Large species, male body 15·5 mm. ; wings 14·0 mm. Crossvein *r-m* less than half as long as the base of the *Rs* (Text-fig. 25). Last segment of palpus six times longer than wide (Text-fig. 23). . . . . ***B. capitaneus*** n. sp.
— Small species, body 5·0 mm. ; wings 4·6 mm. Crossvein *r-m* equal in length to the base of *Rs*. Last segment of palpus scarcely longer than wide (Text-fig. 14) ***B. affiniproximus*** n. sp.
11 Hind basitarsi of male not swollen ; wings evenly fumose, not spotted . . 12
— Hind basitarsi of male swollen (Text-fig. 35). Female with brown spots on the wings as in Text-fig. 37 . . . . . ***B. scaurus*** n. sp.
12 Inner spur well developed, subequal to outer (Text-fig. 42). Body entirely black pilose. Wings smoky black, costal cell and stigma black. Last segment of palpus elongate, 6-7 times longer than wide. Crossvein *r-m* approximately equal to the base of *Rs* (Text-fig. 40). . . . . ***B. totonigra*** n. sp.
— Inner spur of front tibia rudimentary, very small compared to the outer (Text-fig. 11). Body predominantly yellow pilose. Wings lightly fumose, costal cell brownish yellow, stigma brown. Last segment of palpus short, scarcely longer than wide. Crossvein *r-m* about one-half as long as basal section of *Rs* (Text-fig. 9) ***B. ablusus*** n. sp.

Subfamily ***PLECIINAE***

Genus ***PENTHETRIA*** Meigen

Penthetria Meigen, 1803, *Illiger's Mag.* **2** : 264.
Threneste Wiedemann, 1830, *Aussereurop. zweifl. Ins.* **2** : 618 (refer to Edwards, 1928 : 683).
Eupeitenus Macquart, 1838, *Dipt. exot. nouv. ou peu connus* **1** : 85.
Crapitula Gimmerthal, 1845, *Bull. Soc. Nat. Moscou*, **18** : 330.
Pleciomyia Brunetti, 1911, *Rec. Indian Mus.* **4** : 269.
Parapleciomyia Brunetti, 1912, *Rec. Indian Mus.* **7** : 446.

The members of this genus differ from *Plecia* by having vein R_{2+3} elongate and horizontal in position, almost parallel to vein R_{4+5}, and the claspers of the male genitalia lateral in position and large and conspicuous.

Three species have been recorded from Nepal, two of these (*P. atra* (Brunetti) and *japonica* Wiedemann) are present in this collection. *P. indica* (Brunetti) was recorded by Brunetti (1911 : 272).

Type species : *Penthetria holosericea* Meigen.

Penthetria atra (Brunetti)

(Text-figs. 1–4)

Plecia atra Brunetti, 1911, *Rec. Indian Mus.* **4** : 272.

To date only female specimens of *atra* have been recorded. It is readily recognized from all other known *Penthetria* from this region by its entirely black coloration. I have on hand a male specimen from Sze-chuan, China, which appears to be this species. It is highly probable, however, that a complex of species may have the same general appearance and it would not be practical to describe this male as *atra*.

♀. Entirely black species covered with short black setae over the body and legs. The head is short and broad. The rostrum is not developed and the front has a prominent tubercle on the lower median portion. As seen in dorsal view the head is as in Text-fig. 2. The antennae are twelve-segmented (Text-fig. 1) ; Brunetti, in the original description, indicated this, but his figure (1912, plate 12, fig. 16) shows only eleven segments with an indication of two segments being present in the first joint of the flagellum. The wings are entirely smoky black. The venation is as in Text-fig. 3. The forking of veins M_1 and M_2 is well beyond the *r–m* crossvein. The female genitalia are as in Text-fig. 4.

Brunetti recorded the length of this species as 8·0–12·0 mm. The specimens at hand measure 9·5 mm. for the body and 10·0 mm. for the wings.

Brunetti's type-series was from Bhim Tal, KUMAON, western Himalayas and from Soondrijal, NEPAL. Type in the Indian Museum.

NEPAL : Taplejung Distr., Sangu, c. 6,200′, bamboo plantation, 1 ♀, 11. x. 1961 ; by rocky stream, 1 ♀, 7–16. x. 1961 ; and mixed vegetation by stream in valley, 1 ♀, ix–x. 1961 (*R. L. Coe*), B.M. (N.H.).

Penthetria indica (Brunetti)

Plecia indica Brunetti, 1911, *Rec. Indian Mus.* **4** : 271.

Type locality, Darjeeling. Evidently widely distributed through northern India and Nepal. Brunetti recorded cotypes from Soondrijal, Nepal. Type in the Indian Museum.

This species was not present in the collection of the British Museum from Nepal.

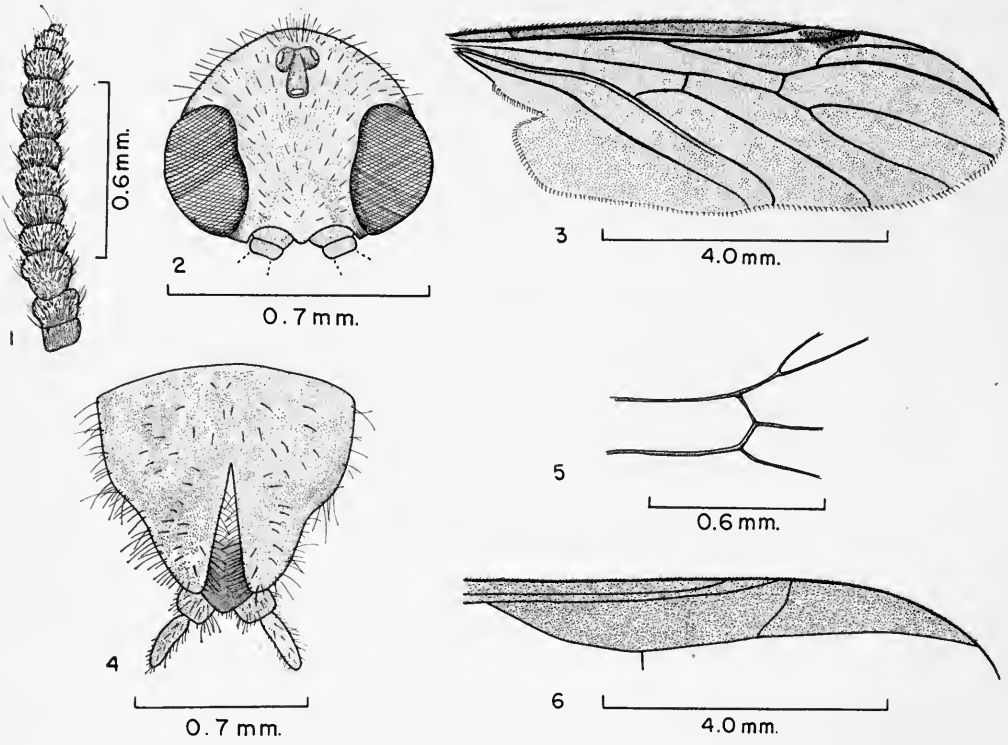
P. indica is differentiated from other *Penthetria* known from this section of the world by having the mesonotum entirely rufous, also by the comparatively short vein R_{2+3}.

The following notes were made from a ♀ specimen from INDIA ; United Province, Naini Tal, 6,750′, 25. ii. 1934 (*J. A. Graham*), B.M. (N.H.).

The entire dorsum of the thorax is opaque orange except for the apex of the scutellum, which is shiny black. The remainder of the body and all appendages are black ; the pleura and femora have a faint brownish to reddish tinge in the ground colour. The mesonotum is sparsely covered with short yellow hairs. As seen from a dorsal view the head is slightly wider than long, the rostrum is not well developed. The ocellar tubercle is well developed and a rather prominent tumescence is present just above the antennae in the middle of the front. The antennae are twelve-segmented. The leg joints are slender, the hind basitarsus is about one-third as long as the tibia. The pile of the coxae and femora is short, yellow, and the tibiae have short yellow pile with some brown to black pile intermixed. The tarsi are covered with brown to black pile. The wings are smoky brown, darker along the anterior margin. The stigma is dark brown, scarcely darker than the membrane. Vein R_{2+3} is about equal in length to the distance from the *r–m* crossvein to the forking of veins R_{2+3} and R_{4+5}. In this respect

this species is somewhat *Plecia*-like but vein R_{2+3} extends almost parallel to R_{4+5} and in this respect would fit *Penthetria*. The fork of veins M_1 and M_2 is situated well before the forking of veins R_{2+3} and R_{4+5}.

Length (of the specimen studied) : Body, 8·5 mm.; wings, 10·3 mm.
Brunetti in the original gave the length as 6·9 mm.



Figs. 1-4. *Penthetria atra* (Brunetti). Fig. 1, antenna ; Fig. 2, head of ♀, dorsal ; Fig. 3, wing ; Fig. 4, ♀ genitalia, ventral. Fig. 5. *Penthetria japonica* Wiedemann, section of wing showing branching of M_1 and M_2. Fig. 6. *Plecia mallochi* Hardy?, anterior margin of wing showing fork of radial sector.

Penthetria japonica Wiedemann

(Text-fig. 5)

Penthetria japonica Wiedemann, 1830, *Aussereurop. zweifl. Ins.* **2** : 618.
Plecia ignicollis Walker, 1848, *List Dipt. Ins. Brit. Mus.* **1** : 116.

For a discussion of this synonymy refer to Hardy (1956 : 85) and to Hardy and Takahashi (1960 : 390). As discussed in the latter reference, *P. japonica* has been commonly treated in the literature as a synonym of *P. melanaspis* Wiedemann; however, the male claspers are rather strongly curved downward, rather blunt at their apices in *japonica* and are straight-sided, rather sharply pointed at the apices

in *melanaspis*. Refer to figures 2 c-d and 3a in Hardy and Takahashi (1960 : 390 and 392). This has been treated by Brunetti : (1911 : 270; and 1912 : 161) as *Pleciomyia melanaspis* Wied.

P. japonica also resembles *motschulskii* (Gimmerthal), from northern China, Siberia and Sakhalin but the wing venation is distinctly different. In *japonica* vein M_1 is joined directly to the *r-m* crossvein (Text-fig. 5) and not joined with M_2 beyond this crossvein, in *motschulskii* vein M_{1+2} extends well beyond the *r-m* crossvein. Also the genitalia are very different in the two species. *P. motschulskii* has the claspers greatly thickened and blunt (fig. 3b, Hardy and Takahashi 1960 : 392).

P. japonica is readily recognized from other known *Penthetria* in Nepal or northern India by having the posterior portion of the mesonotum orange to rufous and the anterior portion velvety black. The remainder of the body and appendages, including the wings, is entirely black.

For a more adequate description, refer to Hardy and Takahashi (1960 : 390–391).

Length of male : Body and wing, 9·0–10·0 mm. Length of female : Body, 10·0–10·7 mm. ; wings, 7·0–12·0 mm.

Type locality : Japan. Type in the Zoologisches Museum, Humboldt Universitat, Berlin.

I have studied specimens of this species from a wide range of localities throughout Northern India, China, and Formosa, as well as Japan.

Nepal, Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, 1 ♀, ix. – x. 1961 (*R. L. Coe*), B.M. (N.H.). Three specimens, two ♂ and one ♀, are in the California Academy of Sciences collection from Nepal : Manga Deorali, 5,500′, 7. xi. 1960 (*L. Swan*) ; Chyaubas to Risingo, 4,000′, no date given—no doubt x. or xi. 1960 (*L. Swan*) ; and Pass Camp near Tarebhir, 4,500′, 26. x. 1960 (*L. Swan*). Brunetti (1912 : 161) recorded this species as *Pleciomyia melanaspis* (Wiedemann), from Soondrijal and Katmandu, Nepal.

Genus ***PLECIA*** Wiedemann

Plecia Wiedemann, 1828, *Aussereurop. zweifl. Ins.* **1** : 72.

Members of this genus are differentiated from *Penthetria* by the short, almost vertical, vein R_{2+3} (Text-fig. 6) and by the vertical, comparatively small, claspers of the male.

Two species are present from Nepal. Both are represented only by females and positive identification is impossible without the males.

Type species : *Hirtea fulvicollis* Fabricius.

Plecia sp. ? ♀ ***impostor*** complex

One female specimen of the *Plecia impostor* complex is in the California Academy of Sciences collection from Nepal : Chyaubas to Risingo, 4,000′, no date given—probably collected x. or xi. 1960 (*L. Swan*). It is impossible to identify species of this complex without the males. The group is characterized by having the mesonotum rufous except for a brown marking on the anterior portion. For a revision of the known Oriental species refer to Hardy 1953.

Plecia mallochi Hardy ?

(Text-fig. 6)

Penthetria thoracica Guérin-Méneville, 1833, in Bélanger, *Voy. Indes Orientales*, : 507. Paris. [Preoccupied by *Laphria thoracica* Fabricius, 1805, *System. Antl.*: 163, a synonym of *Plecia collaris* (Fabricius)].

Plecia confusa Malloch, 1928, *Proc. Linn. Soc. N.S. Wales*, **53** : 605, nec *P. confusa* Loew.

Plecia mallochi Hardy, 1948, *J. Kans. ent. Soc.* **21** : 36. [Change of name for *P. confusa* Malloch, preoccupied by *P. confusa* Loew, 1858, *Berl. ent. Z.* **2** : 109.]

Plecia dispersa Hardy, 1958 : 196. [This was presented as a new name for *mallochi* but the latter is available to replace *thoracica* Guérin-Méneville.]

The *Plecia* which have the thorax entirely rufous have been commonly treated in the literature under the name *fulvicollis* (Fabricius). Brunetti (1912 : 163) treated *Penthetria thoracica* Guérin (= *mallochi* Hardy), *Plecia dorsalis* Walker and *Plecia subvariens* Walker as synonyms under *fulvicollis*. It is probable that none of these are actually synonyms. Brunetti's concept was based entirely upon colour and obviously included an assortment of species. The species from Nepal may probably be *P. mallochi*, which was described from Coromandel, S. E. India, but as I have recorded (Hardy, 1958 : 197) it is one of the common species of India and Ceylon.

One ♀ from NEPAL : Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1,800′, 21.xii.1962. (*R. L. Coe*), B.M. (N.H.), appears to be this species, but it cannot be positively identified without the male. The specimen is larger than any *mallochi* which I have previously seen : the body measures 9·0 mm. and the wing 12·5 mm. although females of *mallochi* will range to 8·5 mm. for the body and approximately 11·0 mm. for the wing and this difference is insignificant.

P. mallochi is related to *javensis* Edwards because of the poorly developed ocellar triangle of the male and is differentiated by the broad blunt claspers and the differences in the shape and development of the ninth sternum and tergum of the male. Refer to Hardy (1958 : 196–197—under *P. dispersa*) for descriptive details and figures.

Genus ***BIBIO*** Geoffroy

Bibio Geoffroy, 1764, *Hist. Nat. Insectes*, **2** : 571.
Pullata Harris, 1776, *Expos. Eng. Ins.* : 76.
Hirtea Fabricius, 1798, *Ent. Syst., Suppl.*, : 551 (*nec* Scopoli, 1763).
Bibiophus Bollow, 1954, *Z. PflBau* **5** (5) : 209, 211.

This genus is characterized by the development of strong apical spurs on the front tibiae (Text-fig. 11), and by the simple radial sector, with the basal portion equal to or longer than the *r-m* crossvein. *Bibio* are rather conspicuously hairy flies, the antennae are short, the segments are thick and closely compressed.

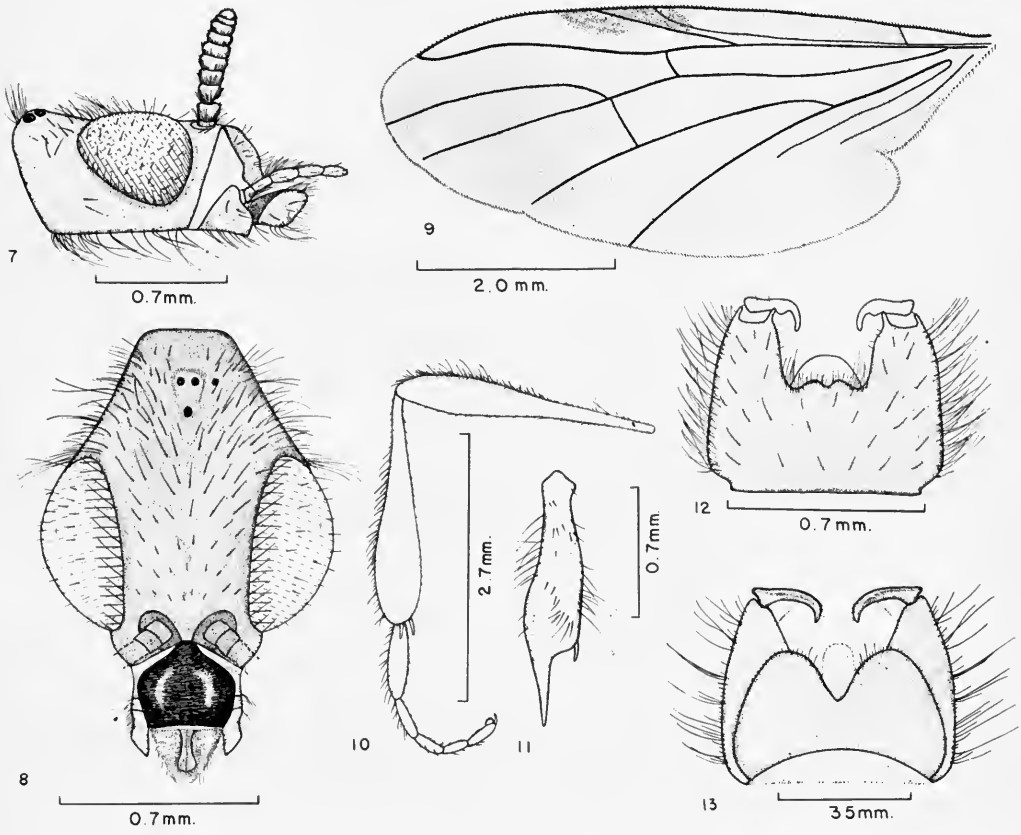
Six species of *Bibio* are known to occur in Nepal, only one of these, *B. nigerrimus* Duda, has been previously recorded. The other five are apparently undescribed.

Type species : *Tipula hortulana* Linnaeus.

Bibio ablusus n. sp.

(Text-figs. 7–13)

This species appears to be related to *B. totonigra* n. sp. but differs by having the body predominantly yellow pilose ; the wings lightly fumose ; the *r-m* crossvein short, about one-half as long as the basal section of *Rs* ; and the terminal segment of the palpus short.



FIGS. 7-13. *Bibio ablusus* n. sp. Fig. 7, ♀ head, lateral ; Fig. 8, ♀ head, dorsal ; Fig. 9, wing ; Fig. 10, hind leg, ♂ ; Fig. 11, front tibia ; Fig. 12, ♂ genitalia, ventral ; Fig. 13, ♂ genitalia, dorsal.

♂. *Head :* Entirely black haired except for long yellow-white hairs down the median portion of the venter. The eyes are densely setose, the setae are approximately one-half longer than the height of the ocellar triangle. The antennae are entirely black, the flagellum is composed of eight segments (Text-fig. 7). The terminal segment of the palpus is short and thick, scarcely longer than wide. The head is just slightly produced beyond the margins of the eyes. The cardo stipites are well developed and prominent (Text-fig. 7). The height of the ocellar tubercle is about equal to the length of the pedicel of the antenna. *Thorax :* Polished black, except for the yellow humeral ridges, and covered with yellow pile except for dense short brown to

black pile over the anteromedian portion of the mesonotum. The stems of the halteres are yellow, tinged with brown, the knobs are brown to black. *Legs :* Polished black except for the yellow to rufous spurs of the tibiae. The inner spur of the front tibia is rudimentary, very tiny compared to the outer (Text-fig. 11). The hind femur is attenuated on the basal half and the tibia is rather gradually expanded, at its widest point it is slightly thicker than the femur. The tarsi are just slightly swollen, the hind basitarsus is four to five times longer than wide and is about one-half as wide as the tibia (Text-fig. 10). *Wings :* Lightly fumose, the stigma and anterior veins brown ; the posterior veins are yellow, tinged with brown, distinctly darker than the membrane. The *r–m* crossvein is about one-half as long as the basal portion of the radial sector. The forking of veins M_1 and M_2 is variable, in some specimens it is distinctly before the *m* crossvein, in others it is at or beyond the *m* crossvein. Veins M_2 and M_{3+4} evanesce before reaching the wing margin (Text-fig. 9). *Abdomen :* Subopaque black, lightly pollinose over the dorsum and submetallic on the lateral margins and on the venter. The abdomen is predominantly yellow pilose with black hairs on the genitalia and over terga five to eight. The ninth sternum is clavate almost half its length on the hind margin and has a small U-shaped concavity at the middle of the hind margin and a membranous gibbosity arising from the inner edge of the sclerite (Text-fig. 12), directly ventral to the aedeagus. The claspers are slender and sharp-pointed. The ninth tergum has a V-shaped concavity on the hind margin extending almost half the length of the segment (Text-fig. 13).

Length : Body and wings, 6·75–7·2 mm.

♀. Exhibiting marked sexual dimorphism from the ♂ and readily differentiated by its brilliant yellow-orange thorax and coxae and the dark fumose wings. As seen from dorsal view, the head is markedly narrowed posteriorly and the clypeus is well developed, slightly longer than broad, also the front is about equal in width to one compound eye (Text-fig. 8). As seen from lateral view, the portion of the head behind the compound eyes is equal in length to approximately two-thirds the length of the eye and the head is shaped as in Text-fig. 7. The wings are rather dark coloured, predominantly brown with the stigma only slightly darker than the wing membrane. The venation is like that of the male.

Length : Body, 7·0–7·7 mm.; wings, 9·0–9·6 mm.

Holotype ♂, NEPAL : Taplejung Distr., edge of mixed forest above Sangu, c. 6,500′, 17.x–1.xi.1961. (*R. L. Coe*). Allotype ♀, Taplejung Distr., Sangu, c. 6,200′, swarming around tents, 2.xi.1961 (*R. L. Coe*). Twenty-six paratypes (eleven ♂, fifteen ♀) all from Taplejung Distr., some same data as holotype and some same data as allotype, others collected at Sangu, c. 6,200′, on blooms of wild cherry, 15-18.xi.1961 ; others between Sangu and Tamrang, deep river gorge, c. 5,200′, x-xi.1961 and same data as above except shrubs by path, c. 5,800′, 6.xi.1961.

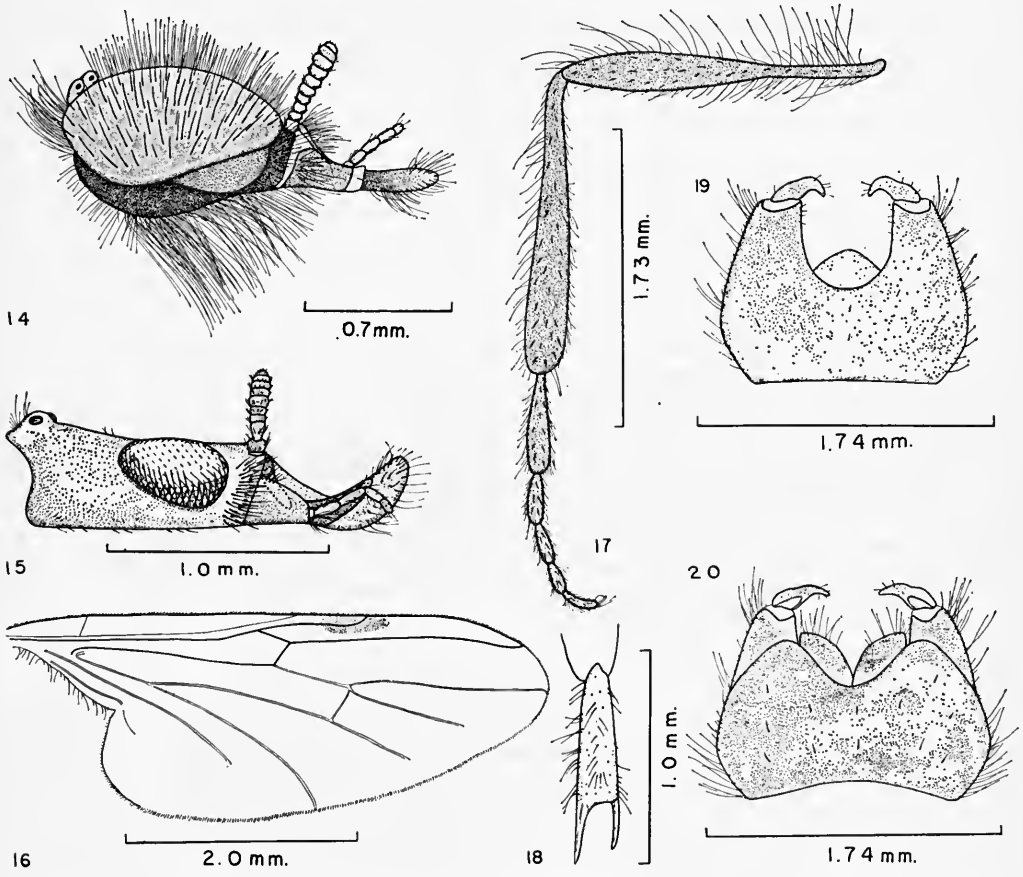
Holotype ♂, allotype ♀ and fifteen paratypes are in the British Museum (Natural History). The remainder of the paratypes are being deposited in the collections of the United States National Museum, B. P. Bishop Museum and the University of Hawaii.

Bibio affiniproximus n. s.p.

(Text-figs. 14–20)

This species would appear to fit near *proximus* Brunetti according to the keys which Brunetti has published for the Indian species. *B. affiniproximus* is readily differentiated by having the wings entirely hyaline except for the dark brown to black stigma and by having the posterior veins colourless, instead of having the wings rather uniformly yellow with the posterior veins coloured darker than the membrane.

It is also characterized by having the rostrum distinctly produced and the cardo stipites well developed (Text-fig. 14), also by the more elongate pile on the eyes and the mesonotum ; the polished black legs ; and by having the *r-m* crossvein approximately equal in length to the base of the radial sector.



FIGS. 14-20. *Bibio affiniproximus* n. sp. Fig. 14, head of ♂ ; Fig. 15, head of ♀ ; Fig. 16, wing ; Fig. 17, hind leg of ♂ ; Fig. 18, front tibia ; Fig. 19, ♂ genitalia, ventral ; Fig. 20, ♂ genitalia, dorsal.

♂. *Head :* By comparison the head is quite elongate, the rostrum is distinctly produced in front of the eyes, this distance is equal or slightly greater than the combined lengths of the scape and pedicel of the antenna. The cardo stipites are very well developed and conspicuous. These fuse ventrally (zygostipes) and form an extension of the rostrum which is about equal in length to the three basal segments of the flagellum of the antenna (Text-fig. 14). The prementum is well developed, is almost as wide as the labellum, and is fused on each side with the bases of the first labial palpal segments. The segments of the palpi are rather short and thick, the apical segment is scarcely longer than wide. The antennae are entirely black, the flagellum is apparently eight-segmented with the last four segments closely joined and distinctly enlarged,

clavate (Text-fig. 14). The entire head is densely black haired, the hairs over the compound eyes are two or more times longer than the height of the ocellar triangle (Text-fig. 14). *Thorax :* Entirely submetallic black, except for the yellow humeral ridges and for a faint tinge of rufous in the ground colour of the pleura. The pile is entirely black. The mesonotum is finely rugose on the sides and down the median portion and is shining in these areas, the dorsocentral lines are opaque black. The scutellum and metanotum are polished black. *Legs :* Predominantly metallic black except for the yellow to rufous tibial claws, and entirely black pilose. The inner spur of the front tibia is approximately three-fourths as long as the outer (Text-fig. 18). The basal two-fifths to one-half of the hind femur is attenuated ; the hind tibia is more gently clavate (Text-fig. 17). The tibia and femur are approximately equal in width. The tarsi are not swollen, the basal segment is five to six times longer than wide. *Wings :* Entirely hyaline except for the dark brown stigma. The anterior veins are brown, tinged with yellow, the posterior veins are colourless. The costa ends at the tip of the radial sector. The *r–m* crossvein is approximately equal in length to the basal section of the radial sector and veins M_1 and M_2 fork at or slightly before the *m* crossvein. Veins M_2 and M_{3+4} evanesce before reaching the wing margin (Text-fig. 16). It is obvious that the position of the forking of veins M_2 and M_1 is somewhat variable. In the paratype male, on one wing the forking is at the *m* crossvein, on the other it is slightly beyond ; in the allotype the forking is at or very slightly beyond the *m* crossvein. *Abdomen :* Metallic black on the venter, subopaque black on the dorsum and entirely black pilose. The ninth sternum is approximately as broad as long and has a semi-membranous gibbosity in the middle of the posterior margin (Text-fig. 19). The claspers are rather slender and pointed. The ninth tergum is approximately two times wider than long and has a U-shaped concavity in the middle of the hind margin which extends approximately two-fifths the length of the segment (Text-fig. 20).

Length : Body, 5·0 mm.; wings, 4·6 mm.

♀. Exhibiting considerable sexual dimorphism from the male. As seen from direct dorsal view the sclerotized portion of the head is almost two times longer than wide. The portion of the head posterior to the compound eyes is about equal in length to one eye and the sclerotized portion in front of the eye (rostrum) is about two-fifths as long as one eye. As seen from lateral view the head is shaped as in Text-fig. 15. The sclerotized portion of the head and appendages is black, the mouth parts are yellow, tinged with brown. The thorax is entirely yellow except for a tinge of brown on the anteromedian portion of the mesonotum, on the lower portions of the pleura, and on the metanotum. The sclerites at the wing base are dark brown to black. The halteres are yellow-brown. The mesonotum is covered with short yellow setae and the scutellum has yellow setae around its hind margin. The pleura are bare or nearly so. The coxae are yellow, the hind margin of each posterior pair is tinged with brown. The trochanters are yellow, tinged with brown to black posterobasally. The front femur is entirely yellow except for a tinge of brown on the base of the segment. The middle femur is yellow, tinged with brown along the dorsal surface, and the hind femur is shining black, tinged with yellow along the ventral portion. The middle and hind tibiae are metallic black. The basal half of the front tibia is brown, tinged with yellow, the apical portion is yellow to rufous. The inner spur of the front tibia is three-fourths to four-fifths as long as the outer. The hind legs are normal in shape for ♀ *Bibio*. The wings are faintly yellow in colour, this is more distinct along the costal margin. The posterior veins are just slightly darker than the wing membrane. The venation is similar to that of the male. The terga of the abdomen are dark brown, the conjunctiva and the sternum are yellow. The cerci are yellow-brown.

Length : Body, 4·3–4·6 mm.; wings, 6·0 mm.

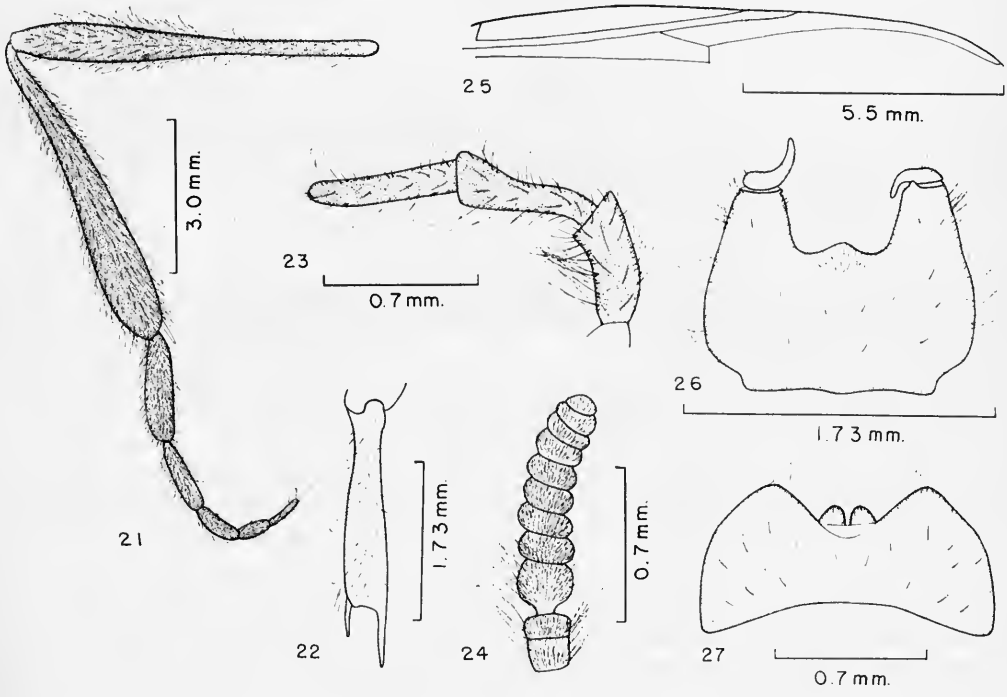
Holotype ♂, allotype ♀, and one paratype ♂, NEPAL : Taplejung Distr., edge of mixed forest above Sangu, c. 6,500′, 17.x-1.xi.1961. (*R. L. Coe*).

The holotype and allotype are in the British Museum (Natural History) collection. The paratype is in the University of Hawaii collection.

Bibio capitaneus n. s.p.

(Text-figs. 21–27)

This is the largest known species in the genus *Bibio*. It appears to be most closely related to *B. hortulanoides* Brunetti and would run to this species in Brunetti's keys (1911 : 273 and 1912 : 169). It should be noted, however, that in Brunetti's key to Oriental species of *Bibio* (1925 : 447), this would run to *obscuripennis* de Meijere. This is misleading since Brunetti's key does not include the males of *hortulanoides* and he overlooked the most obvious characters for separating *obscuripennis*, using only size to differentiate this species. *B. capitaneus*, as well as *hortulanoides*, is not related to *obscuripennis*. The latter is readily differentiated by the narrow, linear-sided front tibiae and blunt tibial spurs. (Refer to my remarks under *Bibio nigerrimus* Duda). *B. capitaneus* is readily differentiated from *hortulanoides* by having the wings, including the costal cells and anterior margin, completely hyaline, rather than having the costal cells dark brown and cell R_5 tinged with brown. *B. capitaneus* also differs by being much larger ; having eleven, rather than nine, segments in the antenna ; having the inner spur on the front tibia nearly one-half as long as the outer, rather than rudimentary ; by the more elongate apical segment of the palpus ; and the more thickened hind tarsi.



FIGS. 21-27. *Bibio capitaneus* n. sp. Fig. 21, hind leg of ♂ ; Fig. 22, front tibia ; Fig. 23, palpus ; Fig. 24, antenna ; Fig. 25, anterior margin of wing ; Fig. 26, ♂ genitalia, ventral; Fig. 27, ninth tergum of ♂.

♂. Entirely shining black species, except for a tinge of rufous on the tibial spurs, and densely covered with black pile. *Head :* The rostrum is not produced, the details of the mouthparts are obscured by the dense black pile. The last segment of the palpus is long and slender (Text-fig. 23), six times longer than wide (0·75 by 0·12 mm.) and slightly longer than the penultimate segment (0·62 mm.). The antenna is 11-segmented, the last two segments are closely joined (Text-fig. 24). The pile of the compound eyes is about two times longer than the height of the ocellar triangle. *Thorax :* Entirely shining black except for a faint tinge of yellow in the ground colour of the posterior portion of each humeral ridge. The mesonotum is finely rugose on the sides and densely pilose except for a bare area down the middle and down the outside of each dorsocentral line. The halteres are entirely black. The sclerites around the wing base are polished black. *Legs :* The front tibia is slender, almost straight-sided, only slightly bulged medianly, the inner spur is approximately one-half as long as the outer (Text-fig. 22). The basal half of the hind femur is attenuated, the apical portion moderately swollen. The hind tibia is gradually enlarged from base to apex and has a bare area extending longitudinally down the posterodorsal surface. The hind femur measures 6·5 mm. in length, the hind tibia 6·0 mm., at their widest points the two segments are approximately equal in width. The hind basitarsus is about five times longer than wide (2·5 mm. long by 0·5 mm. wide) (Text-fig. 21) and is two-thirds as wide as the apex of the tibia. The apical spurs of the hind tibia are sharp pointed. *Wings :* Entirely hyaline except for the brown stigma. The costal cells and anterior margin of the wing are not infuscated. The anterior veins including the humeral crossveins are brown, the posterior veins are colorless. The humeral crossvein is very broad. The costa extends slightly beyond the apex of the radial sector. The *r–m* crossvein is about one-third as long as the basal section of the radial sector (Text-fig. 25). Veins M_1 and M_2 fork slightly before the *m* crossvein. Vein M_3 evanesces just before the wing margin. *Abdomen :* Entirely subshining black, densely black pilose. The ninth tergum is two times wider than long, a broad U-shaped concavity extends about one-half the length of the segment (Text-fig. 27). The claspers are rather slender, pointed at apices. The ninth sternum is shaped as in Text-fig. 26.

Length : Body, 15·5 mm.; wings, 14·0 mm.

♀. Unknown.

Holotype ♂ and one paratype ♂ from NEPAL : Kharikhola, 5,500′, 15.xi.1960 (*L. Swan*).

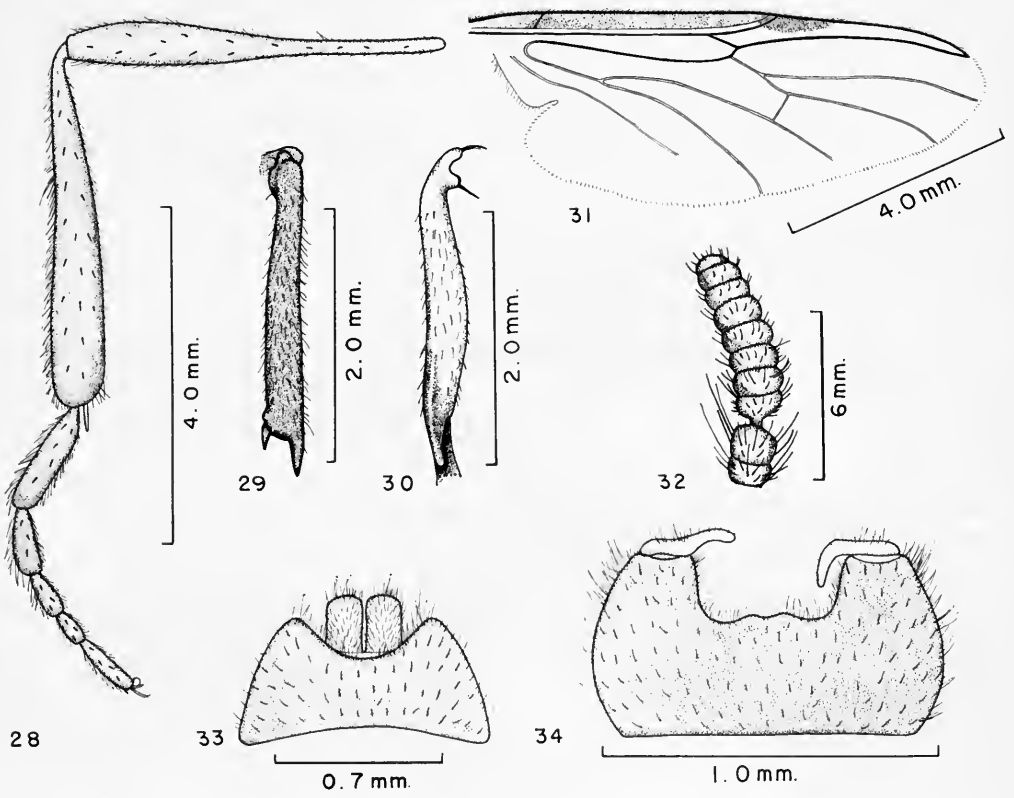
Type in the California Academy of Sciences collection, paratype in the University of Hawaii collection.

Bibio nigerrimus Duda

(Text-figs. 28–34)

Bibio tenebrosus var. *nigerrima* Duda, 1930, 4, Bibionidae, in Lindner, *Fliegen der Palaearkt. Reg.* **4** : 43, 70. [This was spelled " *nigerrimus* " in the key, p. 43, and " *nigerrima* " in the text, p. 70.]

In the recent revision of the Japanese Bibionidae (Hardy and Takahashi, 1960 : 440) I had decided that *B. obscuripennis* de Meijere and *nigerrimus* Duda were synonyms of *B. tenebrosus* Coquillett. I have since had an opportunity of restudying a large series of specimens from Nepal and from northern India as well as from several localities in China and now feel that it is probable that a complex of species exists which is very closely related to *tenebrosus*. These species are characterized by the rather slender, almost linear-sided front tibia and the very broad blunt outer spur ; also by the large size, and dark fumose wings. Typical *tenebrosus* are characterized by having pale yellow pile over at least the pleura and the first two



FIGS. 28-34. *Bibio nigerrimus* Duda. Fig. 28, hind leg of ♂ ; Fig. 29, front tibia, dorsal ; Fig. 30, front tibia, lateral ; Fig. 31, wing ; Fig. 32, antenna ; Fig. 33, ninth tergum of ♂ ; Fig. 34, ♂ genitalia, ventral.

abdominal segments ; also by having eleven distinct segments in the antenna. Specimens from northern India, Nepal, and also Fukien, China, are completely black pilose and have only ten segments in the antenna. Specimens from Nepal (*nigerrimus* Duda) differ from those from northern India (*obscuripennis* de Meijere) by having the ninth tergum of the male broadly U-shaped on the hind margin (Text-fig. 33) rather than having a distinct V-shaped cleft on the hind margin as in *obscuripennis* and also in *tenebrosus*. Also in *nigerrimus* the posterior veins of the wings are concolorous with the grey wing membrane or but faintly yellow, and the second costal cell, stigma, and the anterior veins are dark brownish black. In *obscuripennis* and *tenebrosus* the posterior veins of the wing are brownish yellow, distinctly darker than the wing membrane ; the second costal cell, stigma, and the anterior veins are pale brown. I have studied specimens from the type locality of *nigerrimus* (Chitlong, Nepal) in the Naturhistorisches Museum, Vienna, and have also studied specimens from Darjeeling which were in the Naturhistorisches Museum under *B. obscuripennis*. I have not dissected the male of a specimen from Darjeeling

(the type locality of *obscuripennis*) and the dissected specimens used for this comparison are from the Mishmi Hills, Assam, India. These compare well with my notes made on the Darjeeling specimens in the Naturhistorisches Museum.

This species is readily recognized by its large size, all black coloration and pilosity; by the distinctively shaped front tibiae and tibial spurs (Text-figs. 29, 30) ; by the ten-segmented antenna (Text-fig. 32) ; by the smoky wings with dark brown to black costal margin and stigma, and black anterior veins and almost hyaline posterior veins (Text-fig. 31) ; also by the broadly U-shaped cleft on the hind margin of the ninth tergum (Text-fig. 33). The hind legs are shaped as in Text-fig. 28.

I have not studied a female specimen but presume that the antennae would be eleven-segmented and that they would differ from *tenebrosus* only by having all black pile.

Length : Body, 12·0–13·0 mm. ; wings, 11·0–12·0 mm.

Type locality : Nepal : Chitlong.

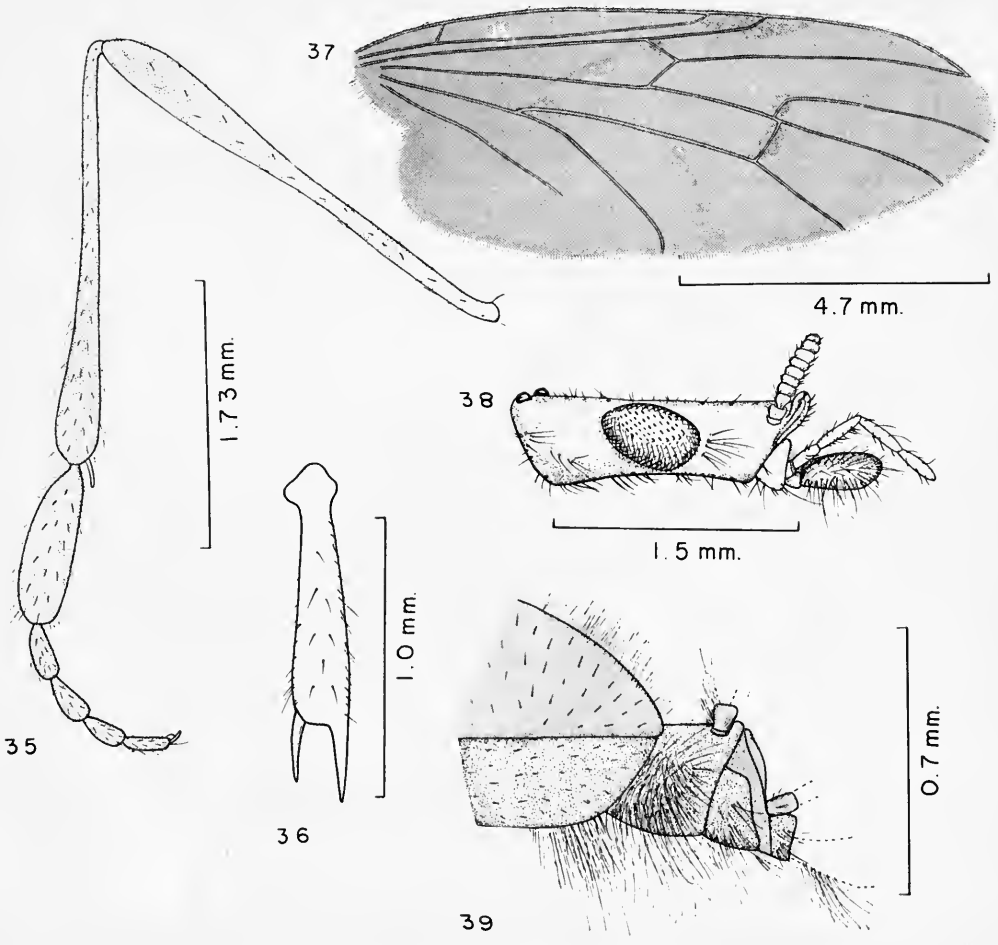
Nepal : Taplejung District, 19 ♂ (*R. L. Coe*) ; edge of mixed forest above Sangu, hovering about ten feet from ground in open spaces, c. 6,500′, 17.x-1.xi.1961 ; below Sangu, edge of small mixed wood, c. 6,000′, 4.xi.1961 and mixed shrubs in deep gorge, 5,200′ ; and Sangu, mixed vegetation by stream in gully, ix-x.1961, B.M. (N.H.). Nepal : Thari, 4,000′, 24.x.1960, 2 ♂ (*L. Swan*), in the California Academy of Sciences collection.

Bibio scaurus n. s.p.

(Text-figs. 35–39)

This species fits near *proximus* Brunetti in Brunetti's keys, but differs distinctly by having the hind femora and tibiae much more slender, the hind tarsi inflated, the wings dusky fumose, and the pile of the thorax predominantly black. The rostrum is also rather strongly produced and the hairs on the compound eyes more elongate than in *proximus*. It also appears to be related to *affiniproximus* n. sp. but the swollen hind basitarsi of the ♂, yellow fumose wings with yellow-brown posterior veins, larger size and other details will separate it.

♂. *Head :* Distinctly higher than long with the rostrum (sclerotized portion of the head beyond the eyes) equal to the combined lengths of the first two to three flagellar segments of the antennae. Also with the cardo stipites prominent, well developed (Text-fig. 39). The hairs of the compound eyes are rather elongate, approximately equal in length to twice the height of the ocellar triangle but are sparsely placed. The antennae are entirely black, the flagellum consists of eight clearly defined segments. The last segment of the palpus is slightly longer than the penultimate segment and is approximately four times longer than wide. The pile of the under side of the head is entirely black. *Thorax :* Black haired except for yellow pile on the propleura and on the meso and sternopleura. The mesonotum is subopaque black except for the yellow humeral ridges, and for a tinge of yellow at the wing bases, shining and smooth down each dorsocentral line, otherwise finely rugose. The halteres are dark brown to black. *Legs :* Metallic black except for the yellow to rufous spurs of the tibiae, and except for a faint tinge of rufous in the ground colour of the front femora and the middle tibiae. The inner spur of the front tibia is approximately three-fourths as long as the outer (Text-fig. 36). The hind legs are elongate, the tibiae and femora are slender, attenuated on their basal three-fifths, clavate apically. The hind basitarsus is rather strongly swollen, distinctly thicker than



FIGS. 35-39. *Bibio scaurus* n. sp. Fig. 35, hind leg of ♂ ; Fig. 36, front tibia ; Fig. 37, wing ; Fig. 38, head of ♀ ; Fig. 39, anterior portion of ♂ head.

the hind tibia and scarcely three times longer than wide (Text-fig. 35). *Wings :* Dusky fumose, slightly darker along the costal margin. The stigma is dark brown. The anterior veins are brown, the posterior veins are brown, tinged with yellow, distinctly darker than the wing membrane. The *r–m* crossvein is approximately two-thirds as long as the basal section of the radial sector. Veins M_1 and M_2 fork slightly before the *m* crossvein and veins M_2 and M_{3+4} extend to the wing margin. *Abdomen :* Shining black in ground colour, dusted with brown to black pollen over the dorsal portion. The genitalia are subshining black. The abdomen is completely black pilose. The genitalia have not been dissected for study. *In situ* the ninth tergum has a rather deep V-shaped concavity on the hind margin, this apparently extends slightly more than one-half the length of the segment. The claspers appear to be rather short and blunt compared to most *Bibio* species.

Length : Body, 6·0 mm.; wings, 6·5 mm.

♀. Showing marked sexual dimorphism from the male. *Head :* Elongate, as seen from dorsal view the head is two times longer than wide. From a lateral view the portion of the

head behind the eye is approximately equal in length to the eye and the sclerotized portion in front of the eye, measured at a level with the bases of the antennae, is also approximately equal in length to the compound eye. The head is predominantly subopaque black, finely rugose. The posteroventral portion is polished black and smooth. The head is yellow pilose except for short brown to black hairs on the anterior portion of the front, and except for black setae on the clypeus, antennae, palpi and mouthparts. The cardo stipites are well developed, approximately equal in length to the two basal flagellar segments of the antennae. The scape of the antenna is brown, faintly tinged with yellow, the pedicel is yellow ; the flagellum is dark brown to black. The front margin of the head and the clypeus fit together forming a gibbosity which extends anterior to the antennae bases (Text-fig. 38). *Thorax :* The prothorax is yellow except for a brown to black spot covering the median portion of the notum. The humeri and the humeral ridges are yellow. The mesonotum is largely black, the anterior corners, the lateral margins, and the posteromedian portion are yellow ; also a thin yellow vitta extends down each dorsocentral line. The three large black areas, which are set off by the yellow, are subopaque, finely rugose. The pleura are yellow except for the shining black lower two-thirds of each sternopleuron ; a black spot at the base of each hypopleuron and one at the lower anterior edge of pteropleuron. The sclerites at the base of the wing are also black. The thorax is entirely yellow pilose. Halteres yellow. *Legs :* Predominantly yellow, tinged with black over the dorsum of the swollen portion of each hind femur, and tinged with brown over the dorsal surfaces of the mid and front femora. The tibiae are yellow except for a faint tinge of brown at the apices of the hind pair and the tarsi are yellow, tinged with brown. The front tibia is as in Text-fig. 36. The hind femur is attenuated on the basal one-half to two-fifths of the segment. The hind tibia is not swollen. *Wings :* Faintly yellowed, more intensely so along the anterior margin. The stigma is yellow, tinged with brown. The anterior veins are brownish yellow, the posterior veins are yellow, faintly tinged with brown but distinctly darker than the wing membrane. Distinct pale brown spots occur at the base of vein M_{3+4}, over the *m* crossvein, and over crossvein *r–m* and the base of the radial sector (Text-fig. 37). The wing venation is similar to that of the ♂. *Abdomen :* Shining brown to black over the dorsum, brown, tinged with red on the first four to five sterna and yellow on the posterior sterna. The genitalia are yellow.

Length : Body and wings, 9·0–9·6 mm.

Holotype ♂ and allotype ♀, NEPAL : Taplejung Distr., damp evergreen oak forest above Sangu, c. 8,500–9,200′, 2-26.xi.1961 (*R. L. Coe*), in the British Museum (Natural History).

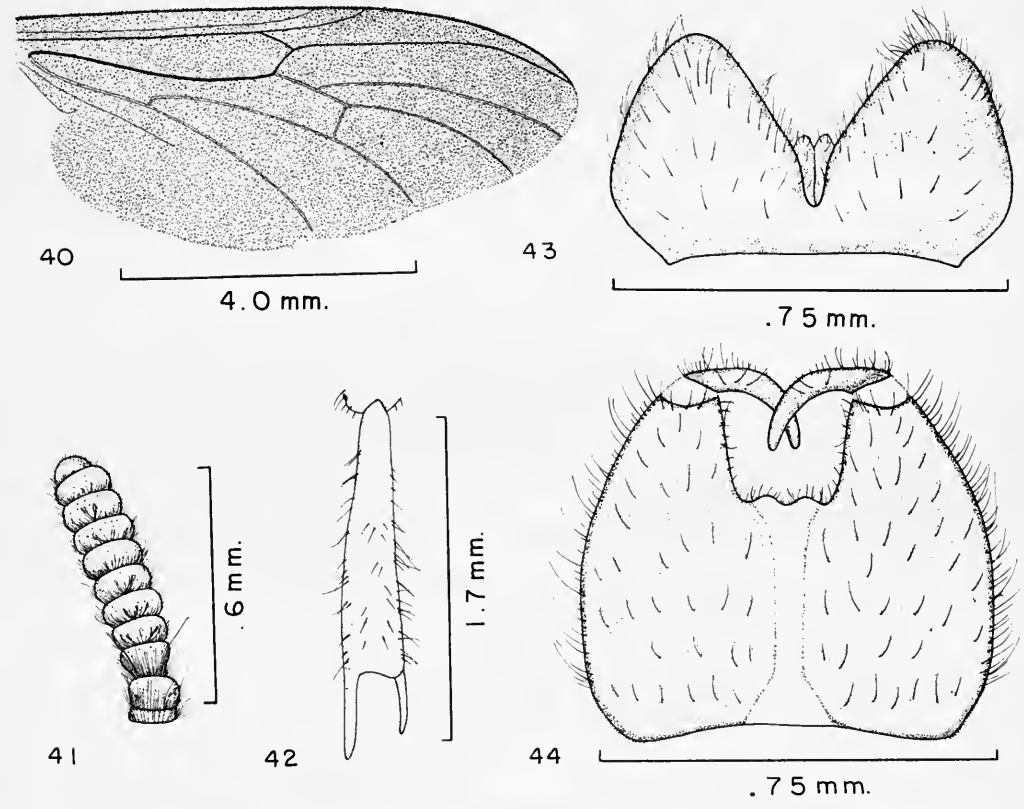
Bibio totonigra n. sp.

(Text-figs. 40–44)

This species superficially resembles *B. nigerrimus* Duda because of the all-black body and appendages and the smoky black wings. The two are not related however, and *totonigra* is readily differentiated by the slender spurs at the apices of the front tibiae ; by having the *r-m* crossvein almost equal in length to the basal section of the radial sector ; as well as by many other details. In the key it fits near *ablusus* n. sp. but is differentiated by the elongate terminal segment of the palpus, the all black pile, smoky black wings, and other characters.

♂. Entirely black species with the body and appendages covered with black pile. *Head :* The rostrum is not developed, the front margin of the head is not produced beyond the eye margins. The antennae are eleven-segmented, the apical two are closely joined (Text-fig. 41). The apical segment of each palpus is slender, slightly longer than the preapical segment, and six or seven times longer than wide. *Thorax :* The lower portion of each sternopleuron is polished black, the pleura are otherwise subshining, finely rugose. The mesonotum is pre-

dominantly opaque black with long black pile on the margins and down each dorsocentral line and is rather coarsely rugose down the median portion and on the sides. The scutellum and metanotum are polished black. *Legs :* Entirely shining black, densely black haired. The inner spur on the front tibia is about three-fourths as long as the outer (Text-fig. 42). It should be noted that the left front tibia of the type is abnormal. This segment is considerably shrivelled,



FIGS. 40-44. *Bibio totonigra* n .sp. Fig. 40, wing ; Fig. 41, antenna ; Fig. 42, front tibia ; Fig. 43, ninth tergum of ♂ ; Fig. 44, ♂ genitalia, ventral.

much shorter than normal and the inner spur is rather poorly developed. The normal development of the more elongate inner spur is borne out by the second specimen at hand. This specimen was not chosen as the type since the abdomen and the hind legs have been broken off. The spurs of the middle and hind tibiae are approximately equal in size and shape. The hind femora are clavate, attenuated on their basal halves. The hind basitarsi are straight-sided, not noticeably thickened, and nearly two times longer than the second tarsal segment. *Wings :* Entirely dark colored, black along the anterior margin, smoky black over most of the membrane. The base of *Rs* is slightly longer than the *r-m* crossvein. The *m* crossvein is situated about its own length from the forking of veins M_1 and M_2. Veins M_2 and M_{3+4} evanesce just before the wing margin (Text-fig. 40). *Abdomen :* Entirely subshining black, densely black pilose. The claspers are slender, rather sharp pointed, the ninth sternum is cleft about half its length and a

pair of small submedian bumps are present on the hindmargin. The basal half of the sternum is semi-membranous down the median portion (Text-fig. 44). The ninth tergum is shaped as in Text-fig. 43, a small mound is present in the middle of the hind margin.

Length : Body, 8·9 mm. ; wings, 9·3 mm.

♀ unknown.

Holotype ♂, NEPAL : Taplejung Distr., damp evergreen oak forest above Sangu, c. 9,200′, 2-26.xi.1961 (*R. L. Coe*). One paratype ♂, same data as type.

Type in the British Museum (Natural History), paratype in the University of Hawaii collection.

Genus ***DILOPHUS*** Meigen

Philia Meigen, 1800, *Nouv. Class. Mouches* : 20. [A rejected name.]
Dilophus Meigen, 1803, *Illiger's Mag.* **1** (2) : 269.

Members of this genus are characterized by having two or three sets of strong spines on each front tibia (Text-fig. 46) and by the simple radial sector of the wing with the basal section of *Rs* short compared to the *r-m* crossvein (Text-fig. 50).

The genus has not previously been reported from Nepal, two species are now known to occur there.

Type species : *Tipula febrilis* Linnaeus.

Dilophus gratiosus Bigot

(Text-figs. 45–47)

Dilophus gratiosus Bigot, 1890, *J. Asiat. Soc. Beng.* **59** : 265.

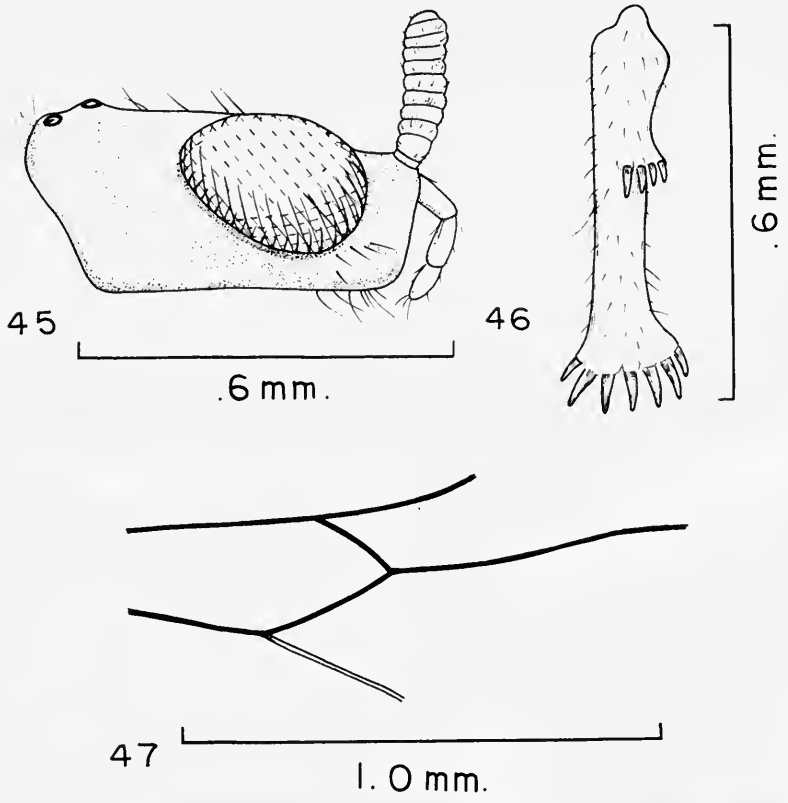
This is the only species of *Dilophus* which has previously been recorded from the Himalaya region. Brunetti recorded it from several localities in northern India and Upper Burma (1911 : 280 and 1912 : 178). It has been differentiated by the predominantly black body and legs of the male, the predominantly red thorax of the female, the short rostrum and the presence of yellow pile over the body and legs. Two ♀ specimens on hand appear to be typical *gratiosus* ; they were not associated with the male and may possibly be the females of the new species *hirsutus* ; on the basis of the wing and leg characters, however, this seems unlikely.

The following descriptive notes are based upon two females from NEPAL, and one ♂ from INDIA : Chhatoru, Spiti Valley, 11,000′, 16.vi.1955 (*A. P. Kapur*).

♂. Entirely shining black, the body and legs are pale yellow pilose except for dark pile on the tarsi. The thorax is sparsely pilose, with short yellow hairs. Brunetti in his redescription (1912 : 178) said that the posterior margin of the scutellum and the sides of the metapleura are bright brownish yellow, on the specimen at hand there is only a rather faint indication of yellow to rufous in the ground colour of the sides of the scutellum. The rostrum is not produced beyond the bases of the antennae and the sclerotized portion of the head in front of the eyes, measured at the antennal bases, is approximately equal in length to the first two flagellar segments of the antenna. On the specimen at hand the legs are entirely shining black, the claws are brownish red. Brunetti described the legs as reddish brown. The front tibia has a transverse row of four short spines arranged at the middle of the segment (Text-fig. 46). The leg segments are rather slender, the hind basitarsi are about half as long as the tibiae. The wings are subhyaline, faintly yellowish along the costal margin ; the stigma is pale brown. The base of the radial

sector is approximately one-half as long as the *r-m* crossvein (Text-fig. 47). The ♂ genitalia have not been dissected for study.

The ♀ head is polished black, smooth, the front is approximately equal in width to one compound eye. The head is slightly longer than wide, as seen from lateral view it is as in Text-fig. 45. The thorax is predominantly rufous, typically with a dark brown to black vitta extending down the anteromedian portion. The coxae, trochanters, and the first two pairs of



FIGS. 45-47. *Dilophus gratiosus* Bigot. Fig. 45, head of ♀ ; Fig. 46, front tibia ; Fig. 47, middle portion of wing.

femora are yellow to rufous. Each middle femur is tinged with brown at the apex. The hind femur is yellow to rufous on the basal two-thirds, shining brown to black on the apex. The tibiae and tarsi are shining black. The tibial spines are slightly larger, more prominent than in the ♂. The wings are yellow fumose, darker along the costal margin. The stigma and anterior veins are dark brown, the posterior veins are yellow, tinged with brown. The venation is similar to that of the ♂. The abdomen is brown to black on the dorsum, rufous, faintly tinged with brown on the venter. The cerci are dark brown.

Length : Body and wings, 3·5–3·75 mm.

Type locality : Dharamsala, western Himalayas. Type in the Indian Museum.

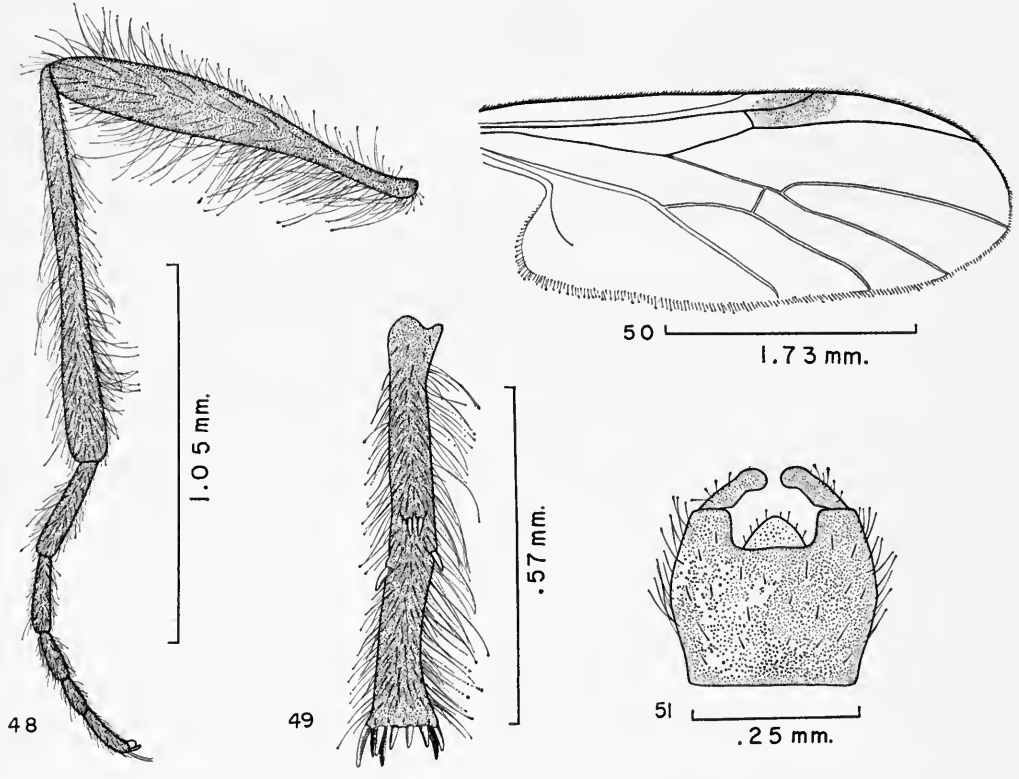
The two ♀ specimens on hand are from NEPAL : Ghanpokhara, 5,500-7,000′, 2.v.1954 (*J. Quinlan*).

Dilophus hirsutus n. sp.

(Text-figs. 48–51)

This species is somewhat similar to *gratiosus* Bigot but differs by having the basal section of the radial sector very short, approximately one-fifth as long as the *r-m* crossvein, rather than being approximately one-half as long as the *r-m* ; by having the body and legs densely black pilose, rather than sparsely pale pilose ; by having spines at the middle of the front tibia differently arranged as in Text-figs. 49 and 46 ; and the hind basitarsus comparatively short (Text-fig. 48). Also the wings of the male are distinctly fumose and the costal vein extends about half the distance between the apices of the *Rs* and M_1 (Text-fig. 50).

♂. Entirely shining black species, including the appendages, and densely covered with black pile. *Head :* The eyes are densely covered with moderately long black pile, the hairs are approximately two times longer than the height of the ocellar triangle. The head beyond the eyes is very short, completely obscured by the dense black pile of the front of the head. The palpi are very short and inconspicuous, only two or three short segments are visible on the specimens at hand and the labellum is not extended. The flagellum of the antenna is made up of six to seven segments, the apical segments are closely fused and the apical portion is distinctly enlarged, clavate. *Thorax :* Predominantly polished black, finely rugose down the median



Figs. 48-51. *Dilophus hirsutus* n. sp. Fig. 48, hind leg ; Fig. 49, front tibia ; Fig. 50, wing ; Fig. 51, ♂ genitalia, ventral.

portion and on the sides of the mesonotum, also on the pleura and the scutellum. The mesonotum has an abundance of long black hairs on the sides and down the dorsocentral lines. The scutellum is densely black haired around the margin. The pile of the pleura is dark brown to black. The halteres are brown, tinged with yellow on the stems. *Legs :* Polished black, densely black pilose except for a few scattered yellow ventral hairs on the apical one-half to three-fifths of the hind femur. Four dorsal spines are arranged near the middle of the front tibia ; these are arranged as in Text-fig. 49. The apical spur is equal in size to the apical spines. The hind basitarsus is slender, but rather short, scarcely over one-fourth as long as the tibia (Text-fig. 48). *Wings :* Faintly infuscated, the anterior veins and stigma are dark brown, the posterior veins are yellow, tinged with brown. The base of the radial sector is approximately one-fifth as long as the *r-m* crossvein and the fork of veins M_1 and M_2 is well beyond the *m* crossvein (Text-fig. 50). The costa extends approximately one-half the distance between the apices of the radial sector and vein M_1. *Abdomen :* Shining black, rather slender, covered with black pile on the basal four segments and yellow pilose on the apical four segments and on the genitalia. The genitalia as seen from ventral view are as in Text-fig. 51, the cleft on the posteromedian margin of the ninth sternum is rather shallow and the claspers are rounded, blunt at apices. The ninth tergum is damaged on the specimen which has been relaxed for study. It appears to be about one-half wider than long with a gentle concavity on the posterior margin.

Length : Body, 3·5 mm. ; wings, 4·0 mm.

♀ unknown.

Holotype ♂ and eight paratypes ♂, E. NEPAL : S. of Makalu, 5.ix.1954, 13,500′ (*L. W. Swan*).

Type and four paratypes in the California Academy of Sciences, two paratypes are being deposited in the British Museum (Natural History), and two in the collection of the University of Hawaii.

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DIPTERA FROM NEPAL

AGROMYZIDAE

By K. A. SPENCER

SYNOPSIS

This paper is based on 34 specimens collected by R. L. Coe during the 1961-62 British Museum Expedition to East Nepal. Eight species are represented. Two of these are described below as new, one being placed in a new genus, *Lemurimyza* ; five were previously known from the Oriental region and one, *Phytoliriomyza australensis* Spencer, has previously only been recorded in Australia and Tahiti.

REFERENCES not included will be found in full in my synopsis of Oriental species (Spencer, 1961).

Genus ***JAPANAGROMYZA*** Sasakawa

Japanagromyza trispina (Thomson) **comb. nov.**

Agromyza trispina Thomson, 1869.
Agromyza variihalterata Malloch, 1914. **syn. nov.**
Japanagromyza variihalterata (Malloch) Spencer, 1960 : 17.

Taplejung Dist., Sangu, c. 6,200′, 1 ♀, ix-x.1961.

I have recently examined the holotype of *Agromyza trispina* in the Naturhistoriska Riksmuseum, Stockholm. This is a female in good condition which is clearly identical with the widespread Oriental species, *J. variihalterata* (Malloch) ; *variihalterata* is therefore synonymized with *trispina* herewith. The type locality of *trispina* is given as " China ", and is presumably somewhere on the southern seaboard; *J. variihalterata* was described from Formosa.

Genus ***MELANAGROMYZA*** Hendel

Melanagromyza metallica (Thomson)

Agromyza metallica Thomson, 1869.
Melanagromyza metallica (Thomson) Spencer, 1959.

Arun Valley, Tumlingtar, East shore of Riv. Arun below Tumlingtar, 1,800′, 1♂, 2 ♀, 14-23.xii.1961. Taplejung Dist., Dobhan, c. 3,500′, Riv. Maewa, 1♂, 2.i.1962 ; Sangu, c. 6,200′, 1 ♀, 16-29.x.1961 ; 1 ♀, ix-x.1961.

The biology of this widespread species has recently been clarified. In November 1962 I found larvae in stems of *Ageratum conyzoides* L. at Delhi but failed to breed any adults ; in January 1963 V. K. Sehgal, who was collecting with me at Delhi, found some more larvae in the same host (India : Bihar, Namkum, Ranchi,) and the adults sent to me for examination proved to be *metallica*. Sehgal has subsequently bred the species also from *Bidens pilosa* L. and it no doubt also occurs in other Compositae.

Melanagromyza phaseoli (Tryon)

Oscinis phaseoli (Tryon) Spencer, 1895.
Melanagromyza phaseoli (Tryon) Spencer, 1959.

Taplejung Dist., between Sangu and Tamrang, c. 5,500′, 1 ♀, 23.x.1961.

Genus ***CERODONTHA*** Rondani

Nowakowski (1962) has recently transferred the sub-genus *Icteromyza* from *Phytobia* to *Cerodontha* and I here follow this new classification.

Cerodontha (*Icteromyza*) *duplicata* (Spencer), **comb. nov.**

Phytobia (*Icteromyza*) *duplicata* Spencer, 1961.

Taplejung Dist., between Sangu and Tamrang, shrubs by path, c. 5,800′, 1 ♂, 1 ♀, 6.xi.1961 ; dense vegetation in tree shade by hill stream, 3 ♂, 3 ♀, 23.x.1961 ; Sangu, c. 6,200′, mixed vegetation by stream in gully, 2 ♂, 1 ♀, ix-x.1961 and xi.1961-i.1962 ; on yellow blooms of cultivated Composite, 2 ♂, 16-29.x.1961 ; below Sangu, c. 4,000′, mixed vegetation on sheltered slopes above river, 1 ♂, 2 ♀, 3.i.1962 ; river banks below Tamrang bridge, c. 5,500′, 1 ♂, x-xi.1961 ; edge of mixed forest above Sangu, c. 6,500′, 3 ♀, 17.x.-1.xi.1961.

This series represents the second record of this species which was described from a single male from INDONESIA : Flores.

Genus ***LIRIOMYZA*** Mik

Liriomyza compositella Spencer

Liriomyza compositella Spencer, 1961.

This leaf-miner on Compositae is widespread in the Oriental Region. In November 1962 I bred a long series from leaf-mines on *Xanthium strumarium* L. at Delhi.

LEMURIMYZA gen. n.

(*Lemuria* and *myza*)

(Text-figs. 52–58)

Frons broad, one and a quarter to twice width of eye, two upper fronto-orbital bristles, one lower ; orbital setulae minute, proclinate, upright, reclinate or lacking ; acrostichals sparse, in only two rows ; small species, wing length 1·75 to 2·3 mm. ; sub-costa reaching costa independently of vein r_1, costa extending to vein M_{1+2}, second crossvein present. Colour : head largely yellow, third antennal segment yellow or black ; mesonotum black but with yellow patch in centre before scutellum ; scutellum yellow, at least centrally ; halteres black or yellow. ♂ GENITALIA : distiphallus in form of characteristic paired tubules (Text-figs. 53, 56, 58), mesophallus dark, cylindrical, surstyli separated by wide suture from ninth tergite, bare or with a few hairs and/or spines, linked to basal end of ninth tergite by strong, black, comb-like process (Text-figs. 54, 57, 59) ; ninth sternite with narrow side-arms, somewhat elongated ; spermal sac either minute (as in *enormis*, Spencer, 1963B : fig. 1C and *dorsata*) or more normal (as in *admirabilis*, fig. 55).

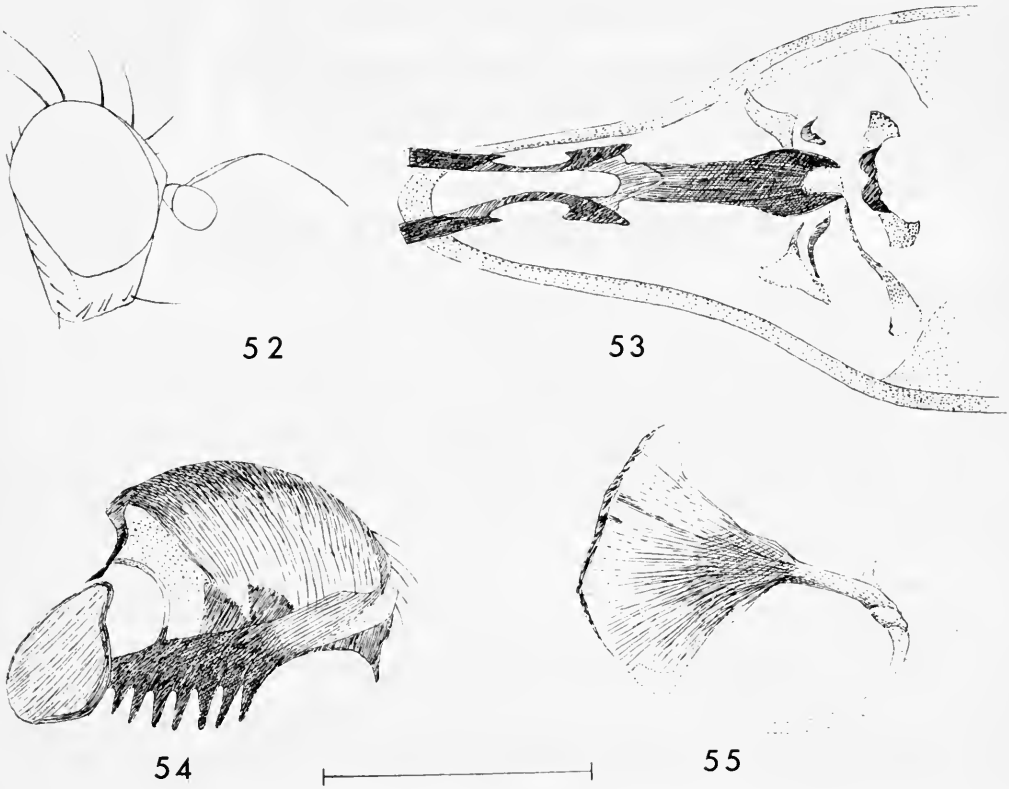
Type species : *Liriomyza enormis* Spencer, 1963B : 114 by present designation.

This genus appears to occupy an intermediate position between *Liriomyza* Mik and *Phytoliriomyza* Hendel. The orbital setulae are intermediate between the distinctly reclinate setulae of *Liriomyza* and the distinctly proclinate setulae of *Phytoliriomyza*. The form of aedeagus approaches that found in some species of *Phytoliriomyza*, such as *P. lurida* Spencer from Brazil (Spencer, 1963C : 379). In many species of *Phytoliriomyza* the halteres are partially darkened. The shape of the head is more typical of *Liriomyza*.

The genus *Lemurimyza* can be included in the author's (1961 : 57) key to Oriental genera by amending and extending couplet 8 as follows : second alternative, for *Liriomyza* Mik read 8A ; add new couplet :

8A Halteres dark brown ; if yellow, orbital setulae incurved, sparse or lacking
Lemurimyza Spencer

— Halteres yellow ; orbital setulae distinctly reclinate . . ***Liriomyza*** Mik



FIGS. 52–55. *Lemurimyza admirabilis* sp. n. : Fig. 52, head ; Fig. 53, aedeagus and ninth sternite, ventral view ; Fig. 54, surstylus ; Fig. 55, spermal sac.
(Scale line represents 0·1 mm. for genitalia drawings).

Four species can immediately be grouped into this genus : *Liriomyza enormis* Spencer from Madagascar ; *L. admirabilis* sp. n. from Nepal described below ; and *Agromyza dorsata* Siebke and *A. pectoralis* Becker from Europe.

These four species can be identified by the following key :

1	Halteres dark, brownish-black	2
—	Halteres pale, yellow	3
2	Third antennal segment yellow	***enormis*** (Spencer)
—	Third antennal segment black	***admirabilis*** sp. n.
3	Palps yellow	***dorsata*** (Siebke)
—	Palps black	***pectoralis*** (Becker)

Lemurimyza enormis (Spencer) comb. nov.

Liriomyza enormis Spencer, 1963B. Holotype ♂ in Musée d'Histoire Naturelle, Paris.

This species was originally placed in *Liriomyza* with some hesitation in view of its dark halteres and aberrant genitalia. With the discovery of a further closely related species in Nepal, with the same essential characters, the erection of a new genus is clearly justified.

Lemurimyza admirabilis s.p. n.

(Text-figs. 52–55)

Head (Text-fig. 52) : frons broad, twice width of eye viewed from above, not projecting above eye in profile ; two equal, reclinate ors, one slightly weaker, incurved ori ; orbital setulae minute, sparse, upright ; third antennal segment rounded, arista long, appearing bare.

Mesonotum : 3 + 1 dorso-centrals, acrostichals sparse, in two rows at front, not extending behind third dc.

Wing : length in male 1·75 mm., costa extending strongly to vein m_{1+2}, discal cell large with vein *rm* at midpoint, last section of vein m_{3+4} not greatly longer than penultimate, in ratio 18 : 13.

Colour : frons and jowls orange yellow, lunule paler, more lemon yellow ; face yellowish-grey ; third antennal segment black, second dark, blackish but distinctly paler with a trace of yellow, third yellow ; mesonotum matt black, with a small oval area adjoining scutellum yellow, not extending to level of first dorso-central ; scutellum yellow centrally, gradually becoming grey laterally ; notopleural area yellow, mesopleura yellow above, black below (exact colour not detectable, owing to damage to specimen) ; sternopleura black below with broad yellow upper margin ; legs appearing entirely black but fore-femora somewhat yellow on inside ; abdomen entirely black ; squamal fringe black ; halteres black.

♂ GENITALIA : aedeagus as in Text-fig. 53 ; distiphallus with paired terminal processes, mesophallus dark, blackish, cylindrical, distinctly broader at base, equal in length to distiphallus; hypophallus in form of two narrow, somewhat irregular ventral appendages arising from base of mesophallus ; ninth sternite with narrow side-arms, elongate (Text-fig. 53) ; surstyli (Text-fig. 54) a black, comb-like process adjoining ninth tergite, then broadening apically into a large flat plate ; spermal sac with rather broad blade, stalk narrow (Text-fig. 55).

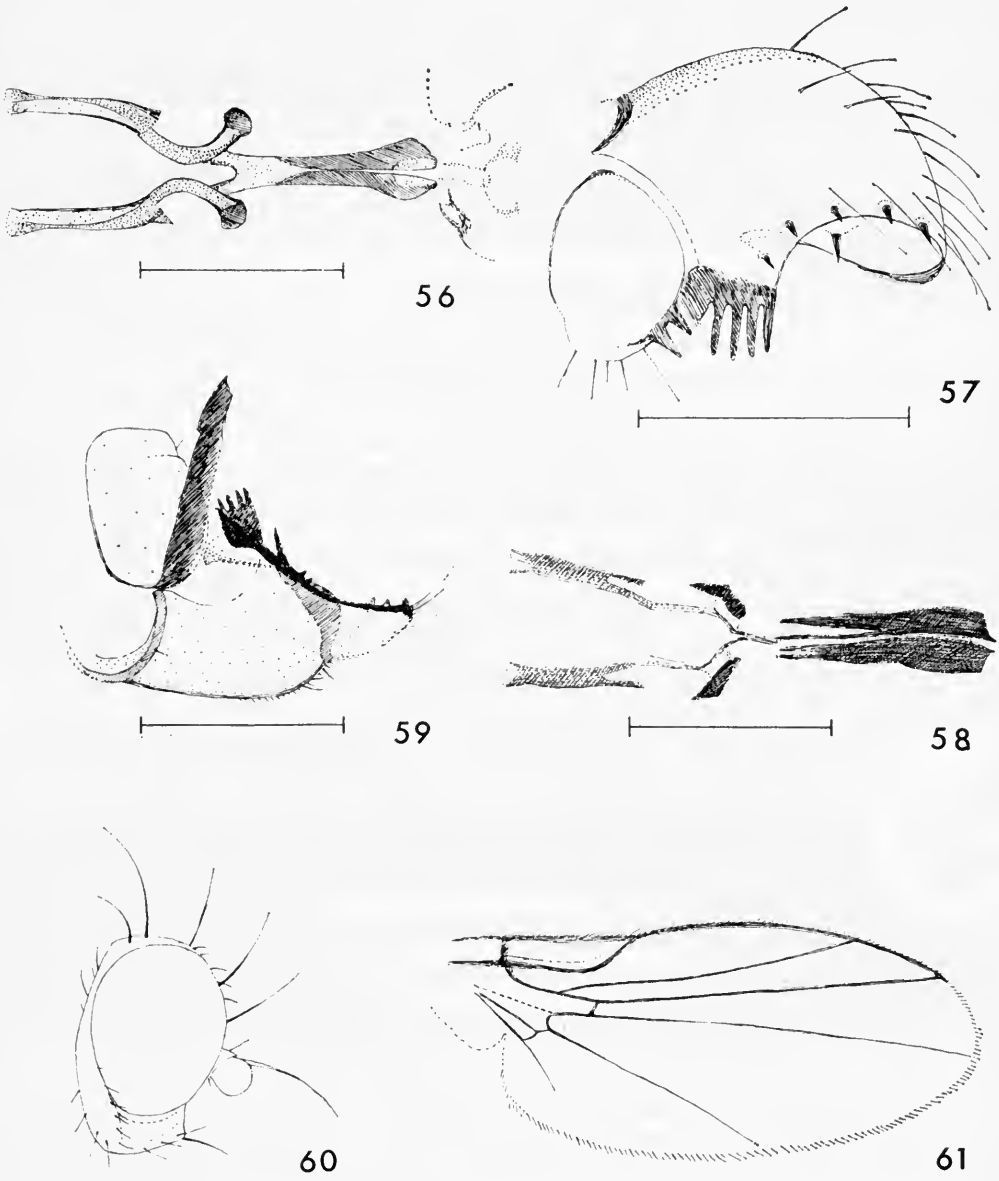
Holotype ♂, NEPAL : Taplejung Distr., river banks below Tamrang bridge, c. 5,500′ x.-xi., 1961 (*R. L. Coe*), in British Museum (Nat. Hist.).

Lemurimyza dorsata (Siebke) comb. nov.

Agromyza dorsata Siebke, 1864. Holotype ♂ in Zoologisk Museum, Oslo.

Liriomyza striata Hendel, 1931-6 : 249. **syn. nov.** Holotype ♀ in Naturhistorisches Museum, Vienna.

Material examined : AUSTRIA : Vienna, meadows beside Danube, 1 ♀, 5.vi. (Hendel), holotype of *striata*. CZECHOSLOVAKIA : Tatra, 1 ♂, genitalia slide 925, 19.vii.1897 (*Kertész*). ENGLAND : Staffs., Madeley, 1 ♂, genitalia slide 880, 25.vii.



FIGS. 56–61. *Lemurimyza dorsata* (Siebke) : Fig. 56, aedeagus, ventral view ; Fig. 57, surstylus ; *Lemurimyza pectoralis* (Becker) : Fig. 58, aedeagus, ventral view ; Fig. 59, surstylus. *Phytomyza nepalensis* sp. n. : Fig. 60, head ; Fig. 61, wing. (Scale line represents 0·1 mm.).

1926 (H. Britten). FINLAND : Helsinki, 1 ♂, genitalia slide 927, no date (*R. Frey*). NORWAY : Jerkin, 1 ♂ (abdomen missing), 27.vii.1853, holotype of *dorsata* ; Fjellfröskvann, 1 ♂, 23.vii.1926 (Rydén, 1957).

The distinctive aedeagus and surstyli of this species are shown in Text-figs. 5, 6.

Hendel (1931-6 : 203) incorrectly synonymized *Agromyza dorsata* with *Phytoliriomyza perpusilla* Meigen. Rydén (1955) similarly synonymized *A. dorsata* with *Phytoliriomyza halterata* Becker, which at that time was thought to be identical with *perpusilla*. This confusion arose understandably from the similarity of these species on external characters. Clarification has only been possible with recent study of the male genitalia.

Lemurimyza pectoralis (Becker) **comb. nov.**

Agromyza pectoralis Becker, 1908 : 167. Holotype ♂ in Zoologisches Museum, Berlin.
Liriomyza pectoralis (Becker) Hendel, 1920 : 144 ; 1931-6 : 241.

I have examined the holotype from the CANARY ISLANDS : Tenerife and the characteristic aedeagus and surstyli are shown in Text-figs. 58, 59.

This species is widespread but local in the Mediterranean area. I caught a series of 12 specimens on the lower slopes of Mt. Etna, Sicily on 8-9.iv.1964.

Genus ***PHYTOLIRIOMYZA*** Hendel

Phytoliriomyza australensis Spencer

Phytoliriomyza australensis Spencer, 1963A : 335.
Phytoliriomyza tahitiensis Sasakawa, 1963. **syn. nov.** [from description and figures].

Arun Valley, East shore of R. Arun below Tumlingtar, c. 1,800′, swept from *Ricinus communis* L., 1 ♂, 23.xii.1961. Taplejung Dist., Sangu, c. 6,200′, mixed vegetation by stream in gully, 2 ♂, xi.1961-i.1962.

This species was previously only known from various localities in New South Wales.

Genus ***PHYTOMYZA*** Fallén

Phytomyza nepalensis **sp. n.**

(Text figs. 60–61)

Head (Text-fig. 60) : frons exceptionally broad, slightly over twice width of eye at foremost ocellus, not significantly projecting above eye in profile ; orbits unusually broad, well-differentiated, two equal, reclinate upper orbital bristles, one similar incurved lower orbital ; eye upright, oval, jowls deepest in centre, one-quarter vertical height of eye, cheeks well-developed below eye ; third antennal segment almost round, arista short.

Mesonotum : acrostichals irregularly in two rows at front, not extending to second dorsocentral ; inner post-alar strong, similar to fourth dc.

Wing (Text-fig. 61) : length 2·1 mm., costal ratio 30 : 12 : 16, second section just less than twice length of fourth.

Colour : an entirely black species ; orbits, mesonotum and abdomen brilliantly shining.

Holotype ♀, Nepal, Taplejung Distr., c. 6,500′, edge of mixed forest above Sangu, 17.x.-1.xi.1961 (*R. L. Coe*), in the British Museum (Natural History).

This species somewhat resembles *Phytomyza hendeli* Hering (cf. Hendel, 1931-6 : 413), a leaf-miner on *Anemone* in Europe but is obviously distinct, in view of its darker head, more shining mesonotum and sparser acrostichals. No comparable black species is known from Japan, nor from the Oriental and Australian regions.

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A SYSTEMATIC REVISION OF THE AMENIINAE (DIPTERA: CALLIPHORIDAE)

R. W. CROSSKEY

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ENTOMOLOGY Vol. 16 No. 2
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BY

R. W. CROSSKEY

Commonwealth Institute of Entomology, London

Pp. 33–140 ; 50 *Text-figures*

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TRUSTEES OF
THE BRITISH MUSEUM (NATURAL HISTORY)

Issued 23 *August,* 1965 *Price* £1 15*s.*

A SYSTEMATIC REVISION OF THE AMENIINAE (DIPTERA : CALLIPHORIDAE)

By R. W. CROSSKEY

CONTENTS

SYNOPSIS

The Ameniinae are fully revised and their affinities discussed ; no evidence is found of affinity with true Tachinidae, and contrary to usual practice the group is excluded from this family and treated as a subfamily of Calliphoridae. Seven genera (one new) and thirty-one species (nine new) are recognised ; five generic, eleven specific and one subspecific name are newly placed in synonymy, and there are five new generic combinations. Keys are provided for the identification of all genera and species, and a summary is given of the revised classification proposed.

INTRODUCTION

A GENERAL systematic study of the Tachinidae of the Oriental and Australian regions currently in progress has necessitated a study of the Ameniine flies to determine whether the group should, following the majority of authors, be included in the true Tachinidae or whether its affinities lie with the Calliphoridae. Townsend (1935, 1937) and van Emden (1950, 1951), departing from earlier work, placed the group in the Calliphoridae, but Paramonov (1957) has more recently treated the Ameniine flies as a tribe of Tachinidae allied to the Rutiliini ; in the present work the group is treated, on the basis of evidence adduced in a later section, as a subfamily of Calliphoridae. The Ameniinae is certainly an anomalous group, and has been much neglected by specialists on higher Diptera ; apart from the scattered papers of Malloch (1927, 1928a, 1928b, 1929, 1930, 1933, 1935) only the revisions of Rutiliinae by Engel (1925) and Enderlein (1936), and a review of Australian species by Paramonov (1957), have been available for identification. Unfortunately neither Engel nor Enderlein saw the types of most of the species they discussed, and both saw very little material, so that their work is much confused by misidentification, and most of the names in Hardy's (1938) key to the species of *Amenia* are also misapplied. To unravel past confusion it has been necessary here to give a full re-description of all species, especially since several species were hitherto known only from a few brief lines in old scattered works of nineteenth-century authors.

Thirty-seven previously described species are involved in this revision and the holotypes or syntypes of thirty-five of these have been examined, thirty-two personally and three (the types were not available on loan) by specialist colleagues. Paratypes of one other species have been examined which are undoubtedly conspecific with the holotype, and the type of the one remaining species is lost (*Amenia imperialis* Robineau-Desvoidy, for which a neotype is designated on page 109). A lectotype has been designated and labelled for each species without specified holotype and based on syntypes, and the available syntypes left after lectotype designation have each been labelled as paralectotype.

After examination of types only twenty-two of the thirty-seven previously described species are upheld in the present work, giving, with the nine new species, a total fauna of thirty-one species in the Ameniinae ; two of the previously described species (*Ptylostylum albomaculatum* Macquart and *Amenia dubitalis* Malloch) are accorded subspecific status only. The remaining thirteen names of previously

described species are here treated in synonymy, eleven being newly established synonyms ; the one previously published subspecific name (*enderleini* Paramonov, see p. 115) is also synonymized.

Of the fourteen described genera belonging in the Ameniinae only six are regarded as valid ; one new genus is added.

MATERIAL STUDIED

No single institution has an extensive collection of Ameniine flies, and the present work is based on a study of 746 specimens assembled from the following museums (abbreviations given are those used throughout the text in the lists of material examined) :

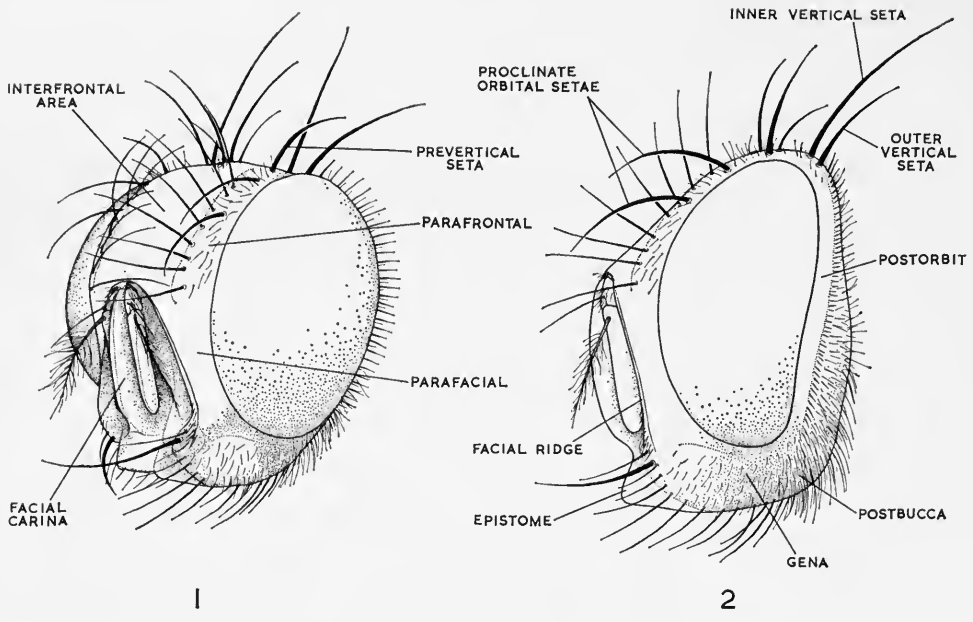
British Museum (Natural History), London (B.M. Nat. Hist.) ; Deutsches Entomologisches Institut, Berlin (D. Ent. Inst.) ; Division of Entomology Museum, C.S.I.R.O., Canberra (Div. Ent. Mus. Canberra) ; Naturhistorisches Museum, Vienna (Nat. Mus. Vienna) ; Rijksmuseum van Natuurlijke Historie, Leiden (Rijksmus. Leiden) ; School of Public Health and Tropical Medicine, Sydney (S.P.H.T.M.) ; Staatliches Museum für Naturkunde, Stuttgart (Staatl. Mus. Stuttgart) ; United States National Museum, Washington (U.S. Nat. Mus.) ; Universitetets Zoologiske Museum, Copenhagen ; University Museum, Oxford (Oxford Mus.) ; Zoölogisch Museum, Amsterdam (Zool. Mus. Amsterdam) ; Zoologische Sammlung des Bayerischen Staates, Munich (Zool. Sammlung, Munich) ; Zoologisches Museum der Humboldt-Universität, Berlin (Zool. Mus. Humb. Univ.).

METHODS EMPLOYED

Taxonomic characters, terms and measurements

At present only adult morphological characters are available for classification. In many Calyptrate flies the male genitalia are of great value in providing specific characters, but in the Ameniinae the male hypopygium is extremely uniform morphologically (cf. Text-figs. 31–42) and is usually virtually indistinguishable even in forms belonging in different genera and differing enormously on external characters. Only in a few species do the male genitalia provide valuable systematic characters, and classification of the Ameniinae must at present be based almost entirely on non-genitalic characters.

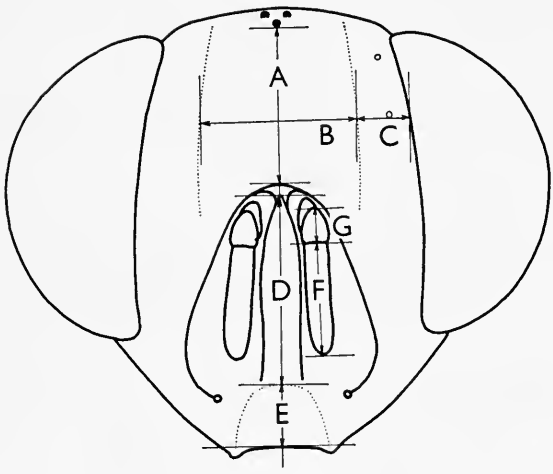
The head provides the most useful characters : terms used for head regions and chaetotaxy are shown in Text-figs. 1 and 2, and the measurement points used in determining the relative proportions of different head structures are shown in Text-figs. 3–6. The following structural proportions often provide valuable specific characters : length of facial carina (D) relative to epistome (E) or distance from lunula to anterior ocellus (A) ; width of interfrontal area (B) relative to width of parafrontal at corresponding point (C) (measured at level of lower proclinate orbital



FIGS. 1 and 2. Head of an Ameniine fly showing terms used in text. Drawn from *Silbomyia latigena* Enderlein.

seta since this provides fixed landmark) ; length of third antennal segment relative to second (F to G) ; width of parafacial (H) at mid point relative to width of third antennal segment (J) ; width of gena (K) as proportion of eye-height (L) ; width of vertex (N) relative to one eye viewed from above (M) in females and males with broad frons ; width of frons at narrowest point (P) as proportion of head width (Q) in males with approximated eyes. Measurements A, B, C, H, and J have been made with the head appropriately oriented so as to avoid foreshortening effect of straight facial or profile view. Head chaetotaxy is of little or no value at specific level, but presence or absence of outer vertical, prevertical and proclinate orbital setae in males is of some value as a supporting generic character.

Thoracic chaetotaxy is very uniform and provides no useful characters except that the position of the outer posthumeral seta (whether mesad or laterad of a longitudinal line through the presutural seta—Text-figs. 9 and 10) is a secondary character supporting the distinction of two tribes ; however even this character must be used with caution, since the outer posthumeral seta may be missing altogether in some specimens. Similarly the presutural intra-alar seta may be present or absent, but systematic importance cannot be attributed to this ; certain setae may in freak specimens be duplicated (giving for instance five instead of the normal four postsutural dorsocentral setae, or four instead of the normal three sternopleural setae). The chaetotaxy of the legs is also uniform, but the presence



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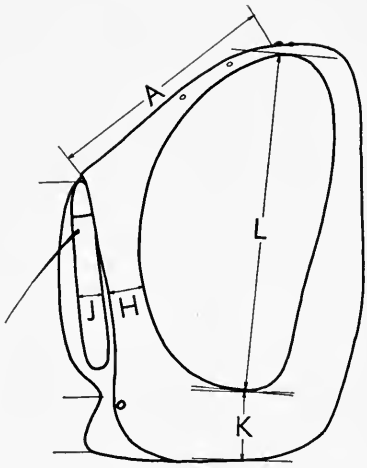

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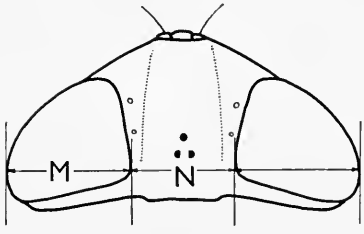

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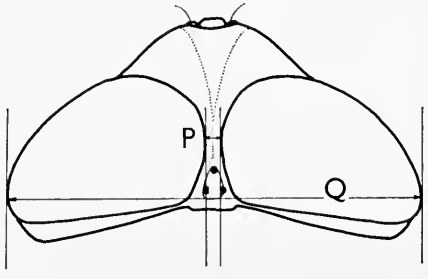

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FIGS. 3–6. Outline drawings of head of Ameniine fly showing measurement points used for determining proportions of head structures. Lunula to anterior ocellus (A). Width of interfrontal area (B) relative to parafrontal at level of lower proclinate orbital seta (C). Length of facial carina (D) relative to epistome (E). Length of third antennal segment (F) relative to second segment (G). Width of parafacial at mid point (H) relative to width of third antennal segment (J). Width of gena (K) as proportion of eye-height (L). Width of vertex (N) relative to one eye viewed from above (M) in females and males with broad frons. Frons width at narrowest (P) as proportion of total head width (Q) in males with reduced frons and strongly approximated eyes.

or absence of postero-dorsal setae on the fore tibia and the number (whether one or two) of postero-ventral setae on this tibia are of some generic value ; the number of antero-dorsal setae on the mid tibia usually varies within a species, but is of some value as a specific character in *Paramenia*.

In the wings the degree of infuscation is remarkably constant within a species and differs between species, providing a useful character in *Silbomyia*. Wing venation varies only in detail, in the forward bowing of the costa of the males of some *Amenia*, in the remoteness of the bend of vein *M* from the wing margin and the position of *r–m* cross-vein relative to the discal cell. Where appropriate, measurements have been made of the relative proportions (see Text-fig. 17) of *r–m* to *m–cu*, *m–cu* to bend of *M*, and bend to wing-margin (point of measurement on the wing margin determined by where an imaginary line extended from *M* basad of the bend intersects with the margin). A previously undiscovered character of great use in defining *Silbomyia* is the presence of fine setulae on the ventral surface of the second costal sector (Text-fig. 23).

Abdominal chaetotaxy is of very limited use : presence or absence of median marginal setae on T1+2 is of some value in *Silbomyia*, and the unusual character of an irregular row of marginal setae on T4 is diagnostic for *Formosiomima*. The inclination (whether erect or recumbent) of hair on the tergites and the presence of long dense hair on the venter of some males also provide characters. Abdominal shape differs but provides a character difficult to define satisfactorily. The fifth sternite of the ♂ produces no bizarre developments such as occur in many Calyptrates and is of almost no taxonomic value in Ameniinae, except to a limited extent in *Platytropesa*.

The arrangement of white pollinosity on thorax and abdomen is very constant within the species and often provides a dependable character ; colour of head pollinosity and the underlying ground colour are also important. Thoracic and abdominal colour vary in most species from green to violaceous, but colour provides a useful character in *Amenia* and *Paramenia* where there is greater constancy.

Body length has been measured from the leading edge of facial carina to the apex of the abdomen with fly viewed in profile, and the wing length measured from the base of the epaulet.

Abbreviations

The abbreviations used in the keys and descriptions are as follows:

Thoracic setae : *acr*, acrostichal setae ; *dc*, dorsocentral setae ; *ph*, outer posthumeral seta ; *prs*, presutural seta ; *prst dc*, presutural dorsocentral setae ; *prst ia*, presutural intra-alar setae.

In describing the positions of setae on the legs the convention is followed of imagining the leg to be extended at right-angles to the longitudinal axis of the fly, when : *a*, anterior ; *ad*, antero-dorsal ; *pd*, postero-dorsal ; *pv*, postero-ventral.

Wings : *m–cu*, posterior cross-vein ; *M*, fourth vein ; R_1, first vein ; R_{2+3}, second vein ; R_{4+5}, third vein ; *Sc*, subcosta. Abdomen : T=tergite ; the composite first apparent tergite is T1+2, and successive tergites are numbered accordingly, the last apparent tergite therefore T5 (as in Text-fig. 27).

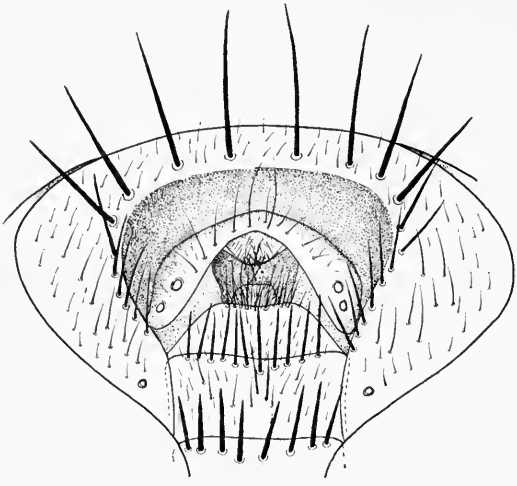
RELATIONSHIPS AND SYSTEMATIC STATUS OF THE GROUP

Amenia and its allied genera were first given family-group status by Brauer and Bergenstamm (1889), who erected the Ameniidae as " Gruppe XLVI " in their classification of the " Muscaria Schizometopa ". Although given a family ending the " Gruppen " of Brauer and Bergenstamm are approximately equivalent to tribes in current classifications of Tachinoid Diptera, and no recent author has accorded family status to the group. Brauer and Bergenstamm (1889) placed their Ameniidae immediately before their groups Amphiboliidae (Gruppe XLVII) and Rutiliidae (Gruppe XLVIII), and in their later systematic catalogue (Brauer and Bergenstamm, 1891 : 417–418) sandwiched the group between their Paradexiidae (Gruppe XXV) on the one hand and their Amphiboliidae and Rutiliidae on the other ; such arrangement clearly implied that Brauer and Bergenstamm considered the affinities of *Amenia* and relatives to lie with the Dexillinae and Rutiliinae, groups now forming part of the Tachinidae.

It is not surprising that Brauer and Bergenstamm should have reached this conclusion, since the superficial resemblance between Ameniinae and Rutiliini (the large size and metallic coloration and the heavily carinate face of most forms) is very remarkable, but it must now be recognized that the resemblances are convergent and that the affinities of the Ameniinae are almost certainly with the Calliphoridae and not at all with the Tachinidae. It is of interest to note that Robineau-Desvoidy had evidently recognized this in 1830, for in his " Essai sur les Myodaires " he at first (p. 320) placed *leonina* Fabricius, type-species of *Amenia*, in *Rutilia* Robineau-Desvoidy among his " Macropodées " but later in the same work (p. 444) assigned this species to his new genus *Amenia* near *Chrysomya* Robineau-Desvoidy in his " Muscides Métalliques ", remarking that " C'est à tort que j'ai placé cette belle espèce [*leonina*] parmi les Macropodées "; in moving *leonina* from his " Macropodées " to his " Muscides Métalliques " he was in effect moving it from a group now considered Tachinidae to a group now considered Calliphoridae (Robineau-Desvoidy has been the subject of unjustified obloquy by later dipterists but this example underlines his remarkable eye for affinity).

In recent times only Townsend (1935, 1937), van Emden (1950, 1951) and Herting (1957 : 441) have considered the affinities of the Ameniinae to lie with the Calliphoridae ; Townsend included *Amenia* and its allies in the Calliphorini, but gave no reasons for this radical departure from their previous position in Tachinidae. Van Emden (1950) drew attention to certain Calliphorid characters in the Ameniini, especially the male hypopygium (Engel, 1925, although placing *Silbomyia* and *Paramenia* in Rutiliinae, also noted the resemblance between the male genitalia of these genera and those of Calliphoridae and Hall, 1948 : 7, remarked that in *Silbomyia* " the form of the male genitalia is conspicuously calliphorid "). The slight development of a swollen postscutellum in Ameniinae (which led Malloch, 1927, to include the group in the Tachinidae instead of the Calliphoridae) is certainly an unreliable indicator of affinity, for a slightly swollen postscutellum occurs in several undoubted Calliphoridae, and that of the Ameniinae does not in any way resemble the very strongly swollen and smoothly convex postscutellum characteristic of true Tachinidae.

Other external characters also support Townsend's and van Emden's view of Ameniine affinities : a unique character of all Ameniinae not previously recorded is the characteristic tuft of long black hairs on the anterior lappet of the metathoracic spiracle (Text-fig. 8) ; no such tuft of hairs ever occurs in true Tachinidae, but some Calliphorinae have a few hairs in this position (e.g. *Catapicephala* Macquart,



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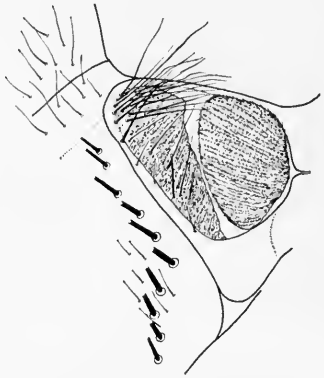

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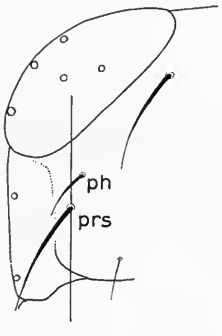

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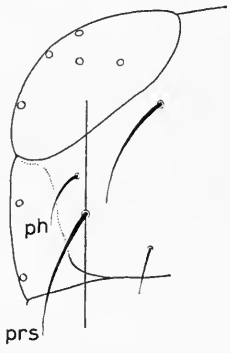

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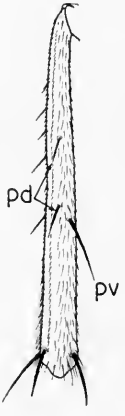

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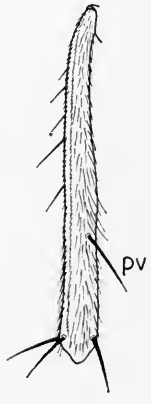

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FIGS. 7–12. 7. Ventro-apical view of ♀ terminalia of Ameniinae in situ, drawn from *Amenia sexpunctata* Malloch. 8. Metathoracic spiracle in Ameniinae : anterior lappet with characteristic group of long strong hairs. 9. Showing outer posthumeral seta (*ph*) in Ameniini, lying mesad of presutural seta (*prs*). 10. Showing outer posthumeral seta (*ph*) of Parameniini, lying laterad of presutural seta (*prs*). 11. Posterior surface of fore tibia of *Platytropesa*. 12. Posterior surface of fore tibia of *Stilbomyella*.

which closely resembles the Ameniinae and to some extent interconnects them with the Calliphorinae).

The most telling evidence that the Ameniinae are not Tachinidae is provided by what little is known of their biology. Townsend (1942 : 229) recorded that *Amenia* was parasitic upon the Melolonthid beetles *Lepidiota* and *Lepidoderma* and this record was accepted and repeated by van Emden (1950 : 196) but Hardy (1951 : 96) has pointed out that the record is erroneous and derives merely from a supposition in the economic literature given currency by Illingworth (1921 : 42) : the Ameniinae are certainly not parasites of the grubs of these sugar-cane beetles. It is now established from a brief note of Hardy (1951), later amplified by van Emden (1953), that *Amenia leonina* larvae occur in snails, and these authors assume that the Ameniinae are true parasites of living Mollusca, although this is not fully authenticated by evidence so far available.

The Ameniinae are undoubtedly larviparous and the female terminalia (Text-fig. 7) are typical of larviparous Calyptrate flies (see Herting, 1957 : 441–443); the postabdomen does not form a telescopic ovipositor as in typical Calliphorinae. There is no doubt that the larvae of Ameniinae are retained in the uterus to a very advanced stage of development (" macrolarviparity "), and it is obvious from the extensive development of soft membrane between the terminal sclerites of the female abdomen that it is modified for the deposition of very large larvae : probably only a single larva develops at one time, as in the South American Mesembrinellinae (Calliphoridae) and the African Glossinidae. The little-known observation of Illingworth (1921 : 42) supports this and deserves quotation : " The fourth [species : i.e. *Amenia imperialis*] is a brilliant green species with a bright yellow face . . . Dissection of the females, however, showed that they still retained a few maggots of rather large size ; and in one instance a maggot about $\frac{3}{8}$ inch in length was dropped by a fly that I was holding rather tightly ".

That the Ameniinae mature the larvae in utero and that the larvae attack snails confirms beyond doubt that the group cannot be included in the Tachinidae, for all true Tachinidae (from which I exclude the Rhinophoridae parasitic upon terrestrial Isopoda) are endoparasites of other insects in the larval stage and none retain the larvae until nearly mature.

Some genera of Sarcophagidae are parasitic in snails, and despite the very great superficial difference (the Ameniinae being large metallic flies) it is possible that the Ameniinae are as closely related to the Sarcophagidae as to the Calliphoridae. When more evidence is available on the biology of the group it may be better to treat it as a full family situated between the Sarcophagidae and the Calliphoridae, but for the present I consider it best to include it within Calliphoridae. Family limits within the Tachinoidea (this superfamily as here used includes the Tachinidae, Rhinophoridae, Sarcophagidae including Miltogrammatinae, and Calliphoridae) are in need of revision, but an improved classification would probably result if the peculiar groups such as Mesembrinellinae were treated as families : this curious group (which despite the presence of hypopleural setae may not be Tachinoidea at all) appears to be a Neotropical analogue to the Australian Ameniinae, also having

a non-telescopic female postabdomen and depositing mature larvae (Hall, 1948).

Zumpt (1956) includes the Sarcophaginae and Miltogrammatinae within the Calliphoridae, and uses the position of the outer posthumeral seta (whether laterad or mesad of the presutural seta) to distinguish these groups from Calliphorinae (Calliphoridae proper) ; this character appears to work for African forms and Palaearctic forms (Mesnil, 1944, uses it as a key character distinguishing Calliphorinae from Sarcophaginae), but present work casts some doubt on its value when the world fauna is considered. In the Ameniinae the outer posthumeral seta is almost always (tribe Ameniini) situated mesad of the presutural seta, but in *Paramenia* (Parameniini) is inserted laterad of the presutural seta—so that on Zumpt's (1956) key segregation by means of the outer posthumeral seta the Ameniini would enter the Calliphorinae and the Parameniini would run to the Sarcophaginae. There is an impressive concordance of characters between Ameniini and Parameniini (here jointly composing the subfamily Ameniinae) and it seems almost certain that the Ameniinae is monophyletic ; if so, then the character of the position of the outer posthumeral seta no longer appears a reliable one for subfamily definition.

Another dubious character is that of the presence or absence of minute hairs on the postorbits which Malloch (1935) remarked upon as a character distinguishing most Calliphoridae from most Tachinidae, and which Hall (1948), under the name " intrapostocular cilia " has used to distinguish all Sarcophagidae from most Calliphoridae ; in Ameniine flies the intrapostocular cilia are usually present (another typical Calliphorid character), but are variable and may or may not be present in specimens of the same species.

It should be noted that Senior White, Aubertin and Smart (1940) omitted the Oriental genus *Silbomyia* from their treatment of Oriental Calliphoridae, and presumably considered it as lying outside the limits of this family. However, they included *Catapicephala* Macquart in their Calliphorinae although this genus shows several features tending towards Ameniinae and away from typical Calliphorniae (non-telescopic female postabdomen, weakly developed postscutellum, few hairs on anterior lappet of metathoracic spiracle, etc.).

No entirely satisfactory characters appear to exist for defining supra-generic taxa in the Calliphoridae (or indeed in any Calyptrate flies) but the Ameniinae as here defined can be distinguished from other subfamilies reasonably easily by the following abbreviated key:*

1 Metathoracic spiracle with single large reniform lappet with dorsal opening. Vein *M* with evenly rounded bend. Female postabdomen not forming telescopic ovipositor. [Neotropical Region] . . . . . **MESEMBRINELLINAE**

– Metathoracic spiracle with normal anterior and posterior lappets. Vein *M* with bend distinctly angulate. Female postabdomen usually forming telescopic ovipositor. [All regions] 2

* Sarcophagidae and Rhinophoridae, sometimes treated as Calliphoridae, are here regarded as separate families, and *Pollenia* and allies (sometimes treated as separate subfamily) are included in Calliphorinae.

2 Stem-vein of wing with long fine setulae posteriorly on upper surface. Subalar bulla sometimes setulose . . . . . **RHINIINAE** and **CHRYSOMYIINAE**

– Stem-vein of wing bare. Subalar bulla always bare 3

3 Anterior lappet of metathoracic spiracle with a conspicuous backwardly-directed tuft of long hairs (Text-fig. 8). Postscutellum forming a definite convex swelling which is micro-rugose and shows slight trace of shallow median incision. Female postabdomen non-telescopic, modified for deposition of mature larvae. Head almost always with very strong facial carina separating antennae and reaching epistome. [Apparently parasites of living land snails, Oriental and Australian Regions] . . . . . **AMENIINAE**

– Anterior lappet of metathoracic spiracle bare or at most with a very few small inconspicuous hairs. Postscutellar region not at all convex or at most with rudimentary trace of swelling, not as above. Female postabdomen forming a telescopic ovipositor (some exceptions). Head without a facial carina or at most with rudimentary trace of carina between antennal bases. [Not parasites of snails. All regions]. . . . . **CALLIPHORINAE**

Subfamily **AMENIINAE**

Diagnosis and Bibliography

AMENIINAE Brauer and Bergenstamm, 1889

Medium-sized or large, usually metallic, Calliphoridae characterized as follows : *Primary characters :* Metathoracic spiracle with characteristic group of strong hairs on anterior lappet (Text-fig. 8), anterior lappet a little narrower than posterior one. Postabdomen of female not forming an extensible telescopic ovipositor. Weak convex postscutellum developed, showing trace of median incision and micro-rugose. Head almost always with very large facial carina. *Additional characters :* Eyes bare. Parafacials bare. Arista long plumose. Subalar bulla bare. Supra-squamal ridge bare. Lateral declivity of postalar callus densely long haired. Supraspiracular convexity bare. Propleuron and prosternum almost always setulose. Prostigmatic seta present. Prothoracic spiracle always dark brown. Stem-vein of wing bare. Vein *M* bent angularly forwards. Abdominal sternites very broad and exposed, in female almost always with spinous setae and often in male. Male hypopygium as in Calliphorinae.

Immature stages and biology : Almost unknown. Probably larvae parasitic in land snails (Mollusca), females larviparous and retaining larvae in utero to near maturity. Larvae and puparium undescribed.

Distribution (map 2, p.136) : Oriental and Australasian Regions, excluding Tasmania and New Zealand. Eastward distribution ending abruptly at Bismarck Archipelago, absent from Solomon Islands and other Pacific islands. Unknown from Ceylon but possibly occurring there.

Type-genus : *Amenia* Robineau-Desvoidy, 1830.

Ameniidae Brauer and Bergenstamm, 1889, *Denkschr. Akad. Wiss., Wien* **56** : 81, 150, 151. Brauer and Bergenstamm, 1891, *Denkschr. Akad. Wiss., Wien* **58** : 309, 398. Brauer and Bergenstamm, 1893. *Denkschr. Akad. Wiss., Wien* **60** : 109.

AMENIINI Malloch, 1927, *Proc. Linn. Soc. N.S.W.* **52** : 342. Malloch, 1928, *Proc. Linn. Soc. N.S.W.* **53** : 329, 614. Malloch, 1929, *Proc. Linn. Soc. N.S.W.* **54** : 285. Malloch, 1930, *Proc. Linn. Soc. N.S.W.* **55** : 101. van Emden, 1950, *Entomologist's mon. Mag.* **86** : 189, 196. van Emden, 1953, *Entomologist's mon. Mag.* **89** : 120. Paramonov, 1957, *Ann. Mag. nat. Hist.* (12) **10** : 52. [Ameniini + Parameniini] Enderlein, 1936, *Veröff. dtsch.KolonMus. Bremen* **1** : 398, 436, 446.

AMENIINAE Malloch, 1933, *Proc. Linn. Soc. N.S.W.* **58** : 74. Mesnil, 1939, *Essai sur les Tachinaires* : 22, 50. Mesnil *in* Lindner, 1944, *Flieg. Palaearkt. Reg.* 64g : 18, 20. Hardy, 1951, *Entomologist's mon. Mag.* **87** : 96.

KEY TO THE TRIBES OF AMENIINAE

1 Head with a very strong facial carina separating antennae. Hind tibia with a *pv* apical seta. Outer posthumeral seta* situated mesad of presutural seta (Text-fig. 9) **AMENIINI**

– Head without a facial carina. Hind tibia without a definite *pv* apical seta. Outer posthumeral seta* situated laterad of presutural seta (Text-fig. 10), or sometimes about in line with it . . . . . **PARAMENIINI**

SYSTEMATIC TREATMENT

Tribe **AMENIINI** Brauer and Bergenstamm

AMENIIDAE Brauer and Bergenstamm, 1889, *Denkschr. Akad. Wiss., Wien* **56** : 150.

DIAGNOSIS. Ameniinae with following characters : Head with facial carina. Prescutum with outer posthumeral seta situated mesad of presutural seta (Text-fig. 9). Hind tibia with *pv* apical seta. Prosternum and propleuron densely haired (latter occasionally bare in *Stilbomyella*).

Type-genus : *Amenia* Robineau-Desvoidy, 1830.

Twelve described genera belong in the Ameniini but it is concluded from study of the type-species that only five of these can be upheld as valid, viz. *Silbomyia* Macquart, *Platytropesa* Macquart, *Stilbomyella* Malloch, *Amenia* Robineau-Desvoidy, and *Formosiomima* Enderlein. These genera, together with one new genus here described, can be distinguished by the key which follows. The genera *Megaloprepes* and *Spinthemyia* described by Bigot (1859) both have a setulose ventral surface to the second costal sector and other *Silbomyia* characters and are treated in synonymy with this genus ; Enderlein's (1936) genera *Liostiria* and *Doleschallius* are not distinguishable from *Platytropesa* and *Stilbomyella* respectively and are synonymized accordingly ; *Ptylostylum* of Macquart (1851a, b) is an isogenotypic synonym of *Amenia*, and *Neoamenia* Malloch and *Chaetamenia* Enderlein (both with type-species not generically distinguishable from that of *Amenia*) are placed in synonymy with *Amenia*.

* This seta occasionally absent on one or both sides.

The affinities of the recognized genera of Ameniini are discussed under the appropriate generic headings. *Platytropesa* and *Stilbomyella* are superficially similar and future discovery of new species may break down the generic distinction maintained in this paper, but for the present it appears best to treat them as separate genera.

Distribution. Range of tribe coincident with that of Ameniinae as a whole.

Key to the Genera of Ameniini

1 Ventral surface of costa setulose between apices of veins *Sc* and R_1 (Text-fig. 23). Scutellum with a pair of very strong erect spiniform preapical setae, set close together just dorsad of the cruciate apical setae. Fore tibia with two strong *pv* setae (except in *timorensis*). Frons of ♂ very broad and equal in width to that of ♀ ; ♂ always with very strong outer vertical, prevertical and proclinate orbital setae, as in ♀. [Oriental Region except for one species in Queensland]
SILBOMYIA Macquart (p. 50)

– Ventral surface of costa bare between apices of veins *Sc* and R_1 (Text-fig. 22). Scutellum without erect spiniform preapical setae. Fore tibia with one submedian *pv* seta. Frons of ♂ sometimes broad as in ♀, but ♂ eyes often very strongly approximated ; ♂ with or without outer vertical, prevertical and proclinate orbital setae. [Australasian Region] 2

2 Gular region of head strongly swollen, prominent and conspicuous in profile (Text-fig. 24). Hind coxa bare on postero-dorsal surface. Middle part of anterior surface of mid femur with one strong isolated seta. Vibrissae of ♂ inserted level with or slightly below epistomal margin (Text-fig. 13), directed upwards and inwards. ♂ frons broad as in ♀, with outer vertical, prevertical and proclinate orbital setae . . . . . ***PARAPLATYTROPESA*** gen. n. (p. 98)

– Gular region of head normal, not prominently swollen and visible in profile. Hind coxa setulose on postero-dorsal surface externally (bare in some specimens of *Stilbomyella*). Middle part of anterior surface of mid femur almost always with a group of two or more strong setae clearly differentiated. Vibrissae of ♂ inserted well above level of epistomal margin (Text-fig. 14), directed more or less horizontally and crossed. ♂ frons narrower than that of ♀ (except in *Platytropesa*), although eyes not always strongly approximated, ♂ usually without outer vertical, prevertical or proclinate orbital setae 3

3 Fore tibia with two or three small but distinct *pd* setae (Text-fig. 11). Facial ridges with fine setulae extending more than half way (♂) or about half way (♀) up their length, in profile reaching far beyond level of apex of antenna. Frons about equal in width in both sexes. ♂ with outer vertical, prevertical and sometimes proclinate orbital setae. Facial carina very strikingly sexually dimorphic, very enlarged (Text-fig. 14) in ♂ with anterior surface flattened and sides pinched-in towards one another. Antennae elongate and in deep foveae, much longer in both sexes than width of gena . . . ***PLATYTROPESA*** Macquart (p. 84)

– Fore tibia without *pd* setae (Text-fig. 12). Fine hairs above vibrissae confined to lower quarter of each facial ridge, in profile only extending at most a little beyond apex of antenna. Frons narrower in ♂ than ♀, ♂ eyes often very strongly approximated and frons reduced. ♂ without prevertical and proclinate orbital setae, almost always without definite outer vertical setae. Facial carina not noticeably sexually dimorphic. Antennae short and usually in shallow foveae, usually not much longer than width of gena 4

4 Mesonotum entirely metallic, without marginal white spots. Body form distinctly elongate, abdomen ovate and in mid line as long as or longer than greatest breadth (Text-fig. 26). Cross-vein *r–m* situated almost exactly at middle of discal cell. Setae of head and mesonotum strongly developed. Anterior margin of wing broadly dark brown infuscate, infuscation extending posteriorly to vein R_{4+5}. Interfrontal area, facialia, antennal foveae and antennae black-brown or dark reddish-brown. [Moluccas, New Guinea and New Britain]

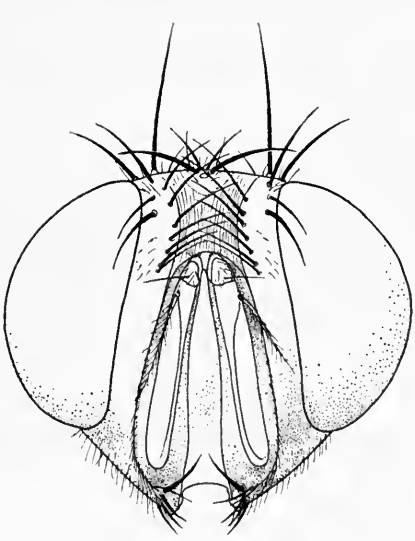
STILBOMYELLA Malloch (p. 93)

– Mesonotum with three pairs of large white-pollinose marginal spots. Body form short and broad, abdomen subquadrate and by measurement shorter in mid line than its greatest breadth (Text-fig. 25). Cross-vein *r–m* situated well before middle of discal cell, distance from *r–m* to *m–cu* 1·3–1·7 times as great as that between *r–m* and basal cell. Setae of head and mesonotum usually fine and weak, those of frons often mostly hair-like. Wing clear hyaline except for dark brown infuscation at extreme base over basal cells. Interfrontal area, facialia, antennal foveae and antennae (except rarely for basal segments) yellow or orange. [Australia only] 5

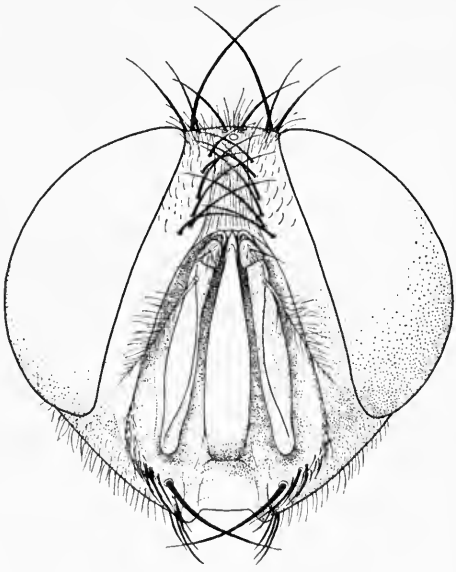
5 Abdominal T4 with a regular row of almost evenly spaced marginal setae. Sutures between abdominal tergites normal, fully formed. Sternites with strong setae, often distinctly spiniform. Scutum without submedian white spots. Abdomen predominantly metallic with white pollinose areas or spots

AMENIA Robineau-Desvoidy (p. 100)

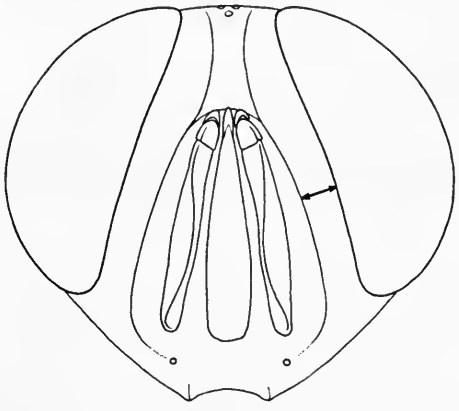
– Marginal setae of T4 not forming a regular transverse row, arranged in widely spaced pairs with each pair standing on a large black spot (Text-fig. 27). Abdominal tergites partially fused, sutures between hindmost visible tergites indistinct and without breaks in dense pollen cover. Sternites without strong setae but with moderately long strong hair. Scutum with a pair of large submedian white spots. Abdomen predominantly and thickly pale pollinose with a pattern of bold black spots (Text-fig. 27) . . . . ***FORMOSIOMIMA*** Enderlein (p. 122)



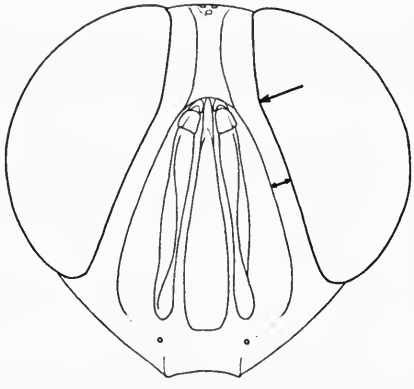
13



14



15



16

FIGS. 13–16. Figs. 13 and 14. Facial view of head of (13) ♂ *Paraplatytropesa* gen. n., and of (14) ♂ *Platytropesa* Macquart, latter drawn from specimen without proclinate orbital setae. Figs. 15 and 16. Facial outlines of head structure in (15) *Platytropesa simulans* sp. n. and (16) *Platytropesa auriceps* Macquart, latter with inner eye margin angulate at point indicated by arrow.

SILBOMYIA Macquart, 1843

Silbomyia Macquart, 1843, *Mém. Soc. Sci. Lille*, Année 1842 : 274. *Diptères Exot.*, **2**, pt. 3 : 117. Type-species : *Musca fuscipennis* Fabricius, 1805, by subsequent designation of Engel (1925).

Stilbomyia Agassiz, 1846, *Nomen. Zool. Index Univ.* : 353. [Unjustified emendation of *Silbomyia* Macquart ; see Articles 32 and 33 of *International Code of Zoological Nomenclature*, 1961.]

Megaloprepes Bigot, 1859, *Rev. Mag. Zool.* (2) **11** : 309. Type-species : *Megaloprepes albonotatus* Bigot, 1859, by monotypy. **syn. n.**

Spinthemyia Bigot, 1859, *Rev. Mag. Zool.* (2) **11** : 309. Type-species : *Spinthemyia fulgida* Bigot, 1859, by monotypy.

Diagnosis. Ventral surface of costa setulose between apices of veins *Sc* and R_1 (second costal sector). Frons very broad and equal in both sexes, ♂ eyes not at all approximated. ♂ with strong outer vertical setae and two pairs of strong proclinate orbital setae as in ♀. Sternites 2–4 in both sexes with strong spinous setae, these sternites in ♂ never with very long dense hair.

Discussion. For the past century this genus has usually been referred to (Brauer and Bergenstamm, 1889 ; Wulp, 1896 ; Engel, 1925 ; Malloch, 1927, 1928a, 1928b, 1929, 1930, 1935 ; Enderlein, 1936 ; Paramonov, 1957) by the name *Stilbomyia*, an emendation of *Silbomyia* attributable to Agassiz (1846) ; in recent years only Townsend (1931, 1935, 1937) has followed the original spelling.

Macquart erected the genus *Silbomyia* for *Musca fuscipennis* and *Musca micans* of Fabricius (1805). The former is type-species of the genus by designation of Engel (1925), not by designation of Brauer and Bergenstamm (1889) as given by Townsend (1937, p. 172) : *fuscipennis* Fabricius is cited by Brauer and Bergenstamm (*op. cit.*) as an *example* of *Silbomyia* and their citation is therefore not acceptable as a fixation of the type-species in view of Opinion 98 (Brauer and Bergenstamm) rendered by the International Commission on Zoological Nomenclature. Engel's (1925) citation of *fuscipennis* Fabricius as type-species is the earliest acceptable type-fixation for *Silbomyia* Macquart.

Engel (1925), who did not see the Fabricius types (now in the Universitetets Zoologiske Museum, Copenhagen), considered *micans* Fabricius and *fuscipennis* Fabricius to be synonymous, but Townsend (1931) has correctly pointed out that Engel was mistaken. The ♂ holotype of *Musca micans* Fabricius lacks the facial carina and other *Silbomyia* characters, and Townsend (1931) was correct in assigning *micans* to the genus *Catapicephala* Macquart ; this genus does not belong in the Ameniinae and *micans* is therefore excluded from consideration in this paper.

Bigot (1859) erected the genera *Megaloprepes* and *Spinthemyia*, both monotypic for new species from Celebes, viz. *M. albonotatus* Bigot and *S. fulgida* Bigot respectively. Townsend (1937, p. 153 and p. 172) has stated that the types of these species are lost, but the types of both from the Bigot collection are in the British Museum. Brauer (1898) recorded seeing *S. fulgida* in his account of the Bigot types (" Originalexemplaren "), and the specimen he saw (now in B.M. Nat. Hist.) is labelled " Type " and " Brauer WIEN CVII (No. 123) ", the number being the serial number of *fulgida* in Brauer's paper : this specimen is undoubtedly the holotype of *S. fulgida*

Bigot. Brauer's papers on the Bigot's types omit any mention of *Megaloprepes albonotatus* and this is probably the basis for Townsend's assumption that the type is lost, but there are three specimens from Celebes in the British Museum collection which were formerly part of Bigot's collection and which were presented to the B.M. Nat. Hist. by the late G. H. Verrall in 1904 ; these specimens agree fully with Bigot's description of *Megaloprepes albonotatus* and there are no other specimens in the entire Bigot collection (which is now in the B.M. Nat. Hist.) which could in any way fit his description of *Megaloprepes*. I therefore consider it justified to regard these three specimens from the Bigot collection, since they are from Celebes and exactly fit the description, as the original type material and to designate a lectotype from them accordingly.

The holotype of *Spinthemyia fulgida* Bigot and the lectotype of *Megaloprepes albonotatus* Bigot are in my view congeneric with *Silbomyia fuscipennis* (Fabricius), type-species of *Silbomyia*, and *Megaloprepes* and *Spinthemyia* are here treated as synonyms of *Silbomyia*.

Silbomyia Macquart is easily distinguished from other genera of the Ameniini by the setulose ventral surface of the costa between the apices of veins *Sc* and R_1. This character (Text-fig. 23) at once easily distinguishes *Silbomyia* from *Amenia* Robineau-Desvoidy, genera which Paramonov (1957) suggests are not convincingly separable on real taxonomic grounds. However almost all the species placed in *Silbomyia* by Paramonov (1957), and previously by Malloch (1927, 1930), and occurring in Australia are not true *Silbomyia*, since they have the second costal sector bare on the ventral surface and lack other characters of *Silbomyia* ; *S. minor* Malloch is the only known species of *Silbomyia* occurring in Australia, the other Australian species previously included in this genus belonging in *Platytropesa* Macquart or *Stilbomyella* Malloch.

The species of *Silbomyia* show an extremely close uniformity, which extends to the male genitalia ; these are more or less indistinguishable even in species which are obviously distinct on other characters. The species differ mainly in the proportions of the head structures, particularly the relative widths of the parafrontals and interfrontal area and in the size and shape of the frontal carina ; these characters are clearly very constant and certainly provide good specific criteria. In this work fifteen species are recognized, of which seven are described as new ; ten previously described species belong in *Silbomyia* of which eight are upheld as good species, two names falling in synonymy. *S. hoeneana* Enderlein from China and *S. sauteri* Enderlein from Formosa are extremely close and may prove to be identical, but for the present there is insufficient evidence on which to synonymize these names.

Wulp (1896) placed twelve names under *Silbomyia*, but only four of these are truly assignable to this genus (*fuscipennis* Fabricius, *fulgida* Bigot, *prospera* Walker, *nitidissima* Vollenhoven) ; of the other eight names, five belong in the Ameniinae in *Platytropesa* and *Stilbomyella* and are dealt with later in this paper. The remaining three species are not Ameniinae at all and belong as follows : *micans* Fabricius in *Catapicephala* Macquart ; *infixa* Walker and *fumipennis* Walker in *Hypopygiopsis* Townsend. These last three names also appear under *Silbomyia* in Bigot's (1892)

catalogue of Oriental Diptera. Both Wulp (1896) and Engel (1925) were in error in treating *prospera* Walker and *nitidissima* Vollenhoven as synonyms of *fulgida* Bigot ; they are both synonymous with *albonotata* Bigot, not with *fulgida*.

Attention should be drawn here to confusion existing among the syntypes of *S. latigena* Enderlein and *S. sauteri* Enderlein, type-material of which is mainly in the Deutsches Entomologisches Institut, but some also in the Zoologisches Museum der Humboldt-Universität and in the British Museum (Natural History). Enderlein (1936) described these species from a long series of specimens collected by H. Sauter in Formosa, applying the name *S. latigena* to a species with a yellow postocular area (" Schlafen lebhaft goldgelb ") and the name *S. sauteri* to another with a silvery postocular area (" Schlafen . . . silberweiss "). He described in addition *S. sauteri* var. *viridis* Enderlein for green, instead of the typical violet or dark blue, specimens of *sauteri*. All the type-material of both species, consisting in all of 58 specimens, has been examined and it is clear that two closely allied species are involved which differ considerably in the structure and proportions of the facial carina ; in one the carina (especially in the male) is long, narrow and somewhat " pinched-in " and in the other is broader, forming a more distinct ridge, and not at all pinched in. Forms with the long narrow carina have a yellow or at least silvery-yellow postocular area and it is clear, although Enderlein did not mention the carina character, that the name *latigena* Enderlein applies to this species ; the name *sauteri* applies to the species with short carina and silver postocular area. Lectotypes have been designated to fix these names.

Enderlein did not designate a holotype for either species, but labelled a number of each as " type " and a number of other specimens of each species as " cotype ". Unfortunately he did not correctly segregate the two species, and as a result seven specimens labelled as types or cotypes of *S. sauteri* End., and three specimens labelled as types and cotype of *sauteri* var. *viridis* End. are actually specimens of *S. latigena* End. and not of *sauteri*! A determination label has been affixed to each of these specimens identifying it as *latigena* with the additional words " labelled as *sauteri* in error by Enderlein ". Almost all the types of the two species agree with the data published by Enderlein, but there are a few slight discrepancies ; nonetheless it appears justifiable to consider all the specimens actually labelled by Enderlein, whether described as a type or a cotype, as forming the syntypic series. The specimens chosen as lectotypes of the two species conform fully with the information published with the original descriptions, and each correctly labelled syntype remaining after lectotype selection has been labelled as a paralectotype. It should be noted that the specimens of *S. latigena* erroneously labelled by Enderlein as *sauteri* are nonetheless paralectotypes of *sauteri* although actually belonging to the other species. In addition to the syntypic material of *S. latigena* and *S. sauteri* bearing Enderlein's labels I have seen a further long series of specimens from the Sauter collection which have very similar or identical data with that on the syntypes but have not been labelled by Enderlein ; there is no evidence that these additional specimens were seen by Enderlein and I am therefore not regarding them as forming part of the syntypic series.

Distribution : *Silbomyia*, except for a single species from northern Queensland, is an entirely Asiatic genus and the only genus of Ameniini occurring in the Oriental Region (map 1). The genus is widely distributed from India eastwards through China to Formosa, and south-eastwards through the Malay peninsula to eastern Indonesia and the Philippines. In Indonesia the eastern limit of distribution is in Celebes (where two species occur that are found nowhere else) and Timor ; so far as is known at present true *Silbomyia* is absent from the Molucca Islands, Aru and New Guinea, where the closely related genera *Platytropesa* and *Stilbomyella* occur. The last two genera do not occur west of the Moluccas, and in eastern Indonesia there is therefore no area of overlap between *Platytropesa* and *Silbomyia* ; in Queensland however *Silbomyia minor* Malloch occurs together with a species of *Platytropesa*. The occurrence of this one species of *Silbomyia* in Australia is puzzling, for it appears to be widely isolated from Timor and Celebes, the nearest known areas where *Silbomyia* occurs. The complete absence of *Silbomyia* from New Guinea makes it appear probable that *Silbomyia* reached Queensland by a route from Timor through Northern Australia rather than through New Guinea (whence, on the other hand, *Platytropesa* almost certainly reached Australia) ; no *Silbomyia* are yet known from the Northern Territory of Australia but it is likely that the genus occurs there.

The evidence so far available suggests that each major island of the East Indian archipelago possesses a species of *Silbomyia* which is endemic on that island and occurs nowhere else or only on other very nearby islands : thus *S. fuscipennis* (Fabricius) is confined to Java and Sumatra, *S. sumba* sp. n. to Sumba, *S. metallica* sp. n. to Borneo, *S. palawana* sp. n. to Palawan, and *S. philippinensis* to the Philippine Islands other than Palawan. Two species, *S. albonotata* (Bigot) and *S. fulgida* (Bigot), are confined to Celebes.

Key to the Species

1 Genal hair black. Upper parts of parafrontals dark metallic brassy green or violaceous, strongly contrasting in colour with whitish pollinose lower parts of parafrontals. Facial carina, antennal foveae, epistome and third antennal segment entirely or largely pale brown or blackish brown 2

– Genal hair pale to golden yellow. Parafrontals all yellowish, upper parts not dark metallic and with yellow ground colour. Facial carina, antennal foveae, epistome and third antennal segment pale yellow or orange 3

2 Interfrontal area twice as wide as a parafrontal. Mesonotum all brilliantly metallic, non-pollinose. Wings uniformly dark brown. Abdominal T3 without discal setae. ♂ third antennal segment 6·0 times as long as second segment and facial carina 4·1–4·7 times as long as epistome. [Celebes] ***S. albonotata*** (Bigot) (p. 56)

– Interfrontal area narrow, at narrowest point no wider than a parafrontal. Mesonotum thinly white pollinose on prescutum, notopleura and areas of supra-alar setae. Wings not evenly dark brown, the infuscation heavier near the veins than elsewhere. Abdominal T3 with discal setae. ♂ third antennal segment 3·3–3·7 times as long as second segment and facial carina 2·8–3·4 times as long as epistome. [Philippine Islands] . . . . . ***S. philippinensis*** sp. n. (p. 58)

3 Postorbits entirely pollinose, upper ends at most only appearing slightly shining in some lights. Mesonotum whitish pollinose marginally, pollinosity most conspicuous seen from behind. Interfrontal area dull, without a sheen. Wings with dark brown infuscation heaviest along the veins, or dark brown anteriorly and evenly fading to clear hyaline posteriorly (except in *fuscipennis*). [Not from Celebes] 4

– Upper ends of postorbits bare shining metallic dark greenish or purplish black. Entire mesonotum brilliantly metallic, no pollinosity visible in any light. Interfrontal area with characteristic golden sheen. Wings uniformly dark brown. [Celebes] . . . . . ***S. fulgida*** (Bigot) (p. 60)

4 Abdominal tergite 1+2 with a pair of strong median marginal setae . . . 5

– Abdominal tergite 1+2 without median marginal setae 6

5 Upper occiput thickly pale yellow pollinose, not at all metallic. Postorbits pale yellow pollinose. Hair of lower parts of parafrontals pale yellow. Interfrontal area 3·2 times as wide as a parafrontal. Seta on second antennal segment fine and weak, much shorter than arista. [Sumba] . . ***S. sumba*** sp. n. (p. 62)

– Upper occiput greenish metallic in most lights, only thinly whitish pollinose. Postorbits silvery white pollinose. Parafrontal hair all black. Interfrontal area 2·3 times as wide as a parafrontal. Seta on second antennal segment very strong, as long as arista. [Palawan Island] . . . ***S. palawana*** sp. n. (p. 63)

6 Gena exceptionally broad, about four-ninths or almost one-half (0·43–0·49) of eye-height. Head very strikingly sexually dimorphic (♂ not known in *minor* but this character almost certain to hold true for this species). Wings largely clear hyaline, only infuscate antero-basally. Very small species, length 6·6–9·9 mm. 7

– Gena narrow, at most just over one-third (0·35) of eye-height. Head not or only slightly sexually dimorphic. Wings evenly dark brown infuscate or infuscation heaviest along veins, largely clear hyaline only in *timorensis*. Larger species, length almost always more than 11 mm. 8

7 Upper occiput thickly white pollinose, not appearing at all metallic in any light. White pollinosity on prescutum very conspicuous, extending back to and ending abruptly at transverse suture. Dorsum of T3 with conspicuous white pollinosity. Third antennal segment of ♀ 3·5 times as long as second segment. Antennae in ♂ inserted far above level of eye middle, extremely elongate, third segment 7·5 times as long as second segment. ♂ facial carina over one and a half times as long as distance from lunula to anterior ocellus. Length 8·9–9·9 mm. [India] ***S. parvula*** Baranov (p. 64)

– Upper occiput very thinly whitish pollinose, appearing dark greenish metallic in most lights. White pollinosity on prescutum only very inconspicuous near anterior margin and disappearing well before transverse suture. Dorsum of T3 without conspicuous white pollinosity. Third antennal segment of ♀ elongate, 4·7 times as long as second segment. ♂ unknown. Length 6·6 mm. [Queensland] ***S. minor*** Malloch (p. 66)

8 Fore tibia with two strong *pv* setae. Wings dark brown infuscate, either evenly or infuscation heaviest along veins. [Not from Timor] 9

– Fore tibia with only one *pv* seta. Wings dark brown only antero-basally, remainder of wings almost clear. [Timor] . . . ***S. timorensis*** sp. n. (p. 67)

9 Wings very uniformly dark brown, infuscation not concentrated along veins or weaker in cells. Bend of vein *M* unusually remote from wing margin, distance from bend to margin at least 3·1 times as great as that between *m–cu* and bend. [Sumatra to Lombok] 10

– Wings with dark brown infuscation most concentrated along veins and paler in cells, not evenly darkened. Bend of vein *M* nearer to wing margin, distance from bend to margin not more than twice that between *m–cu* and bend. [Not from Sumatra to Lombok] 11

10 Postorbits pale to golden yellow. Veins R_{2+3} and R_{4+5} unusually strongly bowed forwards (Text-fig. 18), cell R_1 therefore very strongly tapering apically. Distance from bend of vein *M* to wing margin 3·5–4·0 times as great as that between *m–cu* and bend. Antennae elongate, third segment 4·5 times as long as second segment in ♀ and 6·2 times as long in ♂ ; facial carina correspondingly elongate, 4·5 times as long as epistome in ♀ and 6·2–6·6 times as long in ♂. [Java and Sumatra]
S. fuscipennis (Fabricius) (p. 68)

– Postorbits silvery whitish. Veins R_{2+3} and R_{4+5} not strongly bowed forwards, cell R_1 broader and less strongly tapering. Distance from bend of vein *M* to wing margin 3·1 times as great as that between *m–cu* and bend. Antennae shorter, third segment 3·2 times as long as second segment in ♀ (not known for ♂) ; facial carina shorter, 2·7 times as long as epistome in ♀ (not known for ♂). [Lombok]
S. mackerrasi sp. n. (p. 72)

11 Facial carina longer and distinctly fusiform, especially in ♂, its lateral surfaces pinched in towards one another and anterior surface not forming a definite median ridge, carina 3·5–4·2 times as long as epistome in ♂ and 2·9–3·3 times as long in ♀, in both sexes slightly longer than distance from lunula to anterior ocellus. Antennae longer in ♂ than ♀, third segment in ♂ 4·4–4·6 times as long as second segment. Postorbits yellow in ♀, more silvery yellow in ♂
S. latigena Enderlein (p. 73)

– Facial carina short, broader and more keel-like, usually forming a definite median ridge on anterior surface, shorter than distance from lunula to anterior ocellus and not more than 3·3 times as long as epistome in either sex. Antennae about equal in length in both sexes, third segment not more than 3·9 times as long as second segment. Postorbits silvery white 12

12 Margin of lower calypter dark brown. Interfrontal area very broad, 3·3–3·6 times as wide as a parafrontal. Vertex by measurement distinctly broader than one eye viewed from above, eye-vertex-eye ratio about 5 : 7 : 5 13

– Margin of lower calypter white. Interfrontal area 1·4–2·8 times as wide as a parafrontal. Vertex by measurement almost exactly equal in width to one eye viewed from above 41

13 One or both of abdominal tergites 3 and 4 almost always with median discal setae among the spiniform hair. ♂ third antennal segment 3·4–3·5 times as long as second segment. Colour usually dark blue to violet, only occasionally green. [Formosa] . . . . . ***S. sauteri*** Enderlein (p. 76)

– Tergites 3 and 4 always without discal setae. ♂ third antennal segment longer, 3·7–3·9 times as long as second segment (difference possibly not constant). Colour almost always green. [China] . . . . . ***S. hoeneana*** Enderlein (p. 78)

14 Interfrontal area 2·4–2·8 times as wide as a parafrontal. Parafacials yellowish white pollinose and in some lights having a brilliant creamy white or slightly silvery appearance. [India to Malaya] . . . . . ***S. asiatica*** sp. n. (p. 80)

– Interfrontal area unusually narrow, 1·4–1·7 times as wide as a parafrontal, the parafrontals correspondingly broad. Parafacials golden yellow pollinose, not appearing brilliant whitish in any light. [Borneo] . ***S. metallica*** sp. n. (p.81)

Descriptions of the Species

Silbomyia albonotata (Bigot, 1859) **comb. n.**

(Text-figs. 32, 35)

Megaloprepes albonotatus Bigot, 1859, *Rev. Mag. Zool.* Ser. 2, **11** : 309. Lectotype ♂, CELEBES. In the British Museum (Natural History), London.

Musca prospera Walker, 1860, *J. Linn. Soc. Lond.* (*Zool.*) **4** : 133. Lectotype ♀, CELEBES. In the British Museum (Natural History), London. **syn. n.**

Silbomyia nitidissima Vollenhoven, 1863, *Versl. med. K. Akad. wetensch. Amst.* **15** : 16. Lectotype ♂, CELEBES. In the Rijksmuseum van Natuurlijke Historie, Leiden. **syn. n.**

Lectotype Designations : (1) *Megaloprepes albonotatus* Bigot. The British Museum collection contains three specimens from the Bigot collection labelled Celebes and agreeing perfectly with the original description. None of the specimens bears the name ' albonotatus ' in Bigot's writing, but there is no doubt that these specimens represent the original syntypic series, and a ♂ syntype has been labelled and is here designated as lectotype. The remaining two syntypes have been labelled as paralectotypes.

(2) *Musca prospera* Walker. Walker (1860a) gave a basic description of this species, followed by a brief description of two varieties, " Var. β." and " Var. γ.". These varietal names, being written in the form of single letters, do not have availability (Article 11 (g)(i) of present *Code*) and the specimens on which they are based must therefore be treated as part of the syntype series of *prospera*. The British Museum collection contains two ♀ specimens labelled ' prospera ' in Walker's writing and agreeing fully with his basic description ; one of these has been labelled and is here designated as lectotype. In addition the B.M. contains a ♀ specimen with the same data as the lectotype which agrees perfectly with Walker's description of " Var. γ.", and which must certainly be the specimen Walker had before him when describing this variety : this specimen is not conspecific with the other syntypes of *prospera*, and belongs to the related *S. fulgida* (Bigot) from Celebes. The Oxford University Museum contains a specimen of *prospera* bearing a circular faded blue label reading ' Mak.' identical with a label on the lectotype specimen ; the characters of this specimen fit exactly with Walker's " Var. β." and there seems no doubt that the Oxford specimen was one that Walker had before him at the time of the original description, and must be treated as one of the syntype series. The syntype in Oxford is labelled " Silbomyia prospera Walk, Makassar, Wallace, E Mus Saund. 1867 10d " ; probably in Westwood's writing, and the date and price refer to a transaction in which the specimen changed hands. The three syntypes remaining after lectotype designation have been labelled as paralectotypes.

(3) *Silbomyia nitidissima* Vollenhoven. Described from four specimens from Tondano, stated by Vollenhoven (1863) to be all ♀. The four syntypes are in Rijksmus. Leiden, and three of them are in fact ♂ ; one of the ♂ syntypes has been labelled and is here designated as lectotype, and the remaining syntypes have been labelled as paralectotypes.

DIAGNOSIS. T1+2 with median marginal setae ; genal hair black ; wings uniformly dark brown ; bristle on second antennal segment short and weak.

♂. *Head :* Interfrontal area orange-brown or reddish brown ; area of ocelli and upper halves of parafrontals metallic, dark brassy green occasionally with violaceous reflections ; parafrontals just below metallic areas with blackish ground colour and white pollinosity ; remainder of parafrontals and all of parafacials with pale yellow ground colour and dense white or creamy white pollinosity ; facial carina, antennal foveae and epistome blackish brown or dark reddish brown with very thin inconspicuous greyish pollinosity, pollen on mid line of facial carina a little more yellowish ; genae with dark brownish ground colour and very thin inconspicuous whitish pollinosity, in some lights appearing very slightly metallic greenish or purplish ; postorbits silvery white pollinose except on uppermost parts near the vertex which are dark greenish metallic. Hair of parafrontals and genae entirely black. Upper occiput cupreous to violaceous green, shining, very little trace of pollinosity ; cerebrale brownish yellow. Eye-vertex-eye ratio about 12 : 13 : 12. Interfrontal area about twice (1·9–2·1) as wide as a parafrontal. Facial carina long and narrow, rather pinched in laterally and slightly fusiform in general shape, about 1·4 times as long as distance from lunula to anterior ocellus and 4·1–4·7 times as long as epistome. Gena exceptionally narrow, about one-ninth to one-eighth (0·11–0·125) of eye-height. Parafacial 1·5–1·75 times as wide as third antennal segment ; facial ridges almost straight in profile, fine hairs above the vibrissae reaching about half way up the ridges. Postocellar setae well developed. Antennae brown or blackish brown except for small dark orange area at extreme base of third segment, third segment very long and some 6·0 times as long as second segment ; seta on second segment shorter than arista, usually rather weak ; arista about equal in length to third antennal segment. Palpi brownish yellow. *Thorax :* entire dorsum brilliantly metallic emerald or cupreous green without trace of pollinosity ; mesopleura and sternopleura green, each with a very large spot of dense white pollinosity conspicuous only when viewed from above, in other lights the area of the pollinose spots appearing bluish violet ; pteropleura and hypopleura reddish or violaceous. *Wings :* uniformly dark brown. Distance between bend of vein *M* and wing margin 1·7–2·2 times as great as that between *m–cu* and the bend ; on vein *M* distance from *r–m* to *m–cu* 2·8–3·3 times that between *m–cu* and bend ; veins R_{2+3} and R_{4+5} not bowed forwards. Costal spine minute. Margin of lower calypter dark brown, calyptrae otherwise white. *Legs :* black, femora with violaceous reflections and fore coxae often somewhat greenish. *Abdomen :* dorsum brilliant metallic emerald or cupreous green, apex more violaceous when seen from behind ; venter reddish violaceous to deep violet and contrasting with green dorsum. T5 on each side with a large spot of dense white pollinosity easily visible to naked eye, these pollinose areas mainly ventro-lateral in position but extending slightly on to dorsum of tergite ; T3 when viewed from behind showing trace of an extremely thin covering of whitish pollinosity, this pollinosity extending medially round the sides of the tergite and becoming slightly more conspicuous on latero-ventral surface especially when seen from above. T1+2 with a pair of very strong median marginal setae which are occasionally duplicated on one or both sides ; T3 consistently with only one lateral marginal seta on each side ; T3 and T4 without median discal setae. Hair of T3 and T4 recumbent, except as a rule for some semi-erect hair in mid-line of T3 ; hair of T5 short, fine and erect. ♂ hypopygium as in Text-figs. 32 and 35. *Measurements :* body length 15·5 mm. (range 14·4–16·3 mm.), wing length 12·9 mm. (range 11·8–13·7 mm.) [10 specimens].

♀. Extremely like ♂ except for following detail of the head : facial carina not at all fusiform and laterally compressed, more ridge-like and broader ventrally, 3·6–3·8 times as long as epistome ; third antennal segment shorter, 4·7–5·1 times as long as second segment ; parafacials broader, each about 2·75–3·0 times as wide as third antennal segment ; gena broader, almost one-fifth of eye-height. On abdominal T3 there are sometimes two pairs of strong median marginal setae, always only one in ♂. *Measurements* : body length 15·4 mm. (range 13·7–17·9 mm.), wing length 12·6 mm. (range 11·3–14·3 mm.) [10 specimens].

Material examined. *Megaloprepes albonotatus* Bigot, ♂ lectotype and 1 ♂, 1 ♀, paralectotypes, Celebes (no other data) (B.M. Nat. Hist.). *Musca prospera* Walker, lectotype ♂, Celebes : Macassar (*A. R. Wallace*) ; paralectotypes : Celebes : 1 ♀, Macassar, 1857–58 (*A. R. Wallace*) (B.M. Nat. Hist.), and 1 ♂, Macassar (*Wallace*) (Oxfd. Univ. Mus.). *Silbomyia nitidissima* Vollenhoven, ♂ lectotype and 2 ♂♂, 1 ♀, paralectotypes, Celebes : Tondano (*Forsten*) (Rijksmus. Leiden).

Indonesia. Celebes : 1 ♂ (*Westerm.*) (Zool. Mus. Humb. Univ.) ; 2 ♂♂, 1 ♀, Menado (*Mme. Ida Pfeiffer*) (B. M. Nat. Hist.) ; 1 ♂, Nord-Ost Celebes, Minahassa (*v. Röder*) (Staatl. Mus. Stuttgart) ; 1 ♀, S. Celebes, Samanga, xi.1895 (*H. Fruhstorfer*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Nord Celebes, Toli-Toli, xi-xii.1895 (*H. Fruhstorfer*) (Zool. Mus. Humb. Univ. & B. M. Nat. Hist.) ; 1 ♀, S. Celebes, Lampa-Battau, 3,000 ft., iii.1896 (*H. Fruhstorfer*) (B. M. Nat. Hist.) ; 2 ♀♀, Latimodjonggeb-Uru, 800 m., viii-ix.1930 (*G. Heinrich*) (B. M. Nat. Hist. & Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Bantimoeroeng, 25.v.1930 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Bantimoeroeng, viii.1931 (*G. Heinrich*) (Zool. Mus. Humb. Univ. & B. M. Nat. Hist.) ; 1 ♀, Bonthain, Wawa Karaeng, 1,100 m., viii.1931 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 1 ♀, Bontham, Wawa Karaeng, ix-x.1931 (*G. Heinrich*) (B. M. Nat. Hist.) ; 1 ♀, Ile-Ile, 500–800 m., xii.1930 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 2 ♀♀, N. Celebes, Rurukan, 900 m., i.1931 (*G. Heinrich*) (Zool. Mus. Humb. Univ. and Staatl. Mus. Stuttgart) ; 1 ♀, Enrekang, 5.ix.1930 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 1 ♂, Minahassa, Tomohon, 30.v.–2.vi.1954 (*A. H. G. Alston*) (B. M. Nat. Hist.) ; 1 ♂, Tondano (*Forster*) (Rijksmus, Leiden).

Distribution : Confined to Celebes, where it occurs together with *S. fulgida* (Bigot). Enderlein (1936, p. 440) has referred to some of the material listed above under the name *S. prospera* (Walker).

Affinities. Allied to *S. philippinensis* sp. n. but easily distinguished by the characters given in the key ; also showing fairly close affinity with *S. fulgida* (Bigot) but readily differentiated from this species by the dark brown face and antennae, dark green metallic upper parafrontals, black-haired genae and proportions of head structures.

Silbomyia philippinensis sp. n.

Diagnosis. Genal hair black ; upper parafrontals dark metallic greenish to violet ; interfrontal area at narrowest equal in width to or only a little wider than parafrontal at its broadest ; dorsum of thorax pollinose marginally.

♂. *Head :* Interfrontal area reddish brown ; ocellar area metallic greenish or greenish violet ; upper parts of parafrontals from level of lower proclinate orbital setae to vertex dark metallic green to violet in colour and without pollinosity, contrasting with creamy whitish pollinose lower parts of parafrontals ; lower halves of parafrontals and all of parafacials pale yellow in ground colour and densely yellowish white or creamy yellowish pollinose ; facial carina, antennal foveae and epistome brown or pale brown at least in part (facial carina and part of epistome sometimes yellowish), with thin inconspicuous whitish pollinosity ; genae variable

in material seen, colour ranging from yellow with golden pollinosity to dark slightly metallic violaceous with whitish pollen ; postorbits densely white or yellowish white pollinose, the pollinosity extending dorsally more or less to the outer vertical setae. Hair of parafrontals and genae entirely black. Upper occiput slightly metallic dark green or violet, metallic appearance slightly obscured by thin white pollinosity more obvious in some lights than others ; cerebrale semi-translucent orange medially but slightly metallic blackish green or violaceous laterally. Vertex seen from above obviously narrower than one eye, eye-vertex-eye ratio about 6 : 5 : 6. Interfrontal area at its narrowest point equal in width or only very slightly broader (1·2 times as wide) than one parafrontal at the corresponding point, parafrontals therefore unusually broad in relation to the interfrontal area. Facial carina short and rather ridge-like, not fusiform or noticeably laterally compressed, about equal in length to distance from lunula to anterior ocellus and about 2·8–3·4 times as long as epistome. Gena about one-seventh (0·14–0·15) of eye-height. Parafacial 2·5 times as wide as third antennal segment. Fine hairs above vibrissae reaching at most only one third of way up facial ridges. Postocellar setae fine and weak, sometimes only minute hairs. Antennae brown except for extreme base of third segment narrowly orange, third segment 3·3–3·7 times as long as second segment ; bristle on second segment exceptionally long and strong, as long as or even longer than entire antenna ; arista equal in length to third antennal segment. Palpi yellow or brownish yellow. *Thorax :* dorsum varying from bluish green occasionally with small violaceous patches to deep bluish violet (as in holotype), the prescutum, notopleura and areas of supra-alar setae with a covering of white pollinosity which is most easily seen in posterior view ; sides of thorax mostly bluish green, the mesopleura and sternopleura with the usual very large densely white pollinose spots ; hypopleura and posterior parts of pteropleura reddish brown with metallic reddish violaceous reflections. *Wings :* with heavy brown infuscation broadly along the veins, darkening appearing most concentrated anteriorly where the veins are close together, wing membrane very pale brownish in cells and along hind margin. Distance between bend of vein *M* and wing margin 1·6–1·8 times as great as that between *m–cu* and bend ; on vein *M* distance from *r–m* to *m–cu* 2·7–3·3 times that between *m–cu* and bend. Costal spine short and inconspicuous, shorter than *r–m*. Margin of lower calypter dark brown, calyptrae otherwise white. *Legs :* black, femora with bluish green to violaceous metallic reflections. *Abdomen :* bluish green to violet, deep bluish violet in holotype specimen. T3 on entire dorsum and medially on ventro-lateral surfaces with a covering of white pollinosity, very conspicuous in posterior view ; T4 without pollinosity ; T5 with a pair of very large and very conspicuous white pollinose spots which extend from extreme ventral margins of the tergite round to the latero-dorsal surfaces, the spots easily seen from above. T1+2 with a pair of strong median marginal setae ; T3 with a single lateral marginal seta on each side ; T3 with a pair of median discal setae, usually strong but one sometimes shorter and weaker than the other. Hair of dorsum of T3 erect and rather long spiniform on median third, semi-recumbent and finer laterally ; hair of T4 semi-erect on most of the dorsum, sometimes very slightly spiniform near the middle of the tergite but usually shorter and finer than that on T3 ; hair of T5 very fine and erect. ♂ hypopygium very similar to that of *S. albonotata* (Text-fig. 32). *Measurements :* body length 13·1 mm. (range 11·6–15·5 mm.) wing length 12·2 mm. (range 11·3–14·2 mm.) [5 specimens] : maximum measurements given are those of holotype.

♀. Almost identical with ♂ except for very slightly broader parafacials and genae and vertex almost equal in breadth to one eye when measured from above. *Measurements :* body length 14.4 mm. (range 12·2–15·8 mm.), wing length 12·6 mm. (range 10·0–14·2 mm.) [4 specimens].

MATERIAL EXAMINED. Holotype ♂, PHILIPPINE ISLANDS : Luzon, Mt. Makiling (*Baker*). In British Museum (Natural History), London. Paratypes : PHILIPPINE ISLANDS : 2 ♂♂, 1 ♀, Luzon, Mt. Makiling (*Baker*) (U.S. Nat. Mus.) ; 1 ♀ Luzon, Mt. Makiling (*Baker*) (B. M. Nat. Hist.) ; 1 ♂, Baguio, Benguet [? Luzon or Mindanao] (*Baker*) (U.S. Nat. Mus.) ; 1 ♀ Mindanao, Surigao (*Baker*) (U.S.

Nat. Mus.) ; 1 ♀, Mindanao, Kolambugan (*Baker*) (U.S. Nat. Mus.) ; 1 ♂, Mindoro, Baco River District, 1–23.i.1910 (*J. J. Mounsey*) (B. M. Nat. Hist.).

Distribution : The very limited amount of material available of this species is from Luzon, Mindoro and Mindanao islands, but *S. philippinensis* probably occurs in other islands of the Philippine group. The material seen is rather varied in size and colour, but is too limited to determine whether significant differences exist between forms from different islands ; the specimen from Mindoro however differs noticeably from the other specimens in having a dark narrow somewhat metallic violaceous gena and a shorter facial carina and shorter antennae than usual.

Affinities. The dark metallic non-pollinose upper parafrontals, the partly or completely dark face and antennae, and the black-haired genae of *S. philippinensis* sp. n. undoubtedly indicate affinity with *S. albonotata* (Bigot), the only other species of *Silbomyia* possessing these characters ; it is easily distinguished from *S. albonotata* by the much narrower interfrontal area, the much shorter antennae and facial carina and by other characters given in the key to the species.

Silbomyia fulgida (Bigot, 1859)

Spinthemyia fulgida Bigot, 1859, *Rev. Mag. Zool.* Ser. 2, **II** : 310. Holotype ♂, CELEBES. In the British Museum (Natural History), London.

Diagnosis. T1+2 with median marginal setae ; genal hair yellow ; wings uniformly brown ; dorsum of thorax brilliant metallic coppery green to reddish cupreous without trace of pollinosity.

♂. *Head :* Interfrontal area deep golden with a characteristic satiny sheen ; area of ocelli, vertex and upper halves of parafrontals semi-translucent yellowish, non-pollinose and rather shining ; lower parts of parafrontals, parafacials and genae with entirely yellow ground colour and dense creamy yellowish or pale yellow pollinosity ; facial carina, antennal foveae and epistome yellow with yellowish white pollinosity ; postorbits densely silvery white pollinose except on uppermost parts near the vertex which are bare shining metallic greenish or purplish black, shining white lower parts of postorbits strongly contrasting with yellow genae. Hair of parafrontals entirely black, hair of genae long and very pale yellow to golden orange. Upper occiput slightly metallic greenish especially near upper metallic ends of postorbits, elsewhere ground colour somewhat obscured by thin whitish pollinosity ; cerebrale semi-translucent yellowish like the vertex. Eye-vertex-eye ratio about 5 : 6 : 5. Interfrontal area 3·6–4·0 times as wide as a parafrontal. Facial carina long and laterally compressed, somewhat fusiform, nearly 1·3 times as long as distance from lunula to anterior ocellus and 4·0–4·4 times as long as epistome. Gena about one-fifth (0·19–0·22) of eye-height. Parafacial twice as broad as third antennal segment ; facial ridges very slightly concave in profile, with very fine hairs above vibrissae extending half or two-thirds of the way up each ridge. Postocellar setae very weak and hair-like, inconspicuous. Antennae bright orange, third segment 6·0–6·3 times as long as second segment ; bristle on second segment rather fine and much shorter than arista, latter very nearly equal in length to third antennal segment. Palpi yellow. *Thorax :* entire dorsum brilliantly metallic without pollinosity, usually coppery green but occasionally reddish copper or emerald-green with slight bluish reflections ; mesopleura and sternopleura green, each with a very large area of dense white pollinosity most conspicuous from above, areas under the pollinosity usually appearing blue-violet in certain lights ; pteropleura and hypopleura reddish or reddish brown, sometimes with a violaceous tinge. *Wings* : almost uniformly brown, at most becoming only a little paler posteriorly. Distance between bend of vein *M* and wing margin 1·9–2·2 times as great as that between *m–cu* and bend ; on vein *M* distance from *r–m* to *m–cu* 3·2–4·0 times as great as that between *m–cu* and the bend ; R_{4+5} and R_{2+3} not bowed

forwards. Costal spine very small and inconspicuous. Margin of lower calypter brown, calyptrae otherwise white. *Legs* : black, femora with the usual violet or dark greenish reflections. *Abdomen* : dorsum mostly brilliant metallic emerald or coppery green, becoming blue-violet apically and on extreme sides ; venter violet. T5 ventro-laterally with a median band of white pollinosity which extends on to the sides of the tergite but not on to the dorsum, the pollinosity only conspicuous from certain points of view ; T3 showing almost no trace of pollinosity dorsally, but with very thin traces of pollinosity ventrally visible in some lights. T1+2 with a pair of rather widely spaced median marginal setae, each seta sometimes duplicated on one or both sides ; median marginal setae of T3 sometimes duplicated on one or both sides so that there may be two, three or four median marginal setae on this tergite (three in holotype) ; always one lateral marginal seta on T3 ; T3 and T4 without median discal setae. Hair of T3 and T4 largely erect or semi-erect, especially in median area of each tergite where it is very slightly spiniform ; hair of T5 erect and finer than that of preceding tergites. ♂ hypopygium similar to that of *S. albonotata*. *Measurements* : body length 14·6 mm. (range 13·5–15·9 mm.), wing length 11·0 mm. (range 10·0–12·1 mm.), wings relatively short. [5 specimens].

♀. Some small specimens seen which lack definite median marginal setae on T1+2 and in which general colouring of the dorsum is metallic coppery crimson, but otherwise very much like ♂. Differs from ♀ in proportions of the head structures as follows : facial carina less definitely spindle-shaped, more ridge-like, shorter and usually about 3·2 times as long as epistome ; third antennal segment shorter, 4·4–4·7 times as long as second segment ; parafacials broader, about four times as wide as third antennal segment ; gena broader, a little over a quarter (0·26–0·27) of eye-height. Size very variable in material seen, measurements : body length 13·6 mm. (range 9·9–16·8 mm.), wing length 10·9 mm. (range 7·6–14·2 mm.) [11 specimens].

MATERIAL EXAMINED. Holotype ♂, CELEBES (no other data).

INDONESIA. CELEBES : 1 ♀, Macassar, 1857–58 (*A. R. Wallace*) (B. M. Nat. Hist., a paralectotype from mixed type-series of *Musca prospera* Walker) ; 2 ♂♂, 1 ♀, S. Celebes, Lompa-Battau, 3,000 ft., iii.1896 (*H. Fruhstorfer*) (B. M. Nat. Hist. and Div. Ent. Mus. Canberra) ; 1 ♂, 2 ♀♀, S. Celebes, Bua-Kraeng, 5,000 ft., ii.1896 (*H. Fruhstorfer*) (B. M. Nat. Hist.) ; 1 ♂, Nord-Celebes, Toli-Toli, xi–xii.1895 (*H. Fruhstorfer*) (Zool. Mus. Humb. Univ.) ; 4 ♀♀, Ile-Ile, 500–800 m., xii.1930 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 3 ♀♀, Latimodjonggeb. (=Latimodjon Gebirge), Uru, 800 m., viii–ix.1930 (*G. Heinrich*) (Zool. Mus. Humb. Univ.) ; 1 ♀, Bantimoeroeng, viii.1931 (*G. Heinrich*) (Zool. Mus. Humb. Univ.).

In addition to the foregoing material I have seen one ♂ of this species (in Staatl. Mus. Stuttgart) bearing a single label reading ' Roon ' ; this locality lies in Geelvink Bay, New Guinea, an area much further east than the known distribution limits of *Silbomyia* and no other material of *S. fulgida* has been seen from outside Celebes ; the label ' Roon ' is almost certainly erroneous, and the specimen is presumed to be from Celebes. The material collected by G. Heinrich listed above is that already recorded in the literature by Enderlein (1936, p. 440).

Distribution : Probably confined to Celebes, where it occurs together with *S. albonotata* (Bigot).

AFFINITIES. *S. fulgida* appears to be most closely related to *S. albonotata* (for differences see under this species) and allied to a lesser extent to *S. sumba* sp. n. From the latter species it is distinguished most easily by the bare shining metallic upper ends of the postorbits, by the non-pollinose mesonotum and uniformly brown wings ; the shape of the head structures is also quite different.

Silbomyia sumba sp. n.

DIAGNOSIS. T1+2 with median marginal setae; genal hair yellow ; hair of lower parafrontals pale yellow ; upper occiput and uppermost parts of postorbits not at all metallic, thickly pale yellow pollinose.

♀. *Head* : Interfrontal area orange-yellow ; vertex, parafrontals, parafacials, genae, facial carina, antennal foveae and epistome all orange-yellow in ground colour and densely golden yellow pollinose ; postorbits entirely pale yellow pollinose, upper ends not at all bare or metallic. Parafrontals with a few fine black hairs on upper parts, but lower halves of parafrontals with pale yellow hair which is difficult to see against the yellow pollinose background ; hair of genae long and golden yellow. Upper occiput with unusually thick pale yellow pollinosity covering all the dark ground colour, occiput therefore not at all metallic and unicolorous with postorbits ; cerebrale orange-yellow. Vertex narrower than one eye viewed from above, eye-vertex-eye ratio 5 : 4 : 5. Interfrontal area 3·2 times as wide as a parafrontal at level of lower proclinate orbital seta. Facial carina rather short and broad, especially ventrally, not at all fusiform and not laterally compressed, only slightly longer than distance from lunula to anterior ocellus and 3·0 times as long as epistome. Gena slightly more (0·27) than a quarter of eye-height. Parafacial 2·5 times as wide as third antennal segment. Facial ridges with a few very fine small hairs only on lower quarter, some of the hairs pale. Postocellar setae fine and hair-like. Antennae orange, third segment 4·1 times as long as second segment ; seta on second segment weak, much shorter than arista, the latter about equal in length to third antennal segment. Palpi yellow. *Thorax* : emerald or coppery green, slightly violaceous on parts of pteropleura and hypopleura ; dorsum only partly metallic, when viewed from behind showing a thin covering of white pollinosity on most of prescutum and dense white pollinosity on notopleura, areas of supra-alar setae and on postalar calli ; mesopleura and sternopleura with large densely white pollinose spots. *Wings* : dark brown antero-basally with the infuscation rapidly fading to almost clear hyaline apically and posteriorly except for slight trace of brownish infuscation along veins *M* and Cu_1. Distance between bend of *M* and wing margin about 1·1–1·4 times as great as that between bend and *m–cu* ; on vein *M* distance between *r–m* and *m–cu* 2·5–2·9 times as great as that between *m–cu* and bend ; veins R_{2+3} and R_{4+5} not conspicuously bowed forwards. Costal spine a little shorter than *r–m*. Margin of lower calypter brown, calyptrae otherwise white. *Legs* : black, very slightly coppery greenish metallic on the femora. *Abdomen* : entirely bright green with a slight coppery tinge. T5 with a pair of exceptionally small spots of white pollinosity situated just ventrad to the lateral margins, the spots not reaching on to the dorsum ; T3 with only a very slight trace of whitish pollinosity ventro-laterally. T1+2 with a pair of strong median marginal setae ; T3 with one lateral marginal seta on each side and with the pair of median marginal setae very long and erect ; T3 and T4 without median discal setae. Hair of dorsum short and rather fine, especially on T5, erect on median parts of T3 and T4 but only semi-erect laterally. *Measurements* : body length 12·4, 12·8 mm., wing length 10·0, 10·5 mm. [2 specimens].

♂. Unknown. Probably much like ♀ but with longer facial carina and possibly more elongate antennae.

MATERIAL EXAMINED. Holotype ♀, INDONESIA : N. W. Soemba (= Sumba Island), Laora, 100 m., iv.1925 (*Dammerman*). In United States National Museum, Washington. Paratype : 1 ♀, INDONESIA : Sumba (no other data) (D. Ent. Inst.).

Distribution : Known only from the type material listed above from Sumba Island, Indonesia, and probably confined to this island.

AFFINITIES. *S. sumba* sp. n. is a distinctive species but shows some probable affinity with *S. fulgida* (Bigot) ; it is most easily distinguished from *fulgida* by the entirely pollinose postorbits and upper occiput, the white pollinosity on the mesonotum, the pale yellow lower parafrontal hair, and unevenly darkened wings.

Silbomyia palawana sp. n.

DIAGNOSIS. T1+2 with median marginal setae; face and genal hair yellow ; facial carina very short and ridge-like, antennae correspondingly short, in both sexes; much of mesonotum and abdominal T3 with conspicuous white pollinosity, especially seen from behind.

♀. *Head* : Interfrontal area bright orange ; small ocellar spot slightly metallic blue-green ; vertex and upper parts of parafrontals semi-translucent yellowish and hardly at all pollinose, slightly shining ; lower parts of parafrontals, parafacials, genae, facial carina, antennal foveae and epistome with all yellow ground colour, pollinosity creamy white against eye-margin but darkening on parafacials anteriorly to yellow-orange against facial ridges (when viewed from above all of parafacials appearing shining creamy white), genae densely golden orange pollinose ; postorbits entirely white pollinose, contrasting with yellow genae, uppermost extremities not at all metallic. Parafrontal hair all black, genal hair short and golden yellow. Upper occiput semi-metallic blue greenish in some lights, but thinly covered with whitish pollinosity ; cerebrale orange. Eye-vertex-eye ratio almost exactly 1 : 1 : 1. Interfrontal area 2·3 times as wide as a parafrontal. Facial carina short and broad, ridge-like, shorter than distance from lunula to anterior ocellus and 2·8 times as long as epistome. Gena about one-fifth (0·22) of eye-height. Parafacial three times as wide as third antennal segment. Facial ridges with a few hairs above vibrissae only on lower quarter. Postocellar setae weak. Antennae orange, third segment 3·5 times as long as second segment ; seta on second segment about equal in length to arista, latter conspicuously longer than third antennal segment. Palpi yellow. *Thorax* : bluish green in the single specimen seen, probably varying from green to blue-violet ; hypopleura and pteropleura reddish brown with violaceous reflections ; most of mesonotum but especially prescutum, notopleura, areas of supra-alar setae and postalar calli white pollinose, pollinosity most obvious from behind ; mesopleura and sternopleura each with a large area of dense white pollinosity. *Wings* : very dark brown, almost blackish brown, on most of surface but distinctly paler in cells and marginally. Distance between bend of vein *M* and wing margin 1·9 times as great as that between *m–cu* and bend ; on vein *M* distance from *r–m* to *m–cu* 2·8 times that between *m–cu* and the bend. Costal spine shorter than *r–m*. Margin of lower calypter dark brown, calyptrae otherwise white. *Legs* : black, femora largely dark greenish metallic. *Abdomen* : in single specimen seen mainly bluish green but violaceous on all of T1+2 and on fore and hind margins of other tergites, the violet margins broadest ventrally ; colour probably varies from green to bluish violet. T3 on all dorsal surface and medially on the sides with an even covering of white pollinosity, visible to naked eye when viewed from behind ; T4 with very thin traces of a whitish pollinose covering when seen by microscopic examination from behind, not readily visible to naked eye ; T5 with a pair of large densely pollinose white spots ventro-laterally which extend round the sides of the tergite just on to the latero-dorsal surfaces. T1+2 with a pair of strong median marginal setae ; T3 with a single lateral marginal seta on each side ; T3 and T4 without median discal setae. Hair of T3 and T4 uniform, not evidently spiniform, recumbent ; hair of T5 short, sparse and erect, much finer than that on preceding tergites. *Measurements* : body length 14·9 mm.. wing length 13·7 mm. [1 specimen].

♂. Extremely like ♀, obviously differing only in the narrower gena. Facial carina and antennae not sexually dimorphic. ♂ hypopygium as in *S. sauteri*. In the one ♂ seen the thorax is dark blue and the abdomen violaceous blue, but the general body colour almost certainly varies in this species from green or bluish green to blue-violet or violet. Abdominal hair more erect in ♂ than ♀, judging from only a single specimen of each. *Measurements* : body length 14·1 mm., wing length 12·8 mm. [1 specimen].

MATERIAL EXAMINED. Holotype ♀, PALAWAN ISLAND (Philippines) : N. Palawan Binaluan, xi–xii.1913 (*G. Boettcher*). In British Museum (Natural History), London.

Paratype : 1 ♂, PALAWAN ISLAND : Puerto Princesa (*R. C. McGregor*) (U.S. Nat. Mus.).

Distribution : Occurring only on Palawan, Philippine Islands, between Borneo and the Philippines proper and known to me only from the type-material listed above.

AFFINITIES. Undoubtedly closely related to *S. sauteri* Enderlein and *S. hoeneana* Enderlein, resembling both very closely but almost certainly specifically distinct ; *S. palawana* sp. n. is distinguished from both these species by the possession of a pair of strong median marginal setae on T1+2, by the much narrower vertex and interfrontal area, by the narrow gena, and by the much finer less obviously spiniform hair of the abdominal tergites. From *S. sauteri* it differs also by lacking median discal setae on T3 and T4.

Silbomyia parvula Baranov, 1938

Stilbomyia parvula Baranov, 1938, *Bull. ent. Res.* **29** : 414. Lectotype ♂, INDIA. In the British Museum (Natural History), London.

LECTOTYPE DESIGNATION : Baranov did not designate a single type-specimen and the original description is based on two syntypes (in B.M. Nat. Hist.), a ♂ and a ♀ each labelled in Baranov's handwriting " Stilbomyia parvula sp. n. N. Baranov ". The ♂ syntype has been labelled and is here designated as lectotype.

DIAGNOSIS. Very small species with almost clear hyaline wings ; T1+2 without median marginal setae ; ♂ antennae inserted far above level of eye middle, antennae and facial carina exceptionally elongate ; vertex very conspicuously broader than one eye viewed from above.

♂. *Head* : Interfrontal area bright orange-yellow ; uppermost third of parafrontals from *upper* proclinate orbital setae to vertical setae yellow and semi-shining, non-pollinose ; middle part of parafrontal between upper and lower proclinate orbital setae yellow with pale yellow pollinosity ; parafrontals ventrad of lower proclinate orbital setae and all of parafacials yellowish white in ground colour with dense creamy white pollinosity, the pollinosity appearing rather shining white from above ; genae yellow with dense golden yellow pollinosity ; facial carina, antennal foveae, and epistome yellow with thin pale yellow pollinosity ; postorbits all silvery white pollinose. Parafrontals with short fine and sparse hair, all black ; hair of genae bright yellow. Upper occiput unusually thickly covered with white pollinosity, not at all metallic in any light ; cerebrale orange-yellow. Vertex from above very noticeably broader than one eye, eye-vertex-eye ratio 5 : 7 : 5. Interfrontal area 3·5 times as wide as a parafrontal. Frons prominent and less steeply sloping than usual, antennae inserted far above level of eye middle, facial profile much longer than frontal profile and facial carina, antennal foveae and facial ridges therefore all longer than usual. Facial carina long and subfusiform, less strongly tapering ventrally than dorsally, outer surface somewhat flattened and sides pinched in towards one another so that antennal foveae are very deeply formed, the carina 1·6–1·7 times as long as distance from lunula to anterior ocellus and 4·5 times as long as epistome. Gena very broad, about three-sevenths (0·43–0·44) of eye-height. Parafacial 1·5 times as wide as third antennal segment. Facial ridges straight in profile, fine hairs above vibrissae reaching about two-fifths of the way up each facial ridge. Postocellar setae small. Antennae bright orange, exceptionally long, third segment about 7·5 times as long as second segment ; seta on second segment short

and strong, little more than half as long as arista ; the arista short and unusually strongly thickened nearly to the end, slightly over half as long as third antennal segment and plumose hairs short and rather dense. Palpi yellow. *Thorax* : mesonotum bluish green, scutellum darker greenish blue to violaceous blue ; sides of thorax greenish blue to deep violet-blue, except for hypopleura and pteropleura which are more reddish violaceous. Whole of humeral calli, all of prescutum, posterior and lateral margins of scutum unusually thickly white pollinose, when seen from behind therefore only the centre of the scutum metallic ; mesopleura and sternopleura with large spots of dense white pollinosity. A few of the hairs of the propleura pale yellow. *Wings* : almost entirely clear hyaline, only a little brownish infuscation of the membrane between the costa and R_{2+3} ; alula largely opaque white ; veins around basal cells yellow, giving the wing-base a yellowish appearance to naked eye. Distance from bend of vein *M* to wing margin 2·5 times as great as that between *m–cu* and the bend ; on vein *M* distance from *r–m* to *m–cu* 3·1 times as great as that between *m–cu* and bend. Costal spine long, about equal in length to *r–m*. Calyptrae white, including entire posterior and outer margins of lower calypter. *Legs* : black, femora with bluish green to violaceous metallic reflections. *Abdomen* : violaceous blue on T1+2 and T3, blue-green on T4, and T5, traces of violaceous colour anteriorly on dorsum of T4 and narrow fore and hind margins ventrally of T4 also violet. T3 dorsally rather thickly white pollinose, latero-ventrally with broad conspicuous white pollinose bands, appearance of the latero-ventral pollinosity shifting with the light ; T5 with the usual pair of densely pollinose silvery white spots, but these spots much larger and more conspicuous than in other species, well formed on dorsum of T5 and extending towards midline so that only median third of dorsum is non-pollinose, appearance of the spots changing very much with the direction of the light. T1+2 without median marginal setae ; the lateral marginal setae of T3 single on each side ; T3 and T4 without median discal setae. Hair of dorsum all recumbent, finest on T5 and slightly thickened medially on T3. ♂ hypopygium much as in *fuscipennis*. *Measurements* : body length 9·4, 9·9 mm., wing length 7·6, 7·8 mm. [2 specimens].

♀. Mostly like ♂, but head in the sexes strikingly sexually dimorphic, face and antennae not greatly elongated as in ♂ ; facial carina only 3·1 times as long as epistome and very little longer than distance from lunula to anterior ocellus, third antennal segment only 3·5 times as long as second segment, parafacial nearly two and a half times as wide as third antennal segment. Facial carina less compressed laterally than in ♂, and arista less noticeably thickened with sparser longer plumosity ; since third antennal segment is short the arista is nearly equal in length to third antennal segment. *Measurements* : body length 8·9 mm., wing length 7·7 mm. [1 specimen].

MATERIAL EXAMINED. Lectotype ♂, INDIA : Coimbatore, 10.xii.1920 (*A. A. Coll*). Paralectotype : ♀, INDIA : Coimbatore, 7.xii.1920 (*A. A. Coll.*) (B.M. Nat. Hist.). Both lectotype and paralectotype labelled ' from night soil '.

INDIA : 1 ♂, Coimbatore, 18.ix.1935 (*S. R. Coll*) (B.M. Nat. Hist.) ; this specimen also labelled ' on Acacia leucophloea '.

In addition to the foregoing material the B.M. Nat. Hist. collection contains five female specimens each labelled ' India ex coll. Bombay Nat. Hist. Socy. ' which agree closely with the type-material but differ in having the wings conspicuously dark brown infuscate antero-basally and the margin of the lower calypter brown : there is no male with these specimens and I therefore only refer them tentatively to *S. parvula*.

Distribution : Southern India.

AFFINITIES. *S. parvula* Baranov is an unusually small distinctive species showing evident affinity with *S. minor* Malloch from Queensland ; it is easily recognised by the structure of the head, particularly in the ♂ and by the very characteristic thick covering of white pollinosity on most of the mesonotum.

Silbomyia minor Malloch, 1930

Stilbomyia minor Malloch, 1930, *Proc. Linn. Soc. N.S.W.* **55** : 102. Holotype ♀, QUEENSLAND. In the Division of Entomology Museum, C.S.I.R.O., Canberra.

DIAGNOSIS. Exceptionally small Australian species, length 6·6 mm. ; T1+2 without median marginal setae ; wing dark brown infuscate only antero-basally ; gena half eye-height ; occiput semi-metallic greenish.

♀. *Head* : Interfrontal area bright deep yellow ; parafrontals between upper proclinate orbital setae and vertical setae yellow and semi-shining, non-pollinose ; remainder of parafrontals, parafacials, genae, facial carina, antennal foveae and epistome all with yellow ground colour and yellow pollinosity ; postorbits with blackish ground colour and dense silvery white pollinosity, in some lights very slightly metallic near outer vertical setae. Hair of parafrontals black ; hair of genae and postbuccae yellow. Upper occiput dark greenish metallic in most lights, very thinly whitish pollinose ; cerebrale orange-yellow. Vertex distinctly broader than one eye, eye-vertex-eye ratio 16 : 21 : 16. Interfrontal area 3·0 times as wide as a parafrontal. Facial carina long and widening below, outer surface rather rounded, 1·4 times as long as distance from lunula to anterior ocellus and 4·0 times as long as epistome ; carina rather indistinctly defined from the epistome. Gena exceptionally broad, almost exactly half eye-height. Parafacial about 2·5 times as wide as third antennal segment. Fine hairs above vibrissae extending about one-third of way up each facial ridge. Postocellar setae small, ocellar setae very strong.

Antennae yellowish orange, elongate, third segment 4·7 times as long as second segment ; seta on second segment very strong but much shorter than arista, latter equal in length to third antennal segment. Palpi yellow. *Thorax* : mesonotum and scutellum bright green, prescutum anteriorly with a pair of fine coppery lines visible in some lights ; mesopleura and most of sternopleura bright green, pteropleura, hypopleura and lower parts of sternopleura largely violaceous. Notopleura with conspicuous white pollinosity, prescutum and sides of scutum with only very thin inconspicuous whitish pollinosity visible in some lights ; pollinosity on prescutum not obviously reaching transverse suture (as it does in *parvula*) ; mesopleura and sternopleura each with a large white pollinose spot whose appearance shifts with the light. *Wings* : largely clear hyaline, dark brown infuscation confined to antero-basal area and not extending posteriorly beyond vein *M*. Distance from bend of vein *M* to wing margin 1·9 times as great as that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* 2·9 times that between *m-cu* and bend. Costal spine nearly as long as *r-m*. Calyptrae white except for brown margin of lower calypter. *Legs* : black, femora partly metallic greenish. *Abdomen* : mainly brilliant green, dorsal excavation of T1+2 and all sternites more violaceous ; T5 with a slight coppery tinge. T3 almost completely devoid of white pollinosity, only thinnest traces visible in certain lights even on latero-ventral surfaces ; T4 non-pollinose ; T5 with a pair of small lateral white pollinose spots which dorsally extend on to extreme sides of the tergite, appearance of the spots strongly shifting with the light. T1+2 without median marginal setae ; T3 with one lateral marginal seta on each side ; T3 and T4 without median discal setae. Hair of dorsum, including that on T5, recumbent. *Measurements* : body length 6·6 mm., wing length 5·8 mm. [1 specimen].

♂. Unknown, but almost certainly with the facial carina and antennae very elongate and much longer than in ♀, probably with antennae in profile inserted above level of eye middle.

MATERIAL EXAMINED. Holotype ♂, AUSTRALIA : Queensland, Eidsvold, 1923 (*Bancroft*).

No other material is known.

Distribution : Known only from the holotype from Eidsvold in southern Queensland.

AFFINITIES. Although only known from the female the affinities appear to lie most closely with *S. parvula* ; the shape of the head and facial carina, the unusually broad gena, and the darkening of the wings being confined to the antero-basal region are all characters closely similar in the two species (together with the small size to which both specific names refer).

Silbomyia timorensis sp. n.

DIAGNOSIS. Fore tibia with only one submedian *pv* seta ; wings only dark brown infuscate antero-basally, elsewhere almost clear.

♀. *Head* : Interfrontal area deep yellow or orange-yellow ; parafrontals yellow, upper parts rather shining, lower parts pale yellow pollinose, sometimes a little white pollinose against eyes ; parafacials yellow with golden or yellow pollinosity near facial ridges and brilliant white pollinosity against eyes, contrast between yellow and white pollinose areas more conspicuous in some lights than others, to naked eye parafacials appearing generally pale yellowish ; genae yellow with dense golden yellow pollinosity ; facial carina, antennal foveae and epistome yellow with very thin pale yellowish pollinosity ; postorbits densely silvery white pollinose, colour contrasting with yellow genae ; postbuccae yellow with very thin yellowish white pollinosity. Parafrontal hair black ; hair of genae and postbuccae pale yellow to golden, sometimes one or two blackish hairs among pale genal hair. Upper occiput very thinly and evenly whitish pollinose over blackish ground colour, not appearing at all metallic ; cerebrale orange. Vertex a little broader than one eye viewed from above, eye-vertex-eye ratio about 5 : 6 : 5 or 9 : 11 : 9. Interfrontal area almost exactly three times as wide as parafrontal at level of lower proclinate orbital seta. Facial carina slightly elongate, rather rounded on outer surface and not formed into definite median ridge (much as in ♀ *latigena*), slightly longer than distance from lunula to anterior ocellus, 2·75–3·0 times as long as epistome. Gena 0·31–0·33 of eye-height. Parafacial about three times as wide as third antennal segment. Fine hairs above vibrissae confined to lower third of each facial ridge. Postocellar setae weak. Antennae pale orange, third segment 3·7–3·9 times as long as second segment ; seta on second segment weak, much shorter than third segment ; arista slightly longer than third antennal segment. Palpi yellow. *Thorax* : varying from coppery green through greenish blue to dark blue with violet tinge ; hypopleura and pteropleura dark reddish brown with violaceous or greenish reflections. Each mesopleuron and sternopleuron with large bold white pollinose area. From behind mesonotum showing conspicuous white pollinosity on notopleura and marginally on scutum in supra-alar and post-alar regions, prescutum with covering of white pollinosity which fades out towards transverse suture. *Wings* : mainly almost clear, only dark brown infuscate antero-basally with hardly any trace of brownish colouring along other veins. Distance from bend of vein *M* to wing margin 2·0 times as great as that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* 3·4–3·5 times as great as that between *m-cu* and bend. Calyptrae white except for dark brown margin to lower calypter. *Legs* : black except for violet or greenish blue tinge to femora. Fore tibia with only one *pv* seta. *Abdomen* : dark green to violaceous blue, hind margins of tergites appearing narrowly blackish to naked eye. T3 dorsally with a covering of thin white pollinosity which extends on to extreme sides of tergite, pollen invisible in some lights and most conspicuous

from behind ; T4 non-pollinose ; T5 with usual broad lateral bands of white pollinosity extending on to dorsum, appearance much shifting with direction of light but paired white areas easily visible to naked eye. T1+2 without median marginal setae ; T3 with one lateral marginal seta on each side ; T3 and T4 without median discal setae ; Hair of dorsum of tergites all recumbent. *Measurements* : body length 11·9 mm. (range 11·7–12·3 mm.), wing length 9·6 mm. (range 9·2–9·8 mm.) [5 specimens].

♂. Unknown. Probably generally like ♀ but with longer and more fusiform facial carina and possibly longer antennae.

Material examined. Holotype ♀, Indonesia : Timor, Koepang (= Kupang), 6–21.vi.1929 (*I. M. Mackerras*). In Division of Entomology Museum, C.S.I.R.O., Canberra. Paratypes : Indonesia : 1 ♀, data as for holotype (Div. Ent. Mus. Canberra) ; 1 ♀, Timor, Soe, 2,000 ft., 21.vi.1929 (*I. M. Mackerras*) (B.M. Nat. Hist.) ; 2 ♀♀, Timor, Lelogama, v.1911 (*Haniel*) (Zool. Sammlung. Munich and B.M. Nat. Hist.) ; 1 ♀, Timor, Niki-Niki, vi.1911 (*Haniel*) (Zool. Sammlung. Munich).

The three paratypes from Lelogama and Niki-Niki each bear a label reading 'Stilbomyia fuscipennis det. Engel' and are the specimens from Timor mentioned by Engel (1925, p. 350) under *S. fuscipennis* as ' mit hellen Zellkernen der Flügel '.

Distribution : As yet known only from the above-listed localities in western (Indonesian) Timor, and almost certainly confined to the island of Timor.

Affinities. Distinguished from all other species by presence of only one instead of the usual two *pv* setae on fore tibia, but the form of the facial carina (slightly elongate and not produced to a definite median ridge) suggests affinity with *S. latigena*. The shining white pollinosity externally on the parafacials resembles that of *S. asiatica* sp. n., but *S. timorensis* sp. n. is easily distinguished from this species and from *latigena* by the largely hyaline wings (darkened only antero-basally) as well as by the presence of the single fore tibial *pv* seta.

Silbomyia fuscipennis (Fabricius, 1805)

Musca fuscipennis Fabricius, 1805, *Systema Antl.* : 291. Holotype ♀, SUMATRA. In the Universitetets Zoologiske Museum, Copenhagen.

Diagnosis. In both sexes bend of vein *M* unusually remote from wing margin, distance between bend and wing margin about 3·5 times that between bend and cross-vein *m-cu* ; vein R_{2+3} strongly bowed forward so that cell R_1 is strongly narrowed and tapering ; costal thorn longer than cross-vein *r-m*.

♂. *Head* : Interfrontal area orange or reddish orange ; parafrontals, parafacials, facial ridges, antennal foveae, facial carina, epistome and genae orange-yellow with golden yellow pollinosity ; postorbits pale yellow or silvery yellow pollinose ; postbuccae with pale yellow ground colour and yellowish white hair ; genal hair golden yellow. Upper occiput greenish or violet-black, slightly metallic, with thin greyish pollinosity, cerebrale orange. Eye-vertex-eye ratio : 33 : 31 : 33. Interfrontal area very broad, about 3·7 times as wide as a parafrontal. Facial carina very long and narrow, slightly fusiform and laterally compressed, a little longer than distance from lunula to anterior ocellus and about 6·2–6·6 times as long as epistome ;

epistome therefore relatively short. Gena slightly more than one-sixth (0·18–0·19) of eye-height. Parafacials narrow, only slightly wider than third antennal segment ; facial ridges nearly straight in profile, with fine setulae for about one-third of their length above the vibrissae. Postocellar setae fine and weak. Antennae inserted well above level of eye-middle in profile. Antennae orange, third segment very long and about 6·2 times as long as second segment ; seta on second segment short and rather weak, only about half as long as arista ; arista longer than third antennal segment. Palpi yellow. *Thorax* : varying from bluish green (as in holotype) to violet, but usually dark blue or violet-blue, slightly metallic. Mesonotum without obvious pollinosity to naked eye, but when viewed from behind thin white pollinosity visible on all the prescutum, humeral calli, notopleura and area of the supra-alar setae ; mesopleura and sternopleura with patches of conspicuous white pollen, those on sternopleura less obvious than those on mesopleura. *Wings* : uniformly and consistently dark brown, the colour even throughout the wing and not at all faint in the middle of the cells. Bend of vein *M* unusually remote from wing margin, distance from margin to bend 3·5–4·0 times that between the bend and cross-vein *m-cu* ; on vein *M* distance from *r-m* to *m-cu* about four and half times that between *m-cu* and the bend ; veins R_{2+3} and R_{4+5} strongly bowed forward, cell R_1 very narrow and very strongly tapering apically (Text-fig. 18). Costal spine long and conspicuous, longer than cross-vein *r-m*. Lower calypter white, the margin darkened brownish apically and becoming very dark brown on the scutellar margin. *Legs* : black, femora somewhat metallic violaceous. *Abdomen* : unicolorous with the thorax, varying from bluish green to violet but most frequently greenish blue or violet-blue, hind margins of intermediate segments appearing slightly black to naked eye. T3 with very thin whitish pollinosity, best seen when viewed from behind, T4 with thin white pollen laterally, the pollinosity inconspicuous but visible to naked eye on both intermediate segments ; T5 dorsally with a band of white pollen on each side which extends round laterally to lower surface, appearance of this pollinosity shifting with the light, but the pollen more conspicuous to naked eye than that on T3 and T4. The traces of whitish pollen and the darkened intersegmental appearance give the abdomen a slightly banded appearance to naked eye. T1+2 without median marginal setae ; T3 with two lateral marginal setae on each side ; T3 and T4 without median discal setae. Hair of tergites rather fine and recumbent. ♂ hypopygium as in figs. 31 and 34. *Measurements* : body length 13·6 mm. (range 11·0–15·8 mm.), wing length 12·2 mm. (range 9·9–13·7 mm.) [20 specimens].

♀. Closely similar to ♂ except in details of the facial carina and antennae. Facial carina broader than in ♂, ridge-like and not at all fusiform, only about 4·5 times as long as epistome and equal in length to distance between lunula and anterior ocellus ; third antennal segment not conspicuously elongate, about 4·5 times as long as second segment. Gena and parafacial broader than in ♂, gena about one-quarter of eye-height and parafacial over twice as wide as third antennal segment. In profile antennae inserted about on a level with eye-middle. Postorbits sometimes more conspicuously golden pollinose than in ♂. *Measurements* : body length 13·8 mm. (11·5–15·4 mm.), wing length 12·0 mm. (range 10·1–13·3) [20 specimens].

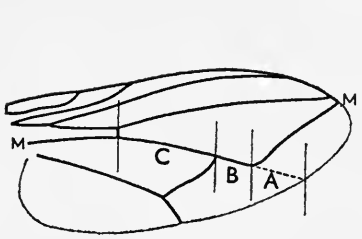
MATERIAL EXAMINED. Holotype ♀, SUMATRA : (*Daldorf*).

INDONESIA. SUMATRA : 3 ♂♂, N. O. Sumatra, Deli (*S. G. Martin*) (Zool. Mus. Humb. Univ.) ; 7 ♂♂, Deli (*G. Martin*) (Zool. Mus. Humb. Univ.) ; 2 ♂♂, Deli (*G. Martin*) (B.M. Nat. Hist.) ; 1 ♀ (*Westermann*) (Zool. Mus. Humb. Univ.) ; 2 ♀♀, Tandiong Merah, 18.xii.1918 (*J. B. Corporaal*) (Zool. Mus. Amsterdam) ; 1 ♀, Negri Baroe, 3.viii.1917 (*J. B. Corporaal*) (Zool. Mus. Amsterdam). JAVA : 1 ♀, Batoerradan, G. Siamat., 29.vii.1938 (*F. C. Drescher*) (Zool. Mus. Amsterdam) ; 1 ♂, G. Papandajan, Garoet, Preanger, 4–6,000 ft., i.1891 (*I. Z. Kannegieter*) (B.M. Nat. Hist.) ; 1 ♀, Pelaboean, Ratoe (B.M. Nat. Hist.) ; 2 ♂♂, 2 ♀♀, West Java, Djampang Mts., G. Malang, 4,000 ft., i.1938 (B.M. Nat. Hist.) ; 2 ♂♂, 2 ♀♀, West

Java, Djampang Mts., Tjampana, viii.1937 (B.M. Nat. Hist.) ; 1 ♂, West Java, Djampang Mts., G. Mimerang, ix.1938 (B.M. Nat. Hist.); 1 ♂, West Java, Djampang Mts., Tjtalahab, ix.1937 (B.M. Nat. Hist.) ; 1 ♂, West Java, Djampang Mts., G. Besser, xi.1937 (B.M. Nat. Hist.) ; 1 ♂, 2 ♀♀, West Java, Djampang Mts., Bibidjilan, x.1937 (B.M. Nat. Hist.) ; 1 ♂, West Java, Djampang Mts., Tjiangsana, xi.1937 (B.M. Nat. Hist.) ; 2 ♂♂, West Java, Djampang Mts., Radjamandala, 1,200 ft., xi.1937 (B.M. Nat. Hist.) ; 1 ♀, Balokambong, Tjiletoch Bay, viii.1937 (B.M. Nat. Hist.) ; 8 ♂♂, 3 ♀♀, Soekaboemi, iii–vii.1926 (*E. le Moult*) (B.M. Nat. Hist.) ; 1 ♂, 3 ♀♀, Soekaboemi, vi.1925 (*E. le Moult*) (B.M. Nat. Hist.) ; 25 ♂♂, 14 ♀♀, Soekaboemi (*E. le Moult*) (B.M. Nat. Hist.) ; 11 ♂♂, 1 ♀ (*E. le Moult*) (B.M. Nat. Hist.) ; 5 ♂♂ (B.M. Nat. Hist.); 2 ♀♀, Java occ., Preanger, 1–2,000 m. (D. Ent. Inst.) ; 1 ♂, Westjava, Sisoeroele, 800 m., ii–iii (*Zobrys u. Wolter S. V.*) (Zool. Mus. Humb. Univ.) ; 1 ♂ (*Westermann*) (Zool. Mus. Humb. Univ.) ; 1 ♂ (*Fritz*) (Zool. Mus. Humb. Univ.) ; 2 ♀♀, Garoet (Rijksmus. Leiden) ; 1 ♀ (*Kuhl*) (Rijksmus. Leiden) ; 1 ♀ (*v. Hartlieb*) (Zool. Sammlung. Munich) ; 1 ♂, Java occ., Preanger, 1–2,000 m. (Zool. Sammlung. Munich) ; 1 ♂ (Zool. Sammlung. Munich) ; 1 ♂, Batavia (Staatl. Mus. Stuttgart) ; 1 ♀, Java (Oxford Mus.) ; 1 ♂, Depok, 13.ii.1921 (*Karny*) (U.S. Nat. Mus.) ; 1 ♂, Depok (U.S. Nat. Mus.). In addition 3 ♀♀ without data, presumed locality Java (Oxford Mus.).

Distribution : *S. fuscipennis* appears to be confined to the islands of Java and Sumatra, and no specimens of true *fuscipennis* have been seen from elsewhere ; the Rijksmuseum van Natuurlijke Historie collection in Leiden contains a female specimen labelled " Borneo ", but this is probably erroneous and there is no other evidence that *S. fuscipennis* occurs in Borneo. All published records of *S. fuscipennis* from anywhere other than Java or Sumatra are the result of misidentifications. Engel (1925, p. 350) recorded *fuscipennis* from Canton and Formosa, but examination of the material (in Zoologische Sammlung, Munich) on which these records are based has shown that the specimen from Canton belongs to *S. hoeneana* Enderlein and that the specimens from Formosa are a mixed series of *S. latigena* Enderlein and *S. sauteri* Enderlein ; the specimens from Timor recorded by Engel (*loc. cit.*) as *fuscipennis*, belong to the new species *S. timorensis* described on page 67.

Affinities. *S. fuscipennis* (Fabricius) is very closely allied to *S. latigena* Enderlein, the general facies and structure of the facial carina being very similar in the two species, but is easily distinguished by the wing venation (cf. Text-figs. 18 and 20) ; in *fuscipennis* the bend of *M* is much more remote from the wing margin, and the anteriormost veins strongly bowed forwards. The long costal spine also distinguishes *S. fuscipennis* from *S. latigena* ; the wing of *fuscipennis* resembles that of *S. mackerrasi* sp. n. but the two species are easily distinguished by the characters given in the key.



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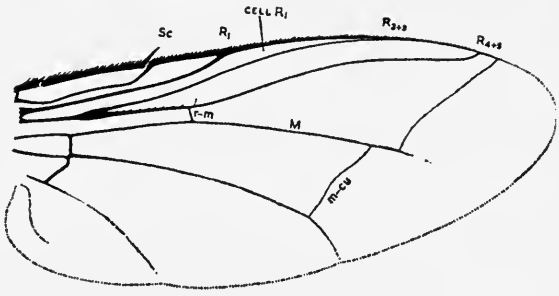

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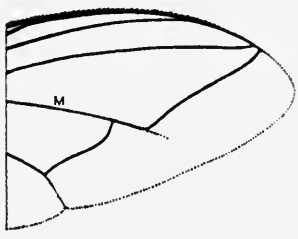

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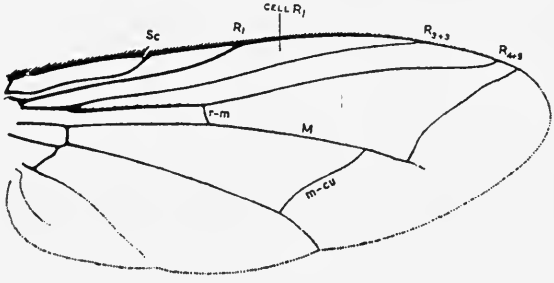

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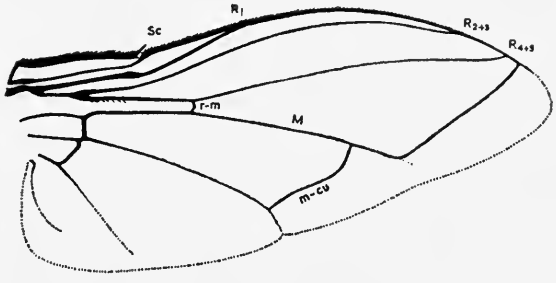

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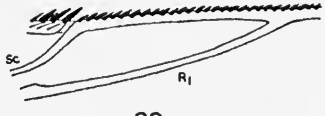
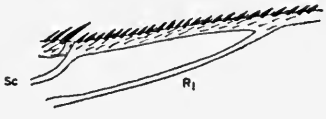


22



23

FIGS. 17–23. 17. Semi-diagrammatic representation of Ameniine wing showing measurements made : bend of vein *M* to wing margin (A), *m–cu* to bend of *M* (B), and cross-vein *r–m* to cross-vein *m–cu* (C). 18. Wing of *Silbomyia fuscipennis* (Fabricius) showing remoteness of bend of vein *M* from wing margin and strong forward bowing of vein R_{2+3}. 19. Apical half of wing of *Amenia longicornis* (Malloch). 20. Wing of typical *Silbomyia* with R_{2+3} not very strongly bowed forwards and cell R_1 less strongly tapering than in *fuscipennis*, bend of *M* not very remote from wing margin. 21. Wing of ♂ *Amenia imperialis* Robineau-Desvoidy showing strong forward curvature of costa. 22. Ventral surface of costa between apices of *Sc* and R_1 in all Ameniinae other than *Silbomyia*. 23. Ventral surface of costa between apices of *Sc* and R_1 in *Silbomyia*.

Silbomyia mackerrasi sp. n.

DIAGNOSIS. T1+2 without median marginal setae ; wings uniformly dark brown ; postorbits silvery white ; interfrontal area 3·5 times as wide as parafrontal ; margin of lower calypter white.

♀. *Head* : Interfrontal area orange ; upper parts of parafrontals yellowish, rather shining and very thinly pollinose ; lower parts of parafrontals, parafacials and genae yellow with dense golden yellow pollinosity ; facial carina, antennal foveae and epistome yellow with thin pale yellow pollinosity ; postorbits silvery white ; postbuccae yellow, rather bare and shining. Parafrontal hair black ; hair of genae, lower occiput and postbuccae golden yellow. Upper occiput with thin but distinct even covering of whitish pollinosity over dark ground colour, not appearing metallic as insect is turned ; cerebrale orange. Vertex slightly broader than one eye, measured from above eye-vertex-eye ratio 9 : 11 : 9. Interfrontal area 3·5 times as wide as parafrontal at level of lower proclinate orbital seta. Facial carina short and ridge-like, equal in length to distance from lunula to anterior ocellus, 2·7 times as long as epistome. Gena 0·29 of eye-height. Parafacial about three times as wide as third antennal segment. Lower quarter of each facial ridge with a few minute pale yellow hairs just above the normal few black hairs near vibrissae. Postocellar setae very weak. Antennae pale orange, third segment 3·2 times as long as second segment ; seta on second segment very long and fine, about equal in length to third antennal segment and slightly shorter than arista. Palpi yellow. *Thorax* : blue-violet, with very slight traces of bluish green colouring especially under white spots of mesopleura ; hypopleura and pteropleura dark reddish brown with very faint violaceous reflections. Each mesopleuron and sternopleuron with large area of white pollinosity, that on mesopleuron forming bold spot from some points of view, but that on sternopleuron inconspicuous. Seen from behind mesonotum showing conspicuous white pollinosity on notopleura and thin less obvious white pollinosity anteriorly on prescutum and marginally on scutum. *Wings* : almost uniformly and evenly dark brown. Distance between bend of vein *M* and wing margin 3·1 times as great as that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* 4·3 times as great as that between *m-cu* and bend. Costal spine well developed, about as long as cross-vein *r-m*. Calyptrae white, including margin of lower calypter. *Legs* : brownish black, femora with very slight violaceous tinge. *Abdomen* : mainly violet blue, mid dorsal area rather more greenish blue. T3 with an extensive covering of thin white pollinosity which extends round sides of tergite on to latero-ventral surfaces, appearance of this pollinosity shifting greatly with direction of light, pollen most conspicuous seen from behind ; T4 non-pollinose and rather strongly shining ; T5 with a broad band of white pollinosity on each side which starts near mid dorsum and extends round to ventral surface, white bands of each side only narrowly separated medially but not conspicuous dorsally from all points of view, in some lights almost disappearing. T1+2 without median marginal setae ; T3 with a single strong lateral marginal seta on each side (two in *fuscipennis*) ; T3 andT4 without median discal setae. Hair of T5 semi-erect, that of preceding tergites all fine and recumbent. *Measurements* : body length 11·2 mm., wing length 10·3 mm. [1 specimen].

♂. Unknown, but probably very like ♀ (head almost certainly not strongly sexually dimorphic).

MATERIAL EXAMINED. Holotype ♀, INDONESIA : Lombok, 29–30.vi.1929 (*I. M. Mackerras*). In Division of Entomology Museum, C.S.I.R.O., Canberra.

Distribution : At present known only from holotype specimen from Lombok Island, Indonesia.

AFFINITIES. *S. mackerrasi* sp. n. appears most closely related to *S. fuscipennis*, agreeing with this species in the very uniformly dark wings and bend of vein *M* unusually remote from wing margin ; it differs from *fuscipennis* by the characters

given in the key to species, most easily seen difference being the silvery white instead of yellow postorbits (a character which also distinguishes *mackerrasi* from *S. latigena*). There is a close superficial resemblance between *S. mackerrasi* and *S. sauteri* but the former differs from the latter by the evenly dark wings, lack of abdominal discal setae, longer costal spine and white border to lower calypter ; the last of these characters *mackerrasi* shares with *S. asiatica* and *S. metallica* but both of these species differ from *mackerrasi* in the unevenly infuscate wings and closer proximity of bend of vein *M* to wing margin as well as other characters.

Silbomyia latigena Enderlein, 1936

Stilbomyia latigena Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 438. Lectotype ♂, FORMOSA. In the Deutsches Entomologisches Institut, Berlin.

LECTOTYPE DESIGNATION : no holotype of this species was designated by Enderlein, and the type-material consists of a series of syntypes (in D. Ent. Inst., Zool. Mus. Humb. Univ., and B.M. Nat. Hist.), some labelled by Enderlein as " type " and others as " cotype ". One of the ♂ syntypes has been labelled and is here designated as lectotype, and the remaining syntypes have been labelled as paralectotypes.

DIAGNOSIS. T1 + 2 without median marginal setae ; bend of vein *M* not strikingly remote from wing margin ; postorbits yellow or silvery yellow pollinose ; facial carina long and somewhat fusiform (especially in ♂), about four times as long as epistome and longer than distance from lunula to anterior ocellus, antennae sexually dimorphic and in ♂ about four and a half times as long as second segment.

♂. *Head* : Interfrontal area bright orange or yellow-orange ; parafrontals, parafacials, facial ridges, antennal foveae, facial carina, epistome and genae orange-yellow with golden yellow pollinosity ; postorbits all pale yellow or silvery yellow, occasionally rather silvery near the middle and brassy silver above and below, normally not strikingly contrasting in colour with yellow genae ; postbuccae yellow with orange-yellow hair ; genal hair all golden yellow. Upper occiput slightly metallic greenish to violaceous black, only appearing thinly yellowish grey pollinose in certain lights ; cerebrale orange. Eye-vertex-eye ratio about 6 : 9 : 6, vertex very distinctly broader than an eye viewed from above. Interfrontal area very broad, 3·3–3·6 times as wide as a parafrontal. Facial carina long and narrow, slightly pinched in inwardly and a little fusiform in shape, the carina about 1·1 times as long as distance from lunula to anterior ocellus and about 3·5–4·2 times as long as epistome. Gena about one-fifth (0·20–0·22) of eye-height. Parafacial about 1·75 times as wide as third antennal segment ; facial ridges nearly straight in profile, with fine setulae for about one third of their length above vibrissae. Postocellar setae strongly developed, curved and strongly divergent as the ocellar setae. Antennae orange, third segment 4·4–4·6 times as long as second segment ; seta on second segment shorter than arista ; arista equal in length to third antennal segment. Palpi yellow. *Thorax* : usually violet or blue-violet, but colour ranging from dark green through blue-green to dark blue and violet, slightly metallic ; hypopleura, pteropleura and anterior parts of sternopleura somewhat reddish. Mesonotal pollinosity not evident to naked eye except on extreme anterior margin, but in certain lights by microscopical examination thin white pollinosity visible on all of prescutum, humeral calli, notopleura, area of supra-alar setae, and post-alar calli ; mesopleuron with a conspicuous area of dense white pollen, sternopleuron with inconspicuous white pollinosity visible in some lights. *Wings* : dark brown infuscate, the infuscation heaviest along the veins and slightly weaker in the cells. Bend of vein *M* not remote from wing margin (Text-fig. 20)

distance from margin to bend 1·75–2·0 times that between the bend and cross-vein *m-cu* ; on vein *M* distance from *r-m* to *m-cu* about 3·25 times that between *m-cu* and bend ; veins R_{2+3} and R_{4+5} not conspicuously bowed forward. Costal spine short. Entire margin of lower calypter very dark brown and conspicuously contrasting with white disc of calypter. *Legs* : black, fore femora and to a lesser extent other femora somewhat violaceous ; tibiae slightly brownish. *Abdomen* : unicolorous with the thorax, ranging from dark green to violet but most often violet-blue ; in greenish or bluish specimens very narrow darker bands are evident at junctions of the tergites. Abdomen dorsally appearing more or less non-pollinose to naked eye, but in fact T3 is rather densely and evenly white pollinose seen from behind in microscopical examination, T4 shining and without pollinosity, T5 ventro-laterally with narrow bands of white pollinosity visible in some lights but these bands not extending on to dorsum of the tergite. T1+2 without median marginal setae ; T3 with two lateral marginal setae on each side ; T3 and T4 without median discal setae. Hair of T3 and T4 mainly rather fine and recumbent, but erect and slightly spiniform on mid-line of T3 and on median quarter or third of T4 ; hair of T5 long and erect. ♂ hypopygium closely similar to *S. fuscipennis*. *Measurements* : body length 14·1 mm. (range 12·2–16·3 mm.), wing length 11·6 mm. (range 9·5–13·7 mm.) [20 specimens].

♀. Generally like the ♂ but differing slightly in details of the head : facial carina broader than in ♂, not at all laterally compressed or spindle-shaped, somewhat rounded on outer edge, the carina about 2·9–3·25 times as long as epistome and a little shorter than distance from lunula to anterior ocellus ; third antennal segment shorter than in ♂, 3·6–3·8 times as long as second segment. Gena about one-third (0·33–0·35) of eye-height, parafacial nearly three times as wide as third antennal segment. Vertex slightly wider than in ♂, more conspicuously broader than an eye viewed from above. Hair on middle parts of intermediate abdominal tergites not spiniform and erect as in ♂, but recumbent as on rest of these tergites ; hair of T5 erect as in ♂ but shorter, finer and sparser. Postorbits more conspicuously yellow pollinose than in ♂. *Measurements* : body length 13·5 mm. (range 11·2–16·8 mm.), wing length 11·4 mm. (range 9·1–13·5 mm.) [20 specimens].

Material examined. Lectotype ♂, Formosa : Tainan, iv.1910 (*Sauter*). Paralectotypes : Formosa : 1 ♂, 4 ♀♀, data as for lectotype (D. Ent. Inst.) ; 1 ♂, 2 ♀♀, Formosa I. (*Sauter*) (D. Ent. Inst.) ; 1 ♂, 1 ♀, Yamo no Taiko, ix.1908 (*H. Sauter*) (D. Ent. Inst.) ; 3 ♀♀, Kanshizei, v.1908 (*Sauter*) (D. Ent. Inst. & B.M. Nat. Hist.) ; 1 ♀, Takao, ix.1907 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Toyenmongai bei Tainan, v.1910 (*Rolle*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 3 ♀♀, Kosun, v.1908 (*Sauter*) (D. Ent. *Inst.*) ; 1 ♂, Koshun, v.1908 (*Sauter*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Koshun, viii.1908 (*Sauter*) (D. Ent. Inst.) ; 1 ♀, Kankau, Koshun, 7.xi.1912 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♂, Kankau, Koshun, 7.viii.1912 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Kankau, ix.1912 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 1 ♂, Formosa (Zool. Mus. Humb. Univ.).

Formosa : 10 specimens of *S. latigena* labelled erroneously by Enderlein as "type" or " cotype " of " Stilbomyia sauteri End. " (7 specimens), and " Stilbomyia sauteri var. viridis End. " (3 specimens), data as follows : 1 ♂, nördl. Paiwan Distr., Paroe, 7.ix.1912 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Takao, 19.i.1908 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 1 ♀, Kosempo, 31.i.1908 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 2 ♂♂, Formosa I. (*Sauter*) (D. Ent. Inst. & Zool. Mus. Humb. Univ.) ; 2 ♂♂, Koshun, viii.1908 (*Sauter*) (D. Ent. Inst.) ; 1 ♂, Kankau, Koshun, 7.xi.1912 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 1 ♂, 1 ♀, Kankau, Koshun, 7.viii. and 7.xi.1912 (*H. Sauter*) (D. Ent. Inst.). Two specimens labelled by Enderlein as " Stilbomyia latigena var. viridis—cotype Enderl. ♀ " (unpublished varietal name of *latigena*),

data as follows : 1 ♀, Koshun, viii.1908 (*Sauter*) and 1 ♀, Kankau, Koshun, 7.viii.1912 (*H. Sauter*) (D. Ent. Inst.).

Each specimen listed above bears an identity label in Enderlein's writing. A further 30 specimens of Sauter's material have been seen which are not labelled by Enderlein ; there is no evidence that Enderlein saw this additional material, which I have therefore not considered to be part of the syntypic series and have not labelled as paralectotypes. Data are as follows : FORMOSA : 1 ♂, nördl. Paiwan Distr., Paroe, x.1912 (*H. Sauter*) (B.M. Nat. Hist.) ; 1 ♀, nördl. Paiwan Distr., Paroe, 7.ix.1912 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♂, nördl. Paiwan Distr., Paroe, 7.ix.1912 (*H. Sauter*) (U.S. Nat. Mus.) ; 2 ♀♀, Chipun, Puyuma Distr., vii.1912 (*H. Sauter*) (D. Ent. Inst. and B.M. Nat. Hist.) ; 1 ♀, Fuhosho, vii.1909 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Kosempo, iv.1908 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Kanshirei, v.1908 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♂, Formosa I. (*Sauter*) (D. Ent. Inst.) ; 2 ♂♂, 1 ♀, Sokutsu, ix.1912 (*H. Sauter*) (D. Ent. Inst. and B.M. Nat. Hist.) ; 1 ♂, Tainan, iv.1910 (*Sauter*) (D. Ent. Inst.) ; 1 ♂, Koshun, vii.1909 (*Sauter*) (D. Ent. Inst.); 1 ♂, Koshun, vii.1908 (*Sauter*) (B.M. Nat. Hist.) ; 1 ♀, Koshun, 7.viii.1912 (*H. Sauter*) (B.M. Nat. Hist.) ; 2 ♂♂, 3 ♀♀, Koshun, v. and viii.1908 (*Sauter*) (D. Ent. Inst.) ; 2 ♂♂, 1 ♀, Kankau, Koshun, ix. and 7.xi.1912 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Kankau, Koshun, iv.1912 (*H. Sauter*) (U.S. Nat. Mus.) ; 1 ♂, Kankau, ix.1912 (*H. Sauter*) (U.S. Nat. Mus.) ; 1 ♂, 3 ♀♀ (*Sauter*) (Zool. Sammlung. Munich).

Other material : FORMOSA : 4 ♀♀, 15.x.1910 (*H. Rolle*) (B.M. Nat. Hist.) ; 1 ♀, Koannania, 22.vii.1908 (B.M. Nat. Hist.) ; 1 ♀, N. Formosa, Kushaku, v.1903 (*Haberer*) (Zool. Sammlung. Munich) ; 3 ♂♂, Tainan (B.M. Nat. Hist., Zool. Sammlung. Munich and Staatl. Mus. Stuttgart) ; 1 ♀, " Japan ", Formosa, Shinkwa, 16.x.1926 (*S. Takano*) (U.S. Nat. Mus.) ; 1 ♀, Formosa (no other data) (*ex coll. Brunetti*) (B.M. Nat. Hist.).

Distribution : *S. latigena* is confined to the island of Formosa, where it is evidently common and occurs in company with the closely related *S. sauteri* Enderlein. The specimen collected by the Japanese dipterist Professor Takano, now in the U.S. National Museum and labelled " JAPAN, Formosa, Shinkwa ", is from Formosa ; it was collected in 1926 when Formosa formed part of the Japanese Empire and the word " Japan " on the label indicates that the specimen was collected in one of the then Japanese islands. The genus *Silbomyia* is absent from Japan.

AFFINITIES. Most closely allied to *S. fuscipennis* and *S. sauteri*. From *S. fuscipennis* it is distinguished by the venational characters mentioned in the key, and also by the shorter facial carina and antennae, and broader vertex ; the abdomen also differs from that in *S. fuscipennis*, there being no white pollinosity on T4, and the hair on T5 being erect (in ♂ erect also in middle of T3 and T4), whereas the abdominal hair in *S. fuscipennis* is entirely recumbent. *S. latigena* is easily distinguishable from *S. sauteri* by the yellow or silvery yellow pollinose postocular stripe (all bright silver in *sauteri*), by the much longer more fusiform facial carina and longer ♂ antennae, and by the absence of median discal setae on T3 and T4 of the abdomen (such setae normally present in *sauteri*). The differences from *S. sauteri* apply also to *S. hoeneana* Enderlein.

Silbomyia sauteri Enderlein, 1936

Stilbomyia sauteri Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 439. Lectotype ♂, FORMOSA. In the Zoologisches Museum der Humboldt-Universität, Berlin.

Stilbomyia sauteri var. *viridis* Enderlein, 1936, *Veröff. dtsch. KolonMus.* Bremen **1** : 439. Lectotype ♂, FORMOSA. In the Zoologisches Museum der Humboldt-Universität, Berlin.

LECTOTYPE DESIGNATIONS: Enderlein did not designate holotype specimens for *S. sauteri* or for *S. sauteri* var. *viridis*, type-material of both of which consists of a series of syntypes variously labelled as ' type ' or ' cotype '. A ♂ from the syntype series of *S. sauteri*, and a ♂ from the syntype series of *S. sauteri* var. *viridis*, have been labelled and are here designated as lectotypes ; remaining syntypes have been labelled as paralectotypes.

DIAGNOSIS. At least one and usually both of intermediate abdominal tergites with a pair or more of strong spiniform discal setae *and* median marginal setae absent on T1+2 ; facial carina short and roof-ridge like, not at all fusiform ; postorbits silvery white ; entire margin of lower calypter dark brown.

♂. *Head* : Interfrontal area orange or yellow-orange ; parafrontals, parafacials, facial ridges, antennal foveae, facial carina, epistome and genae orange-yellow with golden yellow pollinosity ; postorbits bright silver pollinose, conspicuously contrasting with yellow genae and postbuccae ; postbuccae yellow with golden yellow hair ; genal hair all golden yellow. Upper occiput dark greenish to violaceous, metallic in some lights but with very thin greyish pollinosity ; cerebrale orange. Eye-vertex-eye ratio : 5 : 7 : 5. Interfrontal area very broad, 3·3–3·6 times as wide as a parafrontal. Facial carina short and rather broad, more or less ridge-like and not at all laterally compressed or fusiform, the carina conspicuously shorter (0·75–0·85) than the distance from lunula to anterior ocellus and about 2·8–3·3 times as long as epistome. Gena two-ninths (0·22) of eye-height. Parafacial nearly two and a half times as wide as third antennal segment ; facial ridges very slightly concave in profile, with fine setulae extending for a little over a quarter of the length above vibrissae. Postocellar setae variable, sometimes strong but more often only moderately or weakly developed, occasionally two pairs. Antennae pale orange, third segment relatively short, 3·4–3·5 times as long as second segment ; seta on second antennal segment equal in length to arista ; arista distinctly longer (about 1·3 times) than third antennal segment. Palpi yellow. *Thorax* : varying from green to violet, but most often greenish blue to violaceous blue, mesonotum metallic, scutellum sometimes more strongly violet than scutum and prescutum ; hypopleura and pteropleura in part somewhat reddish. Mesonotum with whitish pollinosity visible to naked eye only on anterior margin of prescutum and on notopleural areas, but microscopic examination from behind showing thin whitish pollinosity also on humeral calli, most of prescutum and post-alar calli, and very conspicuously in some lights between *post ia* setae and supra-alar setae ; mesopleura and sternopleura with large conspicuous areas of white pollinosity. *Wings* : generally similar to those of *S. latigena* but vein proportions by measurement slightly different. Dark brown infuscate, most strongly browned along the veins, paler in the cells and to the hind margin. Distance from wing margin to bend of *M* 1·4–1·7 times as great as that between bend and *m-cu* ; on vein *M* distance between *r-m* and *m-cu* 2·4–3·0 (usually 2·7–2·9) times as great as that between *m-cu* and the bend. Costal spine short. Entire border of lower calypter dark brown. *Legs* : black except for the femora dark metallic greenish black to violaceous. *Abdomen* : unicolorous with the thorax, ranging from bright green to violet, most often violaceous blue ; in naked eye appearance with a suggestion of narrow darker intersegmental bands. T3 with white pollinosity conspicuous on most of its surface when viewed from behind dorsally, the pollinosity extending round the sides of the tergite to form narrower bands of bright silvery pollinosity visible in some lights ventro-laterally ; T4 rather shining and non-pollinose ; T5 dorsally somewhat shining and non-pollinose but ventro-laterally and laterally with areas of silvery white pollen conspicuous in

some lights, the appearance shifting ; pollinosity of T3 and T5 not at all conspicuous to naked eye. T1+2 without median marginal setae ; T3 with one or two lateral marginal setae on each side ; T3 almost always with strong spiniform median discal setae, usually one pair but occasionally two pairs, or sometimes rather irregular in number and haphazardly arranged ; T4 usually with, sometimes without, one pair of strong median discal setae. Hair of T3 and T4 long, strong and erect, conspicuously spiniform, on the middle of the tergites, less strong and more recumbent laterally, the spiniform hair especially long and strong on mid-line of T3 ; hair of T5 long and erect, finer than on preceding tergites and not conspicuously spiniform. ♂ hypopygium as in Text-figs. 33 and 36. *Measurements* : body length 13·3 mm. (range 11·3–15·1 mm.), wing length 10·5 mm. (9·6–12·4 mm.) [10 specimens].

♀. Almost identical with ♂, except for very slight differences as follows : gena a little broader, nearly one-third (0·3) of eye-height ; parafacial broader, about three and a half times as wide as third antennal segment ; third antennal segment a little shorter, 3·0 times as long as second segment. Facial carina not noticeably sexually dimorphic (cf. *latigena*). *Measurements* : body length 12·1 mm. (range 10·1–14·2 mm.), wing length 10·7 mm. (range 9·0–12·0 mm.) [14 specimens].

MATERIAL EXAMINED. Lectotype ♂ (*S. sauteri* Enderlein), FORMOSA : Kosempo, 31.i.1908 (*H. Sauter*) ; Lectotype ♂ (*S. sauteri* var. *viridis* Enderlein), FORMOSA : Suisharyo, x.1911 (*H. Sauter*). Paralectotypes of *S. sauteri* : FORMOSA : 1 ♂, Kosempo, iv–v.1908 (*H. Sauter*) (B.M. Nat. Hist.) ; 1 ♀, Kosempo, iv–v.1908 (*H. Sauter*) (Zool. Mus. Humb. Univ.) ; 2 ♀♀, Toyenmongai bei Tainan, v.1910 (*Rolle*) (Zool. Mus. Humb. Univ.) ; 1 ♂, Tainan, iv.1910 (*Sauter*) (D. Ent. Inst.) ; 1 ♀, Tainan, iv.1910 (*Sauter*) (B.M. Nat. Hist.) ; 1 ♂, Kankau, Koshun, 7.viii.1912 (*H. Sauter*) (B.M. Nat. Hist.) ; 1 ♀, Koshun, viii.1908 (*Sauter*) (D. Ent. Inst.) ; 1 ♀, Paroe, nördl. Paiwan Distr., 7.ix.1912 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Formosa (D. Ent. Inst.). Paralectotypes of *S. sauteri* var. *viridis* : FORMOSA : 1 ♀, Suisharyo, x.1911 (*H. Sauter*) (D. Ent. Inst.) [not a green specimen although labelled *viridis* by Enderlein] ; 1 ♂, 1 ♀, Koshun, v. & viii.1908 (*Sauter*) (D. Ent. Inst.) ; 1 ♀, Kankau, ix.1912 (*H. Sauter*) (Zool. Mus. Humb. Univ.).

FORMOSA : 1 ♂, 1 ♀, Yamo no Taiko, ix.1908 (*H. Sauter*) (B.M. Nat. Hist. & D. Ent. Inst.) ; 1 ♀, Polisha, xii.1908 (*H. Sauter*) (D. Ent. Inst.) ; 1 ♀, Kanshizei, v.1908 (*Sauter*) (D. Ent. Inst.) ; 1 ♂, 2 ♀♀, Formosa (no other data) (*ex. coll. Brunetti*) (B.M. Nat. Hist.) ; 1 ♂, Formosa I. (*Sauter*) (D. Ent. Inst.) ; 2 ♂♂, Suisharyo, x.1911 (*Sauter*) (B.M. Nat. Hist. & D. Ent. Inst.) ; 3 ♂♂, Tainan (Zool. Sammlung, Munich & B.M. Nat. Hist.) ; 2 ♂♂, 1 ♀, Formosa (*Sauter*) (Zool. Sammlung, Munich) ; 1 ♂, Formosa (*Sauter*) (Staatl. Mus. Stuttgart) ; 1 ♀, Koshun, viii.1908 (*Sauter*) (B.M. Nat. Hist.) [green specimen] ; 1 ♀, Suisharyo, x.1911 (*H. Sauter*) (D. Ent. Inst.) [green specimen] ; 1 ♂, Paroe, nördl. Paiwan Distr., 7.ix.1912 (*H. Sauter*) (D. Ent. Inst.) [green specimen].

Note : 10 specimens labelled by Enderlein as ' type ' or ' cotype ' of *S. sauteri* and *S. sauteri* var. *viridis* belong to *S. latigena* Enderlein and are therefore listed among the material examined of *S. latigena* ; these specimens are nonetheless paralectotypes of *S. sauteri* and *S. sauteri* var. *viridis*.

Distribution : Occurs only in Formosa, together with *S. latigena* Enderlein.

AFFINITIES. Very closely related to *S. hoeneana* Enderlein from the mainland of China, with a very similar facial carina and silvery white postocular stripe. It is

possible that *S. hoeneana* and *S. sauteri* are conspecific, for the morphological distinctions are certainly slight, but on the evidence available at present it appears best to recognise the two species as distinct. *S. sauteri* is distinguished from *S. hoeneana* by the broader interfrontal area (about three and a half times as wide as a parafrontal), by the presence in almost all specimens of median discal setae on at least one and usually both intermediate abdominal tergites, and normally by the violet-blue coloration (*S. hoeneana* always green in the material seen). *S. sauteri* is easily distinguished from *S. latigena*, also from Formosa, by the short facial carina (not at all fusiform as in *latigena*) and silver-white postorbits.

Discussion. With present evidence it is not possible to accord separate systematic status to the green-coloured form of this species (var. *viridis* of Enderlein). Green specimens appear to be conspecific with the commoner violet-blue specimens, and specimens with this different coloration have been seen with identical data ; the difference is certainly not subspecific in the absence of allopatry. It is worth noting however that the wings are slightly shorter in relation to the body length in green specimens than in violet-blue specimens, the wing length being about ten-thirteenths of the body length in bright green individuals and eleven or twelve-thirteenths of the body length in blue to violet specimens. As yet there is insufficient material available to assess the significance of this apparent distinction.

Silbomyia hoeneana Enderlein, 1936

Stilbomyia hoeneana Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 439. Lectotype ♂, CHINA. In the Zoologisches Museum der Humboldt-Universität, Berlin.

Lectotype Designation : the available type-material of *S. hoeneana* comprises eight syntypes collected by Dr. Mell in China, seven labelled by Enderlein as ' Type ' and one (in Staatl. Mus. Stuttgart) as ' Cotype '. A ♂ syntype in Zool. Mus. Humb. Univ. has been labelled and is here designated as lectotype, and the other syntypes have been labelled as paralectotypes (three in Zool. Mus. Humb. Univ., two in B.M. Nat. Hist. and one in D. Ent. Inst.). In the original description Enderlein mentions two specimens from Nanking in addition to the material collected by Dr. Mell ; the whereabouts of these two syntypes has not been traced.

Diagnosis. Very similar to *S. sauteri* but lacking median discal setae on intermediate abdominal tergites.

♂. *Head* : Interfrontal area orange or orange-yellow ; parafrontals, parafacials, facial ridges, antennal foveae, facial carina, epistome and genae yellow with golden yellow pollinosity ; postorbits with blackish ground colour and dense silvery pollinosity conspicuously contrasting with yellow genae. Parafrontal hair black, hair of genae long and yellow. Upper occiput dark greenish metallic in certain lights, thinly whitish pollinose ; cerebrale orange. Eye-vertex-eye ratio about 5 : 7 : 5. Interfrontal area very broad, 3·3–3·5 times as wide as a parafrontal at level of lower proclinate orbital seta. Facial carina short and broad, rather ridge-like and not at all fusiform, carina slightly shorter (0·9) than distance from lunula to anterior ocellus and 2·8–3·0 times as long as epistome. Gena about two-ninths (0·22) of eye-height. Parafacial two and a half times as wide as third antennal segment ; facial ridges distinctly concave in profile with fine hairs above vibrissae confined to lower quarters. Postocellar setae usually strongly developed, sometimes two pairs. Antennae pale orange, third segment 3·7–3·9 times as long as

second segment ; seta on second segment long and strong, about as long as arista ; arista much longer than third antennal segment. Palpi yellow. *Thorax* : mesonotum usually emerald-green, occasionally with cupreous reflections, violaceous blue in one specimen seen ; scutellum sometimes more bluish than mesonotum ; sides of thorax green or bluish green, hypopleura and pteropleura more reddish brown with metallic greenish reflections. Dorsum with white pollinosity, conspicuous seen from behind, on humeral calli, notopleura, areas of supra-alar setae, prescutum and postalar calli. Mesopleura and sternopleura with usual large densely pollinose white spots. *Wings* : dark brown infuscate, the infuscation distinctly weaker in centres of cells and along hind margin. Distance from bend of vein *M* to wing margin 1·5–1·7 times as great as that between bend and *m–cu* ; on vein *M* distance from *r–m* to *m–cu* 2·6–3·5 times as great as that between *m–cu* and bend. Costal spine distinct, a little shorter than *r–m*. Margin of lower calypter dark brown, calyptrae otherwise white. *Legs* : black, femora with dark greenish metallic reflections. *Abdomen* : usually unicolorous with dorsum of thorax occasionally slightly more blue, colour usually emerald green but sometimes greenish blue, violet in one specimen seen. T3 with white pollinosity on most of dorsum, conspicuous from behind, the pollinosity extending round the sides of the tergite to form conspicuous silvery white median bands ventro-laterally ; T4 non-pollinose ; T5 with a pair of large white pollinose areas ventro-laterally which extend round sides of tergite just on to dorsum, appearance of these spots shifting with the light. T1+2 without median marginal setae ; T3 with a variable number of lateral marginal setae on each side, usually two but occasionally three or four, sometimes one strong seta and one much weaker one ; T3 and T4 without median discal setae. Hair of T3 and T4 sometimes mostly recumbent but sometimes almost all semi-erect or erect, conspicuously thickened and spiniform on median dorsal area of each intermediate tergite ; hair of T5 long and erect, sometimes very slightly spiniform but always finer than on preceding tergites, ♂ hypopygium as in *S. sauteri* (Text-fig. 33). *Measurements* : body length 14·6 mm. (range 12·9–16·8 mm.), wing length 12·4 mm. (range 10·5–14·9 mm.) [11 specimens].

♀. Very similar to ♂, antennae and facial carina not noticeably sexually dimorphic. Gena and parafacial broader than in ♂, former about one-third (0·33–0·36) of eye-height, latter about three and a half times as wide as third antennal segment. *Measurements* : body length 15·0 mm. (range 13·2–17·4 mm.) ; wing length 13·4 mm. (range 11·7–15·9 mm.) [18 specimens].

MATERIAL EXAMINED. Lectotype ♂, CHINA : Canton, Tsha-jiu-san, 14.vii.1910 (*S. V. Mell*). Paralectotypes : CHINA : 1 ♀, Canton, Tsha-jiu-san, 14.vii.1910 (*S. V. Mell*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Tsha-jiu-san, vii–viii.1910 (*S. V. Mell*) (Zool. Mus. Humb. Univ.) ; 2 ♀♀, Canton (*S. V. Mell*) (D. Ent. Inst. & Zool. Mus. Humb. Univ.) ; 2 ♂♂, Canton (*S. V. Mell*) (B.M. Nat. Hist. & Staatl. Mus. Stuttgart).

CHINA : 1 ♀, Canton, 14.vii.1910 (Zool. Sammlung. Munich) ; 1 ♀, Kiukiang, vii.1887 (*Pratt*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Szechuen, Mt. Omei, Si Gi Pin, viii.1925 (*D. C. Graham*) (U.S. Nat. Mus.) ; 3 ♀♀, Szechuen, Mt. Omei, Si Gi Pin, 6–7,000 ft., 10–22.viii.1934 (*D. C. Graham*) (U.S. Nat. Mus. & B.M. Nat. Hist.) ; 1 ♀, Szechuen, Mt. Omei, Si Gi Pin, 6–7,000 ft. (*D. C. Graham*) (U.S. Nat. Mus.) ; 1 ♂, 1 ♀, Szechuen Mt. Omei, Shin Kai Si, 4,400 ft. (*D. C. Graham*) (B.M. Nat. Hist. & U.S. Nat. Mus.) ; 1 ♂, Szechuen, Mt. Omei, Shin Kai Si, 4,400–5,000 ft., 20–26.viii.1934 (*D. C. Graham*) (U.S. Nat. Mus.) ; 1 ♂, Szechuen, Mt. Omei, 4,400–7,000 ft. 20–22.viii.1934 (*D. C. Graham*) (U.S. Nat. Mus.) ; 1 ♀, Szechuen, Mt. Omei, 4–6,000 ft., 10–22.viii.1934 (*D. C. Graham*) (U.S. Nat. Mus.) ; 1 ♀, Szechuen, 1922 (*D. C. Graham*) (U.S. Nat. Mus.) ; 4 ♀♀, Nanking, 22.vii.1924 (*C. Y. Wong*) (U.S. Nat. Mus.) ; 2 ♂♂, Nanking, 23.vii.1924 (*H. A. Jaynes*) (U.S. Nat. Mus. & B.M. Nat. Hist.) ; 2 ♂♂, 1 ♀, Kuling, 3.vi.–8.vii.1926 (*C. Y. Wong*) (U.S. Nat. Mus.) ; 1 ♂, Kuling, 7.vi.1926 (*C. Y. Wong*) (B.M. Nat. Hist.) ; 1 ♀, Hangchow, Mokanshan, ex foliage, 20.vii.1924 (*J. F.*

Illingworth) (U.S. Nat. Mus.) ; 1 ♂, labelled ' China, Honan Isld. ' and ' Hong Kong ', no other data (Staatl. Mus. Stuttgart).

Note : some of the specimens listed above in U.S. Nat. Mus. are labelled as type and paratypes of ' Stilbomyia chinensis Malloch ' ; this is an unpublished manuscript name.

In addition to the foregoing material I have seen a small specimen (in U.S. Nat. Mus.) in which the third antennal segment bears two small black setulae basally on the outer surface but in other respects appears to be a typical specimen of *S. hoeneana*: Malloch has labelled this specimen ' Stilbomyia chinensis v. seticornis, Type ' but this is an unpublished manuscript name. For the present this specimen may be tentatively identified as *S. hoeneana*, and its data are identical with those of a normal specimen of this species (♀, CHINA : Nanking, 23.vii.1924 (*H. A. Jaynes*)).

Distribution : Known only from southern China.

AFFINITIES. Very closely allied to *S. sauteri* Enderlein, and perhaps not specifically distinct : all specimens of *hoeneana* seen (from China) lack median discal setae on the intermediate abdominal tergites, whereas these setae are present on at least one of the intermediate tergites in material of *sauteri* (all from Formosa). In the absence of any evidence to the contrary it seems best to regard the two forms as distinct species for the present.

Silbomyia asiatica sp. n.

DIAGNOSIS. T1+2 without median marginal setae ; lower calypter with white margin ; interfrontal area 2·4–2·8 times as wide as parafrontal ; facial carina and antennae not sexually dimorphic.

♂. *Head* : Interfrontal area orange yellow ; upper parts of parafrontals semi-translucent yellowish, rather shining and non-pollinose ; lower parafrontals and parafacials densely yellowish white pollinose, colour more yellowish inwardly, in some lights the parafacials appearing rather brightly shining white ; facial carina, antennal foveae and epistome yellow with thin yellowish white pollinosity ; genae yellow with dense golden yellow pollinosity ; postorbits densely silvery white pollinose over dark ground colour, pollinosity thinner on upper end of each postorbit which appears slightly shining in certain lights. Parafrontal hair black ; hair of genae golden yellow. Upper occiput dark metallic greenish from some points of view but evenly covered with white pollinosity ; cerebrale orange. Vertex by measurement equal in width to an eye viewed from above. Interfrontal area 2·4–2·8 times as wide as a parafrontal at level of lower proclinate orbital seta. Facial carina short and ridge-like, sometimes widened below, 2·3–2·6 times as long as epistome and distinctly shorter than (0·8) distance from lunula to anterior ocellus. Gena slightly less than (0·22–0·24) a quarter of eye-height. Parafacial about 2·2–2·5 times as wide as third antennal segment. Facial ridges slightly concave in profile, fine hairs above vibrissae confined to lower quarter of each ridge. Postocellar setae weakly developed. Antennae orange, third segment 3·3 times as long as second segment ; seta on second segment long and strong, about equal in length to arista, latter longer than third antennal segment. Palpi yellow. *Thorax* : green, sometimes with slight bluish or cupreous tinge on mesonotum, mesopleura and sternopleura with the usual large white pollinose spots ; pteropleura and hypopleura reddish brown with violaceous reflections ; mesonotum conspicuously white pollinose marginally, the pollinosity especially evident on notopleura and areas of supra-alar setae, prescutum and postalar calli also whitish pollinose. *Wings* : dark brown infuscate, the infuscation concentrated broadly along the veins and obviously paler in middle

of cells and on hind margin. Distance between bend of vein *M* and wing margin 1·8–2·1 times as great as that between *m–cu* and bend ; on vein *M* distance from *r–m* to *m–cu* 3·0–3·5 times as great as that between *m–cu* and bend. Costal spine well developed but shorter than *r–m*. Calyptrae white, including margin of lower calypter. *Legs* : blackish, tibae dark brown, femora with dark metallic greenish or bluish violet reflections. *Abdomen* : brilliant metallic green to bluish green, sometimes with a coppery tinge, more blue or violaceous ventrally. T3 appearing non-pollinose to naked eye but dorsally with thin white pollinosity visible from behind under microscopic examination, each ventro-lateral surface with a broad median band of shining white pollinosity conspicuous to naked eye ; T4 non-pollinose and rather brilliantly shining dorsally, sometimes with small traces of whitish pollinosity ventro-laterally ; T5 with a pair of large white pollinose spots ventra-laterally, the spots extending round the sides of the tergite on to the latero-dorsal surfaces and their appearance shifting with the light. T1+2 without median marginal setae ; T3 with one lateral marginal seta on each side ; T3 and T4 without discal setae. Hair of intermediate tergites recumbent laterally but erect and slightly thickened on median areas ; hair of T5 semi-erect to erect, finer than on preceding tergites. ♂ hypopygium similar to *fuscipennis*. *Measurements* : body length 11·3 mm. (range 9·2–12·7 mm.), wing length 9·6 mm. (range 8·2–10·3 mm.) [4 specimens].

♀. Almost identical with ♂, differing in minor detail as follows : gena broader, 0·35 of eye-height ; parafacial broader, about 3·4 times as wide as third antennal segment ; antennae slightly shorter, third segment 2·7 times as long as second segment ; abdominal hair all recumbent. *Measurements* : body length 10·3, 13·7 mm., wing length 9·7, 11·7 mm. [2 specimens].

MATERIAL EXAMINED. Holotype ♂, THAILAND (SIAM) : Biserat, 18.x.1901 (*H. C. Robinson & N. Annandale*). In British Museum (Natural History), London. Paratypes : 2 ♂♂, data as for holotype except dates 19 & 20.x.1901 (B.M. Nat. Hist.) ; 2 ♂♂, 1 ♀, INDIA : Darjeeling District, Mungpoo, 21.v.1920 (*R. Senior-White*) (B.M. Nat. Hist.) ; 1 ♀, MALAYA : Malacca, Quedah (*v. d. Does de Bye*) (Rijksmus. Leiden).

Distribution : South-east Asia from India to Malaya.

AFFINITIES. *S. asiatica* sp. n. appears to be most closely related to *S. hoeneana* Enderlein and *S. metallica* sp. n. ; from *hoeneana* it is distinguished by the white margin to the lower calypter, by the narrower interfrontal area and smaller size, and from *metallica* by the much broader interfrontal area. From both these species it also differs in the shining creamy whitish appearance of the parafacials when seen from above. There is some resemblance to *S. sumba* sp. n. but *S. asiatica* sp. n. is at once distinguished from this species by the absence of median marginal setae on T1+2 and by the shorter facial carina and antennae.

Silbomyia metallica sp. n.

DIAGNOSIS. T1+2 without median marginal setae ; parafrontals unusually broad and interfrontal area only 1·4–1·7 times as wide as parafrontal at level of lower proclinate orbital seta ; margin of lower calypter white ; dorsal surfaces of T4 and T5 under high power examination completely smooth and brilliantly metallic.

♀. *Head* : Interfrontal area orange-yellow ; vertex and upper parts of parafrontals semi-translucent yellowish or orange-yellow, rather shining and scarcely at all pollinose ; lower parts of parafrontals, parafacials, genae, facial carina, antennal foveae and epistome yellow or orange yellow, pollinosity golden on lower parafrontals, parafacials and genae but thinner and paler yellowish on face ; postorbits densely silvery white pollinose, the pollinosity reaching to outer vertical setae and extreme upper ends of postorbits not at all metallic. Parafrontal hair

all black ; hair of genae golden yellow. Upper occiput thinly whitish pollinose, but appearing metallic green in some lights ; cerebrale orange. Vertex almost exactly equal in width to one eye seen from above, eye-vertex-eye ratio about 13 : 12 : 13. Interfrontal area 1·4–1·7 times as wide as a parafrontal at level of lower proclinate orbital seta, parafrontals therefore unusually broad and interfrontal area relatively narrow. Facial carina short and ridge-like, slightly widening ventrally, only 2·5–2·8 times as long as epistome and distinctly shorter than distance from lunula to anterior ocellus. Gena relatively broad, nearly one-third (0·31) of eye-height. Parafacial three times as wide as third antennal segment. Fine hairs above vibrissae confined to lower quarter of each facial ridge, facial ridges slightly but distinctly concave in profile. Postocellar setae weakly developed. Antennae orange, third segment 3·3–3·5 times as long as second segment ; seta on second segment long and strong, almost as long as whole antenna and longer than arista, latter longer than third antennal segment. Palpi yellow. *Thorax* : brilliant green with slight coppery or bluish tinge, mesopleura and sternopleura with usual large white spots of dense pollinosity ; hypopleura and pteropleura reddish brown with violaceous reflections ; mesonotum when viewed from behind showing very thin inconspicuous traces of whitish pollinosity around the margins, the pollinosity much less obvious than in other species in which such pollen is present. *Wings* : heavily infuscate very dark brown along the veins and paler brownish in cells and posteriorly. Distance between bend of vein *M* and wing margin 1·6 times as great as between *m–cu* and bend ; on vein *M* distance from *r–m* to *m–cu* 2·7–2·9 times as great as that between *m–cu* and bend. Costal spine small, much shorter than *r–m*. Calyptrae white, including posterior and outer margins of lower calypter. *Legs* : black, femora partly dark metallic bluish green. *Abdomen* : bright metallic green, somewhat coppery posteriorly and on ventral surface with broad violaceous hind margins to the tergites. Dorsal surfaces of T4 and T5 under high magnification quite smooth and polished, exceptionally brilliantly shining. T3 with a conspicuous broad median band of white pollinosity on latero-ventral surfaces, but with no white pollinosity visible on dorsum from any point of view ; T5 with usual pair of conspicuous spots of dense white pollinosity, mainly ventral in position but extending on to extreme sides of the tergite. T1+2 without median marginal setae ; lateral marginal setae of T3 single on each side ; T3 and T4 without median discal setae. Hair of dorsum entirely recumbent, including that on T5. *Measurements* : body length 11·7 mm. (range 10·9–12·6 mm.), wing length 10·5 mm. (range 9·8–11·2 mm.) [4 specimens].

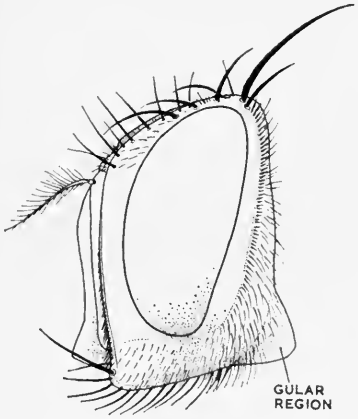
♂. Unknown. Probably very similar to ♀.

MATERIAL EXAMINED. Holotype ♀, INDONESIA : E. Borneo, Babidjoelan, approx. 4,000 ft., vi.1937. In British Museum (Natural History), London. Paratypes : 3 ♀♀, data and depository as for holotype.

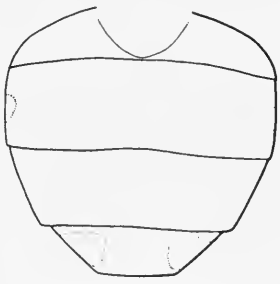
Distribution : At present known only from the four female specimens of the type-series from Borneo, and probably confined to Borneo where no other species of *Silbomyia* is known to occur.

AFFINITIES. *S. metallica* sp. n. appears to be most closely allied to *S. fulgida* (Bigot) and *S. sumba* sp. n. ; it is easily distinguished from both these species by the lack of median marginal setae on T1+2 by the proportions of the interfrontal area and parafrontals, by the white margin of the lower calypter, and by other minor differences.

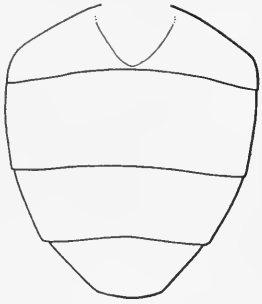
FIGS. 24–30. 24. Head of *Paraplatytropesa* gen. n. in profile showing prominent gular development. 25. Abdominal shape in *Amenia*. 26. Abdominal shape in *Stilbomyella*. 27. Abdomen of *Formosiomima nigromaculata* (Malloch) showing arrangement on T4 of separated pairs of marginal setae, remarkable pattern of black spots and weakness of sutures between tergites. 28. Profile of abdomen of ♂ *Platytropesa auriceps* Macquart. Figs. 29 and 30. Sternite 5 of ♂ of (29) *Platytropesa simulans* sp. n. and (30) *Platytropesa auriceps* Macquart.



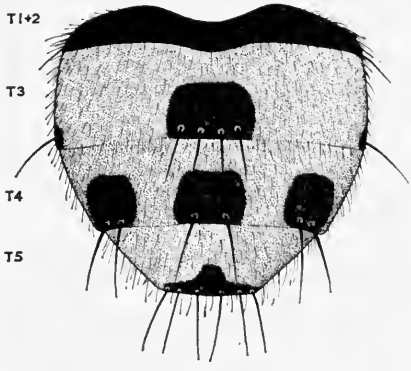
24



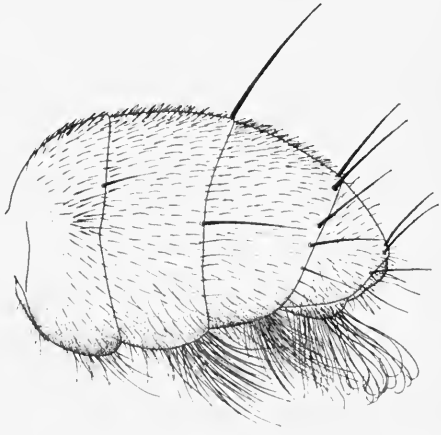
25



26



27



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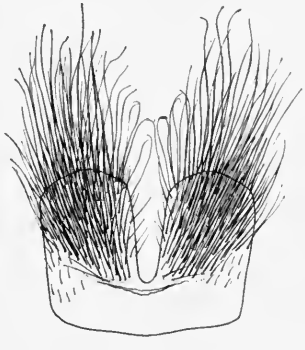

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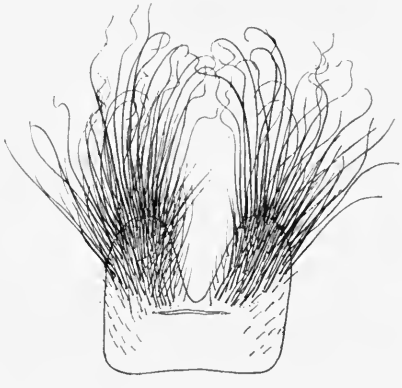


30

PLATYTROPESA Macquart, 1851

Platytropesa Macquart, 1851, *Mém. Soc. Sci. Lille*, Année 1850 : 197, and *Diptères Exot. Suppl.* **4** : 224. [Spelling *Platytropeza* in *Diptères Exot. Suppl.* **4**, Index : 357]. Type-species : *Platytropesa auriceps* Macquart, 1851 [= *ruriceps*, by typographical error], by monotypy.

Liostiria Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen*, **1** : 440. Type-species : *Liostiria ralumensis* Enderlein, 1936 [= *Stilbomyella dubia* Malloch, 1935], by original designation. **syn. n.**

Diagnosis. Ventral surface of costa bare between apices of veins *Sc* and R_1. Head normal, gular region not produced. Fore tibia with one submedian *pv* seta and with two small *pd* setae (Text-fig. 11). Mid femur with two or more strong submedian *a* setae. Hind coxa setulose on postero-dorsal surface. Facial ridges with fine setulae extending more than half way (♂) or about half way (♀) up their length. Facial carina very strongly sexually dimorphic. Frons about equal in width in both sexes, ♂ eyes not approximated ; ♂ with outer vertical, prevertical and sometimes proclinate orbital setae. Inner vertical setae cruciate. Abdomen without white pollinose spots on T5. Sternites of ♂ abdomen with very long dense hair (Text-fig. 28), sternites of ♀ abdomen with spinous setae.

Discussion. *Platytropesa* is to some extent intermediate between *Silbomyia* Macquart and *Stilbomyella* Malloch, but the general facies and the long dense hair on the sternites of the ♂ suggest closer affinity with the latter genus ; the bare ventral surface of the costa between the apices of *Sc* and R_1 easily distinguishes *Platytropesa* from *Silbomyia*, but it agrees with this genus in the broad ♂ frons with outer vertical and prevertical setae and in having small *pd* setae on the fore tibia. The latter character distinguishes *Platytropesa* from *Stilbomyella* and *Paraplatytropesa* gen. n., both of which lack *pd* setae on the fore tibia ; the normal gular region of the head distinguishes it from *Paraplatytropesa*.

There is confusion in the literature concerning the name and type-locality of the type-species of *Platytropesa*. Macquart (1851) spelled the name *ruriceps* in the original description and cited the type-locality as " Océanie, Triton Bay ". Townsend (1931) pointed out that the type was labelled " *auriceps* " and therefore attributed the original spelling " *ruriceps* " to a typographical error ; the spelling " *ruficeps* " in Macquart's (1851) Index p. 357 to the 4th Supplement of his *Diptères Exotiques* is also a misprint. It appears certain that Macquart's name alluded to the golden yellow head, a character mentioned in his original description (' Tete d'un jaune doré '), and Townsend's (1931) emendation to *auriceps* is justified, especially as the type is labelled " *Platytropesa auriceps* ♀, n.g., n. sp., Macq." in Macquart's writing. There is therefore no evidence to support Paramonov's (1957, p. 62) emendation, based on remarks of Séguy, to *rubriceps*.

Triton Bay, type-locality of *auriceps*, lies on the southern coast of the narrow western ' neck ' of New Guinea, an area where *P. auriceps* will probably prove to be quite common when sufficient collecting has been done. Townsend (1935, 1937) erroneously, and without any explanation, cited the type-locality of *auriceps* as the Paracel Islands, and Enderlein (1936, p. 445) repeated this mistake. *Platytropesa* is not known from the Paracel Islands in the China Sea or from anywhere near there,

and Macquart's original citation of Triton Bay quite certainly means the inlet still known by that name in western New Guinea.

DISTRIBUTION (map 1, p. 123). *Platytropesa* occurs throughout New Guinea and its neighbouring islands, including Morotai in the Moluccas, Misoöl, Waigeo, Biak, the Aru Islands, and the Bismarck Archipelago (New Britain and New Ireland) ; it occurs also in northern Queensland, including Palm Island. It is not yet known from Halmahera, Ceram, and Obi but almost certainly occurs in these islands of the Molucca group.

KEY TO THE SPECIES

1 Head in facial view with inner margins of eyes slightly but distinctly angulate near level of lunula (Text-fig. 16). Lower calypter dark brown on about apical fifth (♂) or quarter (♀). Mesolobe of ♂ hypopygium curved in profile and rounded at tip (Text-fig. 39). Hair of ♂ sternite 5 very long and largely curved downwards and inwards apically (Text-figs. 28 and 30). ♂ facial carina 5·3–6·8 times as long as epistome. ♂ with or without proclinate orbital setae 2

– Head in facial view with inner margins of eyes slightly but evenly curved, not at all angulate (Text-fig. 15). Lower calypter dark brown on about apical third to two-fifths (♂) or half (♀). Mesolobe of ♂ hypopygium rather straight in profile, slightly truncate apically with trace of hook (Text-fig. 38). Hair of ♂ sternite 5 shorter and not conspicuously turned downwards or inwards apically (Text-fig. 29). ♂ facial carina 4·5–4·8 times as long as epistome. ♂ without proclinate orbital setae . . . . . ***P. simulans*** sp. n. (p. 89)

2 Mesopleuron shining, without large white pollinose spot. ♂ without or with one pair of proclinate orbital setae. [Bismarck Archipelago] . . ***P. dubia*** (Malloch) (p. 88)

– Mesopleuron not shining, mostly covered by large densely white pollinose spot. ♂ always with two pairs of proclinate orbital setae [not known from Bismarck Archipelago] . . . . . ***P. auriceps*** Macquart (p. 85)

DESCRIPTIONS OF THE SPECIES

Platytropesa auriceps Macquart, 1851

(Text-figs. 16, 28, 30, 39, 42)

Platytropesa ruriceps [sic] Macquart, 1851, *Mém. Soc. Sci. Lille*, Année 1850 : 197. *Diptères Exot. Suppl.* **4** : 224. Holotype ♂ (not ♀ as cited by Macquart), TRITON BAY (NEW GUINEA). In the Muséum National d'Histoire Naturelle, Paris. [Erroneous spelling of *auriceps* by typographical error.]

Musca opulenta Walker, 1859, *J. Linn. Soc. Lond.* (*Zool.*) **3** : 104. Holotype ♀, ARU ISLANDS. In the British Museum (Natural History), London. **syn. n.**

Silbomyia decrescens Walker, 1864, *J. Linn. Soc. Lond.* (*Zool.*) 7 : 215. Holotype ♂, MYSOL (= MISOÖL). In the British Museum (Natural History), London. **syn. n.**

Platytropesa auriceps Macquart, Townsend, 1931, *Ann. Mag. nat. Hist.*, **10** (8) : 376. [Justified emendation of *ruriceps* Macquart.]

[*Stilbomyia costalis* (Walker) ; Malloch, 1930, *Proc. Linn. Soc. N.S.W.*, **55** : 102, [not of Walker] (misidentification)].

DIAGNOSIS. Mesopleuron with large white pollinose spot ; lower calypter dark brown only on posterior quarter or less ; inner eye-margins in facial view slightly angulate near level of lunula ; ♂ with two pairs of proclinate orbital setae.

♂. *Head* : Interfrontal area dark brown or dark reddish brown ; vertex and ocellar plate dark metallic greenish or bluish, yellow pollinose on either side of posterior part of ocellar plate ; parafrontals, parafacials, genae and postbuccae densely pale yellow to deep golden yellow pollinose over yellow ground colour ; antennal foveae and epistome yellow with thin whitish pollinosity ; facial carina yellow with moderately thick shining pale yellow pollinosity on flattened anterior surface ; postorbits thickly pale yellow to deep golden pollinose ; occiput with dark greenish or bluish ground colour thickly covered with yellow pollinosity, metallic coloration only slightly exposed near cerebrale. Parafrontal hair long and fine, all pale to dark brown ; hair of entire occiput, postbuccae and genae yellowish white to golden yellow. Inner margins of eyes in facial view slightly but distinctly angulate (fig. 16) near level of lunula ; vertex slightly less than a quarter of total head width, eye-vertex-eye ratio about 5 : 3 : 5. Ocellar and cruciate frontal setae all strongly developed ; parafrontals with two pairs of strong proclinate orbital setae. Facial carina very long and heavy, its anterior surface broad and flattened but tapering strongly in upper third towards lunula, sides of the carina very strongly pinched-in towards one another so that antennal foveae are extremely deep, the carina about twice as long as distance from lunula to anterior ocellus and 5·3–6·8 times as long as epistome; in profile the carina gently convex and abruptly set off from the epistome, latter short and slightly prominent. Gena about three-tenths (0·29–0·31) of eye-height. Parafacial set off at very sharp angle from inner eye margin, about equal in width to third antennal segment ; in facial view parafacial appearing very narrow, only about as wide as antenna in facial view. Facial ridges in profile nearly straight, fine setulae reaching slightly over half way up each ridge. Antennae inserted far above mid-eye level, in profile very largely hidden within very deep foveae ; antennal colour blackish brown or very dark reddish brown, third segment extremely elongate and 7·7–8·9 times as long as second segment; seta on second segment short, fine and weak ; arista thickened on basal two-thirds, densely plumose and about three-quarters as long as third antennal segment. Palpi yellowish brown. *Thorax* : usually brilliant emerald green, occasionally with slight coppery tinge ; sometimes violaceous blue with violet scutellum. Hypopleural and posterior pteropleural regions largely reddish brown with metallic greenish or violaceous areas. Dorsum entirely shining metallic, without trace of white pollinose areas. Mesopleuron with a very large conspicuous densely white pollinose spot, appearance of spot shifting only slightly with direction of light ; sternopleuron with thin inconspicuous traces of white pollen visible in some lights, without definite spot. *Wings* : conspicuously dark brown infuscate anteriorly and broadly towards the base, infuscation fading posteriorly but all of the wing with at least a very faint trace of darkening (wing not abruptly divided into a dark costal band and clear posterior region as in *Stilbomyella*). Lower calypter dark brown only on posterior quarter or fifth, otherwise white. *Legs* : black, femora with brilliant metallic green or violaceous reflections. Mid tibia with two strong *ad* setae. *Abdomen* : unicolorous with thorax, varying from brilliant metallic green to violet ; sometimes with slight copper tinge. Margins of tergites dorsally appearing slightly darkened to naked eye, ventrally the tergite margins very narrowly but obviously blackish violet. No trace of white pollen spots anywhere on abdomen, but seen from behind the dorsum of T3 shows exceedingly thin trace of pollinose covering and also trace of a black median vitta ; median excavation of T1+2 usually blackish. T1+2 without median marginal setae ; T3 with a pair of very long strong median marginal setae ; tergites without discal setae. Hair of T3 and T4 of short even length, slightly thickened and erect or semi-erect ; hair of T5 finer and erect. Venter with very long dense hair situated mainly on sternites, but hair of ventral ends of intermediate tergites also rather fine and long ; hair of sternites 3 and 4 very long and reaching back under sternite 5 ; hair of sternite 5 extremely long and dense, ends of longest hairs curling downwards (Text-fig. 28) in lateral view and also inwards towards hairs of opposite lobe of the sternite (Text-fig. 30). Ends of longest hairs of sternites very fine and crinkly. ♂ hypopygium as in Text-figs. 39 and 42 ; mesolobes distinctly curved in profile and evenly rounded at extreme tips, slightly variable in length (longer and narrower in specimens from Palm Islands, Queensland, than in specimens seen from elsewhere) ; paralobes parallel-sided in profile and usually rather long, evenly curved apically. *Measurements* : body length 10·7 mm. (range 8·6–13·3 mm.), wing length 8·4 mm. (range 6·7–10·1 mm.) [7 specimens].

♀. Mostly like ♂, but head in the sexes conspicuously sexually dimorphic, face and antennae not greatly elongate as in ♂. Facial carina not strongly flattened on anterior surface and not strongly pinched-in laterally, antennal foveae less deep than in ♂ ; carina 3·0–3·4 times as long as epistome. Antennae with third segment 4·4–4·9 times as long as second segment, arista equal in length to third segment. Fine hairs on facial ridges reaching only about half way at most up each ridge. Parafacial much broader than in ♂, about 2·5 times as wide as third antennal segment. Interfrontal area wider than a parafrontal at level of lower proclinate orbital seta. Gena slightly wider than in ♂, about one-third of eye-height. Vertex broader, about three-elevenths of total head width, eye-vertex-eye ratio about 4 : 3 : 4. *Measurements* : body length 11·0 mm. (range 8·7–13·1 mm.), wing length 8·7 mm. (range 6·8–10·2 mm.) [8 specimens].

MATERIAL EXAMINED. *Platytropesa auriceps* Macquart, holotype ♂, NEW GUINEA: Triton Bay (no other data). *Musca opulenta* Walker, holotype ♀, ARU ISLANDS : (*A. R. Wallace*). *Silbomyia decrescens* Walker, holotype ♂, MISOÖL : (*A. R. Wallace*).

MOLUCCA ISLANDS : 1 ♂, 1 ♀, Morotai, 25–26.viii.1945 (*D. G. Hull*) (U.S. Nat. Mus.) ; 1 ♀, Morotai, 25–26.viii.1945 (*D. G. Hull*) (B.M. Nat. Hist.). MISOÖL ISLAND : 1 ♀, Mysol (= Misoöl) (*A. R. Wallsce*) (B.M. Nat. Hist.) ; 1 ♂, Mysoe (= Misoöl) (*ex coll. Bigot*) (B.M. Nat. Hist.). WAIGEO ISLAND : 1 ♂, Waigiou (= Waigeo) (*ex coll. Bigot*) (B.M. Nat. Hist.). INDONESIAN NEW GUINEA : 1 ♀, Humboldt Bay, Hollandia, sea level, ii.1936 (*L. E. Cheesman*) (B.M. Nat. Hist.); 1 ♂, Fak-Fak (*A. E. Pratt*) (B.M. Nat. Hist.) ; 2 ♀♀, Bernhard Camp, 50 m., 3.x. & 2.xi.1938 (*Neth. Ind. – American N. Guin. Expedit. J. Olthof*) (Rijksmus. Leiden) ; 1 ♀, 1 ♂, Bivak (= Biak) Island, 10.xi.1909 & 23.i.1910 (*Lorentz*) (Rijksmus. Leiden). NEW GUINEA (locality unknown) : 1 ♀ (*ex coll. Bigot*) (B.M. Nat. Hist.). QUEENSLAND : 1 ♂, 1 ♀, Kuranda (*F. P. Dodd*) (U.S. Nat. Mus.) ; 1 ♂, Kuranda (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, 2 ♀♀, Palm Islands (*Bancroft*) (Div. Ent. Mus. Canberra) ; 1 ♂, Palm Islands, ii.1931 (*Mackerras*) (Div. Ent. Mus. Canberra).

In addition to the foregoing : 1 ♂, without locality data, probably A. R. Wallace specimen (B.M. Nat. Hist.).

Distribution : From northern Moluccas (Morotai) to northern Queensland through western New Guinea including Waigeo, Misoöl and Aru Islands. All specimens seen from New Guinea mainland are from Indonesian New Guinea but *P. auriceps* must almost certainly occur in Papua and probably in North-East New Guinea. The specimens seen from Biak Island have the antennae slightly longer than usual, and males seen from the Palm Islands off the Queensland coast have the mesolobes of the genitalia distinctly more elongate than in males from elsewhere (including Queensland mainland), but specimens from both these localities must be regarded as conspecific with the type of *auriceps* on present evidence.

The specimens recorded above from Palm Islands are those recorded by Paramonov (1957) under the name *Stilbomyia opulenta* (Walker).

Platytropesa dubia (Malloch, 1935) **comb. n.**

Stilbomyella dubia Malloch, 1935, *Proc. Linn. Soc. N.S.W.* **60** : 76. Holotype ♂, NEW BRITAIN. In the School of Public Health and Tropical Medicine, Sydney.

Liostiria ralumensis Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 437. Lectotype ♂, NEW BRITAIN. In the Zoologisches Museum der Humboldt-Universität, Berlin. **syn. n.** [Correct original spelling of specific name based on locality Ralum cited in generic key.]

Liostiria ralumsensis [sic] Enderlein, 1936, *Veröff. dtsch. Kolon Mus. Bremen* **1** : 440. [Erroneous original spelling of specific name by lapsus calami in species description.]

Lectotype Designation : Enderlein described *Liostiria ralumensis* from three ♂ specimens without designating a holotype. Two of the syntypes have been seen, one of which has been labelled by Enderlein as " type " and the other as " cotype ". The specimen labelled as type is here designated as lectotype and has been labelled accordingly ; the second syntype has been labelled as paralectotype. The whereabouts of the third syntype is not known to me.

Diagnosis. Mesopleuron bare and shining, without large white pollinose spot ; ♂ without or with only one pair of proclinate orbital setae. Otherwise like *P. auriceps*.

Discussion. It is not certain that *P. dubia* (Malloch) is specifically distinct from *P. auriceps* Macquart, but with a very limited amount of material as yet available of *Platytropesa* it appears best to recognise it as a separate species for the time being. It is identical with *P. auriceps* in most respects, including the ♂ genitalia and characteristic appearance of the dense hair on the venter of the ♂ abdomen, but the small amount of material known differs consistently from *auriceps* in having a shining mesopleuron without the large bold white spot and the ♂ is without any proclinate orbital setae or with only a single pair (always two pairs of proclinate orbitals in *auriceps*). Specimens with the bare shining mesopleuron assignable to *dubia* are known only from the Bismarck Archipelago, whence *Platytropesa* with a mesopleural spot and two pairs of ♂ proclinate orbital setae is unknown ; thus *auriceps* and *dubia* appear on present evidence to be allopatric.

Liostiria ralumensis Enderlein, described the year after *dubia*, shows no significant differences and is here synonymised with *P. dubia* (Malloch). Ralum, the type-locality of *ralumensis*, lies extremely close to Rabaul—the type-locality of *dubia*—and the two type-series are therefore from the almost identical type-locality. The paralobes of the hypopygium are slightly shorter in the type-material of *ralumensis* than in the ♂ paratype of *dubia*, and the lectotype of *ralumensis* has one pair of proclinate orbital setae (absent in the ♂ paralectotype of *ralumensis* and in males of *dubia* type-series), but these minor differences are almost certainly of no systematic significance and the type-material of *ralumensis* therefore conspecific with that of *dubia*.

The type-specimens of *dubia* are green, the paralectotype of *ralumensis* has a green thorax and bluish green abdomen, and the lectotype of *ralumensis* has a dark greenish blue thorax and violet blue abdomen.

Material examined. *Stilbomyella dubia* Malloch, paratype ♂ and paratype ♀, Bismarck Archipelago : New Britain, Rabaul (*F. H. Taylor*) (U.S. Nat. Mus.). *Liostiria ralumensis* Enderlein, lectotype ♂, Bismarck Archipelago : New Britain, Ralum, in forest-valley on plants [" in Waldtal auf Pflanzen "], 27.ix.1896 (*Dahl*), and paralectotype ♂, Bismarck Archipelago : New Britain, Herbertshöhe, forest-ravine [" Waldschlucht vor Herbertshöhe "], 22.xii.1896 (*Dahl*) (Zool. Mus. Humb. Univ.).

One additional ♀ specimen has been seen which lacks the mesopleural spot but is rather large with most of the lower calypter dark brown (as in *P. simulans* sp. n.) ; this specimen is from New Ireland and may be tentatively assigned to *P. dubia*. The specimen is in the Staatliches Museum für Naturkunde, Stuttgart, and bears Engel's (erroneous) determination label as " Stilbomyia costalis Wlk. " : in addition it carries two other labels, one reading " Nusa " and the other " N.M. ". These old handwritten labels must without doubt refer to Nusa in " Neu-Mecklenburg ", the former German name for New Ireland ; Nusa does not appear on modern maps of New Ireland, but is shown on an old German atlas (Andrees' Handatlas, 1913) at the extreme North Cape of New Ireland near Kavieng.

The ♂ holotype of *dubia* and a second ♀ paratype (latter in U.S. Nat. Mus.) have not been seen, but have identical data and are from the same series as the paratype material recorded above.

Distribution : Only certainly known from the northern part of the Gazelle Peninsula of north-eastern New Britain, but probably occurring more widely in New Britain and in New Ireland, and possibly elsewhere in the Bismarck Archipelago. The localities of the type-material of *ralumensis* (Ralum and Herbertshöhe) do not appear on modern maps but are shown on " Andrees' Handatlas, 1913 " on the south coast of Blanche Bay, New Britain, at approximately 152°17′ E., 4°18′ S.

Platytropesa simulans sp. n.

(Text-figs. 15, 29, 38, 41)

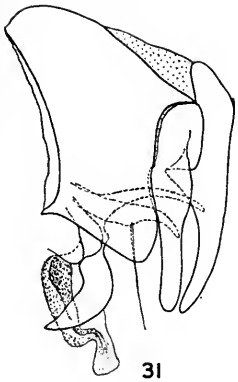
Diagnosis. Mesopleuron with large white pollinose spot ; lower calypter dark brown on posterior third or half ; inner eye margins in facial view slightly and evenly curved ; ♂ without proclinate orbital setae ; mesolobes of ♂ hypopygium nearly straight in profile.

♂. *Head* : Interfrontal area velvety brownish black, sometimes dark reddish brown ; vertex and ocellar plate dark metallic greenish with coppery or bluish tinge, vertex yellowish pollinose on either side of posterior part of ocellar plate ; parafrontals, parafacials, genae and postbuccae densely yellowish white, pale yellow or lemon yellow pollinose over yellow ground colour ; antennal foveae and epistome yellowish or pale reddish yellow with very thin whitish pollinosity ; facial carina pale yellow with yellow or yellowish white pollinosity on anterior surface ; postorbits thickly pale yellow to golden yellow pollinose ; occiput with dark ground colour obscured by thick pale yellow or pale golden pollinosity, some metallic green colour exposed near vertex. Parafrontal hair brownish, long and very fine ; hair of entire

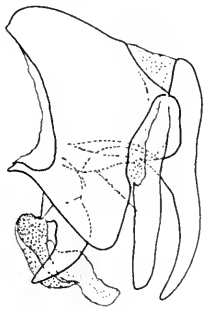
occiput, postbuccae and genae pale to deep yellow. Inner margins of eyes in facial view slightly and evenly curved (Text-fig. 15), not at all angulate near level of lunula ; vertex nearly a quarter of total head width, eye-vertex-eye ratio about 11 : 7 : 11 (one eye viewed from above between 1·5 and 1·7 times as wide as vertex). Ocellar and cruciate frontal setae strong ; proclinate orbital setae absent. Facial carina very large, anterior surface broad and flattened but tapering towards lunula, sides of carina very strongly pinched-in towards one another so that antennal foveae are very large and deep, the carina 1·8 times as long as distance from lunula to anterior ocellus and 4·5–4·8 times as long as epistome ; in profile carina very abruptly and deeply set off from epistome. Gena about three-tenths (0·29–0·31) of eye-height. Parafacial in facial view distinctly broader than antenna in facial view, in full-breadth view also conspicuously broader than third antennal segment. Facial ridges nearly straight or very slightly convex in profile, fine setulae reaching slightly more than half way up each ridge. Antennae in profile inserted well above level of eye middle and about half-hidden within antennal foveae, blackish brown or very dark reddish brown in colour and with third segment 7·0–7·5 times as long as second segment ; seta on second segment fine and weak ; arista thickened only on about basal half and nearly equal in length to third antennal segment. Palpi brownish yellow. *Thorax* : mesonotum brilliant metallic green without pollinosity ; mesopleura and sternopleura green ; hypopleura and hind part of pteropleura reddish brown with traces of metallic reddish violet colour. Mesopleuron with a large densely white pollinose spot, spot conspicuous from most points of view and shifting little with direction of light ; sternopleuron with traces of white pollinosity when viewed from above ; both mesopleura and sternopleura sometimes slightly blue under the pollen. *Wings* : mainly almost clear hyaline or with only faint trace of darkening, but becoming narrowly and gradually dark brown infuscate anteriorly towards the base. Lower calypter dark brown on apical third or two-fifths, the dark brown colour well defined from basal white part of calypter. *Legs* : black with green, coppery green or slightly violaceous metallic reflection on femora. Mid tibia usually with three *ad* setae (as in holotype), occasionally four or only two, number may be different on two mid tibiae of same fly. *Abdomen* : brilliant metallic green without trace of white pollen spots ; sometimes slightly blue violet on the venter anteriorly, posterior margins of tergites appearing slightly darkened ; T3 in some lights with trace of blackish median vitta. T1+2 without median marginal setae ; T3 with a pair of very long and strong median marginal setae ; tergites without discal setae. Hair of T3 and T4 semi-erect to erect on mid dorsum, recumbent elsewhere ; hair of T5 very fine and erect. Venter with very long dense hair on sternites and ventral ends of intermediate tergites; hair very long on sternites 3 and 4 and reaching back under sternite 5 ; hair on sternite 5 very dense but rather straight, in profile not noticeably curved downwards and in ventral view not conspicuously curving inwards towards hair of opposite lobe of sternite (Text-fig. 29) ; longest hairs of sternites very fine and crinkly towards apex. ♂ hypopygium as in Text-figs. 38 and 41 ; mesolobes in profile almost straight, rather truncate apically with a very slightly developed blunt hook ; paralobes usually tapering gradually from base towards apices and extreme tips rather acuminate, paralobe in profile therefore not evenly parallel-sided with rounded apex. *Measurements* : body length 12·4 mm. (range 11·4–13·1 mm.), wing length 10·2 mm. (range 9·2–10·9 mm.) [5 specimens].

♀. Generally like ♂ except for sexual dimorphism of head ; some specimens rather bluish green, lower calypter dark brown on apical half or even more. Face and antennae much shorter

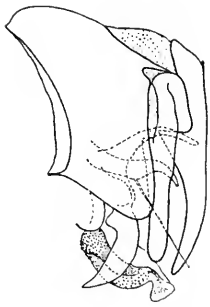
FIGS. 31–42. ♂ hypopygium (lateral view) and mesolobes and paralobes (posterior view) of : (31 and 34) *Silbomyia fuscipennis* (Fabricius). (32 and 35) *Silbomyia albonotata* (Bigot). (33 and 36) *Silbomyia sauteri* Enderlein. (37 and 40) *Stilbomyella nigrocostalis* (Doleschall). (38 and 41) *Platytropesa simulans* sp. n. (39 and 42) *Platytropesa auriceps* Macquart.



31



32



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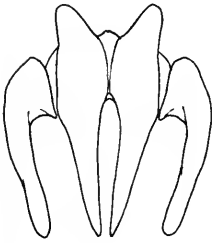

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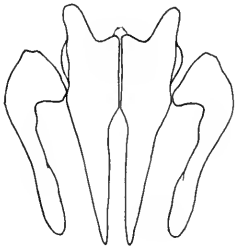

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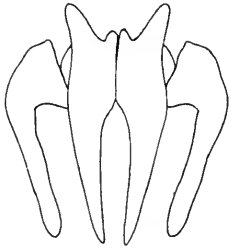

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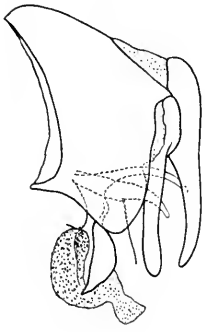

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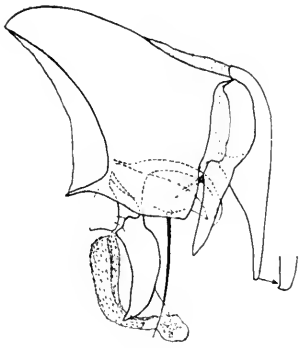

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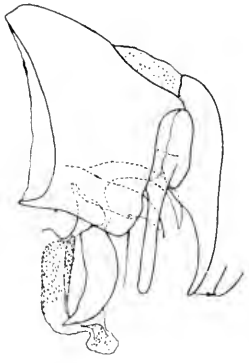

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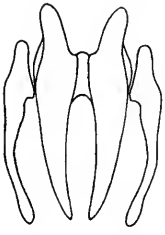

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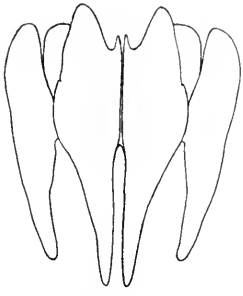
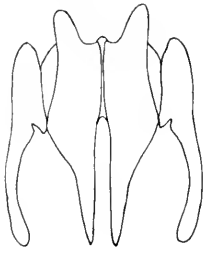


41



42

than in ♂, antennal foveae shallower and antennae in profile hardly at all hidden ; facial carina not flattened on anterior surface or with sides pinched-in, its length 3·4–3·5 times as great as that of epistome ; third antennal segment 3·9–4·8 times as long as second segment, arista conspicuously longer than third segment. Fine setulae on facial ridges reaching only half way or slightly less up each ridge ; parafacial much broader than in ♂, nearly three times as wide as third antennal segment. Interfrontal area about equal in width to parafrontal. Gena and vertex equal in width to ♂. *Measurements* : body length 12·3 mm. (range 9·8–13·7 mm.), wing length 10·1 mm. (range 7·9–11·2 mm.) [6 specimens].

Material examined. Holotype ♂, Indonesian New Guinea : Fak-Fak (*A. E. Pratt*). In British Museum (Natural History), London. Paratypes : 2 ♂♂, 2 ♀♀, data as for holotype (B.M. Nat. Hist.) ; 1 ♂, Indonesian New Guinea : Cyclops Mts., Sabron, 930 ft., v. 1936 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 1 ♀, Indonesian New Guinea : Njau-Limon, S. of Mt. Bougainville, 300 ft., ii.1936 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 1 ♀, Japen Island (Indonesian New Guinea) : Camp 2, Mt. Eiori, 2,000 ft., xi.1938 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 1 ♂, Waigeo Island (Indonesian New Guinea) : Waigiou, 6.i.1910 (*Mevr. de Beaufort*) (Rijksmus. Leiden) ; 1 ♀, Australian New Guinea : Papua, Keria, vii.1962 (*W. W. Brandt*) (Div. Ent. Mus. Canberra) ; 1 ♀, New Guinea (locality not known, probably western New Guinea) (*ex coll. Bigot*) (B.M. Nat. Hist.).

Distribution : New Guinea, including islands of Waigeo and Japen. Apparently mainly western Indonesian New Guinea to judge from limited material so far known, but also Papua ; not yet seen from North-eastern New Guinea. Sympatric on Waigeo and in western New Guinea with *P. auriceps* Macquart.

Affinities. Very closely related to, and superficially extremely like, *Platytropesa auriceps* Macquart but with quite distinct ♂ genitalia (cf. Text-figs. 38 and 41, and Text-figs. 39 and 42). The head of the two species appears almost identical at first glance but is constantly different in facial view in the shape of inner eye margins (cf. Text-figs. 15 and 16), this margin being quite smooth in *P. simulans* sp. n. but always slightly and distinctly angulate at the level of the lunula in *P. auriceps*. The extent of brown infuscation on the lower calypter appears also to be a useful distinguishing character, the extent of dark coloration being much greater in *simulans*. The absence of proclinate orbital setae in the ♂ of *simulans* distinguishes this species from *auriceps* in material so far known, but this character may not hold when more material becomes available. Other minor differences from *auriceps* are shown in the key to species.

STILBOMYELLA Malloch, 1935

Stilbomyella Malloch, 1935, *Proc. Linn. Soc. N.S.W.* **60** : 74. Type-species : *Stilbomyella nitens* Malloch, 1935, by original designation.

Doleschallius Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 441. Type-species : *Rutila nigrocostalis* Doleschall, 1858, by original designation. **syn. n.**

Diagnosis. Ventral surface of costa bare between apices of veins *Sc* and R_1. Fore tibia without *pd* setae. Cross-vein *r-m* very near middle of discal cell. Body form somewhat elongate, abdomen ovate and as long or longer than broad. Mesonotum entirely metallic, without areas of dense white pollinosity. Setulae above vibrissae confined to lower quarter or at most third of each facial ridge. Facial carina not noticeably sexually dimorphic. ♂ frons much narrower than in ♀, eyes of ♂ very strongly approximated. ♂ without proclinate orbital setae and without outer vertical setae (latter present in one exceptional specimen seen). Abdominal sternites 2–5 with very long dense hair in ♂, sternites with spinous setae in ♀.

Discussion. The holotypes of the type-species of *Stilbomyella* Malloch and *Doleschallius* Enderlein are certainly congeneric and possibly conspecific ; Malloch's name has priority and *Doleschallius* falls in synonymy. *Stilbomyella* is to some extent intermediate between *Platytropesa* Macquart and *Amenia* Robineau-Desvoidy, containing metallic green flies superficially similar to *Platytropesa* but lacking *pd* setae on the fore tibia and superficially very different from *Amenia* yet difficult to distinguish from this genus on good structural characters common to both sexes. The main differences between *Stilbomyella* and *Amenia* are shown in the foregoing key to genera, and in my view are of sufficient constancy and magnitude for the two genera to be regarded as distinct. Males of *Stilbomyella* differ conspicuously from the males of all *Amenia* by the presence of very long dense hair on the abdominal sternites, a character shared with the males of most *Platytropesa*.

At present *Stilbomyella* is known only from a limited amount of material : in all I have seen 33 specimens. Five described species belong to the genus, *Rutila* [sic] *nigrocostalis* Doleschall, *Musca costalis* Walker, *Musca gloriosa* Walker, *Musca diffusa* Walker, and *Stilbomyella nitens* Malloch, but it is doubtful whether there is really more than one species—although for the present I am accepting *nitens* (still known only from the ♀ holotype from New Britain) as distinct from *S. nigrocostalis* (Doleschall), with which the Walker names are here synonymised.

The 32 specimens of *Stilbomyella* seen other than the holotype of *nitens* include the holotypes of the other four described species ; the material is variable particularly in the presence or absence of hair on the propleura, the presence or absence of a large densely white pollinose spot on the mesopleuron, the colour of the genal hair, the shape of the facial carina and its width at the ventral end relative to the distance between the vibrissae, the length of the antennae, width of the ♂ frons, density and length of the long hair on sternites of ♂, and the colour of the pollinosity of the head. When only a few specimens are examined there appears to be a segregation of the material into two groups, that without white pollen on the mesopleuron in which the facial carina is usually narrow and subfusiform and the head pollen pale yellowish, and that in which there is a distinct white pollen spot on the mesopleuron combined with a broader elongate triangular facial carina and golden head pollen ; however when all available material is examined these apparently correlated distinctions break down, and fail also to show any definite correlation with geography (although there is a tendency for specimens with bare shining mesopleuron and narrow carina

to be commoner in the west and north of the range, and specimens with white pollinose mesopleuron and broader carina to be commoner in the east and south). This tendency is shown also by the propleural character, all specimens seen from Buru having a bare propleuron and those from Papua and north-eastern New Guinea showing a haired propleuron ; but the propleuron may be bare or haired in specimens from Amboyna and western New Guinea, and the same specimen may have hairs on one side but not the other. The presence or absence of hair on the propleuron is clearly of no value as a specific character in this group. The ♂ genitalia do not appear to differ in specimens showing obvious differences in the external characters.

When more material is available or when *Stilbomyella* can be studied in the field, evidence may emerge to determine whether an east-west cline within a single species exists from eastern New Guinea westwards to the Moluccas, or whether *Stilbomyella* comprises a complex of species all extremely closely allied and difficult or almost impossible to distinguish morphologically. At present there is insufficient evidence for treating any of the observed differences in the available material as specific, and in the absence of evidence to the contrary it appears best to regard the material as conspecific ; *S. nigrocostalis* (Doleschall) is the oldest available name for the single species thus recognised.

The two species other than *S. nitens* placed in *Stilbomyella* by Malloch (1935) at the time of the original description (*opulenta* Walker and *dubia* Malloch) belong in *Platytropesa* Macquart.

Paramonov (1957) has placed *S. nitens* Malloch (type-species of *Stilbomyella* Malloch) in *Silbomyia* Macquart, and has thereby implied that *Stilbomyella* is synonymous with *Silbomyia* ; however *nitens*, and the other species placed in *Silbomyia* by Paramonov, have the ventral surface of the second costal sector bare and lack other characters of true *Silbomyia*. *Stilbomyella* is a valid genus quite distinct from *Silbomyia*.

Distribution (map p. 123). *Stilbomyella* is at present known from the Molucca Islands (Batjan, Buru and Amboyna), the Aru Islands, New Guinea including the islands of Roon and Japen, and New Britain. It probably also occurs in Ceram and Halmahera. I have not seen material of the genus from Australia, but it appears possible that it might occur in northern Queensland.

Key to the Species

1 Size larger, length at least 10·5 mm. Hair of genae and postbuccae usually yellow. Mesopleuron with or without a densely white pollinose spot. [Moluccas, Aru, New Guinea] . . . . . ***S. nigrocostalis*** (Doleschall) (p. 95)

– Size small, length 8·5 mm. Hair of genae and postbuccae brown. Mesopleuron without white pollinose spot. [New Britain.] (Known only from ♀ holotype and possibly conspecific with above species) . . . . ***S. nitens*** Malloch (p. 97)

Descriptions of the Species

Stilbomyella nigrocostalis (Doleschall, 1858) **comb. n.**

(Text-figs. 37, 40)

Rutila nigrocostalis Doleschall, 1858, *Natuurk. Tijdschr. Ned.-Ind.*, **17** : 108. Holotype ♂, AMBOYNA. In the Zoologisches Museum der Humboldt-Universität, Berlin.

Musca gloriosa Walker, 1859, *Proc. Linn. Soc. Lond.* (*Zool.*) **3** : 104. Holotype ♀, ARU ISLANDS. In the British Museum (Natural History), London. **syn. n.**

Musca costalis Walker, 1860, *Proc. Linn. Soc. Lond.* (*Zool.*) **5** : 159. Holotype ♂ [not ♀ as stated by Walker], AMBOYNA. In the British Museum (Natural History), London. **syn. n.**

Musca diffusa Walker, 1861, *Proc. Linn. Soc. Lond.* (*Zool.*) **5** : 290. Holotype ♂, BATCHIAN (= Batjan Island). In the British Museum (Natural History), London. **syn. n.**

[No diagnosis is given as it is not yet certainly established that there is more than this one species in the genus]

♂. *Head* : Interfrontal area brownish black ; parafrontals, parafacials, genae and entire postorbits densely pale to golden yellow pollinose ; facial carina pale yellowish with pale yellow or golden pollinosity ; antennal foveae, facialia and sometimes epistome blackish brown and strongly contrasting in colour with yellow parafacials and genae, epistome yellowish or pale brownish in some specimens. Upper occiput dark greenish black metallic ; cerebrale mainly blackish but uppermost part with an area of yellowish or golden pollinosity extending on to vertex ; vertex blackish brown around ocelli. Parafrontals with a few fine black hairs, upper occipital hair black ; hair of postbuccae usually pale yellow (as in *diffusa* holotype) or golden yellow (as in *gloriosa* holotype) but occasionally dark brown to blackish (as in *nigrocostalis* and *costalis* holotypes), in some specimens mostly pale but with an admixture of a few dark hairs ; hair of postbuccae variable in colour, sometimes mainly or almost entirely pale yellowish but sometimes almost all dark brownish. Eyes very strongly approximated, interfrontal area therefore very reduced with its upper part almost obliterated and parafrontals of each side usually meeting or nearly meeting in mid-line for some distance in front of anterior ocellus ; frons always narrow but exact width a little variable even in specimens from same locality, at narrowest point 0·07–0·10 of head width, exceptionally narrow (0·04 of head width) in one of specimens seen from Buru. Ocellar setae long and very fine, sometimes scarcely differentiated from long hairs on ocellar triangle. Frontal setae mostly very strong and crossed, rows extending nearly to level of anterior ocellus but last few pairs much weaker than others. Facial carina short and usually distinctly widening ventrally, at upper end very abruptly angled from lunula and at lower usually very suddenly set off from epistome, equal in length to or slightly shorter than distance from lunula to anterior ocellus, 2·0–2·9 times as long as epistome; epistome very prominent. Gena 0·26–0·29 of eye-height. Parafacial about three or three and a half times as wide as third antennal segment. Antennae entirely blackish brown, third segment 3·3–3·7 times as long as second segment ; seta on second segment fine and short ; arista conspicuously longer than third antennal segment, with very long fine plumosity. Palpi blackish brown. *Thorax* : brilliant metallic green, often with coppery golden tinge and sometimes slightly bluish green, violet blue in holotype of *diffusa* ; in emerald or cupreous green specimens the hypopleura and pteropleura sometimes partly violet. Very thin inconspicuous covering of whitish pollinosity visible in some lights on whole dorsum of mesonotum and scutellum. Mesopleuron sometimes with large densely white pollinose conspicuous spot (as in holotype of *diffusa*), in other specimens (including holotypes of *nigrocostalis* and *costalis*) mesopleuron appearing bare and shining or showing only very thinnest traces of pollen. Sternopleuron largely covered with white pollinosity visible mainly from above. Propleuron varying from completely bare (as in holotype of *costalis*) to densely haired, sometimes (as in holotypes of *nigrocostalis* and *diffusa*) bare anteriorly but haired posteriorly in some specimens with a very

few hairs only ; same specimen sometimes with propleuron totally bare on one side but with one or two hairs on other side. *Wings* : whole fore margin of wing blackish brown infuscate and posterior part clear hyaline, infuscation covering basal cells and extending back to vein *M* based on *r–m* and to vein R_{4+5} apicad of *r–m* ; usually in addition slight brown staining along part of vein *M* between *r–m* and *m–cu* ; wings of *diffusa* holotype all hyaline, but probably teneral specimen. Costal margin apicad of vein *Sc* very slightly bowed forwards. Bend of vein *M* widely obtuse and near wing margin, distance from bend to margin 0·8–1·1 times that between *m–cu* and bend ; on *M* distance from *r–m* to *m–cu* 2·1–3·1 times as great as that between *m–cu* and bend. Lower calypter all dark brown except white base hidden by upper calypter in wings-folded position, upper calypter mainly opaque white but with variable brownish tinge on inner (wings-folded position) third. *Legs* : black, femora with green to violet metallic reflections ; metallic colouring confined to basal half or two-thirds of middle and hind femora. Mid tibia with one or two, more rarely three, *ad* setae, number sometimes different on two mid tibiae of same specimen (two on one side, three on other in *diffusa* holotype) ; a single strong isolated *ad* seta on each mid tibia of *nigrocostalis* holotype, one strong and one weak seta on each side in *costalis* holotype. *Abdomen* : metallic green with slight coppery or sometimes bluish tinge (violet-blue in *diffusa* holotype). Without white spots, but from behind showing dorsally an extremely thin white pruinosity over most of surface ; T3 with slight trace of a narrow blackish median vitta, not always evident. T1+2 without median marginal setae ; T3 with one pair of very strong erect median marginal setae. Tergites without discal setae, with very short fine recumbent hair. Sternites very broad and exposed ; bearing extremely long dense hair, especially long and curved and backwardly directed on second and third sternites, hair on lateral lobes of fifth sternite generally similar to that of *Platytropesa simulans* (Text-fig. 29), very long and curving slightly inwards rather than backwards. ♂ hypopygium as in Text-figs. 37 and 40. *Measurements* : body length 13·0 mm. (range 11·4–14·4 mm.), wing length 12·0 mm. (range 10·6–13·1 mm.) [9 specimens].

♀. Very like ♂ except for normal secondary sexual differences of strong outer vertical, prevertical and two pairs of very strong proclinate, orbital setae, and sternites with strong spinous setae instead of long hair ; frons broader than in ♂, vertex measured from above almost exactly one-fifth of head width. Interfrontal area varying from very slightly narrower than, to slightly broader than, one parafrontal at level of lower proclinate orbital seta. Gena slightly wider than in ♂, 0·29–0·32 of eye-height. *Measurements* : body length 12·8 mm. (range 8·7–14.9 mm.), wing length 11·7 mm. (range 8·8–13·3 mm.) [6 specimens].

Material examined. *Rutila nigrocostalis* Doleschall, holotype ♂, Amboyna (no other data). *Musca gloriosa* Walker, holotype ♀, Aru Islands : (*A. R. Wallace*). *Musca costalis* Walker, presumed holotype ♂, presumed locality Amboyna : (*A. R. Wallace*). *Musca diffusa* Walker, holotype ♂, Batchian (= Batjan Island) : (*A. R. Wallace*).

Molucca Islands : 1 ♂, 1 ♀, Batchian (= Batjan Island) (*ex coll. Bigot*) (B.M. Nat. Hist.) ; 1 ♂, Buru (*A. R. Wallace*) (B.M. Nat. Hist.) ; 1 ♂, Buru, Station 1, 1921 (*L. J. Toxopeus*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Buru, Station 1, 1921 (*L. J. Toxopeus*) (Rijksmus. Leiden & Zool. Mus. Amsterdam) ; 2 ♂♂, Buru, Station 7, 1921 (*L. J. Toxopeus*) (Rijksmus. Leiden & Zool. Mus. Amsterdam) ; 1 ♂, Buru, Station 13, 29.viii.1921 (*L. J. Toxopeus*) (B.M. Nat. Hist.) ; 1 ♂, Buru, Station 13, 2.ix.1921 (*L. J. Toxopeus*) (U.S. Nat. Mus.) ; 1 ♂, Buru, Station 13, 24.x.1921 (*L. J. Toxopeus*) (Rijksmus. Leiden) ; Aru Islands : 1 ♀, Aru Islands, 1916 (W. W. F. [roggatt]) (Div. Ent. Mus. Canberra). Indonesian New Guinea : 1 ♂, 1 ♀, Roon Island, Geelvink Bay (Staatl. Mus. Stuttgart) ; 1 ♂, Fak-Fak, Onin

Peninsula (*A. E. Pratt*) (B.M. Nat. Hist.) ; 2 ♂♂, Humboldt Bay District, Bewani Mts., ix.1937 (*W. Stueber*) (B.M. Nat. Hist.) ; 1 ♀, Japen Island, Seroei, Camp 1 Mt. Baduri, Aiam Range, 1,000 ft., viii–ix.1938 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 1 ♂, Japen Island, Camp 2 Mt. Eiori, 2,000 ft., xi.1938 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 1 ♂, New Guinea (*Macke*) (Rijksmus. Leiden) ; 3 ♂♂, Bernhard Camp, 50 m., 20.ix.–10.x.1938 (*J. Olthof*) (Rijksmus. Leiden) ; 1 ♀, Hollandia, vii.1938 (*L. J. Toxopeus*) (Rijksmus. Leiden). AUSTRALIAN NEW GUINEA : 1 ♂, Papua, Kokoda, 1,200 ft., iv.1933 (*L. E. Cheesman*) (B.M. Nat. Hist.) ; 2 ♀♀, Western Highlands, Uinba, Minj River Valley, 6,200 ft., 11 and 17.viii.1963 (*R. Pullen*) (Div. Ent. Mus. Canberra).

The specimen here accepted as the holotype of *Musca costalis* Walker bears a label reading " costalis " in Walker's writing but no locality or collector's name, and agrees well with the original description except that it is ♂ and not ♀ as Walker (1860b) recorded. There is no other specimen in the British Museum (Natural History) or in the Oxford University Museum which could be the type of *costalis*, and since it is evident from the label in Walker's writing that he saw the specimen named *costalis* by him it is considered justified to hold this specimen as the type ; that it is not the same sex as mentioned by Walker in the original description is not considered important, as it is known from studies of Walker's types that he frequently misidentified the sex or recorded it erroneously. The specimen here recognised as holotype of *costalis* is presumed to be from Amboyna and to have been collected by A. R. Wallace, as this is the information given with the original description.

Distribution : From the Molucca Islands (Batjan, Amboyna, and Buru) eastwards through Indonesian New Guinea to Papua, and also in the Aru Islands. *Stilbomyella nitens* Malloch is very probably not specifically distinctfrom *nigrocostalis*, and if this proves true the known range of *nigrocostalis* will extend further east to include New Britain. When a large amount of material becomes available for study it may prove possible to recognise a number of distinct geographically isolated subspecies within New Guinea and neighbouring islands. *S. nigrocostalis* may possibly occur in the Cape York peninsula of Queensland as Aru Islands species tend to occur there, but this is not yet proved.

Stilbomyella nitens Malloch, 1935

Stilbomyella nitens Malloch, 1935, *Proc. Linn. Soc. N.S.W.*, **60** : 75. Holotype ♀, NEW BRITAIN. In the School of Public Health and Tropical Medicine, Sydney.

[No diagnosis is given as it is not certain that *S. nitens* is specifically distinct from *S. nigrocostalis* (Doleschall)]

DISCUSSION. *S. nitens* is known only from the ♀ holotype which differs from *S. nigrocostalis* only in minor details of size and hair colouring ; at present it is impossible to be certain whether *nitens* is specifically distinct from *nigrocostalis*,

but it appears best to consider it so until more material becomes available. Future study may show that *S. nigrocostalis* ought to be treated as a compound of several good geographically distinct subspecies, and it may then be appropriate to consider *nitens* as a subspecies of *nigrocostalis* occurring in New Britain.

S. nitens is almost identical with *S. nigrocostalis* and has been adequately described by Malloch (1935), and a full description is here unnecessary ; the few following notes on the type are however appropriate. Holotype much smaller than is usual in *nigrocostalis*, length 8·5 mm. ; all hair of genae and postbuccae dark brown, black hair of lower occiput extending round entire mouth opening, head therefore entirely without pale (yellow or brownish yellow) hair ; fine hair above vibrissae extending only one third of way up each facial ridge (not to about middle as stated by Malloch in original description) ; mesopleura shining, without densely white pollinose spot, only with extremely thin traces of a whitish covering in some lights ; general colour more strongly coppery green than Malloch's description " emerald green " suggests. Holotype specimen in imperfect condition, badly greased and with some chaetotaxy missing, head gummed to thorax.

Material examined. Holotype ♀, New Britain : Keravat (*F. H. Taylor*).

Distribution : Only holotype known.

PARAPLATYTROPESA gen. n.

(Text-figs. 13, 24)

Genus of Ameniini with following combination of characters : ventral surface of costa bare between apices of veins *Sc* and R_1. Both sexes with gular region of head strongly produced backwards (Text-fig. 24). Facial carina and epistome forming one continuous median keel with vibrissae of ♂ inserted level with or even slightly below epistomal margin (Text-fig. 13), vibrissae directed slightly upwards. Fore tibia with one submedian *pv* seta, without *pd* setae. Mid femur with only one strong isolated submedian *a* seta. Hind coxa bare on postero-dorsal surface. Facial ridges with fine setulae extending more than half way (♂) or about half way (♀) up their length. Facial carina only slightly sexually dimorphic. Frons broad in both sexes, ♂ eyes not at all approximated, ♂ with proclinate orbital, prevertical and outer vertical setae. Inner vertical setae not crossing, parallel or at most slightly convergent. Abdomen without white pollinose areas on T5. Sternites 2 and 3 of ♂ abdomen with a few very long hairs, sternites of ♀ with spinous setae.

Type-species : *Stilbomyia rieki* Paramonov, 1957.

Discussion. *Paraplatytropesa* gen. n. is erected for the reception of the single species *rieki* Paramonov, originally described in *Silbomyia* Macquart but lacking the true characters of this genus ; in *rieki* the ventral surface of the costa is bare between the apices of veins *Sc* and R_1, there are no strong erect preapical spinous setae on the scutellum, the hind coxa is bare on the postero-dorsal surface, and there is only one *pv* seta on the fore tibia, so the species cannot be regarded as congeneric with *S. fuscipennis*, type-species of *Silbomyia*.

The affinities of *Paraplatytropesa* gen. n. are most closely with *Platytropesa* and *Stilbomyella* which it resembles in the metallic green colour without white pollinose areas on the abdomen, but it differs from these—and other Ameniine genera—in the remarkable development of the gular region of the head. The parallel non-cruciate

inner vertical setae also distinguish the new genus from both *Platytropesa* and *Stilbomyella*, but it resembles the former in having a broad ♂ frons with fully developed outer vertical, prevertical and proclinate orbital setae and resembles the latter in lacking *pd* setae on the fore tibia. The general facies of the ♂ head with very elongate antennae lying in very deep foveae and with setulae up much of the length of the rather straight facial ridges is another character much resembling *Platytropesa*, but the bare hind coxa is a noteworthy distinction from this genus (the latter character does not fully distinguish *Paraplatytropesa* from *Stilbomyella* since the hind coxa is occasionally bare in *Stilbomyella*). A remarkable feature of *Paraplatytropesa* is the presence of only one isolated seta near the middle of the anterior face of the mid femur ; in other Ameniinae there appear always to be two or more setae in this position. The lower calyptrae also vary slightly from other Ameniines in that (in the ♂) the outer posterior margin is regularly and evenly curved, whereas in other Ameniines the outer posterior margin of the lower calypter is very slightly angulate so that the calypter is subtriangular in general shape.

Distribution : Queensland only.

Description of the Species

Paraplatytropesa rieki (Paramonov, 1957) **comb. n.**

Stilbomyia rieki Paramonov, 1957, *Ann. Mag. nat. Hist.* **12** (10) : 54. Holotype ♂, AUSTRALIA. In the Division of Entomology Museum, C.S.I.R.O., Canberra.

Diagnosis as for genus, *Paraplatytropesa* monotypic.

♂. *Head* : Interfrontal area pale red brown to very dark brown ; ocellar plate and mid part of vertex metallic dark green with coppery or blue tinge ; parafrontals and parafacials with blackish ground colour and dense silvery white pollinosity, extreme upper ends of parafrontals nearly bare and rather shining with greenish reflections ; genae with yellow ground colour and golden yellow pollinosity ; postbuccae and gular region dark metallic blackish green with hardly any trace of pollinosity ; antennal foveae black with thin whitish pollinosity ; facial carina and epistome yellow with rather shining and conspicuous creamy white pollinosity ; postorbits thickly silvery white pollinose ; occiput very dark greenish, rather shining with very inconspicuous traces of whitish pollen cover. Hair of parafrontals, genae, postbuccae and most of occiput and gular region black ; some hair of lower occiput and upper part of gular region paler brownish. Vertex almost exactly equal in width to one eye, eye-vertex-eye ratio 1 : 1 : 1. Ocellar setae very strong, cruciate frontal setae all strongly developed ; two pairs of strong proclinate orbital setae. Facial carina very long and not distinctly set off from epistome, the two together forming a single uniform keel about 2·7 times as long as distance from lunula to anterior ocellus, sides of carina nearly parallel. Gena about 0·23 of eye-height. Facial ridges in profile very slightly convex, fine setulae reaching nearly two-thirds of way up each ridge. Antennae inserted very high up (not far below upper margin of eye) and very elongate, mainly hidden in profile in the deep foveae. Antennae black, third segment about 7·25 times as long as second segment ; seta on second segment fine and short ; arista about three-fifths as long as third antennal segment. Palpi yellowish. *Thorax* : bright green with coppery or bluish tinge on mesonotum ; pteropleural and hypopleural regions with bluish or violet metallic reflections, mesopleura sometimes bluish under white pollen spots. Mesonotum with dense white pollinosity on notopleura and in areas of supra-alar setae, prescutum with a covering of

white pollen visible in some lights. Mesopleuron and sternopleuron with large white pollinose area, pollen appearing as conspicuous white spots in some lights but disappearing from other points of view. *Wings* : entirely clear hyaline. Calyptrae opaque white. *Legs* : black, femora with green or violet metallic reflections. Mid tibia with one strong isolated *ad* seta at about three-fifths from base. *Abdomen* : mainly brilliant green, slightly violaceous antero-ventrally ; posterior segments burnished reddish copper in holotype specimen. Abdomen entirely shining, no trace of white pollinose spots. T1+2 without median marginal setae in holotype, but with a weak but distinct pair of median marginals in ♂ paratype specimen (probably normally without) ; T3 with a pair of strong median marginal setae ; tergites without discal setae. Hair of all tergites recumbent. Sternites very broad. Sternite 3 with very long backwardly-directed hair which reaches about to level of apex of sternite 5 ; sternite 4 with long fine hair, but much shorter than that on sternite 3 ; lateral lobes of sternite 5 with moderately long fine hair, but this hair sparse and inconspicuous. *Measurements* : body length 6·0, 7·0 mm., wing length 4·9, 5·6 mm. [2 specimens].

♀. Very like ♂ except for detail of head. Facial carina and epistome forming less parallel-sided median keel than in ♂, carina widening below and epistome very distinctly wider than carina. Antennal foveae less developed, antennae shorter, third antennal segment 4·1–4·3 times as long as second segment ; arista equal in length to third antennal segment. Facial ridges with fine setulae extending only half-way up their length. Parafacial and interfrontal area slightly wider than in ♂. Gena about 0·26 of eye-height. Vertex slightly wider than in ♂, eye-vertex-eye ratio about 7 : 8 : 7. Postero-lateral corner of lower calypter more angulate (calypter generally less evenly rounded) than in ♂. *Measurements* : body length 5·9, 6·0 mm., wing length 4·7, 4·9 mm. [2 specimens].

Material examined. Holotype ♂, Queensland : 30 mls. W. of Collinsville, 12.ix.1950 (*E. F. Riek*). Paratypes : Queensland : 1 ♀ (labelled allotype), 30 mls. W. of Collinsville, 17.ix.1950 (*E. F. Riek*) (Div. Ent. Mus. Canberra) ; 1 ♀, 10 mls. S. of Bowen, 28.ix.1950 (*E. F. Riek*) (B.M. Nat. Hist.) ; 1 ♂, Palm Is., 20.xii.1930–6.i.1931 (*I. M. Mackerras*) (Div. Ent. Mus. Canberra) ; 1 ♀, Springsure, ex trap, xi.1930 (*I. M. Mackerras*) (Div. Ent. Mus. Canberra).

Distribution : Known only from the type-material listed above from east-central Queensland. The known range appears to conform closely with the Queensland part of the range of *Platytropesa auriceps*, both species occurring for instance in the Palm Islands.

AMENIA Robineau-Desvoidy, 1830

Amenia Robineau-Desvoidy, 1830, *Mém. prés. Acad. Sci., Paris*, **2** : 443. Type-species : *Musca leonina* Fabricius, 1775, by subsequent designation of Macquart, 1843a : 273, 1843b : 116.

Ptylostylum Macquart, 1851, *Mém. Soc. Sci. Lille* **1850** : 195, and *Diptères Exot. Suppl.* **4** : 222. Type-species : *Ptylostylum albomaculatum* Macquart, 1851 [= *Musca leonina* Fabricius, 1775], by monotypy.

Neoamenia Malloch, 1930, *Proc. Linn. Soc. N.S.W.* **55** : 103. Type-species : *Neoamenia longicornis* Malloch, 1930, by original designation. **syn. n.**

Chaetamenia Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442. Type-species : *Dexia chrysame* Walker, 1849, by original designation. **syn. n.**

[*Grapholostylum* Macquart, 1851, of Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 441, not of Macquart (misidentification)]

Diagnosis. Ventral surface of costa bare between apices of veins *Sc* and R_1. Fore tibia with one *pv* seta and without distinct *pd* setae. Cross-vein *r–m* distinctly

before middle of discal cell. Body form short and broad ; abdomen broader than long with normal well formed sutures dorsally between tergites. Mesonotum with three pairs of large marginal white spots. Setulae above vibrissae confined to lower quarter of each facial ridge. Facial carina not noticeably sexually dimorphic. ♂ frons always narrower than ♀ frons, eyes of ♂ usually strongly approximated. ♂ without proclinate orbital and prevertical setae, almost always without distinct outer vertical setae. Abdominal sternites of both sexes with strong setae, ♂ always without long dense hair.

Discussion. *Amenia* contains a small number of unusually beautiful flies which form a characteristic element in the calyptrate fauna of Australia. Eleven described species and one described subspecies are assignable to the genus, but only five species and two subspecies are accepted as valid in the present treatment. One species described in *Amenia* (*nigromaculata* Malloch) belongs in the closely related genus *Formosiomima* Enderlein. The study of the genus has been much bedevilled by misidentifications and erroneous synonymies established in the literature, and the following detailed discussion, based upon examination of all the types, is given to clear up a very confused situation.

The main cause of confusion has been the application of different names to the two commonest species of *Amenia*, one of which is the type-species. These two species are easily distinguished : one has a pair of submedian white lines anteriorly on the mesonotum, typically has a dark bronzy green thorax and dark steel-blue abdomen, and has the eyes of the male strongly approximated ; the other species is without submedian white lines on the dorsum of the thorax, is typically bright golden green, and has the eyes of the male well separated. The name *Amenia imperialis* Robineau-Desvoidy correctly applies to the latter species, and *Amenia leonina* (Fabricius) to the former. Robineau-Desvoidy (1830) included both these species in *Amenia* at the time of its original description, and gave a very good brief description of *A. imperialis* and a statement of the characters by which *leonina* could be distinguished from *imperialis*. *A. imperialis* he described in part as follows : " corselet d'un beau vert-doré métallique, avec trois points argentés de chaque coté du dos ; abdomen d'un beau vert-doré métallique ", thus clearly indicating a golden-green colour and making no mention of submedian white lines on the thorax ; *Amenia leonina*, he remarked, " diffère de l' *A. imperialis* par ses teintes azurées . . . par la présence de deux lignes argentées vers le sommet de l'écusson ". Robineau-Desvoidy was certainly distinguishing between the two commonest species.

Fabricius (1775, 1794, 1805) cited " Mus. Banks " as the depository of his *Musca leonina* Fabricius, and the holotype specimen is still in the Sir Joseph Banks collection (the specimen in the Fabricius collection is not the holotype as erroneously stated by Townsend, 1931, 1937) ; I have examined the holotype and this has confirmed that the thorax is dark brassy green and the abdomen dark blue, and that there are two conspicuous white submedian lines on the mesonotum in addition to the lateral spots, all characters mentioned by Fabricius in the original description and emphasised by Wiedemann (1830) in his more detailed re-description.

Both Wiedemann (1830) and Robineau-Desvoidy (1830) correctly understood *leonina* of Fabricius and rightly applied the name to the species possessing white submedian lines on the thorax, but despite this Macquart (1843a and b) shortly afterwards gives an account of *Amenia* and *A. leonina* which does not conform fully to the true characters of *leonina* Fabricius. In discussing the characters of *Amenia*, Macquart states " Yeux assez séparés ♂. " and in his plate, said to be a figure from *leonina*, shows the mesonotum without evident submedian white lines ; in true *leonina* the ♂ eyes are approximated and the white lines are present and part of Macquart's description therefore appears to relate not to *leonina* but to *imperialis*. Macquart (*op. cit.*) cited *Musca leonina* of Fabricius and of Wiedemann as type of the genus *Amenia*, the earliest type-fixation for the genus, but Enderlein (1936) cited *A. imperialis* R.–D. as type-species (presumably, although no reasons are given, on the assumption that *leonina* of Macquart is not *leonina* of Fabricius but *imperialis* R.–D. through misidentification). However Macquart repeats Wiedemann's (1830) brief Latin description of *leonina* Fabricius and clearly intended that the true *Musca leonina* Fabricius should be type of *Amenia*. Townsend (1931, p. 374 ; 1937, p. 136) has cited *Musca leonina* Fabricius as type-species of *Amenia* Robineau-Desvoidy by designation of Macquart, and this is in my view fully justified on nomenclatural grounds ; there is no justification for holding *A. imperialis* R.–D. to be the type-species.

The names *A. leonina* (Fabricius) and *A. imperialis* Robineau-Desvoidy, which hitherto had been rightly applied to two quite distinct species, were synonymised by Walker (1849) without explanation or justification, and this was the main cause of confusion in the usage of these names, for the erroneous synonymy established by Walker was accepted by Schiner (1868), Osten Sacken (1881), and Engel (1925). *A. leonina* of Schiner, Osten-Sacken and Engel is a misidentification of *A. imperialis* Robineau-Desvoidy, to which attention was first drawn by Malloch (1927) ; to the true *A. leonina* (Fabricius) Schiner applied an unpublished manuscript name, *stictica*. The latter name first appeared as a nomen nudum in Brauer and Bergenstamm (1891 : 418) but a full description was later published by Engel (1925) and the name *stictica* must therefore be attributed to this author ; it sinks in synonymy with *A. leonina* (Fabricius) as Malloch (1933 : 75) implied.

Schiner (1868) synonymised *Ptylostylum albomaculatum* Macquart with his misindentified *leonina* Fabricius (i.e. *imperialis* R.–D.), but examination of the syntypes of *Ptylostylum albomaculatum* in the Paris Museum shows that they are conspecific with the type of *leonina* Fabricius, and the name *albomaculatum* falls in synonymy with true *leonina* ; I am however recognising *albomaculatum* as a subspecies of *leonina*.

Hardy (1938) remarked upon the confusion existing in the application of specific names to the species of *Amenia*, but himself added considerably to the confusion by misidentifying *Amenia parva* Schiner through reliance upon the original description only. Hitherto this species had been correctly understood by Engel (1925) and Malloch (1927, 1928, 1929), both of whom had seen Schiner's types. Malloch (1930), finding that *Dexia chrysame* Walker is an *Amenia* identical with *A. parva*

Schiner, correctly placed the latter name in synonymy with *chrysame* ; this synonymy has been confirmed by my own comparison of the types, and Hardy (1938) is wrong in stating that Malloch made a mistake in establishing this synonymy. Hardy (*op. cit.*), through not accepting the statements of earlier workers who had seen the types and as a result of not seeing the types himself, erroneously applied Schiner's name *parva* to *Amenia leonina* (Fabricius). Thus *A. leonina* (Fabricius) has been variously known in the literature as *leonina*, *stictica* or *parva*, and at the same time the name *leonina* has often been misapplied to *A. imperialis* Robineau-Desvoidy ; in reality the two common species *A. leonina* and *A. imperialis* are quite distinct and were excellently characterised as long ago as 1830 by Robineau-Desvoidy, and it is difficult to see why confusion should ever have arisen.

Grapholostylum dorsomaculatum Macquart of Enderlein (1936) is not true *dorsomaculatum* of Macquart (which does not belong in the Ameniinae) but a misidentification of *Amenia sexpunctata* Malloch, a name overlooked by Enderlein.

Malloch (1930) described the genus *Neoamenia* for a species in which the facial carina is slightly sulcate but otherwise resembling *Amenia* ; Paramonov (1957) has pointed out that the groove in the facial carina is variable and sometimes absent, and that *Neoamenia* cannot be accepted as a good genus distinct from *Amenia*. I agree fully with Paramonov and regard the type-species of *Neoamenia* and *Amenia* as congeneric ; Paramonov (1957) implied the synonymy but did not definitely establish it, and *Neoamenia* is here sunk in definite synonymy with *Amenia*, The genus *Chaetamenia* Enderlein, erected for *chrysame* Walker, shows no significant differences from *Amenia*, and is here sunk in synonymy. *Ptylostylum* Macquart is synonymous with *Amenia* Robineau-Desvoidy through conspecificity of the type-species.

Distribution : The genus *Amenia* is confined to Australia, where it occurs in all states except Tasmania. In Queensland it occurs in the small islands near the coast (Prince of Wales Island in the Torres Straits, Magnetic Island and the Palm Islands) and in the Northern Territory is known from Groote Eylandt in the Gulf of Carpentaria. The genus is best represented in Queensland and New South Wales, and appears to be uncommon in Victoria and South Australia to judge from the small amount of material yet available from these states.

Macquart (1851) described *Ptylostylum albomaculatum* (= *Amenia leonina* (Fabricius)) from Tasmania, but there is no doubt that this type-locality is erroneous and that the type-material (consisting of six syntypes labelled ' Tasmania ' and ' M. Verreaux ' in the Muséum National d'Histoire Naturelle, Paris) of *P. albomaculatum* must have been collected on the Australian mainland and probably at or near Sydney. It is well established from Hardy's (1929) investigations (Hardy, *loc. cit.* p. 63) that " . . . although Macquart published the descriptions of about one hundred and forty species of Diptera in his fourth supplement [to *Diptères Exotiques*] as being from Tasmania, the majority, if not all, were from Sydney ". *P. albomaculatum* is one of the species collected by the Verreaux brothers and described in the fourth supplement, and this, combined with the absence of *Amenia* from Tasmania, makes it certain that the published type-locality is wrong.

Amenia (as well as all other Ameniini) is absent from New Zealand, but there are erroneous records in the literature of its occurrence here. These records originate with Schiner (1868), who recorded *A. leonina* from New Zealand, a record repeated by Hutton (1873, 1881) in his catalogues of New Zealand Diptera ; the latter author also, without evidence, recorded *A. parva* Schiner from New Zealand in these two earlier catalogues but in his later catalogue (Hutton, 1900, p. 95) deleted both names. Brauer & Bergenstamm (1891, p. 418) recorded *A. stictica* from New Zealand in error.

Key to the Species

1 Scutellum with three pairs of marginal setae 2

– Scutellum with four to six pairs of marginal setae 3

2 Postorbits pale yellow or orange-yellow. Hair of genae and postbuccae golden yellow. ♂ frons extremely narrow with upper part of interfrontal area almost obliterated and parafrontals more or less meeting in mid line, frontal setae of upper half of frons very reduced and hair-like. General colour dark blue-green to bluish violet. Larger species, length 10–14 mm. . ***A. leonina*** (Fabricius) (p. 112)

– Postorbits silvery white. Hair of genae and postbuccae brownish black. ♂ interfrontal area narrow but distinct to the ocelli, frontal setae of upper half of frons well developed. General colour emerald or cupreous green. Smaller species, length 6–11·7 mm. . . . . ***A. chrysame*** (Walker) (p. 120)

3 Upper occiput thickly yellow pollinose over yellow or yellowish orange ground colour. Hair of entire occiput and postbuccae golden yellow. Bend of vein *M* near wing margin, distance from bend to margin not more than 1·3 times as great as that between *m–cu* and bend. Abdominal T4 without lateral white spots. Larger species, length usually 11–16 mm. 4

– Upper occiput non-pollinose, black and semi-shining. Hair of occiput and postbuccae dark brown or black. Bend of vein *M* unusually remote from wing margin, distance from bend to margin at least 2·4 times as great as that between *m–cu* and bend (Text-fig. 19). Abdominal T4 with a pair of small white pollinose lateral spots. Small species, length about 9–10 mm. . . ***A. longicornis*** (Malloch) (p. 116)

4 General colour bright green, sometimes coppery green or slightly bluish green. Scutellum with four pairs of marginal setae (rarely a supernumerary fifth seta present on one side). Abdominal tergites 3 and 4 without submedian spots. Bend of vein *M* obtuse and at least as remote from wing margin as from *m–cu*. Eyes of ♂ widely separated, ♂ frons at least one-sixth of head width. Apical half of costal margin of ♂ wing conspicuously bowed forwards (Text-fig. 21)
A. imperialis Robineau-Desvoidy (p. 107)

– General colour dark purplish black. Scutellum with five or six pairs of marginal setae (occasionally even with a smaller supernumerary seventh seta on one side). Abdominal tergites 3 and 4 each with a pair of dorsal submedian silvery spots with shifting appearance. Bend of vein *M* rectangular and much closer to wing margin than to *m–cu*. Eyes of ♂ very strongly approximated so that frons at narrowest is only slightly wider than anterior ocellus and only about one-twentieth of total head width. Costal margin of ♂ wing not bowed forwards on apical half
A. sexpunctata Malloch (p. 105)

Descriptions of the Species

Amenia sexpunctata Malloch, 1933

Amenia sexpunctata Malloch, 1933, *Proc. Linn. Soc. N.S.W.*, **58** : 76. Holotype ♂. AUSTRALIA. In the Deutsches Entomologisches Institut, Berlin.
[*Amenia stictica* Engel, 1925, *Zool. Jb.*, **50** : 353 (part), misidentified paralectotypes].
[*Grapholostylum dorsomaculatum* Macquart of Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 441, not of Macquart (misidentification)].

Diagnosis. Scutellum with five or six pairs of marginal setae ; large purplish black species with six shifting silvery submedian spots on mid-dorsum of abdomen.

♂. *Head* : Interfrontal area yellow-orange ; parafrontals, parafacials, face, genae and postbuccae with orange-yellow ground colour and golden yellow or golden orange pollinosity ; postorbits yellow with dense golden pollinosity ; occiput with yellow ground colour and a moderately thick covering of pale or deep yellow pollinosity. Parafrontal hair all pale yellow ; all hair of genae, postbuccae and occiput golden yellow. Eyes approaching one another very closely and frons therefore very reduced with upper parts of parafrontals meeting in mid line and upper part of interfrontal area correspondingly obliterated ; at narrowest point frons width only about one-twentieth (0·044–0·054) of total head width and only slightly wider than anterior ocellus. Ocelli raised on well formed ocellar tubercle which occupies most of the reduced vertex, ocelli visible in profile, ocellar setae very weak and hair-like. Upper ends of postorbits very narrowly tapering but just reaching vertex as a very narrow pollinose strip separating postocular setae from eye. Only lowest one or two pairs of cruciate frontal setae well developed, other pairs progressively reduced so that uppermost pairs are minute and hair-like, the rows of frontal setae stopping altogether well before anterior ocellus. Facial carina short and broad but not strongly flattened on anterior surface, antennal foveae well formed, the carina much shorter than distance from lunula to anterior ocellus and about two or two and a half times as long as epistome. Eye relatively longer than in other species and gena correspondingly narrower, gena slightly more than a quarter (0·27) of eye-height. Parafacial about two and a half times as wide as third antennal segment and much narrower than length of this segment. Antennae pale orange, falling short of mouth-margin by about their own length ; third segment 2·9–3·1 times as long as second segment ; seta on second segment fine and shorter than third segment ; arista slightly longer than third segment. Palpi yellow. *Thorax* : dark blackish purple or violet-black, scutellum sometimes with a more violaceous blue tinge but always very dark ; posterior pleural regions partly dark brownish. Margins of mesonotum with the usual three pairs of conspicuous white pollinose spots, the anterior pair almost confined to notopleural area and not noticeably extending on to humeral calli, the latter thinly and obscurely yellowish brown pollinose. In addition to the three pairs of white spots mesonotum shows distinct pattern on prescutum as follows : a pair of conspicuous lateral white pollinose vittae lying laterad of *prst dc* setae, these vittae broadest anteriorly and narrowing and fading out posteriorly before suture ; broad median area of prescutum between *dc* rows of setae almost entirely grey when seen from behind, except for postero-median triangular area which is purplish black, the median grey area becoming conspicuously white pollinose at each antero-lateral corner and when viewed from behind showing an overlying pair of narrow pale brown submedian lines (each brown line lying medially between the *dc* and *acr* rows of each side.). Scutum when viewed from behind showing a rather even covering of pale golden brown pollinosity, similar pollinosity visible on scutellum in some lights ; this pollinosity not visible to naked eye. Appearance of prescutal pattern shifting according to the angle of view. Each mesopleuron and sternopleuron with a small white pollinose spot. Scutellum with five or six pairs of marginal setae, sometimes irregular with five one side and six the other or rarely a supernumerary seventh seta present on one side (total number of marginal scutellar setae therefore from 10 to 13). *Wings* : basal cells obscurely brownish, wings otherwise clear hyaline. Bend of vein *M* sharp

and rectangular, unusually close to wing margin, distance from bend to margin only 0·5–0·6 of that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* 3·0–3·4 times as great as that between *m-cu* and bend. Calyptrae dark smoky brown except for opaque white outer quarter (in resting position of wings) of upper calypter. *Legs* : dark brownish black with femora inconspicuously violet metallic. Mid tibia usually with two *ad* setae, occasionally three. *Abdomen* : blackish purple and concolorous with mesonotum. T3, T4 and T5 dorsally each with a pair of silvery pollinose spots, those on T3 and T4 larger and close together in a submedian position, those on T5 smaller and more widely spaced in a sublateral position ; the total of six silvery dorsal spots conspicuous to naked eye but their appearance changing greatly with direction of the light, from some points of view the spots appearing to vanish altogether. T3 and T5 in addition to the dorsal spots each with a pair of small lateral (T3) or ventro-lateral (T5) white pollinose spots which are conspicuous to naked eye and more fixed in appearance than the silvery spots of the dorsum ; the two well separated spots on each side of T5 appear to be the equivalent of the upper and lower ends of the normally continuous large lateral white area found in other species. T3 with a pair of very strong median marginal setae, one or both of these setae usually flanked on outer side by a second much smaller, weaker and less erect marginal seta ; sometimes the supernumerary setae outside the normal pair are strongly developed so that there are four strong median marginal setae altogether. *Measurements* : body length 14·3 mm. (range 12·9–15·2 mm.), wing length 13·2 mm. (range 12·6–13·8 mm.) [10 specimens].

♀. Closely similar to ♂ except for very broad frons and broader parafacials and genae. Interfrontal area dark reddish orange and strongly contrasting with paler golden or golden orange pollinose parafrontals, usually almost parallel-sided but sometimes contracted medially, at level of lower proclinate orbital setae slightly narrower than one parafrontal (the parafrontals relatively broad) ; usually two proclinate orbital setae on each side, sometimes a smaller third proclinate orbital seta developed on one or both sides. Hair of parafrontals mainly dark, upper part of each parafrontal and vertex immediately behind ocelli with some short stiff black setulae. Vertex very broad, viewed from above almost exactly equal in width to, or a little wider than, one eye. Postorbits broad all along their length, not narrowed to the vertex. Gena about two-fifths (0·39–0·43) of eye-height. Parafacial nearly five times as wide as third antennal segment. Dorsal submedian silver spots of T3 and T4 sometimes very small, on T3 occasionally evanescent.

MATERIAL EXAMINED. Holotype ♂, AUSTRALIA : Northern Territory, Palmerston, x.1908. Paratype : 1 ♀, data as for holotype (D. Ent. Inst.).

AUSTRALIA : 2 ♂♂, Northern Territory, Palmerston, x.1908 (Zool. Mus. Humb. Univ. & Staatl. Mus. Stuttgart) ; 1 ♂, Northern Territory, Darwin (*G. F. Hill*) (B.M. Nat. Hist.) ; 1 ♂, Northern Territory, Darwin, 22.ix.1913 (*G. F. H[ill]*) (B.M. Nat. Hist.) ; 1 ♂, Northern Territory, Port Darwin (*F. P. Dodd*) (B.M. Nat. Hist.) ; 11 ♂♂, 5 ♀♀, Northern Territory, Port Darwin, x.1908 & i, iii–iv.1909 (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Northern Territory, Port Darwin, x.1908 & iii–iv.1909 (D. Ent. Inst.).

Specimens of *A. sexpunctata* with the same data as the type-material (viz. " Palmerston, N. Australia, October 1908 ") have been mentioned in the literature by Engel (1925) under the name *A. stictica* Schiner in litt. and by Enderlein (1936) under the name *Grapholostylum dorsomaculatum* Macquart. Enderlein (1936, p. 441) pointed out that Engel's material of *stictica* was mixed, some being *A. leonina* (Fabricius) and some (i.e. specimens from Palmerston) being another species which Enderlein identified wrongly as *Grapholostylum dorsomaculatum* Macquart. All the material mentioned by Engel under the name *stictica* forms part of the type-series

of *stictica* Engel (name attributable to Engel as his is the first valid publication of it) and the misidentified specimens from Palmerston which Engel erroneously associated with rest of his *stictica* material are syntypes ; the lectotype designated for *stictica* in this paper sinks this name into synonymy with *leonina*, but since a lectotype is designated the other syntypes of *stictica* become paralectotypes. Thus the specimens from Palmerston mentioned by Engel, although belonging to *A. sexpunctata*, are paralectotypes of *stictica* ; two of them, a ♂ in Staatl. Mus. Stuttgart and a ♂ in Zool. Mus. Humb. Univ. each labelled " Amenia stictica Schin. Engel det.", have been labelled as paralectotypes. It is probable that the ♀ mentioned by Engel is the same specimen as the ♀ paratype of *A. sexpunctata* in D. Ent. Inst, but this is not certain and the specimen is not definitely a paralectotype of *stictica*. The ♂ specimen in Zool. Mus. Humb. Univ. labelled by Engel also bears a label in Enderlein's writing " Grapholostylum dorsomaculatum (Mcq 50) ♂ Dr. Enderlein det. 1936 " and is certainly one of the specimens from Palmerston mentioned by Enderlein (1936, p. 442). Enderlein's identification is wrong, and he completely overlooked Malloch's (1933) earlier description of *A. sexpunctata* for this Palmerston material.

Male paratypes, not seen, are in the Australian Museum, Sydney and U.S. National Museum (one in each Museum) with the same data as the holotype.

Distribution : Apparently confined to the Northern Territory of Australia, including Groote Eylandt in the Gulf of Carpentaria (Paramonov, 1957). The single ♂ with enlarged eye facets recorded by Paramonov (1957) from Claudie River, northern Queensland, has not been seen but may not be true *sexpunctata*. The locality " Western Australia " in Paramonov's (*op.cit.*) key to *Amenia* species is an inadvertant error.

Amenia imperialis Robineau-Desvoidy, 1830

Amenia imperialis Robineau-Desvoidy, 1830, *Mém. prés. Acad. Sci., Paris*, **2** : 443. Neotype ♂, AUSTRALIA. In the British Museum (Natural History), London.

Amenia dubitalis Malloch, 1927, *Proc. Linn. Soc. N.S.W.*, **52** : 343. Holotype ♂, AUSTRALIA. In the United States National Museum, Washington.

Grapholostylum latifrons Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442. Lectotype ♂, AUSTRALIA. In the Zoologisches Museum der Humboldt-Universität, Berlin.

Amenia imperialis ab *chaetameniina* Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 443. (Name without nomenclatorial status.)

[*Amenia leonina* (Fabricius) ; Schiner, 1868, *Reise Novara, Zool.* **2**, Dipt. : 316, [not of Fabricius] (misidentification)].

[*Amenia leonina* (Fabricius) ; Engel, 1925, *Zool. Jb.*, **50** : 350, 352, [not of Fabricius] (misidentification)].

Diagnosis. Scutellum with four pairs of marginal setae ; general colour green ; upper occiput densely pollinose ; prescutum without white submedian vittae ; ♂ eyes unusually widely separated ; ♂ wing with apical half of costal margin strongly bowed forwards.

Description. See under subspecies below.

Discussion. *A. imperialis*, like *A. leonina*, appears to be represented by two morphologically distinguishable but partly overlapping populations, one mainly centred in northern Queensland in which the frons of the ♂ is extremely broad, and the other mainly centred in New South Wales in which the ♂ frons is conspicuously narrower ; the frontal character and other characters enable almost all specimens of both sexes to be separated without much difficulty, and since there appears to be associated geographical separation two subspecies of *A. imperialis* are here recognised. Malloch's name *dubitalis* is available for the subspecies with the narrower frons, and a neotype is designated below to affix the name *imperialis* sensu stricto to the typical subspecies with broad frons. The ♂ type-material of *Grapholostylum latifrons* Enderlein possesses a narrower frons, and this name falls in synonymy with *dubitalis* Malloch. In *A. imperialis*, unlike *A. leonina*, no importance can be attached to the median marginal setae on T3 ; these setae differ between the sexes (present in ♂, absent in ♀) and the number present in the ♂ is variable—usually the ♂ shows a single pair, but there are occasionally more or even only one. Among 52 male specimens examined 44 have the normal single pair of median marginal setae on T3 three specimens have four setae (i.e. two pairs close together), three specimens have three setae (i.e. one of the normal pair duplicated on one side), one specimen has five setae (two on one side, three on the other), and the remaining specimen has only a single median marginal seta on one side. Variations in the number of setae occur in the males of both subspecies. Enderlein (1936) evidently did not realise that presence or absence of median marginal setae on T3 in *A. imperialis* is a secondary sexual character, and he described specimens with such setae as *A. imperialis* ab *chaetameniina* Enderlein ; this name is without status in nomenclature.

The two subspecies may be distinguished by the following key.

Key to the Subspecies of *A. imperialis*

1 Both sexes without pollinosity on genae and parafacials, these areas dull like the frons whatever the direction of the light. ♂ frons very broad, at vertex 0·23–0·30 of head width, one eye viewed from above 1·2–1·7 times as wide as vertex. ♀ vertex seen from above 1·15–1·30 times as wide as one eye. ♂ ocellar setae well developed, directed straight outwards towards the eyes. Hair of lower parts of parafrontals almost always pale yellow . ***A. imperialis imperialis*** Robineau-Desvoidy (p. 109)

– Both sexes with slightly shining yellow pollinosity on genae and parafacials, that on latter areas best seen when head viewed from above ; in ♂ pollinosity extends half way up parafacial and then stops abruptly, distinction between slightly shining pollinose lower area and dull non-pollinose upper area obvious in some lights ; in ♀ pollinosity reaching up parafacials to lower ends of parafrontals. ♂ frons conspicuously narrower, at vertex 0·16–0·20 of head width, one eye viewed from above 2·0–2·7 times as wide as vertex. ♀ vertex narrower, almost exactly equal in width to one eye seen from above. ♂ ocellar setae usually weaker and sometimes absent, when present directed partly forwards as well as outwards. Pale hair of lower parts of parafrontals usually with an admixture of darker brownish or black hairs, parafrontal hair sometimes entirely dark . ***A. imperialis dubitalis*** Malloch (p. 111)

Amenia imperialis imperialis Robineau-Desvoidy, 1830

(Text-fig. 21)

Amenia imperialis Robineau-Desvoidy, 1830, *Mém. prés. Acad. Sci., Paris*, **2** : 443.

Neotype Designation : Robineau-Desvoidy (1830), in the original description of *Amenia imperialis*, recorded that this species was in the collection of Count Dejean (" Cette espèce, originaire de la Nouvelle-Hollande, fait partie de la collection du compte Dejean ") ; it was never, so far as is known, represented in Robineau-Desvoidy's own collection, and is not in the remnants of that collection now in the Paris Museum. The Diptera from Dejean's collection are lost, and there is therefore no type-material of *A. imperialis* now known to exist ; it is desirable, since *imperialis* has been confused in the past and since it is here treated as comprising more than one subspecies, to designate a neotype to fix the meaning of the name, and I am here designating a specimen in the British Museum (Natural History) as neotype. It is not known from which part of Australia the original material came, but *imperialis* is commonest in Queensland and the specimen chosen for neotype is therefore from this state ; its characters agree as closely as possible with those mentioned in the original description, particularly the " beau vert-doré " colour. The neotype specimen has been labelled " *Amenia imperialis* Robineau-Desvoidy ♂ neotype designated by R. W. Crosskey, 1964 ".

Diagnosis. Diagnostic characters are those given in foregoing key to subspecies.

♂. *Head* : Interfrontal area deep yellow ; parafrontals, parafacials and genae yellow without evident yellow pollinosity and appearing dull like the frons in any light (as both interfrontal area and parafrontals are dull and non-pollinose the only demarcation between them is provided by the frontal setae) ; facial carina, antennal foveae and epistome yellow with thin slightly shining pale yellow pollinosity ; postorbits and entire occiput densely pale yellow or golden pollinose over a yellow ground colour ; postbuccae yellow with thin yellowish pollinosity which is much less conspicuous than that on occiput and disappears altogether towards the genae. Parafrontals with a very few black hairs near vertex but otherwise with extremely short sparse pale yellow hair, lower parts of parafrontals rarely with one or two dark hairs intermixed with pale ones ; all hair of genae, postbuccae and entire occiput pale or golden yellow, that on genae exceptionally short. Eyes widely separated, frons and vertex broader than in other species, the frons swollen and prominent so that in profile it is well visible above the eyes, the parafrontals steeply set off from inner eye margins ; frons at narrowest point near vertex from 0·23–0·30 of head width (0·25 in neotype specimen), one eye viewed from above 1·2–1·7 times as wide as vertex (1·5 times in neotype). Vertex with small blackish brown spot around ocelli, conspicuous to naked eye ; ocellar setae moderately strong and directed straight outwards towards the eyes. Frontal setae short, fine and weak, uppermost pairs hair-like, the setae not nearly meeting in mid line as the two rows are widely separated by the broad interfrontal area (latter about three times as wide as upper part of a parafrontal). Facial carina short and very broad, flattened on outer surface but sometimes very slightly sulcate, much shorter than distance from lunula to anterior ocellus and about 1·75–2·25 times as long as epistome ; antennal bases widely separated, antennal foveae rather shallow. Gena exceptionally broad, about half (0·48–0·53) of eye-height. Parafacials very broad, five or six times as wide as third antennal segment or about equal in width to the length of third antennal segment. Antennae yellowish orange, falling short of mouth-margin by slightly less than their own length ; third segment 3·5–3·9 times as long as second segment (3·7 times in neotype) ; seta on second segment well developed but much shorter than third segment, arista equal in length to third segment. Palpi

yellow. *Thorax* : mesonotum bright green, often with a coppery golden or coppery reddish tinge (as in neotype), sometimes bluish green ; scutellum usually unicolorous with mesonotum, occasionally a little more bluish. Margins of mesonotum with the usual three pairs of conspicuous white pollinose spots in notopleural, supra-alar and postalar positions, but without submedian white pollinose vittae on prescutum ; prescutum seen from behind with thin traces of evenly distributed whitish pollinosity, sometimes in certain lights showing a pair of very fine longitudinal coppery lines which reach back nearly to transverse suture. Sides of thorax dark greenish, sometimes partly violet on sternopleura and mesopleura, hypopleura and pteropleura reddish violaceous ; mesopleura and sternopleura with large white pollen spots, appearance of those on mesopleura shifting with light. Hair of propleura almost always black, rarely brownish yellow. Scutellum with four pairs of marginal setae. *Wings* : brown at base, otherwise clear hyaline. Costal margin apicad of end of *Sc* conspicuously bowed forwards (Text-fig. 21) and vein R_{2+3} with corresponding strong forward curvature. Bend of vein *M* obtuse, distance from bend to wing margin 1·0–1·3 times as great as that between bend and *m-cu* ; on vein *M* distance from *r-m-* to *m-cu* 3·1–4·2 times as great as that between *m-cu* and bend. Lower calypter all dark brown except for basal part which is hidden when wings are folded back, upper calypter usually all white but sometimes partly tinged pale brown. *Legs* : dark black-brown, slightly dark greenish or violet metallic on femora. Mid tibia almost always with three *ad* setae of which basal one is very small, rarely with only two or with four *ad* setae. *Abdomen* : brilliant golden green, sometimes bluish green or cupreous ; venter violet on at least first two tergites and sternites. Each side of T3 ventro-laterally with a large brilliantly white pollinose area, appearance of the white spots changing greatly with angle of the light but most conspicuous in lateral view, thin traces of whitish pollinosity extending round dorsally from the ventro-lateral spots to form a very thin pollinose covering on whole dorsum of tergite which is visible only from behind. T4 non-pollinose, without spots. T5 with a pair of very large brilliant white pollinose areas situated mainly ventrally but extending round each side of tergite well on to dorsum, appearance of the white areas changing very strikingly with the direction of light (cf. *leonina* in which white spots on T5 are fixed in appearance). T3 with median marginal setae, almost always a single pair, but occasionally three, four or even five such setae, very rarely only one of the pair developed ; in single exceptional specimen seen median marginal setae absent from T3. T5 without or with only a very few hairs situated on the pollinose areas. *Measurements* : body length 13·0 mm. (range 9·1–16·2 mm.), wing length 11·6 mm. (range 8·2–14·5 mm.) [35 specimens]. Dimensions of neotype : body length 12·9 mm., wing length 11·9 mm.

♀. Generally very like ♂ but costal margin not noticeably bowed forwards and abdominal T3 without median marginal setae. Frons broader than in ♂ and slightly exceeding one eye in width seen from above, eye-vertex-eye ratio about 9 : 11 : 9 ; one eye from above from 1·15–1·30 times as wide as vertex. Proclinate orbital setae variable in size and number, usually three or four on each side but sometimes five or only two, number often different on the two parafrontals of same specimen. Size range similar to that of ♂.

MATERIAL EXAMINED. Neotype ♂, AUSTRALIA : N. Queensland, Cairns District (*R. C. L. Perkins*). In British Museum (Natural History), London.

AUSTRALIA : 7 ♂♂, 2 ♀♀, Queensland, Stradbroke, 20.ix.1915 (*J. C. Bridwell*) (U.S. Nat. Mus.) ; 1 ♂, Queensland, Gordonvale, xi.1922 (*E. Jarvis*) (U.S. Nat. Mus.) ; 1 ♂, Queensland, Cairns, 1917 (*J. F. Illingworth*) (U.S. Nat. Mus.) ; 1 ♀, Queensland, 1892 (*v. Mueller*) (Staatl. Mus. Stuttgart) ; 1 ♂, Queensland (Staatl. Mus. Stuttgart) ; 1 ♂, Queensland, Cairns (*F. H. Taylor*) (Staatl. Mus. Stuttgart) ; 1 ♀, Queensland, Herberton, 3,200 ft., xii.1910 (*Dodd*) (Staatl. Mus. Stuttgart) ; 1 ♂, 1 ♀, Queensland, Herberton, i.1911 (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Herberton (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Prince of Wales Is., Torres Strait, 19.v.1903 (*M. J. Nicoll*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Thursday Is., 14.i.1939

(B.M. Nat. Hist.) ; 1 ♂, Queensland, Cape York (B.M. Nat. Hist.) ; 1 ♀, Queensland, Rockhampton (B.M. Nat. Hist.) ; 1 ♀, Queensland, Stannary Hills, c. 3,000 ft. (*T. L. Bancroft*) (B.M. Nat. Hist.) ; 1 ♂, 2 ♀♀, Queensland, Townsville (*F. P. Dodd*) (B.M. Nat. Hist.) ; 2 ♀♀, Queensland, Townsville, i. & 27.ii.1903 (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, i.1903 (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Queensland, vii.1909 (B.M. Nat. Hist.) ; 1 ♂, 2 ♀♀, Queensland, Kuranda (*Dodd*) (B.M. Nat. Hist.) ; 1 ♂, Queensland (*F. P. Dodd*) (B.M. Nat. Hist.) ; 2 ♂♂, 1 ♀, Queensland, Redlynch, 11.ix.1938 (B.M. Nat. Hist.) ; 1 ♂, Milson Is. (? Queensland), 18.xii.1914 (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Eccleston, 26.ii.1921 (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Como, 10.xi.1923 (*Nicholson*) (B.M. Nat. Hist.) ; 3 ♂♂, New South Wales, Sydney (*Bridwell*) (U.S. Nat. Mus.) ; 1 ♀, New South Wales, Chester Hill, 6.xi.1927 (U.S. Nat. Mus.) ; 1 ♂, New South Wales, Katoomba, Blue Mts., 3,400 ft., 1912 (*Dodd*) (Staatl. Mus. Stuttgart) ; 1 ♀, New South Wales, Sydney, Auburn, 12.v.1927 (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, New South Wales, Toronto, Filmer (*Health Dept.*) (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Cumberland (B.M. Nat. Hist.) ; 4 ♂♂, New South Wales, Gooranbong, 26.ii.1950 (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Mt. Kuring-Gai, 27.ix.1950 (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, labelled Kopp. Biberach. 1917 (Staatl. Mus. Stuttgart) ; 8 ♂♂, Australia (no other data) (Oxford Mus.) ; 1 ♂, Australia (no other data, ex coll. Bigot) (B.M. Nat. Hist.).

Distribution : *A. imperialis imperialis* occurs commonly in Queensland and New South Wales, in the latter state overlapping with *A. imperialis dubitalis* ; in Queensland it occurs on the groups of small islands—Prince of Wales Islands, Thursday Island, Palm Islands, Magnetic Island—as well as on the mainland. Paramonov (1957) records *imperialis* sensu stricto from one locality in Northern Territory of Australia. Paramonov's (*loc. cit.*) records from New South Wales suggest that *imperialis* typical form and *dubitalis* occur so commonly near together that the two forms ought not perhaps to be regarded as subspecies ; however until field work can resolve better the status of the two forms it appears best to regard them for the time being as subspecies.

Amenia imperialis dubitalis Malloch, 1927 **stat. n.**

Amenia dubitalis Malloch, 1927, *Proc. Linn. Soc. N.S.W.*, **52** : 343.
Grapholostylum latifrons Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442. **syn. n.**

Lectotype Designation : no holotype of *Grapholostylum latifrons* was designated by Enderlein and the species was based on four specimens (in Zool. Mus. Humb. Univ.) ; three of these syntypes (all ♂) have been seen, and one has been labelled and is here designated as lectotype. Syntypes seen other than the lectotype have been labelled as paralectotypes ; one of these has been erroneously labelled by Enderlein as ♀.

Diagnosis. Diagnostic characters as given in foregoing key to subspecies.

Very similar to the typical subspecies, but differs in the following characters : ♂ frons conspicuously narrower, at the vertex only 0·16–0·20 of total head width (0·16 in *dubitalis* holotype, 0·17 in *latifrons* lectotype), viewed from above one eye from 2·0–2·7 times as wide as

vertex (2·7 in *dubitalis* holotype, 2·5 in *latifrons* lectotype) ; ♀ frons also narrower than in typical subspecies, at vertex almost exactly equal in width to one eye when measured from above. Ocellar setae of ♂ often absent, when present usually very weak and directed partly forwards as well as outwards. Hair of parafrontals sometimes all dark brownish or black, if largely pale yellow then almost always with an admixture of dark hairs. Genae and parafacials of both sexes with fine yellow slightly shining pollinosity, these areas therefore not completely dull, pollinosity on parafacials best seen when head is viewed largely from above, pollinosity on parafacial in ♂ extending about half way up and then stopping abruptly so that upper half is quite dull and non-pollinose, in ♀ all of parafacials pollinose up to lower ends of parafrontals ; on ♂ parafacial possible to see definite line at which pollinosity stops if head is viewed from a certain angle, in other lights pollinosity of lower half not very noticeable. Size range much as in typical subspecies, body length 12·8 mm. (range 8·7–15·3 mm.), wing length 11·2 mm. (range 8·0–13·0 mm.) [15 specimens of both sexes].

MATERIAL EXAMINED. *Grapholostylum latifrons* Enderlein, lectotype ♂, AUSTRALIA (*Damel*), ♂ paralectotype with same data as lectotype, and ♂ paralectotype labelled *Kraatz* and presumed locality Australia (all in Zool. Mus. Humb. Univ.).

AUSTRALIA : 3 ♂♂, New South Wales, Sydney (*ex coll. Bigot*) (B.M. Nat. Hist.) ; 2 ♂♂, New South Wales, Sydney (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Shoalhaven River, Tallong, 1.xii.1951 (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Grose R., 1.iv.1950 (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Toronto, Filmer (*Health Dept.*) (B.M. Nat. Hist.) ; 1 ♀, New South Wales, Jenolan Caves, 2,000 ft. (*J. C. Wiburd*) (U.S. Nat. Mus.) ; 1 ♂, Queensland, Brisbane, 2.xii.1913 (*H. Hacker*) (B.M. Nat. Hist.) ; 2 ♂♂, Queensland, Mackay (*G. Turner*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Tambourine (?), Davidson, 10.xii.1916 (*W. W. Froggatt*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Burnett River District (*T. L. Bancroft*) (B.M. Nat. Hist.).

The holotype of *A. dubitalis* has not been seen, but has been examined for me by Mr. Curtis Sabrosky. The holotype data are : New South Wales, Sydney, National Park, 1.xi.1902 (*W. W. Froggatt*). The ♀ specimen listed above from Jenolan Caves is exceptionally small and possesses a pair of median marginal setae on T3 (such setae are absent in all other females of *imperialis* seen), but it appears justified for the present to assign it to *dubitalis*.

Distribution : Known only from New South Wales and the southern half of Queensland, being replaced in northern Queensland by the typical subspecies ; however, there is considerable overlap of the ranges of the subspecies in New South Wales. *A. imperialis dubitalis* is evidently much more common in New South Wales than in southern Queensland ; of thirty specimens of *dubitalis* recorded by Paramonov (1957) only five are from Queensland.

Amenia leonina (Fabricius, 1775)

Musca leonina Fabricius, 1775, *Systema Ent.* : 776. Holotype ♂, AUSTRALIA (' NEW HOLLAND '). In the Sir Joseph Banks collection, British Museum (Natural History), London.

Ptylostylum albomaculatum Macquart, 1851, *Mém. Soc. Sci. Lille*, **1850** : 195. *Diptères Exot. Suppl.* **4** : 222. Lectotype ♂, AUSTRALIA (' TASMANIA ' in error). In Muséum National d'Histoire Naturelle, Paris.

Amenia stictica Brauer and Bergenstamm, 1891, *Denkschr. Akad. Wiss. Wien*, **58** : 418 (nomen nudum : publication without description of manuscript name of Schiner).
Amenia stictica Engel, 1925, *Zool. Jb.*, **50** : 353. Lectotype ♂, AUSTRALIA. In the Naturhistorisches Museum, Vienna. (First valid publication of Schiner's manuscript name.)
[*Amenia parva* Schiner ; Hardy, 1938, *Proc. roy. Soc. Qd* **49** : 58, [not of Schiner] (misidentification)].

DIAGNOSIS. Scutellum with three pairs of marginal setae ; genal hair and postorbits yellow ; prescutum with a pair of broad white pollinose submedian lines.

DESCRIPTION. See under the subspecies below.

DISCUSSION. Paramonov (1957) recognised the subspecies *A. leonina leonina* (Fabricius) and *A. leonina enderleini* Paramonov. It is impossible to be certain of the significance of the differences between the two forms but from examination of a good series there appears to be sufficient constancy of structural difference and a sufficient degree of allopatry to justify the recognition of two subspecies, at least for the present ; I am following Paramonov in treating *leonina* as two subspecies, but am applying Macquart's old name *albomaculatum* to the subspecies in which median marginal setae on T3 are present, since these setae exist on some specimens of Macquart's original type-series of *Ptylostylum albomaculatum* (a lectotype is here designated to fix the usage of the name *albomaculatum*). The lectotype here designated for *A. stictica* Engel is without median marginal setae on T3 and this name therefore goes into synonymy with *A. leonina* sensu stricto.

A summary of the differences between the two subspecies is given in the following key.

KEY TO THE SUBSPECIES OF *A. leonina*

1 Both sexes with a pair of median marginal setae on T3. ♂ head very broad, 1·15–1·24 times as wide as thorax at the humeral calli. Upper parts of postorbits of ♂ obliterated so that eyes abut directly against upper occiput. ♂ frons extremely reduced, at narrowest point only between 0·023 and 0·036 of head-width. Head of ♀ golden orange pollinose . . ***A. leonina albomaculata*** (Macquart) (p. 115)

– Both sexes without median marginal setae on T3. ♂ head not conspicuously broad, 1·05–1·14 times as wide as thorax at the humeral calli. Upper parts of postorbits very narrowly tapering and evident as a yellow pollinose band more or less reaching vertical seta in ♂, eyes therefore not abutting directly against upper occiput. ♂ frons broader, eyes less strongly approximated, at narrowest point frons between 0·035 and 0·055 of head-width. Head of ♀ pale to golden yellow pollinose ***A. leonina leonina*** (Fabricius) (p. 113)

Amenia leonina leonina (Fabricius, 1775)

Musca leonina Fabricius, 1775, *Systema Ent.* : 776.
Amenia stictica Engel, 1925, *Zool. Jb.*, **50** : 353.

DIAGNOSIS. Diagnostic characters as given in above key.

♂. *Head* : Interfrontal area yellow-orange ; parafrontals, parafacials, face, genae, postbuccae and lower occiput with orange-yellow ground colour and golden yellow pollinosity ; postorbits densely golden pollinose ; upper occiput blackish brown, slightly shining in some lights and without evident pollinosity. Parafrontal hair short and black ; hair of genae,

postbuccae and lower occiput golden yellow ; hair of dark uppermost parts of occiput black. Eyes very strongly approximated and frons therefore reduced, upper part of interfrontal area almost eliminated by coming together of parafrontals in mid line ; frons at narrowest point 0·035–0·055 of head width, head only slightly (1·05–1·14 times) wider than thorax at humeral calli. Ocelli slightly raised, ocellar setae weak. Upper end of each postorbit very narrowly tapering but just about reaching inner vertical seta as a distinct yellow pollinose band which clearly separates the upper occiput from the eye. Lowest pairs of cruciate frontal setae well developed, but the setae becoming progressively weaker dorsally and uppermost pairs extremely weak and hair-like, the row of setae stopping altogether well below anterior ocellus. Facial carina short and broad, antennal bases well separated and antennal foveae shallow ; the carina much shorter than distance from lunula to anterior ocellus and only about 1·75 times as long as epistome, latter elongate and poorly differentiated from ventral end of facial carina. Gena very broad, about two-fifths (0·37–0·43) of eye-height. Parafacial about four times as wide as third antennal segment, width therefore about as great as length of this segment. Antennae orange, very small and falling short of mouth-margin by more than their own length ; third segment 2·4–2·7 times as long as second segment ; seta on second segment usually a little shorter than third segment ; arista much longer than third segment. Palpi yellow. *Thorax* : mesonotum dark green with a slight bronze or bluish tinge, occasionally violet-blue ; scutellum dark blue-green, blue or violet, almost always more distinctly blue than the mesontoum ; sides of thorax bluish green or violaceous on mesopleura and sternopleura, otherwise dark brownish. Mesonotum with usual three pairs of large boldly marked white pollinose spots, anteriormost pair covering both humeral calli and notopleura ; prescutum with a submedian pair of broad white pollinose longitudinal bands which extend back to and end abruptly at transverse suture, these white bands lying between *acr* and *dc* rows of setae and their appearance shifting very much with the direction of the light (the white bands disappearing altogether from some points of view and being replaced by a pair of fine longitudinal cupreous lines in positions mid-way between *acr* and *dc* rows of setae) ; prescutum, in addition to broad submedian bands, with a pair of small indefinite white pollinose areas lying on the transverse suture just laterad of the *prst ia* seta (or in this position if this seta, as sometimes happens, is absent), these white areas visible only from behind. Each mesopleuron and sternopleuron with a large rounded and boldly marked white spot, appearance of these spots not shifting with direction of light. Scutellum with three pairs of marginal setae. *Wings* : brown on the basal cells, otherwise clear hyaline. Bend of vein *M* nearly rectangular, distance from bend to wing margin only 1·1–1·4 times as great as that between bend and *m-cu* ; on vein *M* distance from *r-m* to *m-cu* 3·5–4·1 times as great as that between *m-cu* and bend. Calyptrae dark brown except for half of upper calypter opaque white. *Legs* : black with dark greenish to violaceous metallic reflections on femora. Mid tibia almost always with two *ad* setae, rarely a third very small *ad* seta present basad of the usual two. *Abdomen* : dark blue-green, blue or violet dorsally, usually largely violaceous ventrally. T3 with a pair of very small white pollinose spots on extreme sides of tergite, their appearance slightly shifting with direction of light, and usually with a pair of rather indefinite silvery pollinose submedian spots (the latter very inconspicuous to naked eye in most specimens). T4 without pollinose spots. T5 with a pair of very large boldly marked creamy white spots dorso-laterally, these spots extending round each side of the tergite and fixed in appearance, not fading or disappearing when seen from different angles. T3 without median marginal setae. T5 without hair on the areas of the creamy-white spots or medially between the spots. *Measurements* : body length 12·5 mm. (range 10·3–14·0 mm.), wing length 10·8 mm. (range 9·0–12·0 mm.) [20 specimens].

♀. Very like ♂ except for broad frons. Interfrontal area broad and slightly widening dorsally, 1·8–2·25 times as wide as parafrontal at level of lowest proclinate orbital seta ; usually two proclinate orbital setae present on each side, but occasionally with a third or fourth smaller proclinate orbital in addition. Vertex slightly variable in width, usually about two-sevenths of head width, eye-vertex-eye ratio varying from 11 : 10 : 11 to 14 : 10 : 14. Mid tibia almost always with three *ad* setae. Measurements much as in ♂.

MATERIAL EXAMINED. *Musca leonina* Fabricius, holotype ♂, AUSTRALIA (no other data). *Amenia stictica* Engel, lectotype ♂, AUSTRALIA : Queensland, Cape York, 1868 (*Thorey*) and paralectotype ♀, AUSTRALIA : Queensland (Nat. Mus. Vienna).

AUSTRALIA : 6 ♂♂, 3 ♀♀, Queensland, Kuranda (*F. P. Dodd*) (B.M. Nat. Hist) ; 2 ♂♂, Queensland, Kuranda (*F. P. Dodd*) (U.S. Nat. Mus.) ; 6 ♂♂, 2 ♀♀ Queensland, xii.1913–i.1914 (B.M. Nat. Hist.) ; 2 ♂♂, Queensland (Staatl. Mus. Stuttgart) ; 1 ♀, Queensland, Herberton, 3,700 ft., ii.1911 (*Dodd*) (Staatl. Mus. Stuttgart) ; 1 ♀, Queensland, Herberton, i.1911 (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Palm Island (*F. H. Taylor*) (Staatl. Mus. Stuttgart) ; 1 ♂, Queensland, Cardstone, nr. Tully Falls, 9.i.1962 (*E. B. Britton*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Queensland, Townsville (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Druidson, 10.ii.1916 (*W. W. Froggatt*) (B.M. Nat. Hist.) ; 1 ♂ labelled, ' Australia ' and Ptylostylum albomaculatum, *ex coll. Bigot* (B.M. Nat. Hist.) ; 8 ♀♀, Northern Territory, Port Darwin, x.1908 and i.1909 (B.M. Nat. Hist.) ; 4 ♀♀, New South Wales, Sydney, Auburn, 12.v.1927 (B.M. Nat. Hist.).

In addition 2 ♂♂ and 1 ♀ without data have been seen in Oxford Mus.

Distribution : *A. leonina leonina* is the more northerly subspecies and occurs predominantly in northern Queensland to the north of Bowen and in the Northern Territory. It is less common in southern Queensland (southwards from Bowen) where it is largely replaced by *A. leonina albomaculata.* Some specimens of the nominate subspecies have been seen from New South Wales and Paramonov (1957) has also recorded the typical form from this state and it is evident that the distribution of the typical subspecies overlaps considerably with that of subspecies *albomaculata.*

Amenia leonina albomaculata (Macquart, 1851)

Ptylostylum albomaculatum Macquart, 1851, *Mém. Soc. Sci. Lille* **1850** : 195. *Diptères Exot. Suppl.* **4** : 222.

Amenia leonina ab *chaetameniina* Enderlein, 1936, *Veröff. dtsch. Kolon Mus. Bremen* **1** : 443. (Name without nomenclatorial status).

Amenia leonina enderleini Paramonov, 1957, *Ann. Mag. nat. Hist.*, **12** (10) : 60. Holotype ♂, NEW SOUTH WALES. In the Division of Entomology Museum, C.S.I.R.O., Canberra. **syn. n.**

LECTOTYPE DESIGNATION : the type-material of *Ptylostylum albomaculatum* Macquart (in Mus. Hist. Nat. Paris) consists of two ♂ and four ♀ syntypes ; of the six syntypes, three (a ♂ and two ♀) have median marginal setae on T3 and other three syntypes do not. The ♂ syntype in which median marginal setae on T3 are present has been labelled and is here designated as lectotype ; the name *albomaculatum* is thus affixed to the form possessing these setae.

DIAGNOSIS. Characters as given in foregoing key to subspecies.

Very similar in most characters to the nominate subspecies but differing as follows : Both sexes with a pair of median marginal setae on abdominal T3. Head of ♂ very broad, 1·15–1·24 times as wide as thorax measured at the humeral calli. Frons of ♂ extremely narrow and at

its narrowest point only 0·023–0·036 of head width. Ocelli (♂) raised on a very distinct ocellar tubercle which is especially prominent because of the reduction of vertex and frons. Upper parts of the postorbits in ♂ obliterated so that the postorbits do not nearly reach the vertex, the upper parts of the eyes abutting directly against the occiput. Head of ♀ with more distinctly orange colour, the pollinosity golden orange and not usually so yellow as in typical subspecies. The pair of small whitish pollinose submedian spots on T3 often more conspicuous than in typical subspecies, sometimes very distinct to naked eye. Size range as in typical subspecies.

Material examined. Australia : 3 ♂♂, New South Wales, Toronto, Filmar (*Health Dept.*) (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Jervis Bay, xii.1926–ii.1927 (*F. A. Rodway*) (B.M. Nat. Hist) ; 1 ♂, 1 ♀, New South Wales, Awaba, 9.ii.1950. (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♀, National Park, 12.iv.1925 (*Mackerras*) (U.S. Nat. Mus.) ; 1 ♂, Queensland, Mackay (*G. Turner*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Buderim Mts., 7.iv.1912 (*H. Hacker*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Queensland, Brisbane, 24.ix.1914 (*H. Hacker*) (B.M. Nat. Hist.) ; 1 ♀, Milson Island, 23.ix.1915 (B.M. Nat. Hist.) ; 1 ♀, Rockhampton, 1868 (*Thorey*) (Nat. Mus. Vienna, paralectotype of *A. stictica* Engel) ; 2 ♀♀, Australia (no other data, *ex coll. Bigot*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, without data (Staatl. Mus. Stuttgart).

Distribution : *A. leonina albomaculata* has a more southerly distribution in Australia than the typical subspecies, and occurs principally in New South Wales and southern Queensland ; in the latter area it occurs northwards as far as Brisbane and Bowen and overlaps in distribution with *A. leonina leonina*. Paramonov (1957, p. 60) has recorded a large number of specimens of this subspecies (under the name *A. leonina enderleini*) from New South Wales and has also recorded it from Victoria. Paramonov's type of *enderleini* is from Bateman's Bay, N.S.W. Malloch (1929) recorded a specimen of *A. leonina* from Deep Creek, near Kingscote, Kangaroo Island, South Australia ; I have not seen the specimen on which this record is based, but from the locality it almost certainly belongs to the subspecies *albomaculata*.

Macquart (1851) cited Tasmania as the type-locality of *Ptylostylum albomaculatum*, and the type-specimens are labelled ' Tasmania ' ; *A. leonina* does not occur in Tasmania and, as discussed earlier (see page 103), the type-locality of *albomaculata* is almost certainly New South Wales.

Amenia longicornis (Malloch, 1930)

(Text-fig. 19)

Neoamenia longicornis Malloch, 1930, *Proc. Linn. Soc. N.S.W.*, **55** : 103. Holotype ♂. WESTERN AUSTRALIA. In the Division of Entomology Museum, C.S.I.R.O., Canberra.
Amenia longicornis (Malloch), Paramonov, 1957, *Ann. Mag. nat. Hist.* **12** (10) : 57.

Diagnosis. Scutellum with four pairs of marginal setae ; general colour purple-black ; abdominal T4 with a pair of lateral white spots ; facial carina pinched-in inwardly and antennae in deep foveae ; upper occiput black and shining.

♂. *Head* : Interfrontal area yellow-orange or deep orange ; parafrontals, parafacials and genae orange-yellow with bright golden orange pollinosity ; facial carina, antennal foveae and epistome yellow-orange with pale yellowish pollen, that on carina rather shining ; postorbits

thickly yellow or bright golden pollinose ; postbuccae and lower parts of occiput yellow-orange and semi-shining, almost devoid of pollinosity ; upper two-thirds of occiput (except for orange cerebrale) very dark shining black-brown, non-pollinose. Parafrontal hair black, some of uppermost parafrontal hairs rather strong and proclinate and resembling small irregular proclinate orbital setae ; genal hair yellow, hair of postbuccae pale brown to blackish ; all occipital hair black. Eyes well separated, frons and vertex broader than in other species except *imperialis*; frons narrowest about midway between lunula and ocelli and gradually and slightly widening from this point to vertex, interfrontal area either slightly narrowed near middle or gradually and evenly broadening from lunula to ocelli. Vertex seen from above and measured across posterior ocelli varying from 0·23–0·32 of head width (0·24 in holotype). Vertex with black spot around ocelli easily visible to naked eye ; ocellar setae well developed, directed mainly outwards. A pair of minute but distinct prevertical setulae present in some specimens, counterpart of prevertical setae of female. Vertex with outer vertical setae distinguishable, either very fine and hair-like and only slightly longer than setulae of postocular row or (in South Australian specimens) well developed. Frontal setae not or only just meeting at tips, uppermost pairs not very noticeably weaker than lowest pairs. Facial carina very heavy, strongly postero-laterally compressed so that outer surface is rather flattened and sides very conspicuously pinched-in towards one another ; anterior surface of carina sometimes sulcate (as in holotype) but often rather flat, shape in facial view variable, in some specimens regularly elongate-oval but in others merging through to more lanceolate shape with upper end more gradually contracting than ventral end ; length of carina variable as well as shape, from 1·9–3·3 times as long as epistome (3·3 times as long in holotype) and longer or shorter than distance from lunula to anterior ocellus. Antennal foveae very deep, antennal bases not widely separated. Gena a little over a third of eye-height in most specimens but varying from 0·32–0·42 of eye-height (0·32 in holotype). Parafacial two to three times as wide as third antennal segment. Antennae orange, length variable, third segment from 3·2–5·9 times as long as second segment (5·9 times in holotype) ; seta on second segment rather weak ; arista equal in length to third antennal segment in specimens with very short antennae, much shorter than third segment in specimens with elongate antennae, in latter specimens thickened for slightly more than half its length and more densely plumose. Palpi yellow. *Thorax* : purplish black ; dark purple colouring most evident on scutellum and near white spots. Mesonotum with usual three pairs of bold thickly white pollinose marginal spots, front pair of which cover top of humeral callus and notopleuron ; prescutum with a pair of white pollinose submedian vittae which taper posteriorly and die out well before transverse suture, vittae sometimes small and inconspicuous to naked eye, their appearance shifting with direction of light ; marginal spots with fixed appearance irrespective of viewpoint. Each mesopleuron and sternopleuron with large white spot. Scutellum with four pairs of marginal setae (lateral pair rather weak in holotype specimen). *Wings* : clear hyaline except for usual dark brown infuscation over basal cells. Costal margin not bowed forwards in holotype, but in some specimens conspicuously or slightly bowed forwards apicad of vein *Sc* (bowing forwards of wing most developed in S. Australian specimens). Bend of vein *M* widely obtuse, apical part of vein almost straight from bend to apex. Bend of *M* unusually remote from wing margin (Text-fig. 19), distance from bend to margin 2·3–3·9 times as great as that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* 3·5–5·2 times as great as that between *m-cu* and bend. Calyptrae dark brown except for extreme base of lower calypter and outer three-quarters (in wings-folded position) of upper calypter which are opaque white. *Legs* : black with metallic violaceous reflections on femora. Mid tibia with three or four *ad* setae and sometimes some smaller additional *ad* setulae. *Abdomen* : dark purple, slightly more violaceous and less black in appearance than mesonotum. T3 with a pair of lateral white pollinose bands extending round sides of tergite from ventro-lateral position and fading out dorso-laterally, appearance of these white areas depending on direction of light, inconspicuous dorsally from some points of view. T4 with a pair of very small but conspicuous white pollinose lateral spots (absent in other *Amenia*), rounded in shape and not extending on to dorsum of tergite. T5 with a pair of very large white bands occupying most of sides of tergite, very broad and extending from near ventral margins of tergite round on to dorsal surface, bands

of each side separated mid dorsally by about one-third of width of tergite ; white bands appearing brilliantly and boldly marked to naked eye, but under microscopic examination shifting in appearance with direction of light, from some points of view appearing silvery or very dark greyish with a narrow metallic blue margin around the pollinose areas. T3 with a pair of strong median marginal setae, occasionally one of the pair duplicated so that there are three median marginals in all. T5 without or with only very few hairs situated on white areas. *Measurements* : body length 10·5 mm. (range 9·4–11·6 mm.), wing length 9·2 mm. (range 7·5–10·3 mm.) [11 specimens]. Dimensions of holotype : body length 9·4 mm., wing length 7·5 mm.

♀. Very like ♂ but differing in broader frons and vertex and normal unbowed costal margin of wing. Interfrontal area 1·5–1·7 times as wide as a parafrontal at level of lowest proclinate orbital seta. Parafrontals with two or three pairs of proclinate orbital setae. Vertex seen from above 0·31–0·35 of head width. Facial carina 2·0–2·4 times as long as epistome. Antennae short in all known specimens, third segment 2·8–3·4 times as long as second segment. *Measurements* : body length 8·8 mm. (range 8·4–9·2 mm.), wing length 7·8 mm. (range 7·5–8·2 mm.) [4 specimens] ; the few females at present available are probably at small end of size range and a longer series would probably show mean size near that of ♂.

MATERIAL EXAMINED. Holotype ♂, AUSTRALIA : Western Australia (*Newman*).

AUSTRALIA : 1 ♂, 1 ♀, Western Australia, 1902 (*Heath*) (B.M. Nat. Hist.) ; 1 ♀, Western Australia, Booanya, ii.1932 (*Miss A. E. Baesjou*) (Div. Ent. Mus. Canberra); 2 ♀♀, Western Australia, Margooinya Rks. 4 mls. WSW of Balladonia H.S., 10.xii. 1953 (*J. H. Calaby*) (Div. Ent. Mus. Canberra) ; 5 ♂♂, Western Australia, 8 mls. E. of Youlgannah R.H., N. of Eyre, 5.viii.1952 (*Calaby & McIntosh*) (Div. Ent. Mus. Canberra and B.M. Nat. Hist.) ; 1 ♂, Western Australia, 100 mls. W. of Eucla, 25.x.1958 (*E. F. Riek*) (Div. Ent. Mus. Canberra) ; 3 ♂♂, South Australia, 25 mls. SW. of Iron Knob, 23.x.1958 (*E. F. Riek*) (Div. Ent. Mus. Canberra and B.M. Nat. Hist.) ; 1 ♂, South Australia, 40 mls. SW. of Iron Knob, 23.x.1958 (*E. F. Riek*) (Div. Ent. Mus. Canberra) ; 1 ♂, South Australia, Wilpena Pound (*H. M. Hale*) (Div. Ent. Mus. Canberra).

Distribution : Only known from the south-eastern part of Western Australia and from South Australia. It is of interest to note that in Western Australia, judging from material so far available, the range of *A. longicornis* (Malloch) does not overlap with that of *Formosiomima nigromaculata* (Malloch) which appears to be confined to the south-western corner of Western Australia ; *Formosiomima* appears to replace *Amenia* in the extreme south-west corner of Australia.

DISCUSSION OF VARIABILITY. At present *A. longicornis* is known only from a very limited amount of material but it is nonetheless evident that the species (assuming as here, that the material is truly conspecific) varies considerably in its cephalic characters. Male specimens from South Australia have short antennae, a short facial carina which is regularly elongate oval in facial view, a broader vertex, rather strongly developed outer vertical setae and a strongly marked forward bowing of the costal margin of the wing ; most males from Western Australia, on the other hand, have elongate antennae and a long rather lanceolate facial carina, a narrower vertex, very weak or hair-like outer vertical setae and no well marked bowing forward of the costa. At first it appeared likely that *A. longicornis* fell into two distinct, largely geographically isolated, populations definable as subspecies but this was not satisfactorily confirmed when measurements on all available were taken into account;

for instance, a specimen from near Eucla in the extreme east of Western Australia is completely intermediate between specimens from further west in Western Australia and specimens from further east in South Australia. There appears to be no point at which there is any sudden break, and there is a gradual transition in the variable head characters from east to west. *A. longicornis* occurs only so far as is known in a relatively small area of southern Australia across the Nullarbor Plain and the southern part of the state of South Australia, but within this area the species appears to show an east-west cline with a very rapid transition of certain characters : thus from east to west the ♂ vertex gets narrower, the facial carina longer and narrower, the antennae much longer, and the outer vertical setae much weaker ; in addition there is a narrowing of the parafacials and genae, and the loss of the forward bowing of the costal wing margin. Unfortunately the exact locality of the holotype specimen in Western Australia is unknown, but it has the longest antennae and facial carina and the narrowest vertex of any specimen seen and by inference therefore must have been collected at or near the extreme western end of the distribution range. Insufficient female material is yet available to determine whether this sex shows similar evidence of a cline. However for the present it appears best to regard all available male and female material as belonging to a single species, *A. longicornis*, and showing strong evidence of a cline within this species. There is no clear evidence of definite geographical subspeciation. The evidence for a cline will be clear from the following tabulation :

(a) Locality : Wilpena, S.A., approx. longitude 139° E., vertex 0·31 of head width, carina 1·9 times as long as epistome, third antennal segment 3·2 times as long as second.

(b) Locality : near Iron Knob, S.A., approx. longitude 134–135° E., vertex 0·31–0·32 of head width, carina 2·0–2·2 times as long as epistome, third antennal segment 3·4–4·1 times as long as second.

(c) Locality : near Eucla, W.A., approx. longitude 127° E., vertex 0·29 of head width, carina 2·4 times as long as epistome, third antennal segment 3·5 times as long as second.

(d) Locality : near Eyre, W.A., approx. longitude 126° E., vertex 0·25–0·26 of head width, carina 2·7–3·2 times as long as epistome, third antennal segment 4·7–5·3 times as long as second.

(e) Holotype specimen (exact locality unknown) : vertex 0·24 of head width, carina 3·3 times as long as epistome, third antennal segment 5·9 times as long as second.

Foregoing data refers to male specimens and exact localities are given in detail under ' material examined ' above ; abbreviations ' S.A. ' and ' W.A. ' refer to states of South and Western Australia respectively.

Amenia chrysame (Walker, 1849)

Dexia chrysame Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.*, **4** : 866. Holotype ♀, AUSTRALIA (' NEW HOLLAND '). In the British Museum (Natural History), London. *Amenia chrysame* (Walker), Malloch, 1930, *Proc. Linn. Soc. N.S.W.*, **55** : 101. *Chaetamenia chrysame* (Walker), Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442.

Musca varia Walker, 1852, *Ins. Saundersiana* **1**, Dipt. pt. iv : 342. Holotype ♀, AUSTRALIA. In the British Museum (Natural History), London. **syn. n.**

Amenia parva Schiner, 1868, *Reise Novara, Zool.* **2**, Dipt. : 316. Lectotype ♂, AUSTRALIA. In the Naturhistorisches Museum, Vienna. *Grapholostylum parvum* (Schiner), Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442.

Chaetamenia chrysame ab *graphostylina* Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442. (Name without nomenclatorial status.)

LECTOTYPE DESIGNATION : type-material of *Amenia parva* Schiner consists of two ♂ syntypes in the Vienna Museum ; one of these has been labelled and is here designated as lectotype, the other has been labelled as paralectotype.

DIAGNOSIS. Scutellum with three pairs of marginal setae ; postorbits silvery white ; genal hair brownish black ; basal quarter or third of discal cell largely devoid of macrotrichia.

♂. *Head* : Interfrontal area yellow-orange ; parafrontals, parafacials, genae, postbuccae and extreme lower parts of occiput yellow with yellow or golden pollinosity ; face yellow or orange-yellow with yellow pollinosity on facial carina but rather bare and shining on epistome and lower ends of antennal foveae ; postorbits densely silvery white pollinose over dark ground colour ; most of occiput very dark brownish black and shining, non-pollinose ; upper part of cerebrale yellow-orange like vertex. All hair of parafrontals, genae and postbuccae brownish black ; occipital hair black. Eyes approximated and frons narrow but interfrontal area distinct throughout its length and at its narrowest point as wide as or usually slightly wider than one parafrontal at corresponding position ; frons narrowest a little in front of anterior ocellus and widening very slightly from this point to vertex, at its narrowest 0·10–0·14 of head width. Vertex usually with dark brown spot around ocelli ; ocellar setae very weak, not strongly differentiated from tuft of long hairs on ocellar triangle. Postorbits very strongly tapering towards vertex and almost obliterated just before vertical setae so that uppermost setulae of postocular row are inserted very close to eye. Frontal setae well developed, each row reaching about to level of anterior ocellus and setae becoming only gradually and slightly weaker dorsally, setae of each side just meeting or crossing only near the tips ; none of frontal setae very weak and hair-like. Facial carina narrower than in other species, slightly elongate and rounded on outer surface (not at all sulcate), sometimes a little pinched-in laterally and slightly fusiform in facial view, equal in length to or a little shorter than distance from lunula to anterior ocellus, 2·5–2·9 times as long as epistome ; epistome very distinctly set off from ventral end of carina and unusually prominent. Gena 0·31–0·38 of eye-height. Parafacial about three times as wide as third antennal segment. Antennae usually brownish on basal segments except for orange dorsal tip of second segment, third segment pale orange ; third segment 3·0–3·5 times as long as second segment ; seta on second segment well developed but much shorter than third segment ; arista about equal in length to third segment. Palpi yellow. *Thorax* : mesonotum bright coppery green, sometimes with coppery reddish or golden tinge, occasionally emerald or slightly bluish green ; scutellum concolorous with mesonotum. Mesonotum with three pairs of white pollinose marginal spots, front pair on notopleura and hind part of humeral calli conspicuous to naked eye but other pairs small and much less conspicuous ; prescutum with a pair of broad white pollinose submedian vittae occupying most of area between *dc* and *acr* rows of setae on each side, vittae only obvious to naked eye near fore margin of prescutum but from behind under microscopical examination seen to extend back thinly to transverse

suture ; submedian white vittae disappearing in some lights as fly is turned, but then a pair of very fine coppery longitudinal lines usually evident underlying the pollen. Sides of thorax largely green anteriorly but reddish brown with violet or dark greenish tinge posteriorly, usually also partly violet around white spot on mesopleuron ; each mesopleuron and sternopleuron with large very boldly marked white pollinose spot, appearance not shifting with light. Scutellum with three pairs of marginal setae. *Wings* : clear hyaline except for dark brown mark over basal cells. Costal margin without definite forward bowing. Basal quarter or third of discal cell with membrane bare, devoid of macrotrichia except sometimes near mid line. Bend of vein *M* slightly obtuse, distance from bend to wing margin 1·1–1·4 times as great as that between *m-cu* and bend ; on vein *M* distance from *r-m* to *m-cu* usually 2·9–3·3 times as great as that between *m-cu* and bend. Upper calypter opaque white, lower calypter dark brown except for white extreme base. *Legs* : dark black-brown, femora only slightly violaceous metallic. Mid tibia usually with only a single strong submedian *ad* seta, sometimes with a much smaller *ad* seta nearer the base ; never with more than two *ad* setae in material seen. *Abdomen* : bright green dorsally and postero-ventrally, mainly violet antero-ventrally, dorsum usually with bright coppery reflections at least posteriorly, dorsum of T4 and T5 sometimes extensively reddish copper. Hind margins of tergites sometimes more distinctly cupreous than rest of surface. Dorsally usually with a narrow but distinct median longitudinal dark line which is widest and blackish on T3 but very narrow and copper-coloured on succeeding tergites ; on last two visible tergites median coppery line sometimes lost in general copper colouring. T3 on each side with a broad band of white pollinosity appearance of which shifts with direction of light, viewed from behind white pollinosity seen to extend thinly on to most of dorsum of the tergite ; from behind white pollinose areas appear clearly separated from one another in mid line by the broad blackish median vitta. T4 non-pollinose. T5 with usual pair of large lateral white pollinose areas which extend round on to dorsum of tergite, appearance of the white spots changing greatly with direction of light. T3 with one or two pairs of very strong erect median marginal setae (specimens with two pairs referred to by Enderlein (1936) as aberration *graphostylina*), occasionally a very strong pair flanked by a much weaker less erect outer pair, some specimens with three strong median marginals. Pollinose areas of T5 with sparse hair like rest of tergite. *Measurements* : body length 9·0 mm. (range 7·5–9·8 mm.), wing length 8·5 mm. (range 7·2–9·5 mm.) [8 specimens].

♀. Mainly like ♂ but differing as follows : frons very broad but strongly contracting towards vertex, viewed from above width of vertex about a quarter (0·25–0·28) of head width ; interfrontal area equal in width to or a little narrower than a parafrontal at level of lower proclinate orbital seta ; frontal setae more strongly crossed ; ocellar setae long and strong ; apparently always with two *ad* setae on mid tibia ; abdomen without dark fine median line and with very indistinct pollinosity dorso-laterally on T3, this tergite only noticeably white on sides and with median blackish vitta at most only partially and weakly developed. In all specimens seen only two pairs of (for *Amenia*) unusually strong proclinate orbital setae. Size range much as for ♂, holotype of *varia* Walker (in poor condition) is smallest specimen seen, body length 6·0 mm., wing length about 5·2 mm.

MATERIAL EXAMINED. *Dexia chrysame* Walker, holotype ♀, AUSTRALIA (no other data). *Musca varia* Walker, holotype ♀, AUSTRALIA (no other data). *Amenia parva* Schiner, lectotype ♂, AUSTRALIA : New South Wales, Sydney (*Novara Exp.*) and paralectotype ♂, data as for lectotype (Nat. Mus. Vienna).

AUSTRALIA : 1 ♀, Victoria, Bright (*H. W. Davey*) (B.M. Nat. Hist.) ; 1 ♀, Victoria, Ararat (*H. W. Davey*) (B.M. Nat. Hist.) ; 1 ♀, New South Wales, Laura (B.M. Nat. Hist.) ; 1 ♀, New South Wales, Sydney, 4.xii.1921 (*Health Dept.*) (B.M. Nat. Hist.) ; 2 ♂♂, New South Wales, Sydney (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Sydney (*Bridwell*) (U.S. Nat. Mus.) ; 1 ♂, Mill, Allyn Range, 18.xii.1922

(*Nicholson*) (U.S. Nat. Mus.) ; 1 ♀, New South Wales, Milson Is. (B.M. Nat. Hist.) ; 1 ♂, New South Wales, Mt. Kuring-Gai, 27.ix.1950 (*B. McMillan*, (B.M. Nat. Hist.) ; 1 ♂, Queensland, Brisbane (*Bridwell*) (U.S. Nat. Mus.) ; 1 ♂, 1 ♀, Queensland, Brisbane, 24.ix.1914 (*H. Hacker*) (U.S. Nat. Mus.) ; 1 ♀, Queensland, Eidsvold (*J. L. Bancroft*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Mackay (*G. Turner*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Kuranda (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Queensland, Herberton, 3,700 ft., xii.1910 (*Dodd*) (Staatl. Mus. Stuttgart).

In addition to the foregoing material I have seen one ♂ (in Zool. Mus. Humb. Univ.) without locality data but with the collector's name ' v. Kraatz ' ; the specimen has been labelled by Enderlein as ' Grapholostylum parvum (Schiner 1868) ' and is the one referred to in Enderlein's (1936, p. 442) paper.

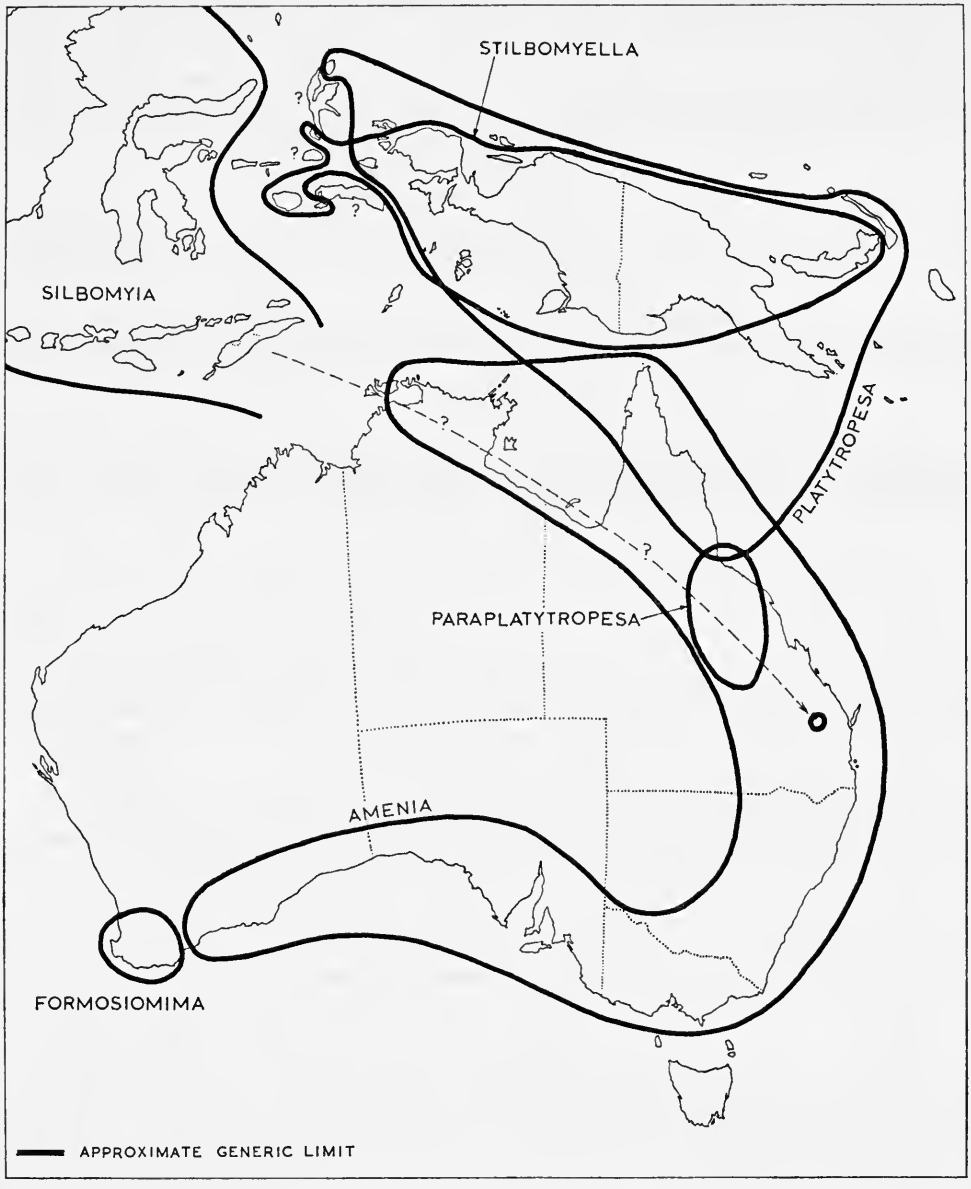
Distribution : Widespread in eastern Australia from Victoria northwards to Queensland. Hutton's (1873, 1881) record of this species from New Zealand under the name *A. parva* Schiner is erroneous, as Hutton (1900) later pointed out.

FORMOSIOMIMA Enderlein, 1936

Formosiomima Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 444. Type-species : *Formosiomima imitatrix* Enderlein, 1936 [= *Amenia nigromaculata* Malloch, 1929], by original designation.

Diagnosis. Ventral surface of costa bare between apices of veins *Sc* and R_1. Fore tibia with one *pv* seta and without *pd* setae. Cross-vein *r-m* distinctly before middle of discal cell. Body short and broad with remarkable black and whitish pattern resembling Tachinid genus *Amphibolia* Macquart. Abdominal tergites partially fused, sutures between hindmost visible tergites indistinct and without break in dense pollen cover. Marginal setae of T4 not regularly spaced as in other Ameniinae, arranged in widely separated pairs (Text-fig. 27). Scutum with pair of white sunmedian spots in addition to three marginal pairs of mesonotum. Facial carina not sexually dimorphic. ♂ eyes strongly approximated. ♂ without proclinate orbital, prevertical or outer vertical setae. Abdominal sternites of both sexes without definite strong or spiniform setae but with moderately long hair.

Discussion. *Formosiomima* is at present monotypic, containing only the single species originally described as *Amenia nigromaculata* Malloch and later described by Enderlein as *Formosiomima imitatrix*. This species differs very strikingly from all *Amenia* species not only in the remarkable *Amphibolia*-like pattern (the basis of Enderlein's name *imitatrix*) but in the partial obliteration of the sutures dorsally between the tergites and the very unusual arrangement of widely spaced pairs of marginal setae on T4 (in *Amenia* and other Ameniinae the marginal setae of T4 form an almost regular evenly spaced row) ; in my view these very exceptional characters justify the recognition of *Formosiomima* Enderlein as a genus distinct from *Amenia*. The abdominal pattern is quite differently formed from that of *Amenia* : in *Amenia* the abdomen is almost all bare and metallic with only thin silvery-white pollinosity almost entirely confined to the sides of T3 and T5 ; in *Formosiomima* most of the abdomen is very thickly and uniformly pollinose except on T1+2 and on large



spot-like areas on succeeding tergites. The areas of the abdomen in *Formosiomima* in which pollinosity is absent appear as black spots surrounded and separated by a generally pale pollinose background (Text-fig. 27) ; each of the separated pairs of marginal setae on T4 stands on a black spot. *Formosiomima* also differs from *Amenia* in the much weaker and more hair-like vestiture of the sternites, which bear no strong spiniform setae.

Distribution : Western Australia only.

Description of the Species

Formosiomima nigromaculata (Malloch, 1929) **comb. n.**

(Text-fig. 27)

Amenia nigromaculata Malloch, 1929, *Proc. Linn. Soc. N.S.W.*, **54** : 286. Holotype ♂, WESTERN AUSTRALIA. In the Division of Entomology Museum, C.S.I.R.O., Canberra. *Chaetamenia nigromaculatum* (Malloch), Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 442.

Formosiomima imitatrix Enderlein, 1936. *Veröff. dtsch. KolonMus. Bremen* **1** : 444. Holotype ♂, WESTERN AUSTRALIA. In the Zoologisches Museum der Humboldt-Universität, Berlin. **syn. n.**

Diagnosis. Diagnosis as for genus, *Formosiomima* monotypic. Immediately distinguishable from all *Amenia* species by remarkable pattern resembling that of *Amphibolia* in the Tachinidae, including presence of submedian white spots on scutum.

♂. *Head* : Interfrontal area orange or orange-yellow ; parafrontals, parafacials and genae pale orange or orange-yellow with dense golden or golden orange pollinosity ; face and epistome also yellowish orange but with thin yellowish white pollinosity ; postorbits thickly yellow to golden orange pollinose ; postbuccae semi-shining orange-yellow, inconspicuously pollinose ; occiput (except for small orange triangle behind vertex) brownish black, non-pollinose. Hair of parafrontals, genae, postbuccae and occiput entirely black. Eyes very strongly approximated and frons very narrow, upper part of interfrontal area almost eliminated but parafrontals of each side not quite meeting in mid line ; frons narrowest slightly anterior to anterior ocellus, at narrowest point about one-thirteenth (0·068–0·085) of head width. Ocellar triangle blackish, slightly raised, ocellar setae distinct. Postorbits very narrowly tapering at upper ends, occiput and long fine postocular setae just laterad of vertical setae almost abutting against eyes. Frontal setae cruciate, very weak, uppermost pairs very fine and hair like, the rows of setae reaching almost to anterior ocellus. Facial carina short and broad, antennal bases well separated and antennal foveae shallow, outer surface of carina slightly rounded and sometimes slightly sulcate ; carina shorter than distance from lunula to anterior ocellus and 1·7–2·0 times as long as epistome, latter elongate and poorly differentiated from ventral end of facial carina. Gena about two-fifths (0·39–0·43) of eye-height. Parafacial about 2·5 times as wide as third antennal segment. Antennae with first two segments mainly dark brown or black (distinction from all *Amenia* species), third segment pale orange, falling short of mouth-margin by more than their own length, third segment about 2·5 times as long as second segment ; seta on second segment shorter, arista slightly longer, than third antennal segment. Palpi yellow. *Thorax* : black, sometimes with slight bluish purple tinge round edges of spots. Mesonotum with five pairs of large boldly-marked white pollinose areas, appearance of which is fixed (not noticeably shifting with direction of light) ; five pairs of spots comprise the usual three marginal pairs, plus a pair on prescutum and a pair on scutum. Anterior pair of marginal spots are elongate, lying over humeral calli, notopleura and portion of each side of prescutum ; white marks on prescutum consist of pair of broad submedian white vittae lying just mesad of each *prst dc* row of setae and extending back almost to transverse suture ; pair of white spots on scutum large but more rounded than those on prescutum, submedian in position on posterior half of scutum, lying almost in line with prescutal white vittae. Each mesopleuron and sternopleuron with a large round white pollinose spot with fixed appearance. All thoracic white spots strongly contrasting with black background. Scutellum with four pairs of marginal setae. *Wings* : basal cells dark brown except for clear area at extreme base, wings otherwise clear hyaline. Apical half of costal margin not noticeably bowed forwards. Bend of vein *M* obtuse, distance from bend to wing margin 1·6 times as great as that between *m-cu* and bend ; on vein *M* distance from

r-m to *m-cu* 3·2–3·4 times as great as that between *m-cu* and bend. Lower calypter very dark brown except for white basal part which is hidden when wings folded back, one third of upper calypter brown and remainder opaque white. *Abdomen* : with very striking black and pale yellowish grey pattern (Text-fig. 27), the dorsum with five large bold black spots. Tergites with a thick uniform covering of pale pollinosity, usually pale yellowish grey but with a very slight greenish tinge, except for following black areas : whole of T1+2 black ; large median dorsal spot and a pair of small lateral spots on T3 black ; large median spots, pair of large sublateral spots and a pair of smaller lateral spots on T4 black ; large postero-median subtriangular area on T5 black ; in addition ventral ends of T4 and T5 black adjacent to sternites. All sternites black. Lateral and sublateral pairs of black spots on T4 sometimes nearly or just confluent ; median black spots of T3 and T4 variable in size, but set against hind margin and not reaching fore margin of each tergite. Sutures between T3 and T4, T4 and T5 almost obliterated dorsally with the pale pollinosity appearing continuous between the tergites. All black spots and T1+2 with dark purple or violaceous tinge in some lights under microscopic examination, but appearing quite black to naked eye. Median marginal setae of T3 variable, usually four but sometimes one pair only or number irregular, three or five. Transverse row of marginal setae on T4 irregular, setae standing in pairs on black spots with distinct spaces between each pair. Dorsal abdominal hair long and very fine ; hair of sternites long and strong but not at all spiniform. *Measurements* : body length 10·9, 11·0 mm., wing length 10·4, 10·5 mm. [2 specimens].

♀. Very similar to ♂ except for broad frons and broader parafacials. Interfrontal area in specimen seen 0·85 times as wide as one parafrontal at level of lowest proclinate orbital seta, parafrontals very broad and each bearing two or three proclinate orbital setae. Vertex seen from above slightly narrower than one eye, by measurement eye-vertex-eye ratio 27 : 25 : 27. Gena 0·44 of eye-height. Parafacial about 3·75 times as wide as third antennal segment. Mid tibia with four strong *ad* setae and some smaller setae interspersed in the one specimen seen.

MATERIAL EXAMINED. *Formosiomima imitatrix* Enderlain, holotype ♂, AUSTRALIA : Western Australia, Swan River (*von Preiss*).

AUSTRALIA : 1 ♂, Western Australia, Garden I., 23.viii.1959 (*Mackerras*) (B.M. Nat. Hist.) ; 1 ♀ ,Western Australia, Pt. Peron, 29.viii.1933 (*K. R. Norris*) (B.M. Nat. Hist.).

The holotype of *Amenia nigromaculata* Malloch has not been seen but this is an unmistakable species ; the two specimens mentioned above (other than *imitatrix* type) have been compared with *nigromaculata* type in Canberra and are each labelled " Paramonov det. Amenia nigromaculata Mall. compared with type ". The data of *nigromaculata* holotype are : ♂, Western Australia, Perth, 1.xi.1924 (*Nicholson*).

Distribution : Known only from the south-western part of the state of Western Australia. Paramonov (1957) has recorded several localities for this species, all in the general area of Perth.

Tribe **PARAMENIINI** Enderlein

PARAMENIINI Enderlein, 1936, *Veröff. dtsch. KolonMus. Bremen* **1** : 446.

DIAGNOSIS. Ameniinae with following characters : Head without facial carina. Prescutum with outer posthumeral seta situated laterad of presutural seta or in line with it (Text-fig. 10). Hind tibia without definite *pv* apical seta. Prosternum and propleuron bare or at most with a few very short fine inconspicuous hairs.

Type-genus : *Paramenia* Brauer and Bergenstamm, 1889.

The tribe Parameniini is at present monogeneric for *Paramenia*.

PARAMENIA Brauer and Bergenstamm, 1889

Paramenia Brauer and Bergenstamm, 1889, *Denkschr. Akad. Wiss. Wien* **56** : 151. Type-species : *Paramenia semiauriceps* Brauer and Bergenstamm, 1889, by monotypy.

Calliphoropsis Townsend, 1915, *Proc. biol. Soc. Wash.*, **28** : 22. Type-species : *Musca macularis* Walker, 1859, by original designation.

Diagnosis. Diagnostic characters as for tribe, following additional characters may be noted : Ventral surface of costa bare between apices of *Sc* and R_1. Fore tibia with one *pv* and without *pd* setae. Both sexes with strong spinous setae on abdominal sternites. ♂ with eyes approximated and frons narrow, without outer vertical, prevertical or proclinate orbital setae.

Discussion. Malloch (1928a) synonymised the species on which *Paramenia* and *Calliphoropsis* are based, and thus treated the genera as isogenotypic synonyms. The synonymy of the genera is upheld in the present treatment as the type-species are unquestionably congeneric ; but *macularis* from the Aru Islands and *semiauriceps* from the Australian mainland, although superficially extremely alike, differ constantly in major characters of the head and it appears best to regard them as distinct species in the absence of good evidence of conspecificity. In addition to these two species, one new species is here described and *divitiosa* Walker (originally described in *Chrysomya* Robineau-Desvoidy) is newly-assigned to *Paramenia* (comb. n.) ; thus four species of *Paramenia* are here recognised.

Townsend (1931) accepted Malloch's synonymy of *semiauriceps* and *macularis* and cited *Calliphoropsis* Townsend as a synonym of *Paramenia*, but later (Townsend, 1935, 1937), without explanation, treated the two genera as distinct. Enderlein (1936, p. 438) remarked that *Calliphoropsis* Townsend was unknown to him, but appears to have overlooked Malloch's (1928a) and Townsend's (1931) synonymy of this genus with *Paramenia*, for he omits any mention of *Calliphoropsis* in his brief treatment of Parameniini (p. 446). The assignment of *divitiosa* Walker and *macularis* Walker to *Lucilia* Robineau-Desvoidy by Wulp (1896) is erroneous.

Specimens of *Paramenia* vary in the development of short fine inconspicuous hair on the propleuron and prosternum, but there is no evidence that the presence or absence of hairs on these sclerites is of any value as a systematic character.

Distribution : *Paramenia* occurs from Misoöl and the Aru Islands through parts of Indonesian New Guinea to Papua and Queensland ; in Australia *Paramenia* is most abundant in Queensland, but the range extends into New South Wales, and one specimen is known from Victoria (Paramonov, 1957, p. 61). Engel (1925, p. 348) recorded *Paramenia* (identified as *semiauriceps*) from Celebes, but confirmation is needed that the genus occurs here : the two specimens (actually belonging to *P. divitiosa*) on which Engel based this record have been seen ; each bears the single word " Celebes " without other data, and the validity of the labels appears very doubtful.

Key to the Species

(1) Males

1 Eyes almost meeting in mid-line, frons reduced to very narrow strip at most only as wide as anterior ocellus. Upper third of frons anterior to ocelli without frontal hairs. Colour dark purple or bluish purple. [Queensland] . ***P. angustifrons*** sp. n. (p. 128)

– Eyes distinctly separated, frons as wide as or almost as wide as third antennal segment (about three times as wide as anterior ocellus). Frons with crossed frontal hairs reaching almost to level of anterior ocellus. Colour dark green or greenish blue in material seen (probably sometimes purplish in *divitiosa*) 2

2 Parafacials almost entirely silvery white, only narrowly golden adjacent to genae, and parafrontals pale silvery greyish. White pollinosity on scutum in area of supra-alar setae very inconspicuous, not forming spots obvious to naked eye. Dorsum of T3 with distinct covering of white pollinosity easily visible from behind. [New Guinea and Misoöl] . . . . . ***P. divitiosa*** (Walker) (p. 130)

– Parafacials and parafrontals entirely yellow to deep golden. White pollinosity on scutum in area of supra-alar setae forming conspicuous white spots distinct to naked eye. Dorsum of T3 without noticeable white pollinosity from any point of view, white pollen on this tergite confined to lateral areas 3

3 Eyes large and genae correspondingly narrow (Text-fig. 50), gena in profile only 0·16–0·17 of eye height. Third antennal segment 5·1–5·5 times as long as second segment ; antennae falling short of mouth-margin by not more than half the length of third segment. Parafacial not strongly widening towards gena, at mid-height only twice as wide as third antennal segment. [Aru Islands]
P. macularis (Walker) (p. 131)

– Eyes smaller and genae broader (Text-fig. 49), gena in profile 0·27–0·29 of eye-height. Third antennal segment 4·0–4·4 times as long as second segment ; antennae falling short of mouth-margin by at least two-thirds of length of third segment. Parafacial strongly widening towards gena, at mid-height two and a half or three times as wide as third antennal segment. [Australia]
P. semiauriceps Brauer and Bergenstamm (p. 133)

(2) Females

1 Mid tibia with one strong isolated submedian *ad* seta 2

– Mid tibia with two or three *ad* setae, basal one sometimes weak but always distinct 3

2 Colour violet purple. Gena very narrow, in profile 0·21–0·23 of eye-height. Third antennal segment 5·0–5·1 times as long as second segment ***P. angustifrons*** sp. n. (p.128)

– Colour blue with slight green tinge. Gena broader, in profile 0·26–0·28 of eye-height. Third antennal segment 4·6–4·8 times as long as second segment
? new species (see p. 136)

3 Parafacial almost entirely silvery white, only narrowly yellow or golden adjacent to gena. Eyes very long, gena in profile only 0·18–0·21 of eye-height. Colour purple or dark blue in material seen . . ***P. divitiosa*** (Walker) (p. 130)

– Parafacial yellow or golden on lower half or more, only upper half or third silvery white. Eyes slightly or conspicuously smaller, gena in profile 0·22–0·35 of eye-height. Colour almost always dark green or bluish green 4

4 Eyes smaller and gena correspondingly broad, gena in profile about a third (0·31–0·35) of eye-height. Third antennal segment 5·4–6·2 times as long as second segment. Vertex broader, from above 0·60–0·66 of width of one eye. [Australia]
P. semiauriceps Brauer and Bergenstamm (p. 133)

– Eyes larger, gena in profile about a quarter (0·22–0·25) of eye-height. Third antennal segment 6·5–7·0 times as long as second segment. Vertex narrower, from above 0·48–0·55 of width of one eye. [Aru Islands] . . ***P. macularis*** (Walker) (p. 131)

Descriptions of the Species

Note : the following characters of colour and pollinosity are common to all species and are therefore omitted from the individual descriptions :—Legs black (with slight metallic reflections on femora of same colour as body). Lower calypter mainly black-brown, only white on extreme base which is hidden by upper calypter ; upper calypter opaque white on outer part with some pale brown infuscation on inner part (in wings-folded position). Mesopleuron and sternopleuron each with a very large thickly white pollinose spot occupying most of the sclerite. Abdominal T3 on each side with an area of shining white pollen, appearance of the lateral white spots shifting with light. Abdominal T5 with a pair of very large white pollinose areas occupying most of sides of tergite and nearly meeting one another mid-dorsally, appearance shifting with direction of light but spots very conspicuous from behind.

Paramenia angustifrons sp. n.

(Text-figs. 45, 48)

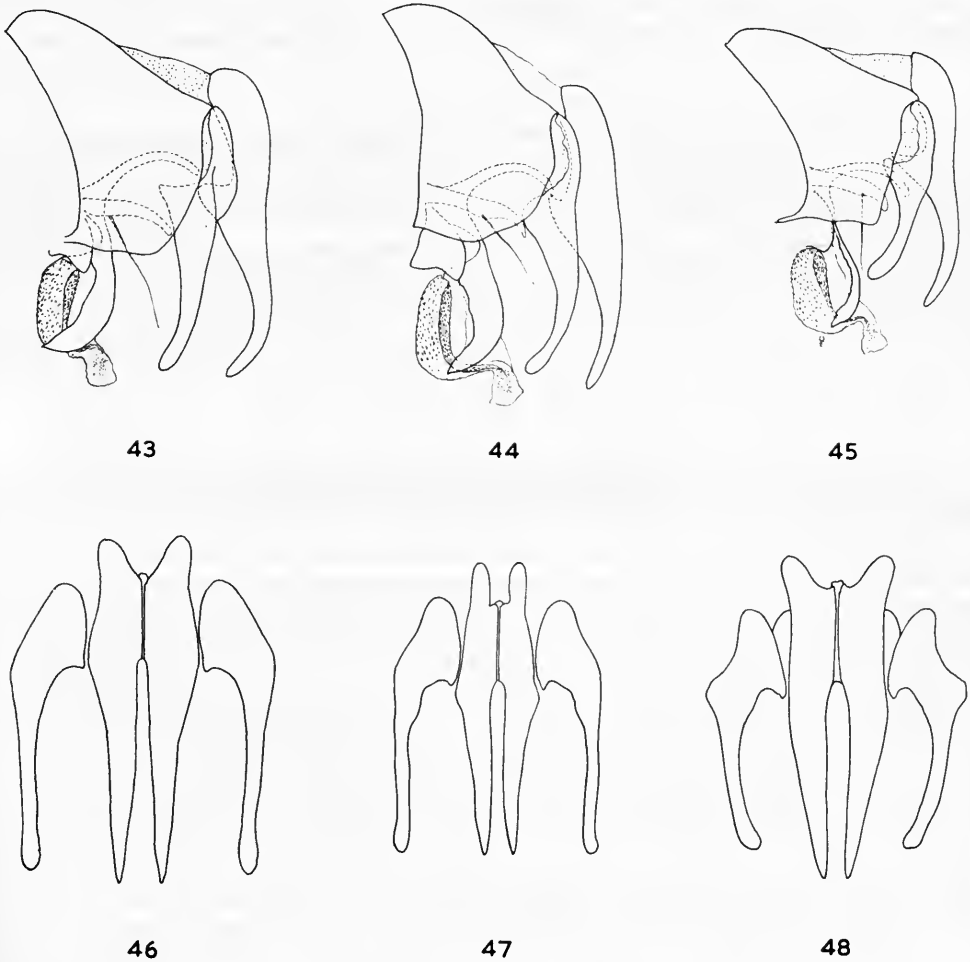
Diagnosis. ♂ eyes nearly meeting, upper part of frons almost obliterated and without frontal hairs ; ♀ with only one *ad* seta on mid tibia *and* with gena less than one quarter of eye-height. General colour violet-purple.

♂. *Head* : Interfrontal area dark brown. Parafrontals pale yellowish grey or silvery grey pollinose ; parafacials and genae bright yellow or deep golden pollinose, the yellow colour of upper parafacials merging gradually into greyish colour of parafrontals ; facialia and peristomal strip blackish brown ; epistome yellowish ; face with blackish ground colour under antennae, more yellowish towards epistome, with thin white pollinosity ; postorbits densely silvery white pollinose ; occiput black with thin white pollen covering. Genal hair golden yellow. Eyes very strongly approximated, almost meeting in mid-line and upper part of frons reduced to very narrow strip only about as wide as anterior ocellus. Cruciate frontal setae weak, uppermost pairs very short fine and hair-like, frontal hairs absent altogether from upper third of frons below anterior ocellus. Eyes in profile very elongate, gena only 0·17–0·19 of eye-height. Parafacial at mid-point about one and a half times as wide as third antennal segment. Antennae blackish brown, third segment 4·0–4·2 times as long as second segment and falling short of mouth-margin by about half its length. Palpi yellowish brown. *Thorax* : mainly dark purple or violet-purple, sometimes with traces of bluish green colour on prescutum and scutum or around sternopleural spot. Dorsum with very distinct thin white pollen covering when seen from behind, white pollinosity thickest around margins of mesonotum, that in areas of supra-alar setae distinct to naked eye. *Wings* : clear hyaline, except for usual slight darkening at extreme base. *Legs* : mid tibia with a single strong *ad* seta which is not preceded by any smaller *ad* setae. *Abdomen* : dark purple or violet-purple, sometimes blue-violet. Dorsum of T3 seen from behind shining and without trace of any covering of white pollinosity. T3 either without median marginal setae or with one or a pair (as in holotype) of such setae very weakly developed. Hair of T5 very long and exceedingly fine, hairs hardly at all thickened towards their bases. ♂ hypopygium as in Text-figs. 45 and 48. *Measurements* : body length 10·4 mm. (range 9·2–11·7 mm.), wing length 10·1 mm. (range 8·9–11·4 mm.) [5 specimens].

♀. Generally like ♂ except for details of head. Lower half of parafacials golden and upper half (like the parafrontals) silvery white. Gena 0·21–0·23 of eye-height. Antennae more elongate than in ♂, third segment 5·0–5·1 times as long as second segment and falling short of mouth-margin by only about one third of its length. Vertex about four-sevenths (0·55–0·59)

of width of one eye viewed from above. Parafacial at mid-point about twice as wide as third antennal segment. Mid tibia as in ♂ with only one isolated *ad* seta (cf. *semiauriceps*). *Measurements* : body length 11·8 mm. (range 11·2–12·4 mm.), wing length 10·6 mm. (range 9·8–11·6 mm.) [4 specimens].

MATERIAL EXAMINED. Holotype ♂, AUSTRALIA : Queensland, Kuranda (*F. P. Dodd*). In the Division of Entomology Museum, C.S.I.R.O., Canberra. Paratypes : AUSTRALIA : 1 ♀, data as for holotype (Div. Ent. Mus. Canberra) ; 1 ♂, 2 ♀♀, data as for holotype (B.M. Nat. Hist.) ; 2 ♂♂, Queensland, Kuranda, ix.1910 (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Townsville (*F. P. Dodd*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Herberton, 3,700 ft., xi.1911 (*Dodd*) (U.S. Nat. Mus.).



FIGS. 43–48. ♂ hypopygium (lateral view) and mesolobes and paralobes (posterior view) of *Paramenia* : (43 and 46) *P. divitiosa* (Walker). (44 and 47) *P. macularis* (Walker). (45 and 48) *P. angustifrons* sp. n.

The specimen from Herberton in U.S. Nat. Mus. bears a determination label by Engel as ' semiauriceps ' and one by Townsend as ' macularis '. Engel (1925) and Enderlein (1936) both record two specimens of *Paramenia* from Herberton with data identical to that of the specimen in U.S. Nat. Mus. ; these specimens have not been seen but from Enderlein's brief description (Enderlein, 1936, p. 446, under the non-existent erroneous name ' P. auriceps B.B.') almost certainly belong to *P. angustifrons* sp. n. Paramonov's (1957) record of *P. macularis* from Kuranda, Queensland, refers to this species.

Distribution : Known only from the localities cited above in northern Queensland. To judge from the limited amount of material so far available the range appears to lie to the north of, and not to overlap with, that of *P. semiauriceps*.

Affinities. *P. angustifrons* sp. n. is undoubtedly a true *Paramenia* but stands slightly apart from other species because of the exceedingly narrow ♂ frons and presence of only one *ad* seta on the ♀ mid tibia ; it is easily distinguished from *P. semiauriceps*, the only other Australian species, also by the purplish colour and by the much narrower gena and more elongate eye.

Paramenia divitiosa (Walker, 1864) **comb. n.**

(Text-figs. 43, 46)

Chrysomyia divitiosa Walker, 1864, *Proc. Linn. Soc. Lond.* (*Zool.*), **7** : 215. Holotype ♀, MYSOL (= MISOÖL). In the British Museum (Natural History), London.

Diagnosis. Parafacials of both sexes almost entirely silvery white, only very narrowly golden yellow for about lower sixth or seventh adjacent to genae. White pollinosity on scutum in areas of supra-alar setae inconspicuous, not forming white spots obvious to naked eye.

♂. *Head* : Interfrontal area dark reddish brown. Parafrontals and almost all of parafacials densely silvery white pollinose ; extreme ventral ends of parafacials (about lower seventh) and all of genae golden yellow pollinose ; facialia blackish brown with thin whitish pollinosity ; epistome and lower face pale reddish yellow ; upper face beneath antennae with blackish ground colour covered by thin greyish white pollen ; postorbits thickly creamy white pollinose ; occiput black with thin whitish pollinosity. Genal hair golden yellow. Eyes conspicuously separated, frons at narrowest point nearly as wide as third antennal segment and about three times as wide as anterior ocellus, parafrontals of each side meeting in mid-line and upper interfrontal area therefore entirely occluded. Lowest pairs of cruciate frontal setae well developed but uppermost pairs fine and hair-like and reaching to level of anterior ocellus. Eyes in profile very elongate, gena only 0·17 of eye-height. Parafacial at mid-point twice as wide as third antennal segment. Antennae very dark reddish brown, third segment 5·7 times as long as second segment and falling short of mouth-margin by about two-fifths of its length. Palpi yellow brown. *Thorax* : dark greenish blue with traces of violet on mesonotum and scutellum (probably sometimes entirely purplish). Dorsum with thin but distinct covering of white pollinosity when seen from behind, pollen thicker round margins of mesonotum but that in areas of supra-alar setae not forming spots conspicuous to naked eye. *Wings* : almost clear hyaline, very faintest trace of yellowish brown tinge in addition to usual basal darkening. *Legs* : mid tibia with two *ad* setae. *Abdomen* : dark greenish blue with violaceous reflections, especially ventrally ; T3 with traces of a black median vitta in some lights. Dorsal surface of T3 with a conspicuous covering of white pollinosity when seen from behind, pollen on most of dorsum

except for median dark vitta. T3 without median marginal setae. Hair of T3 and T4 all recumbent, that of T5 erect and fine. ♂ hypopygium as in Text-figs. 43 and 46. *Measurements* : body length 12·3 mm., wing length 10·0 mm. [1 specimen].

♀. General colour from dark greenish blue to dark purplish, holotype specimen purple. Agreeing with ♂ in having almost entirely silvery white parafacials with golden colour confined to lower sixth adjacent to genae. Gena 0·18–0·21 of eye-height. Antennae with third segment 5·9–6·3 times as long as second segment, falling short of mouth-margin by a little under one third of length of third segment. Vertex only about half (0·48–0·55) as wide as one eye viewed from above. Parafacial at mid-point about two and a half times as wide as third antennal segment. Mid tibia almost always with three *ad* setae of which basal one small, occasionally only two, one specimen seen with four. *Measurements* : body length 13·5 mm. (range 12·2–15·1 mm.), wing length 11·9 mm. (range 10·8–13·2 mm.) [8 specimens].

Material examined. Holotype ♀, Misoöl Island (Indonesian New Guinea) (*A. R. Wallace*).

Indonesian New Guinea : 3 ♀♀, Fak-Fak (*A. E. Pratt*) (B.M. Nat. Hist.) ; 1 ♀, Bernhard Camp, 50 m., 22.xii.1938 (*Neth. Ind.–American N. Guin. Expedit. J. Olthof*) (Rijksmus. Leiden).

New Guinea (presumed Indonesian but no accurate data) : 1 ♀ (*Macke*) (Rijksmus. Leiden) ; 2 ♀♀ (*A. R. Wallace*) (B.M. Nat. Hist.).

In addition to foregoing material : 1 ♂, 1 ♀ in Staatl. Mus. Stuttgart, each labelled " Celebes " without other data, but this label probably erroneous ; these specimens recorded by Engel (1925, p. 348) erroneously as *P. semiauriceps* B.B.

Distribution : Probably confined to the western part of Indonesian New Guinea with its adjacent islands (including Misoöl, the type-locality), but the small amount of material seen is poorly labelled so that exact localities cannot be fixed. The ♀ specimen of *Paramenia* recorded under the name ' P. auriceps ' [sic] by Enderlein (1936) from the Central Range, Dutch New Guinea, has not been seen but is almost certainly this species.

Affinities. Most closely allied to *P. macularis* (Walker), with similar long eye and narrow gena and with vertex of same width in ♀, but distinguished by almost all silvery white parafacials ; antennae slightly longer than in *macularis*.

Paramenia macularis (Walker, 1859)

(Text-figs. 44, 47, 50)

Musca macularis Walker, 1859, *Proc. Linn. Soc. Lond* (*Zool.*), **3** : 104. Lectotype ♂, ARU ISLANDS. In the British Museum (Natural History), London. *Paramenia macularis* (Walker), Malloch, 1928, *Proc. Linn. Soc. N.S.W.*, **53** : 330.

Lectotype Designation : the type-material of *Musca macularis* Walker consists of one ♂ and two ♀ syntypes in B.M. Nat. Hist. The ♂ syntype has been labelled and is here designated as lectotype.

Diagnosis. ♂ eyes separated by width of third antennal segment, parafacials entirely yellow and gena one-sixth of eye-height ; ♀ mid tibia with two or more *ad* setae, only upper third or half of parafacial white, gena about a quarter of eye-height and third antennal segment at least 6·5 times as long as second.

♂. *Head* : Interfrontal area dark reddish brown. Parafrontals pale or lemon yellow pollinose ; parafacials entirely yellow to deep golden pollinose, very slightly paler towards parafrontals ; genae golden yellow pollinose ; facialia blackish brown near vibrissae and on inner parts, more reddish yellow on facial ridges themselves, with thin whitish pollinosity ; epistome and lower face reddish yellow, upper face with brownish or blackish ground colour thinly obscured by whitish pollinosity ; postorbits silvery white pollinose ; occiput blackish with dark green metallic tinge, thinly covered with whitish pollinosity. Genal hair yellow or golden orange. Eyes well separated, frons at narrowest about as wide as third antennal segment, parafrontals on upper part of frons more or less meeting in mid-line. Crossed frontal setae moderately strong near lunula but becoming very fine, short and hair-like towards anterior ocellus, parafrontals near anterior ocellus with some fine hairs more or less in continuation with crossed frontal hairs. Gena narrow, 0·16–0·17 of eye-height. Parafacial at mid-point about twice as wide as third antennal segment or slightly less. Antennae dark reddish brown, third segment 5·1–5·5 times as long as second segment and falling short of mouth-margin by about two-fifths of its length. Palpi reddish yellow. *Thorax* : dark green or bluish green, mesonotum sometimes with coppery tinge and scutellum sometimes more bluish. White pollen on mesonotum very thin and inconspicuous except marginally, most of scutum with scarcely any trace of white pollinosity except for usual patches in areas of supra-alar setae and these not forming white spots conspicuous to naked eye (cf. *semiauriceps*). *Wings* : with a faint but definite yellowish brown tinge, due mainly to slight yellowish infuscation along veins. *Legs* : mid tibia with two strong *ad* setae, proximal one very distinct. *Abdomen* : shining dark green, blue green or blue with traces of violet colour. T3 without definite white pollinosity on dorsum of T3, with only very faintest traces visible from behind. T3 without median marginal setae. Hair of T3 and T4 entirely recumbent, that of T5 long fine and erect. ♂ hypopygium as in figs. 44 and 47. *Measurements* : body length 11·8 mm. (range 11·2–12·9 mm.), wing length 9·6 mm. (range 8·9–10·6 mm.) [3 specimens].

♀. Differing from ♂ in having parafrontals and upper third or half of parafacials silvery white pollinose ; extreme upper ends of parafrontals sometimes very thinly pollinose and appearing metallic dark green. Gena 0·22–0·25 of eye-height. Antennae very elongate, third segment 6·5–7·0 times as long as second segment and falling short of mouth-margin by about a third of its length or a little less. Vertex only about half (0·48–0·55) as wide as one eye viewed from above. Parafacial at mid-point about two and a half times as wide as third antennal segment. Mid tibia with two strong *ad* setae, sometimes a small third *ad* seta in addition nearer the base. *Measurements* : body length 13·3 mm. (range 12·4–14·2 mm.), wing length 11·4 mm. (range 10·4–12·3 mm.) [8 specimens].

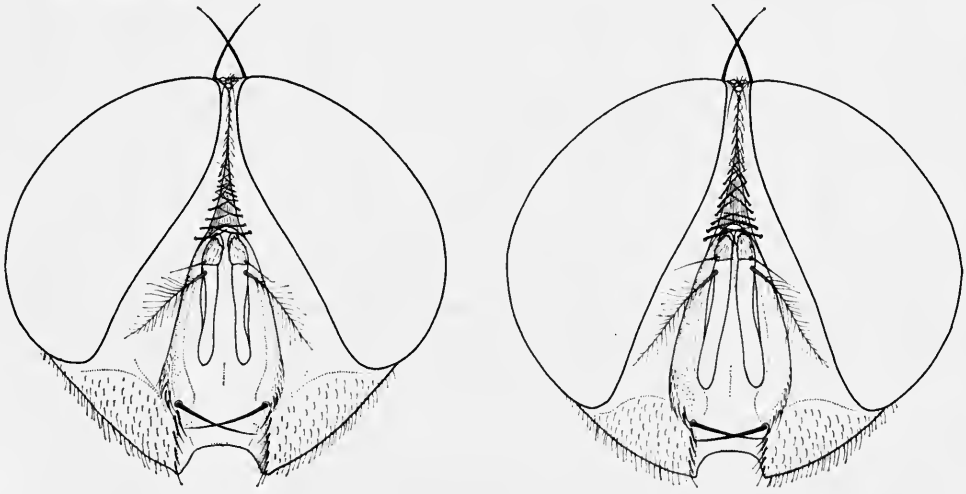
MATERIAL EXAMINED. Lectotype ♂, ARU ISLANDS : (*A. R. Wallace*) ; paralectotypes : 2 ♀♀, data as for lectotype.

ARU ISLANDS : 1 ♂, 3 ♀♀, Aru Islands (no other data) (*ex coll. Bigot*, B.M. Nat. Hist.) ; 1 ♂, 3 ♀♀, Aru Islands, 1911 (*Elger, W. W. Froggatt coll.*)(Div. Ent. Mus. Canberra). Last four specimens are those already recorded in the literature by Paramonov (1957) from Aru Islands.

In addition two specimens have been seen whose identity is doubtful, but which I tentatively associate with *macularis*. The data are : 2 ♀♀, NEW GUINEA : Bivak (= Biak) Island, xii.1909 and i.1910 (*Lorentz*) (B.M. Nat. Hist. and Rijksmus. Leiden) ; these two females differ from typical *macularis* from the Aru Islands by having more distinctly reddish antennae and paler yellow genae, by the possession of a small *pd* seta on the fore tibia (absent in all other *Paramenia* seen), by the slightly shorter antennae with third segment 6·0–6·2 times as long as second, by very slightly broader gena and vertex and slightly narrower parafacials. They may represent a new species, but for the present there is insufficient evidence of this.

Distribution : Only certainly known to occur in Aru Islands. All material recorded by earlier authors from Australia as *P. maculatis* belongs to *P. semiauriceps.*

Affinities. Probably closest to *P. divitiosa* (Walker), to judge from similarity of structural proportions of head, but superficially much more closely resembling *P. semiauriceps* Brauer and Bergenstamm. *P. maculatis* is easily distinguished from *P. divitiosa* by the extent of yellow coloration on the parafacials (all yellow in ♂, half or two-thirds yellow in ♀) ; differences from *P. semiauriceps* are discussed under this species.



49 50

Figs. 49 and 50. ♂ head in facial view of (49) *Paramenia semiauriceps* Brauer and Bergenstamm and (50) *Paramenia maculatis* (Walker).

Paramenia semiauriceps Brauer and Bergenstamm, 1889

(Text-fig. 49)

Paramenia semiauriceps Brauer and Bergenstamm, 1889, *Denkschr. Akad. Wiss. Wien* **56** : 151, 171. Holotype ♀, AUSTRALIA (citation of New Zealand by Brauer and Bergenstamm, *op. cit.* p. 171 in error). In the Naturhistorisches Museum, Vienna.

Diagnosis. ♂ eyes separated by width of third antennal segment, parafacials entirely yellow and gena two-sevenths of eye-height ; ♀ mid tibia with two or three *ad* setae, upper half of parafacial silvery white, gena one-third of eye-height.

♂. *Head* : Interfrontal area red-brown. Parafrontals bright yellow pollinose ; parafacials and genae bright yellow or golden yellow pollinose ; facialia mainly pale to dark reddish brown, sometimes slightly blackish near vibrissae, with thin white pollinosity, more reddish yellow with yellow pollinosity on outer facial ridges ; epistome and lower face reddish yellow, upper face more reddish to blackish brown under a thin covering of whitish pollinosity ; postorbits white or silvery white pollinose, sometimes very slightly creamy white ; occiput black with thin white pollinosity. Genal hair bright yellow. Eyes distinctly separated, frons at narrowest point as

wide as or slightly wider than third antennal segment, upper parafrontals meeting one another in mid-line and upper part of interfrontal area therefore completely occluded. Cruciate frontal setae rather weak, becoming very weak and hair-like towards anterior ocellus but reaching more or less to level of latter. Eye unusually short and gena correspondingly broad, gena in profile 0·27–0·29 of eye-height. Parafacial very conspicuously widening ventrally towards gena, at mid-point two and a half or three times as wide as third antennal segment. Antennae very dark reddish brown or blackish brown, third segment only 4·0–4·4 times as long as second segment and falling short of mouth-margin by about three-quarters of its length. Palpi brownish yellow. *Thorax* : usually dark green, sometimes with coppery reflections, but sometimes bluish green ; scutellum often more distinctly blue than mesonotum, and sometimes violet blue. Mesonotum with general covering of white pollinosity extremely thin and inconspicuous, but scutum on each side in area of supra-alar setae with an elongate densely white pollinose spot which is very conspicuous to naked eye and sharply defined. *Wings* : clear hyaline. *Legs*: almost always with only one isolated *ad* seta, very occasionally with a second much smaller seta nearer the base. *Abdomen* : from shining dark green, sometimes with reddish copper tinge, to violet blue, often more distinctly blue than thorax ; ventral surface usually rather blue in specimens with green dorsum and violet in specimens with blue dorsum. Dorsum of T3 hardly at all pollinose, only with very thinnest traces in some lights. T3 without median marginal setae. Hair of mid dorsum of T3 and T4 very short and semi-erect or erect, only recumbent dorsally on sides of these tergites ; hair of T5 fine and erect. ♂ hypopygium very similar to that of *P. macularis* (Text-figs. 44 and 47). *Measurements* : body length 12·1 mm. (range 10·0–13·9 mm.), wing length 11·0 mm. (range 9·4–12·3 mm.) [12 specimens].

♀. Differing from ♂ in having parafrontals and upper half of parafacials silvery white. Gena unusually broad, 0·31–0·35 of eye-height. Antennae with third segment 5·4–6·2 times as long as second segment and falling short of mouth-margin by nearly half the length of third segment. Vertex slightly broader than in other species, 0·59–0·66 of width of one eye viewed from above. Parafacial at mid-point about three times as wide as third antennal segment. Mid tibia with two strong *ad* setae, sometimes with a third much smaller *ad* seta nearer the base. *Measurements* : body length 12·5 mm. (range 10·4–14·5 mm.), wing length 10·6 mm. (range 8·7–12·2 mm.) [12 specimens].

MATERIAL EXAMINED. Holotype ♀, AUSTRALIA : Port Denison, 1868 (*Thorey*).

AUSTRALIA : 1 ♂, Queensland, Hayman Island, 18.x.1950 (*R. Dobson*) (Div. Ent. Mus. Canberra) ; 1 ♂, Queensland, Eidsvold (B.M. Nat. Hist.) ; 1 ♀, Queensland, Eidsvold, x.1929–iv.1930 (*T. L. Bancroft*) (Div. Ent. Mus. Canberra) ; 1 ♀, Queensland Eidsvold (Div. Ent. Mus. Canberra) ; 1 ♀, Queensland, Burpengarry (*T. L. Bancroft*) (B.M. Nat. Hist.) ; 1 ♂, 1 ♀, Queensland, Mt. Gravatt, 28.ii.1916 (*T. Batchelor*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Stanthorpe, 26.x.1926 (B.M. Nat. Hist.) ; 1 ♂, Queensland, Mt. Gravatt, 19.ii.1915 (*T. Batchelor*) (B.M. Nat. Hist.) ; 1 ♀, Queensland, Botanic Gardens, 9.v.1916 (*H. Jarvis*) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Tweed Hds., 9.xi.1910 (*Batchelor*) (B.M. Nat. Hist.) ; 2 ♂♂, Queensland, Stradbroke, 20.ix. 1915 (*J. C. Bridwell*) (U.S. Nat. Mus.) ; 1 ♂, Queensland, Stradbroke Island, 5.xii. 1913 (*H. Hacker*) (U.S. Nat. Mus.) ; 1 ♂, 11 ♀♀, Queensland, Yeppoon, 28.iii.1950 (*I. F. B. Common*) (Div. Ent. Mus. Canberra) ; 3 ♀♀, Queensland, Yeppoon, 28.iii. 1950 (*I. F. B. Common*) (B.M. Nat. Hist.) ; 2 ♂♂, Queensland, Yeppoon, 20 & 27.xii. 1961 (*I. F. B. Common*) (Div. Ent. Mus. Canberra) ; 2 ♂♂, Fairy Bower, Rockhampton, 15.i.1962 (*I. F. B. Common*) (Div. Ent. Mus. Canberra) ; 1 ♂, Olsen's Caves, 13 mls. N. of Rockhampton, 25.iii. 1950 (*I. F. B. Common*) (Div. Ent. Mus. Canberra) ; 1 ♂, 2 ♀♀, Queensland, Palm Is., 20.xii.1930–6.i.1931 (*I. M. Mackerras*) (Div. Ent. Mus. Canberra) ; 1 ♀, Queensland, Palm Is., 20.xii.1930–6.i.1931 (*I. M.*

Mackerras) (B.M. Nat. Hist.) ; 1 ♂, Queensland, Palm Is., xii.1931 (*Mackerras*) (Div. Ent. Mus. Canberra) ; 1 ♀, Queensland, Wallaville, 1933 (Div. Ent. Mus. Canberra) ; 1 ♀, New South Wales, Gooranbong, 26.ii.1950 (*B. McMillan*) (B.M. Nat. Hist.) ; 1 ♀, New South Wales, Collaroy, 2.i.1959 (*K. R. Norris*) (Div. Ent. Mus. Canberra) ; 2 ♂♂, New South Wales, Sydney (*Bridwell*) (U.S. Nat. Mus.) ; 1 ♂ New South Wales, Toronto, Filmer (*Health Dept.*) (B.M. Nat. Hist.) ; 1 ♀, labelled ' N. Holl.' [=Australia], *ex coll. Bigot* (B.M. Nat. Hist.).

In addition to the foregoing material one specimen has been seen which is larger than typical *semiauriceps* and, although a ♀, has only a single isolated *ad* seta on middle tibia. This specimen is tentatively assigned to *semiauriceps* ; the data are : 1 ♀, Queensland, Byfield, 22.i.1961 (*I. F. B. Common*) (Div. Ent. Mus. Canberra).

Distribution : *P. semiauriceps* is confined to eastern Australia, where it occurs most commonly in southern Queensland ; a few specimens are known from New South Wales, and Paramonov (1957) has recorded a specimen—under the name *P. macularis*—from Elsternwick, Victoria. *P. semiauriceps* appears to be absent from northern Queensland, and to be replaced in the Kuranda area by *P. angustifrons* sp. n. ; the most northerly known localities of *P. semiauriceps* in Queensland are the off-shore islands, Hayman, Magnetic and Palm Island, and on the Queensland mainland *P. semiauriceps* is not yet known further north than Yeppoon (23° 05′ S.).

Australian specimens of *Paramenia* recorded by Malloch (1928a) and Paramonov (1957) as *P. macularis* are all *P. semiauriceps*, and specimens recorded as *semiauriceps* by Engel (1925) and Enderlein (1936) from localities outside Australia belong to other species.

Brauer and Bergenstamm (1889, p. 171) cited New Zealand as the type-locality of *semiauriceps* in the original description, but this is clearly an inadvertant error as on an earlier page (*op. cit.* p. 151), where the generic description of *Paramenia* is given, they correctly cite ' Neuholland ' (= Australia).

Affinities. *P. semiauriceps* is close to, and superficially extremely similar to, *P. macularis* (with which it was synonymised by Malloch, 1928a) ; however the differences indicated in the foregoing key to species are constant and of some magnitude and justify the recognition of two distinct species, at least for the present. In addition to the differences in the eye size, width of gena, length of antennae, width of parafacial and width of vertex, the following differences between *macularis* and *semiauriceps* should be noted : in *semiauriceps* the wings are clear hyaline, but in *macularis* have a faint though distinct yellowish brown tinge ; in *semiauriceps* the white pollinose lateral spots on the scutum are very boldly marked and obvious to the naked eye, whereas in *macularis* they are only faintly indicated and very indefinite to naked eye ; in the ♂ of *semiauriceps* the hair in the mid dorsum of abdominal tergites 3 and 4 is very distinctly erect or semi-erect while in *macularis* all hair on the tergites is recumbent ; in ♂ *semiauriceps* there is only one *ad* seta on the mid tibia (exceptionally a second very small *ad* seta) while in all ♂ *macularis* seen there are two strong *ad* setae on mid tibia (character possibly not constant) ; in *semiauriceps* the epistome is distinctly longer and slightly more prominent than

in *macularis* and the vibrissae therefore conspicuously further from the mouth-margin than in *macularis*.

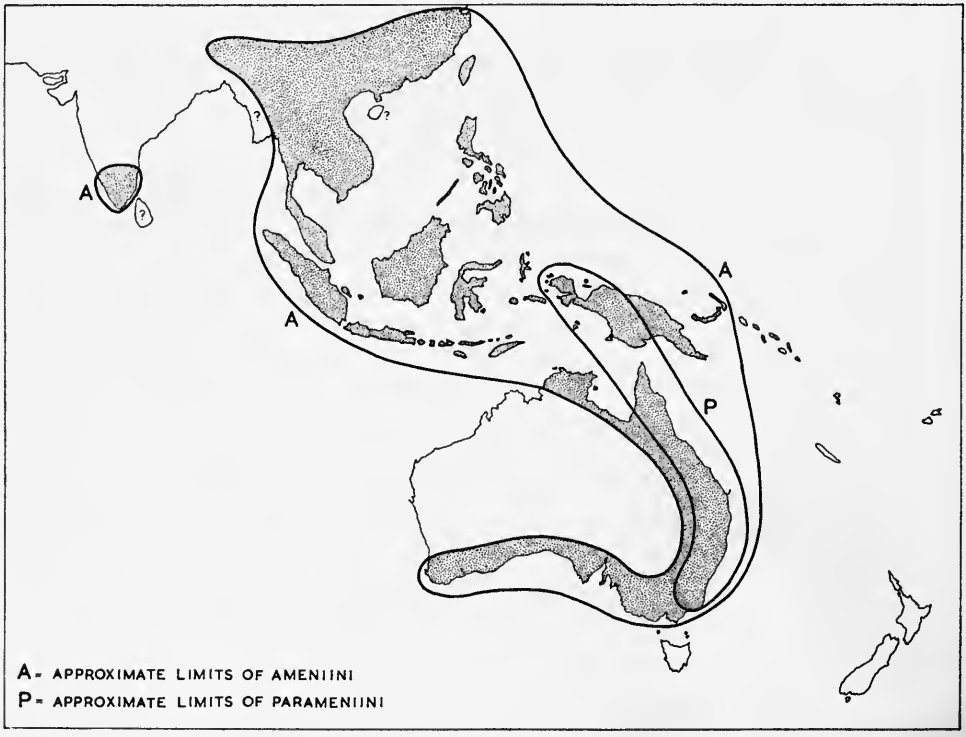
The unusually broad gena and relatively short eye distinguish *semiauriceps* from all the other species.

Paramenia sp. indet.

Three female specimens of *Paramenia* have been seen which cannot be reliably assigned to any of the foregoing species, and which may represent a new species ; at present it is premature to describe these as new, especially in the absence of associated males, but the characters by which they differ from *P. angustifrons* sp. n., the most similar species, are indicated below.

Colour blue (not distinctly purple as in *angustifrons*) and genae and lower parafacials very intensely golden ; gena slightly broader and eye shorter in profile, gena 0·26–0·28 of eye-height (0·21–0·23 in *angustifrons*) ; vertex 0·61 as wide as one eye viewed from above (0·55–0·59 in *angustifrons*) ; antennae slightly shorter, third segment 4·6–4·8 times as long as second segment (5·0–5·1 in *angustifrons*). In other respects very similar to *P. angustifrons* sp. n. and agreeing with this species in having in the female only one strong isolated *ad* seta on mid tibia (in *P. semiauriceps* always at least two such setae in female).

Data of the specimens are 3 ♀♀, AUSTRALIA : Queensland, 14 mls. N.W. of Brisbane, 27.xii.1959 (*R. Straatman*) (Div. Ent. Mus. Canberra and B.M. Nat. Hist.)



SUMMARY OF REVISED CLASSIFICATION OF AMENIINE FLIES

Names in synonymy indented : T.-S. = type-species of genus having priority.

Family CALLIPHORIDAE Brauer and Bergenstamm, 1889

Subfamily AMENIINAE Brauer and Bergenstamm, 1889

Tribe AMENIINI Brauer and Bergenstamm, 1889

Genus *SILBOMYIA* Macquart, 1843
STILBOMYIA Agassiz, 1846
MEGALOPREPES Bigot, 1859 **syn. n.**
SPINTHEMYIA Bigot, 1859
albonotata (Bigot, 1859) **comb. n.**
prospera (Walker, 1860) **syn. n.**
nitidissima Vollenhaven, 1863 **syn. n.**
philippinensis sp. n.
fulgida (Bigot, 1859)
sumba sp. n.
palawana sp. n.
parvula Baranov, 1938
minor Malloch, 1930
timorensis sp. n.
fuscipennis (Fabricius, 1805) T.-S.
mackerrasi sp. n.
latigena Enderlein, 1936
sauteri Enderlein, 1936
sauteri var. *viridis* Enderlein, 1936
hoeneana Enderlein, 1936
asiatica sp. n.
metallica sp. n.

Genus *PLATYTROPESA* Macquart, 1851
LIOSTIRIA Enderlein, 1936 **syn. n.**
auriceps Macquart, 1851 T.-S.
opulenta (Walker, 1859) **syn. n.**
decrescens (Walker, 1864) **syn. n.**
dubia (Malloch, 1935) **comb. n.**
ralumensis (Enderlein, 1936) **syn. n.**
simulans sp. n.

Genus *STILBOMYELLA* Malloch, 1935
DOLESCHALLIUS Enderlein, 1936 **syn. n.**
nigrocostalis (Doleschall, 1858) **comb. n.**
gloriosa (Walker, 1859) **syn. n.**
costalis (Walker, 1860) **syn. n.**
diffusa (Walker, 1861) **syn. n.**
nitens Malloch, 1935 T.-S.

Genus *PARAPLATYTROPESA* gen. n.
rieki (Paramonov, 1957) **comb. n.** T.-S.

Genus *AMENIA* Robineau-Desvoidy, 1830
PTYLOSTYLUM Macquart, 1851
NEOAMENIA Malloch, 1930 **syn. n.**
CHAETAMENIA Enderlein, 1936 **syn. n.**
sexpunctata Malloch, 1933
imperialis imperialis Robineau-Desvoidy, 1830 T.-S.
imperialis dubitalis Malloch, 1927 **stat. n.**
latifrons (Enderlein, 1936) **syn. n.**
leonina leonina (Fabricius, 1775)
stictica Engel, 1925
leonina albomaculata (Macquart, 1851) **stat. n.**
leonina enderleini Paramonov, 1957 **syn. n.**
longicornis (Malloch, 1930)
chrysame (Walker, 1849)
varia (Walker, 1852) **syn. n.**
parva Schiner, 1868

Genus *FORMOSIOMIMA* Enderlein, 1936
nigromaculata (Malloch, 1927) **comb. n.**, T.-S.
imitatrix Enderlein, 1936 **syn. n.**

Tribe PARAMENIINI Enderlein, 1936

Genus *PARAMENIA* Brauer and Bergenstamm, 1889
CALLIPHOROPSIS Townsend, 1915
angustifrons sp. n.
divitiosa (Walker, 1864) **comb. n.**
macularis (Walker, 1859)
semiauriceps Brauer and Bergenstamm, 1889 T.-S.

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A REVISION OF THE NODINI AND A KEY TO THE GENERA OF EUMOLPIDAE OF AFRICA (COLEOPTERA: EUMOLPIDAE)

B. J. SELMAN

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BY

B. J. SELMAN

Dept. of Agricultural Zoology, University, Newcastle-on-Tyne

Pp. 141-174 ; 27 *Text-figures*

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TRUSTEES OF
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CONTENTS

SYNOPSIS

The genera of the Eumolpidae of the Ethiopian region are revised and the tribes defined. In the tribe Nodini the genera are redefined and the species are revised. A key is given to the African genera of the Eumolpidae. An appendix is included listing some of the taxonomic changes of the Madagascan species necessitated by the present work.

INTRODUCTION

The Eumolpidae is a large chrysomeloid family. Sixty-four genera, containing a very large number of species, are found on the mainland of Africa south of the Sahara Desert. They are commonest in tropical forest and on trees and shrubs in the more thickly wooded savannas. Thus they are often serious pests of plantation crops, e.g. coffee, cocoa, tea and cotton. All the larvae found up to the present time are root feeders.

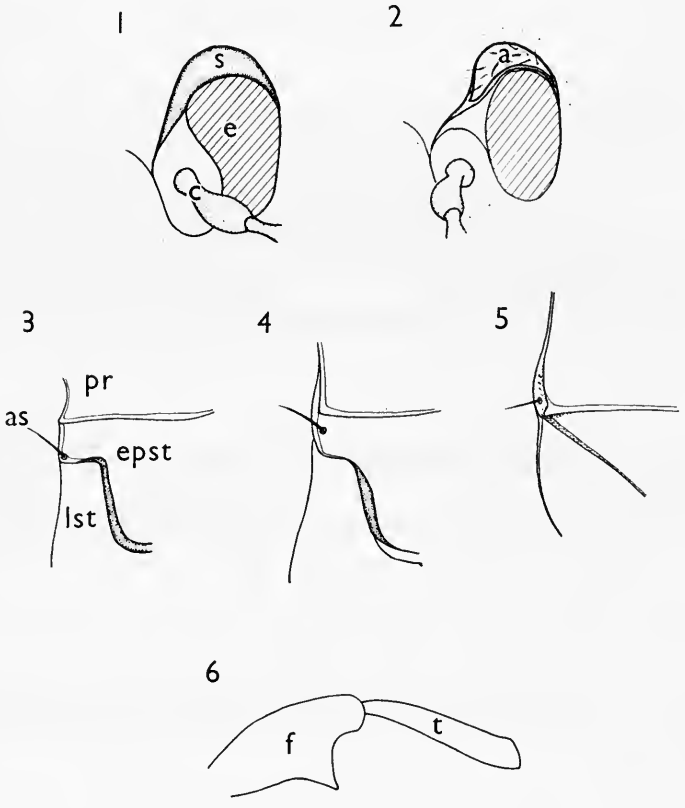
Few studies have been made on the African genera since the works of Lefèvre, Baly and Chapuis, though large numbers of new species have been described. The present work began as an attempt to produce a key to the African genera, and the tribe Nodini was found to be hopelessly confused and in need of complete revision.

In this paper a key has been made to sixty-three of the African genera, excluding *Angoleumolpus* Pic (1938). Only one species from this genus has been found. This was described by Pic but has unfortunately proved to belong to a different tribe from that indicated by the generic description. The present work is based mainly on the extensive collections of the British Museum (Nat. Hist.), supplemented by loans of generic type-species from other museums. In the tribe Nodini, where wholesale movement of species from one genus to another has been necessary, only those species which have been seen by the author have been moved. This represents

sixty-five per cent of the total described African species. Since many of the remaining species are probably synonymous with those seen by the author, the percentage of unseen species will be still lower.

The zoogeographical area studied is that of the mainland of Africa south of the Sahara Desert and excluding the offshore islands, e.g. Madagascar. The islands have been omitted because in most cases the genera are different from those of the mainland.

Only those species seen by the author are listed under the genera.



FIGS. 1–6. 1. *Menius* ; 2. *Sarum*, side view of left eye and base of the antenna ; e, eye ; c, constriction of the basal segment of the antenna ; s, sulcus above the eye ; a, setose crescent-shaped area. 3. *Gabberella* ; 4. *Rhembastus* ; 5. *Paraivongius*, left anterior view of the side of the prothorax ; as, anterior seta ; epst, episternum ; lst, lateral arms of the sternum ; pr, pronotum. 6. *Microeurydemus*, left anterior leg, front view ; f, femur ; t, tibia.

THE TRIBAL CLASSIFICATION OF THE EUMOLPIDAE

The African genera have been divided into four tribes in place of the seventeen found in the Junk *Coleopterorum Catalogus* (Clavareau, 1914). This follows the

system used by Chen (1940) and Gressitt and Kimoto (1961) for the genera of China. It has been found to produce by far the most satisfactory premier division of the family.

Tribe *Nodini*

This tribe is a very natural one, containing a complex of eighteen genera with the following characters : 1. prothorax transverse ; 2. the mid and hind tibia emarginate ; 3. the elytra with punctures in regular longitudinal rows, except in a few aberrant species ; and 4. body very rarely pubescent.

Tribe *Eumolpini*

This tribe is less distinct and contains fourteen genera with the following characters : 1. prothorax transverse ; 2. neither mid nor hind tibiae emarginate. Some of these genera are pubescent and some have species which are pubescent and others which are not.

Tribe *Adoxini*

This tribe is an assemblage of twenty-nine somewhat diverse genera. It is the least natural of the 4 tribes, comprising several strongly divergent or convergent groups having the following characters : 1. prothorax cylindrical or sub-cylindrical and frequently lacking a margin ; 2. usually heavily pubescent, the setae often broadened and scale-like.

Tribe *Colaspoidini*

This tribe is poorly represented in Africa, containing only two genera. These have the following characters : 1. prothorax cylindrical ; 2. the pygidium with a distinct median longitudinal groove.

REVISION OF THE TRIBE NODINI

The generic concepts within the other three tribes of the Eumolpidae were found to be workable. The tribe Nodini was, however, in need of a major revision, as the original generic descriptions were often inadequate and many species had been added which differed from the generic descriptions and type-species. The genera have been completely regrouped around the type-species and redefined. This has resulted in the wholesale transfer of large numbers of species from one genus to another.

In the past, many species from Madagascar have been placed in genera described from Africa and *vice versa*. It is rare for a Chrysomelid genus to occur in both Africa and Madagascar. Thus *Syagrus* Chapuis is almost certainly confined to Africa and *Pheloticus* Harold to Madagascar (Appendix). The Madagascan species at present placed in the genera *Eurydemus* Baly, *Menius* Chapius and *Rhembastus* Harold clearly do not possess the characters of these genera. However, the Madagascan species are left in these genera until the Eumolpidae of Madagascar are revised. It is suggested that a detailed study of the Madagascan genera of the

tribe Nodini would produce a complete generic separation of the Madagascan and African species.

Redefinition of the Genera of the Tribe Nodini

CHIRIDEA Baly

(Text-fig. 7)

Chiridea Baly, 1878 : 253. Type-species : *Chiridea chapuisi* Baly, 1878 [Sierra Leone].

This is a monotypic genus.

Length : less than 3 mm. *Head* : sutures very indistinct ; eyes protuberant, and very wide apart, with a narrow sulcus above, antennae filiform, reaching half-way down the elytra. *Thorax* : pronotum just broader than long, disc highly convex, edges strongly convex and multiserrate, anterior margin of the lateral arms of the prosternum flat or concave, legs with the front femora with a small ventral tooth, the tibiae short and the claws appendiculate. *Elytra* : broader near the apex than at the base, heavily punctate-striate, intervals highly convex, except in the depression immediately behind the basal area and humeral callus, where they are flat.

This monotypic genus and *Colposcelis* are the only two genera of the tribe Nodini with appendiculate claws. *Chiridea* differs from *Colposcelis* in having the sides of the pronotum multiserrate and the elytra broader near the apex than at the base. In *Colposcelis* the pronotum has a single tooth on the sides and the elytra approximately parallel-sided.

COLPOSCELIS Dejean

(Text-fig. 8)

Colposcelis Dejean, 1837 : 408. Type-species : *Colaspis viridiaenea* Gyllenhal, 1808 [East Indies, Ceylon].

Pagria Lefèvre, 1884 : 67. Type-species : *Pagria suturalis* Lefèvre, 1884 [East Africa].

Aphthonesthis Weise, 1895 : 329. Type-species : *Aphthonesthis concinna* Weise, 1895 [West Africa]. **syn. n.**

Length : less than 5 mm. *Head* : heavily punctured, sutures either very distinct or indistinct ; eyes protuberant and very wide apart, with a prominent suture above ; antennae filiform and reaching half-way down the elytra. *Thorax* : pronotum heavily punctured, disc highly convex, edges strongly curved and usually with a single tooth half to one third of the way from the base, anterior edges of the lateral arms of the prosternum flat or concave ; legs elongated, tibiae very slim, claws appendiculate. *Elytra* : sides approximately parallel, punctures deep, intervals raised or flat.

This mainly Indian genus seems generally to have been overlooked in Africa, where many of its species were described in other genera. These are now transferred to *Colposcelis*. It is probable that many more species, especially from central Africa, remain to be described. *Colposcelis* and *Chiridea* are the only two African genera in the tribe Nodini with appendiculate claws. *Colposcelis* differs from *Chiridea* in having the sides of the pronotum with a single tooth and the elytra with parallel sides.

Species examined :—

Colposcelis cameruense (Jacoby) **comb. n.** for *Aphthonesthis cameruense* Jacoby.
C. concinna (Weise) **comb. n.** for *Aphthonesthis concinna* Weise.
C. gossypii (Bryant).
C. liturata (Lefèvre).
C. mahembensis **n.n.** for *Eurydemus suturalis* Bryant, 1956 nec Lefèvre, 1884.
C. nigrosuturatus (Bryant) **comb. n.** for *Eurydemus nigrosuturatus* Bryant.
C. porosicollis (Jacoby) **comb. n.** for *Eurydemus porosicollis* Jacoby.
C. suturalis (Lefèvre).
C. varians (Lefèvre).

AMBLYNETES Weise

(Text-fig. 9)

Amblynetes Weise, 1904 : 41. Type-species : *Amblynetes bottegoi* (Jacoby), 1899 [Somaliland].

This is a monotypic genus.

Body elongate. *Length* : 5–6 mm. *Head* : inserted into the prothorax, heavily granulate, sutures indistinct ; eyes not protuberant, a narrow suture above ; antennae stout, reaching just less than half-way down the elytra, terminal eight segments slightly expanded, third segment twice as long as second segment, first segment globular. *Thorax* : pronotum with surface heavily granulate, obscuring the punctures, cylindrical, lightly margined, the edges little curved, anterior setae arising just above the level of the lateral margin of the pronotum, anterior edges of the lateral arms of the prosternum concave, not continuous with the rest of the prosternum ; legs stout, front femora each with a large ventral tooth, tibiae longer than the femora and heavily ridged, claws bifid. *Elytra* : parallel-sided, elongate, punctures small, close together and shallow, almost obscured by the intense granulation of the intervals.

The genus *Amblynetes* contains one highly distinctive species, characterized by the very heavily granulate surface of the head, pronotum and elytra, the lateral arms of the prosternum with the anterior edge convex and the antennae with the third segment twice as long as the second segment.

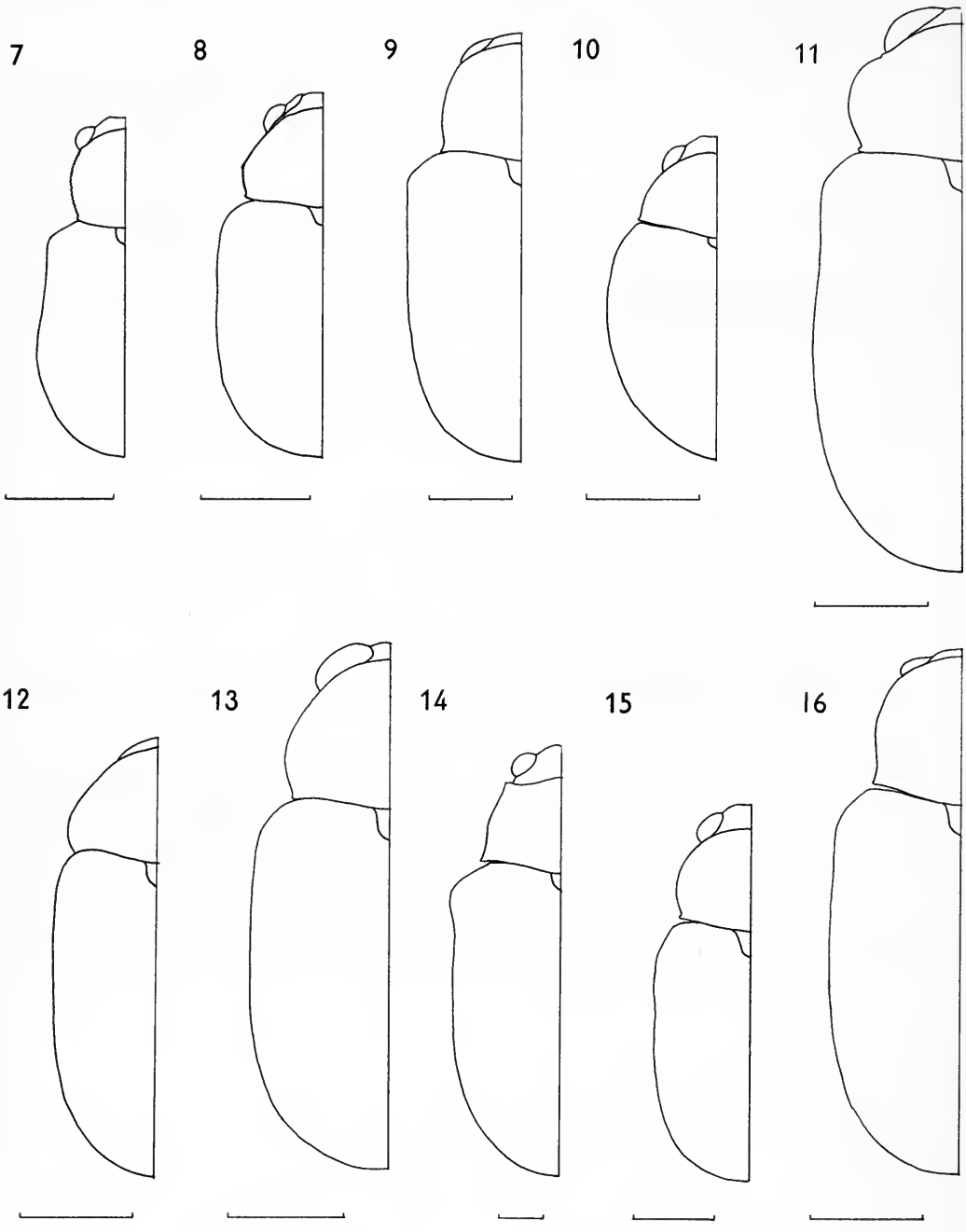
PSEUDIVONGIUS Jacoby

(Text-fig. 10)

Pseudivongius Jacoby, 1897 : 546. Type-species : *Pseudivongius natalensis* Jacoby, 1897 [South Africa].

Length : less than 3 mm. *Head* : inserted into the prothorax, sutures indistinct ; eyes wide apart and not protuberant, antennae filiform and reaching less than half-way down the elytra, second and third segments approximately equal in length. *Thorax* : pronotum with disc strongly convex, sides lightly convex, margins narrow, the bases of the anterior setae on a level with the lateral margins of the pronotum, the lateral arms of the prosternum strongly convex ; legs with the front femora unarmed and tibiae only very lightly ridged. *Scutellum* : in the form of an equilateral triangle. *Elytra* : ovate, the width at the middle 1·5 times as wide as at the base, punctures large and distinct, the intervals often lightly raised especially along the sides.

A revision of this genus, including keys to the species, has already been published (Selman, 1963). *Pseudivongius* is a highly distinctive genus and is characterized by the ovate elytra, which are 1·5 times as wide at the middle as at the base, the unarmed anterior femora and the scutellum in the form of an equilateral triangle.



FIGS. 7–16. Outline of the left hand side of the dorsal surface of, 7. *Chiridea* ; 8. *Colposcelis* ; 9. *Amblynetes* ; 10. *Pseudivongius* ; 11. *Microeurydemus* ; 12. *Liniscus* ; 13. *Afroeurydemus* ; 14. *Menius* ; 15. *Microsyagrus* ; and 16. *Proliniscus*.

Species examined :—

Pseudivongius aeneus Jacoby.
P. apicicornis Jacoby.
P. lamottei Selman.
P. natalensis Jacoby.

MICROEURYDEMUS Pic

(Text-figs. 6, 11)

Microeurydemus Pic, 1938 : 35. Type-species : *Microeurydemus unimaculatus* Pic, 1938 [Gaboon].

Length : less than 5 mm. *Head* : very heavily punctured, sutures indistinct ; eyes very large but not protuberant, very close together, heavily emarginate ; antennae filiform and short, reaching one-quarter the way down the elytra, third segment a little longer than the second. *Thorax* : pronotum transverse, flattened dorsoventrally, broadly margined, edge strongly convex, deeply and closely punctured, anterior edges of the lateral arms of the prosternum convex ; legs stout, front femora each with a very large tooth, basal width and height of tooth much greater than the maximum width of the tibiae, tibiae strongly ribbed, claws bifid. *Elytra* : elongate, parallel-sided, punctures large, close and distinct, intervals slightly convex.

Microeurydemus is slightly flattened dorsoventrally resembling *Afroeurydemus*, especially in the head region. *Microeurydemus* is distinguished by the very large femoral spines (Text-fig. 6).

Species examined :—

Microeurydemus africanus (Jacoby) **comb. n.** for *Pseudosyagrus africauus* Jacoby,
M. semivittatus (Jacoby) **comb. n.** for *Eurydemus semivittatus* Jacoby.
M. ongemepres Pic.

LINISCUS Lefèvre

(Text-fig. 12)

Liniscus Lefèvre, 1885 : 129. Type-species : *Liniscus sansibaricus* Lefèvre, 1885 [Zanzibar]. By present designation.

Body narrow and strongly elongated. *Length* : less than 5 mm. *Head* : turned downwards and hidden by the pronotum, sutures distinct, eyes large and round, close together, their width as seen from above not less than the distance between the two eyes, a prominent suture above ; antennae reaching one-third of the way down the elytra, segments short, second and third segments approximately equal. *Thorax* : pronotum transverse, maximum width as wide as the elytra, hood-like, sides strongly margined, edges very convex, disc heavily punctured, anterior edges of the lateral arms of the prosternum convex ; legs short, anterior tibiae straight, claws bifid. *Elytra* : more than 1·4 times as long as wide across the humeri, basal area and humerus very little raised, sides parallel, punctures deep and close, intervals lightly raised.

Many small elongated species of Nodini were included in the genus *Liniscus*. These species had little in common other than their general shape. The majority of them are now found to belong to other genera and have been transferred. The genera *Liniscus*, *Afroeurydemus* and *Microeurydemus* are characterized by eyes which are large and round, the distance between the two eyes being not less than their individual widths. *Liniscus* differs from *Afroeurydemus* in that the pronotum is hood-like, the legs are short and stout and the elytra are elongate and at least

1·425 times as long as wide across the humeri, and at the suture are more than 2·5 times as long as the hind tibia. In *Afroeurydemus* the pronotum is not hood-like, the legs are elongate and stout, the elytra are broad and less than 1·425 times as long as wide across the humeri, and at the suture are less than 2·5 times as long as the hind tibia. *Microeurydemus* is easily distinguished from the other two genera by the very large femoral spines.

Species examined :—

Liniscus koullmannensis (Selman) **comb. n.** for *Syagrus koullmannensis* Selman.
L. sansibaricus Lefèvre.

AFROEURYDEMUS gen. n.

(Text-fig. 13)

Type-species : *Eurydemus geniculatus* Jacoby, 1904 [Beira, E. Africa].

Length : 4–8 mm. *Head* : inserted little into the prothorax ; frontoclypeus with sides strongly diverging from posterior to anterior ; eyes very large, when viewed from above each at least as wide across as they are apart from each other, deeply emarginate, very little covered by the lateral arms of the prosternum ; antennae variable but with all segments elongate, segments two and three usually equal in length but segment three may be longer. *Thorax* : pronotum transverse and strongly convex, sides rounded and narrowly margined, lightly narrowing anteriorly and posteriorly, surface smooth or deeply punctured, anterior edges of the lateral arms of the prosternum convex ; legs elongate, femora stout, front femora each with a prominent ventral tooth, claws bifid. *Elytra* : approximately parallel-sided, humerus prominent, basal area little raised, punctures prominent and often deep, intervals often very convex.

Afroeurydemus is separated from the Fijian genus *Eurydemus* Chapuis, 1874 : 333. Type-species *Eurydemus grandis* Baly [Fiji]. *Eurydemus* differs from *Afroeurydemus* by the following characters. It is much longer, being greater than 11 mm. The head is deeply inserted into the prothorax. The eyes are closer together, almost touching and partially hidden inside the prothorax. The prothorax has a prosternum with very small lateral extensions, with the anterodorsal corner far below the margin of the pronotum. The sides of the pronotum are almost parallel. The elytra taper slightly posteriorly and their punctures are widely spaced. The anterior setae of the prothorax lie above the level of the margin of the pronotum, and not on the anterodorsal corner of the lateral extensions of the prosternum.

All the African species of *Eurydemus* seen by the author clearly should belong to the genus *Afroeurydemus* or other related African genera. It is almost certain that *Eurydemus* is a genus restricted to the Fiji Islands and that *Afroeurydemus* is a genus restricted to the mainland of Africa.

Species examined :—

Afroeurydemus alluaudi (Lefèvre) **comb. n.** for *Syagrus alluaudi* Lefèvre.
A. armatus (Achard) **comb. n.** for *Eurydemus armatus* Achard.
A. bimaculatus (Lefèvre) **comb. n.** for *Syagrus bimaculatus* Lefèvre.
A. bipunctatus (Weise) **comb. n.** for *Syagrus bipunctatus* Weise.
Angoleumolpus grandis Pic **syn. n.**
A. bredoi (Burgeon) **comb. n.** for *Eurydemus bredoi* Burgeon.

A. brevilineatus (Jacoby) **comb. n.** for *Eurydemus brevilineatus* Jacoby.
A. caliginosus (Burgeon) **comb. n.** for *Syagrus caliginosus* Burgeon.
A. carinatus (Bryant) **comb. n.** for *Syagrus carinatus* Bryant.
Eurydemus jansoni Baly **syn. n.**
A. flavicans (Harold) **comb. n.** for *Eurydemus flavicans* Harold.
A. geniculatus (Jacoby) **comb. n.** for *Eurydemus geniculatus* Jacoby.
A. ghesquierei (Burgeon) **comb. n.** for *Eurydemus ghesquierei* Burgeon.
A. gussfeldi (Karsch) **comb. n.** for *Eurydemus gussfeldi* Karsch.
A. holubi (Jacoby) **comb. n.** for *Eurydemus holubi* Jacoby.
A. hopei (Bryant) **comb. n.** for *Syagrus hopei* Bryant.
A. ituriensis (Weise) **comb. n.** for *Rhembastus ituriensis* Weise.
A. jansoni (Baly) **comb. n.** for *Eurydemus jansoni* Baly.
A. maculipennis (Jacoby) **comb. n.** for *Eurydemus maculipennis* Jacoby.
A. maculosus (Harold) **comb. n.** for *Eurydemus maculosus* Harold.
A. marginatus (Jacoby) **comb. n.** for *Eurydemus marginatus* Jacoby.
A. nigriceps (Jacoby) **comb. n.** for *Eurydemus nigriceps* Jacoby.
A. nigrolimbatus (Ritsema) **comb. n.** for *Syagrus nigrolimbatus* Ritsema.
A. nigrostriatus (Jacoby) **comb. n.** for *Syagrus nigrostriatus* Jacoby.
A. nubiensis (Harold) **comb. n.** for *Eurydemus nubiensis* Harold.
Eurydemus geniculatus Jacoby **syn. n.**
A. puncticollis (Bryant) **comb. n.** for *Syagrus puncticollis* Bryant.
A. quadrimaculatus (Jacoby) **comb. n.** for *Eurydemus quadrimaculatus* Jacoby.
A. rufonitens (Thomson) **comb. n.** for *Syagrus rufonitens* (Thomson).
A. rufulus (Thomson) **comb. n.** for *Syagrus rufulus* Thomson.
A. striatipennis (Lefèvre) **comb. n.** for *Syagrus striatipennis* Lefèvre.
A. vrijdaghi (Burgeon) **comb. n.** for *Eurydemus vrijdaghi* Burgeon.

MENIUS Chapuis

(Text-fig. 14)

Menius Chapuis, 1874 : 332. Type-species : *Menius lacordairei* Chapuis, 1874. [Nigeria].

Brilliant metallic-coloured species. *Length* : 5–9 mm. *Head* : inserted into the prothorax ; sutures very deep ; epicranium projecting forwards and bounded by a huge crescent-shaped sulcus above the eyes ; eyes large and prominent but not protuberant, wide apart ; antennae elongate, reaching half-way down the elytra, terminal five segments expanded, basal segment bulbous. *Thorax* : pronotum cylindrical with maximum width less than 1·5 times the length along the mid-line, strongly margined, disc deeply punctured, anterior edges of the lateral arms of the prosternum strongly convex, anterior setae of the prothorax with bases on a level with the margin of the pronotum ; legs robust, front femora strongly armed, front tibiae with distal ends turned outwards and strongly ribbed. *Elytra* : parallel-sided, humeri prominent, basal area little raised, punctate-striate but in some species the punctures are confused particularly on the basal half, intervals flat and glabrous.

The type-species of *Menius* was found to differ radically from the majority of the species subsequently placed in the genus. Twenty-four species are now removed from *Menius* and placed in other genera. Most of these species have been transferred to *Paraivongius* Pic. This leaves a few large elongated insects characterized by a narrow pronotum, a protuberant epicranium, the eyes with a huge crescent-shaped sulcus above, the sulcus extending to a point well behind the mid-point of the eye (Text-fig. 1) and the basal segment of the antennae twice as wide as the second segment.

Species examined :—

Menius conradti Jacoby.
M. lacordairei Chapuis
M. splendidus Jacoby.
M. subcostatus Jacoby.

MICROSYAGRUS Pic

(Text-fig. 15)

Microsyagrus Pic, 1952 : 507. Type-species : *Microsyagrus trinotatus* Pic, 1952 [Dahomey].

Length : less than 5 mm. *Head* : sutures shallow or indistinct ; eyes prominent but not protuberant, a narrow suture above ; antennae filiform, extending to less than half-way down the elytra, with the terminal five segments a little stouter than segments three to six, third segment approximately equal in length to second. *Thorax* : pronotum transverse and strongly convex, sides strongly rounded, edges lightly but distinctly margined, anterior setae arising well below the lateral border of the pronotum, the distance from the base of one anterior seta to the base of the other approximately equal to the length of the pronotum at the midline, the anterior edges of the lateral arms of the prosternum convex or slightly convex ; legs elongate, front femora each with a ventral tooth, tibiae strongly ridged, claws bifid. *Elytra* : with distinct and often deep punctures, intervals often slightly convex, parallel-sided, approximately 1·4 times as long at the mid-line as they are wide at the humerus.

Microsyagrus is a very natural genus of small beetles, characterized by the elongated basal segment of the antennae and the pronotum with the base of the anterior setae well below the margins. Formerly many of the species were placed in the genus *Syagrus*.

Species examined :—

Microsyagrus fulvimanus (Jacoby) **comb. n.** for *Syagrus fulvimanus* Jacoby.
M. gossypii (Bryant) **comb. n.** for *Eurydemus gossypii* Bryant.
M. insignitus (Jacoby) **comb. n.** for *Syagrus insignitus* Jacoby.
M. marshalli **n.n.** for *Syagrus mashonanus* Jacoby, 1897, nec Jacoby, 1897.
M. mashonanus (Jacoby) **comb. n.** for *Liniscus mashonanus* Jacoby.
M. rosae (Bryant) **comb. n.** for *Syagrus rosae* Bryant.
M. trinotatus Pic.
M. zeae (Burgeon) **comb. n.** for *Liniscus zeae* Burgeon.

PROLINISCUS gen. n.

(Text-fig. 16)

Type-species : *Liniscus natalensis* Lefèvre, 1891 [South Africa].

Length : less than 4 mm. *Head* : inserted into the prothorax, sutures indistinct ; eyes strongly convex, dorsoventrally elongated, emarginate, wide apart, a narrow sulcus above ; antennae varying in length, with the basal segment globular, all segments approximately equal in length. *Thorax* : cylindrical, pronotum quadrate, slightly wider than long, the lateral margins convex but never dentate, anterior setae arising on or just below the level of the lateral margins of the pronotum, the anterior edges of the lateral arms of the prosternum strongly convex and separated from the remainder of the prosternum ; legs stout and short, front femora without a ventral tooth, tibiae lightly ridged, claws bifid. *Elytra* : elongate, parallel-sided, deeply punctured, interstices flat or very slightly convex.

This genus contains a group of species characterized by a pronotum with shallow punctures and lateral margins curved but never dentate. Most of the species are

transferred from the genera *Liniscus* and *Syagrus*. *Proliniscus* differs from these two genera in not having a hood-like pronotum. Also in *Liniscus* the width of the eyes is not less than the distance between the eyes but in *Proliniscus* the distance between the eyes is greater than their width.

Species examined :—

Proliniscus antennatus (Jacoby) **comb. n.** for *Syagrus antennatus* Jacoby.
P. cylindriformis (Jacoby) **comb. n.** for *Rhembastus cylindriformis* Jacoby.
P. dombeyae (Bryant) **comb. n.** for *Liniscus dombeyae* Bryant.
P. natalensis (Lefèvre) **comb. n.** for *Liniscus natalensis* Lefèvre.
P. parvulus (Jacoby) **comb. n.** for *Ivongius parvulus* Jacoby.
P. puncticollis (Jacoby) **comb. n.** for *Ivongius puncticollis* Jacoby.

SYAGRUS Chapuis

(Text-fig. 17)

Syagrus Chapuis, 1874 : 331. Type-species : *Syagrus calcaratus* (Fabricius), 1775 [Central and West Africa].

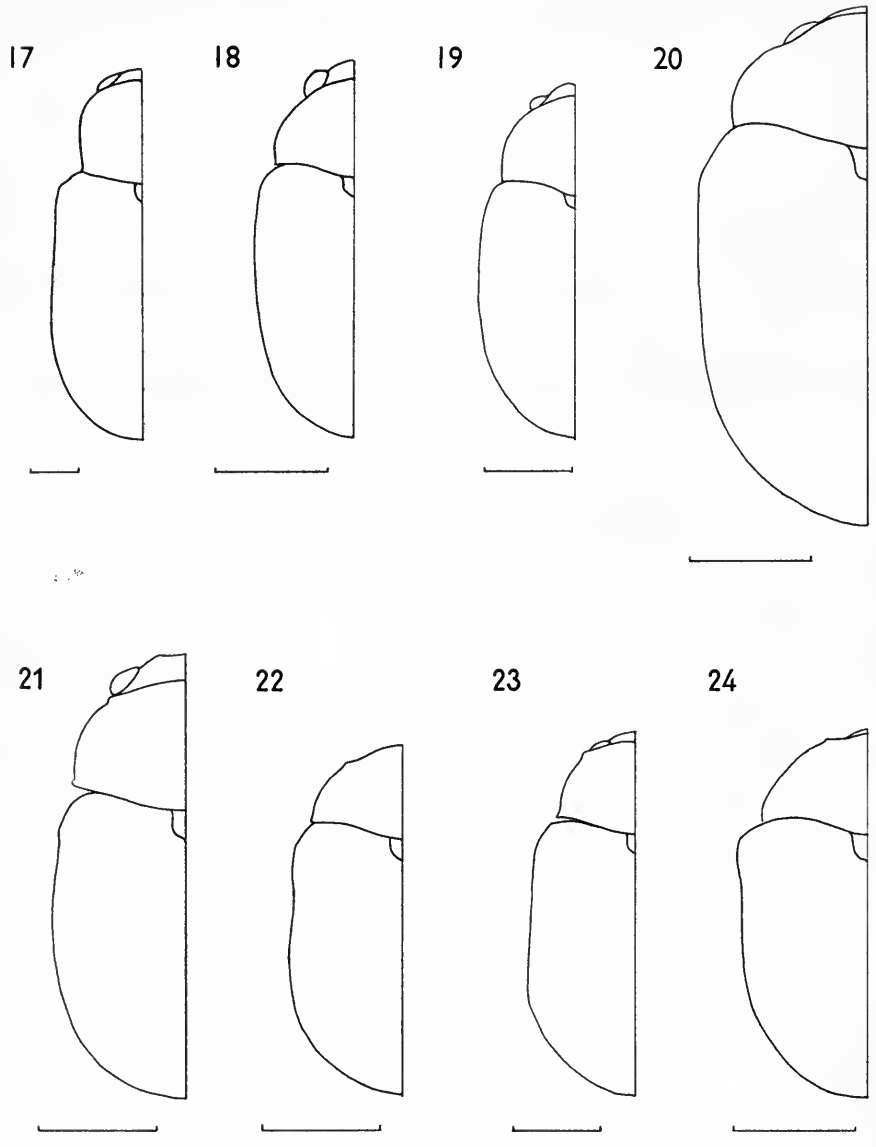
Length : less than 8 mm. *Head* : often lightly pubescent, inserted into the prothorax, sutures indistinct and often hidden by very heavy surface sculpture ; eyes flattened, dorso-ventrally elongated, strongly emarginate, a deep sulcus above ; mandibles short but massive ; antennae stout, reaching half-way down the elytra, basal segment globular, segment three twice as long as segment two. *Thorax* : pronotum globose and hood-like, little wider than long, a little wider anteriorly than posteriorly, margins convex and usually dentate, disc with scattered, often deep and wide punctures, anterior setae arising on a level with the lateral margin of the pronotum, the anterior edges of the lateral arms of the prosternum strongly convex and never continuous with the rest of the prosternum ; legs massive, front femora each with a large ventral tooth, front tibiae curved and ribbed. *Elytra* : 1·5 or more times as long as wide, punctures large and deep, intervals often strongly convex.

Nineteen African species are transferred from this large genus, twelve of them to *Afroeurydemus*. In addition eleven Madagascan species of *Syagrus* are transferred to *Pheloticus*. It is almost certain that *Syagrus* will prove to be confined to the continent of Africa. The remaining species of *Syagrus* are characterized by a pronotum that is hood-like with the anterior half wider than the posterior half, the lateral margins very convex and usually dentate and a head with the distance between the eyes greater than their individual widths. Some of the smaller species of *Syagrus* might be confused with *Mandollia*. However species of *Mandollia* are much less robust, the eyes rounded and the pronotum wider in proportion to the length, narrowing anteriorly and without dentate margins.

Species examined :—

Syagrus calcaratus (Fabricius).
S. fuscoaenius Fairmaire.
S. interstitialis (Jacoby) **comb. n.** for *Liniscus interstitialis* Jacoby.
S. morio Harold.
S. opacus Jacoby.
S. ortobiensis Selman.
S. perpuncticollis (Burgeon) **comb. n.** for *Liniscus perpuncticollis* Burgeon.
S. puncticollis (Harold) **comb. n.** for *Rhembastus puncticollis* Harold.

S. rugiceps Lefèvre.
S. rugifrons Baly.
S. strigaticeps (Lefèvre) **comb. n.** for *Liniscus strigaticeps* Lefèvre.
S. tristis Jacoby.



FIGS. 17–24. Outline of the left hand side of the dorsal surface of, 17. *Syagrus* ; 18. *Mandollia* ; 19. *Sarum* ; 20. *Meniellus* ; 21. *Massartia* ; 22. *Paraivongius* ; 23. *Rhembastus* ; and 24. *Gabberella*.

SARUM gen. n.

(Text-fig. 19)

Type-species : *Rhembastus geminatus* Jacoby, 1900 [Mashonaland].

Length : approximately 4 mm. *Head* : pubescent and deeply punctured, sutures distinct ; eyes dorsoventrally elongated, scarcely emarginate, a sulcus above, and above this sulcus a short, broad, crescent-shaped area, with the surface granular and heavily setate (Text-fig. 2) ; antennae reaching one-quarter of the way down the elytra, the basal segment globose, second segment a little longer than the third, terminal five segments a little broader than segments three to six. *Thorax* : pronotum pubescent, deeply and closely punctured, transverse but less than 1·65 times as broad as long at the mid-line, anterior setae on a level with the lateral margin of the pronotum, the lateral arms of the prosternum apparently extending well above the margin of the pronotum, anterior edges convex, completely separated from the rest of the prosternum ; legs short, femora deeply and closely punctured, front femora each with a large ventral tooth, tibiae distinctly ridged, mid and hind tibiae deeply emarginate. *Elytra* : pubescent, approximately 1·35 times as long at the mid-line as they are broad across the humeri, confusedly punctured or with the punctures in irregular rows, humeri prominent, basal area little raised.

This genus is similar to *Meniellus* and *Massartia* but the pronotum is less than 1·65 times as broad as long at the mid-line, the pronotum and elytra are often lightly setate and the head has a short, broad, crescent-shaped raised area above the sulcus of the eye (Text-fig. 2).

Species examined :—

Sarum geminatus (Jacoby) **comb. n.** for *Rhembastus geminatus* Jacoby.
S. inermis (Jacoby) **comb. n.** for *Rhembastus inermis* Jacoby.
S. mashonanus (Jacoby) **comb. n.** for *Rhembastus mashonanus* Jacoby.
S. obscurellus (Gerstaecker) **comb. n.** for *Rhembastus obscurellus* Gerstaecker.
S. pergeminatus (Burgeon) **comb. n.** for *Rhembastus pergeminatus* Burgeon.

MENIELLUS Weise

(Text-fig. 20)

Meniellus Weise, 1903 : 202. Type-species : *Meniellus kohlschutteri* Weise, 1903 [Tanganyika].

Body short and rounded. *Length* : approximately 4 mm. *Head* : broad, sutures indistinct ; eyes large but not protuberant, with a prominent suture above ; antennae short and stout, reaching one-third of the way down the elytra, first segment broad, second longer than third. *Thorax* ; pronotum transverse and strongly margined, with its base almost as wide as the elytra, sides narrowing anteriorly, surface heavily punctured, anterior setae with their origins just below the margin of the pronotum, the anterior edges of the lateral extensions of the prosternum convex ; legs stout, femora each with a distinct ventral spine, tibiae strongly ribbed, with distal ends turned strongly outwards, claws bifid. *Elytra* : short and broad, sides parallel, epipleura continuing to the apex with little decrease in width, punctation confused by punctures of equal size lying between the rows.

This is one of the few genera in which no changes have been made. It is a highly distinctive genus with a spherical body. The elytra are often spotted and have large punctures in single rows confused by punctures of equal size lying in between the rows. The pronotum is more than 1·85 times as wide as long at the mid-line. The nearest genus is *Massartia*, which is clearly differentiated by the more elongated

body, the elytra with smaller punctures in confused double rows and the pronotum between 1·60 and 1·85 times as wide as long at the mid-line.

Species examined :—

Meniellus kohlschutteri Weise *Meniellus maculicollis* (Jacoby).

MASSARTIA gen. n.

(Text-fig. 21)

Type-species : *Rhembastus colasposomoides* Burgeon, 1941 [Belgian Congo].

Body rounded. *Length* : less than 4 mm. *Head* : deeply inserted into the prothorax, sutures indistinct ; eyes convex, rounded, barely emarginate, wide apart ; antennae short and stout, reaching to less than half-way down the elytra, terminal five segments broader than segments three to six, first segment greatly expanded. *Thorax* : pronotum transverse, more than 1·65 times as broad as long at the mid-line, lightly margined, sides slightly convex, anterior setae on a level with the lateral margin of the pronotum, the lateral arms of the prosternum separated from the remainder of the prosternum and extending to well below the lateral margins of the pronotum, anterior edges convex ; legs short, stout, front femora unarmed, tarsi distinctly ridged, mid and hind tibiae deeply emarginate. *Elytra* : 1·1 times as long as broad, heavily punctured, the punctures lying in irregular double rows, the intervals flat and glabrous with scattered micropunctures, humeri and basal areas little raised.

This new genus is entirely composed of species removed from the genus *Rhembastus*, from which they differ by having the elytra with the punctures in irregular double rows and the anterior prothoracic setae on a level with the lateral border of the pronotum. *Massartia* is related most closely to *Meniellus* and *Sarum*. *Meniellus* differs in having a sulcus above the eye, the elytral punctures in single rows confused by punctures of equal size lying between the rows. *Sarum* differs in having a sulcus above the eye, a narrower pronotum and usually a light pubescence on the elytra and pronotum.

Species examined :—

Massartia albertianus (Burgeon) **comb. n.** for *Rhembastus albertianus* Burgeon.
M. colasposomoides (Burgeon) **comb. n.** for *Rhembastus colasposomoides* Burgeon.
M. irregularis (Jacoby) **comb. n.** for *Rhembastus irregularis* Jacoby.
M. minimus (Burgeon) **comb. n.** for *Rhembastus minimus* Burgeon.
M. schoutedeni (Burgeon) **comb. n.** for *Rhembastus schoutedeni* Burgeon.

PARAIVONGIUS Pic

(Text-figs. 5, 22)

Paraivongius Pic, 1937 : 32. Type-species : *Paraivongius metallicus* Pic, 1937 [Tanganyika].

Body robust and broad. *Length* : 2–6·5 mm. *Head* : turned downwards and almost completely retracted into the pronotum, sutures distinct ; eyes not protuberant, scarcely emarginate, often dorsoventrally elongated, often with a sulcus above which may be large, distance between the two eyes as seen from above greater than their individual width ; antennae filiform, reaching approximately one-third of the way down the elytra, all segments approximately equal in length, first segment with that part distal to the constriction globular or at least greatly expanded, distal five segments slightly broader than segments three to six. *Thorax* : pronotum turned slightly downwards at an angle to the elytra, more than 1·45 times as wide as

long along the mid-line, posterior border produced posteriorly at the mid-point, lateral edges evenly curved, curvature small, lightly margined, anterior setae arising on a level with or above the level of the lateral edges of the pronotum, lateral arms of the prosternum variable in shape but always with the anterior edges strongly convex ; legs, anterior coxae broadly separated, femora each with a small tooth on the ventral surface, tibiae strongly ribbed, claws bifid. *Elytra* : broad, with sides approximately parallel, apices tending to turn downwards, basal area hardly raised, humerus often prominent but smoothly rounded in form, punctures regular and close, often deep and often lying in a groove, intervals either flat or highly convex, epipleuron tapering evenly to the apex.

Twenty-eight species of *Rhembastus* and twenty-one species of *Menius* are here transferred to the genus *Paraivongius*. Thus this genus now becomes one of the largest in the African Eumolpidae. It may readily be distinguished from *Rhembastus*, *Mandollia* and *Gaberella* by the position of the anterior setae of the prothorax, which in *Paraivongius* is above or on a level with the lateral edges of the pronotum. *Paraivongius* differs from *Menius* in that the epicranium and eyes are not protuberant, the pronotum is usually more than 1·5 times the length along the mid-line and the body shorter and broader.

Species examined :—

Paraivongius armatus (Burgeon) **comb. n.** for *Rhembastus armatus* Burgeon.
P. bayeri (Burgeon) **comb. n.** for *Rhembastus bayeri* Burgeon.
P. bequaerti (Burgeon) **comb. n.** for *Rhembastus bequaerti* Burgeon.
P. bicolor (Lefèvre) **comb. n.** for *Rhembastus bicolor* Lefèvre.
P. chalceatus (Lefèvre) **comb. n.** for *Menius chalceatus* Lefèvre.
P. coeruleus (Bryant) **comb. n.** for *Menius coeruleus* Bryant.
P. coffeae (Bryant) **comb. n.** for *Rhembastus coffeae* Bryant.
P. collarti (Burgeon) **comb. n.** for *Menius collarti* Burgeon.
P. congoensis (Burgeon) **comb. n.** for *Rhembastus congoensis* Burgeon.
P. costatus (Jacoby) **comb. n.** for *Rhembastus costatus* Jacoby.
P. curtus Pic.
P. cyanipennis (Gerstaecker) **comb. n.** for *Rhembastus cyanipennis* Gerstaecker.
P. distanti (Jacoby) **comb. n.** for *Menius distanti* Jacoby.
P. diversicolor Pic.
P. diversitarsis Pic.
P. elizabethanus (Burgeon) **comb. n.** for *Rhembastus elizabethanus* Burgeon.
P. emaliensis (Bryant) **comb. n.** for *Rhembastus emaliensis* Bryant.
P. flavimanus (Burgeon) **comb. n.** for *Menius flavimanus* Burgeon.
P. flavitarsis (Jacoby) **comb. n.** for *Menius flavitarsis* Jacoby.
P. fulvicornis (Jacoby) **comb. n.** for *Menius fulvicornis* Jacoby.
P. gossypii (Bryant) **comb. n.** for *Menius gossypii* Bryant.
P. hypomelas (Lefèvre) **comb. n.** for *Rhembastus hypomelas* Lefèvre.
P. interstitialis (Jacoby) **comb. n.** for *Rhembastus interstitialis* Jacoby.
P. jacobii **n. n.** for *Menius rufipes* Lefèvre, 1891, nec Weise, 1883.
P. katangensis (Burgeon) **comb. n.** for *Menius katangensis* Burgeon.
P. kraatzi (Jacoby) **comb. n.** for *Rhembastus kraatzi* Jacoby.
P. lepesmei (Burgeon) **comb. n.** for *Menius lepesmei* Burgeon.
P. maynei (Burgeon) **comb. n.** for *Rhembastus maynei* Burgeon.
P. metallicus Pic.
P. micans (Gerstaecker) **comb. n.** for *Menius micans* (Gerstaecker).
P. milliani (Burgeon) **comb. n.** for *Rhembastus milliani* Burgeon.
P. mimicus Pic.

P. motoensis (Burgeon) **comb. n.** for *Rhembastus motoensis* Burgeon.
P. murrayi (Baly) **comb. n.** for *Menius murrayi* Baly.
P. nigripes (Jacoby) **comb. n.** for *Rhembastus nigripes* Jacoby.
P. nigritarsis (Lefèvre) **comb. n.** for *Rhembastus nigritarsis* Lefèvre.
P. parvulus (Jacoby) **comb. n.** for *Menius parvulus* Jacoby.
P. pauliani (Burgeon) **comb. n.** for *Menius pauliani* Burgeon.
P. plagiatus (Lefèvre) **comb. n.** for *Menius plagiatus* Lefèvre.
P. pomorum (Bryant) **comb. n.** for *Rhembastus pomorum* Bryant.
P. pseudobscurellus (Burgeon) **comb. n.** for *Rhembastus pseudobscurellus* Burgeon.
P. pseudoparvulus (Burgeon) **comb. n.** for *Rhembastus pseudoparvulus* Burgeon.
P. recticollis (Jacoby) **comb. n.** for *Rhembastus recticollis* Jacoby.
P. rotundatus (Burgeon) **comb. n.** for *Rhembastus rotundatus* Burgeon.
P. rufipes (Weise) **comb. n.** for *Rhembastus rufipes* (Weise).
P. ruandicus (Weise) **comb. n.** for *Liniscus ruandicus* Weise.
P. ruwenzoricus (Burgeon) **comb. n.** for *Menius ruwenzoricus* Burgeon.
P. scapularis (Burgeon) **comb. n.** for *Rhembastus scapularis* Burgeon.
P. semipiceus (Jacoby) **comb. n.** for *Menius semipiceus* Jacoby.
P. subaeneus (Jacoby) **comb. n.** for *Rhembastus subaeneus* Jacoby.
P. tarsalis (Lefèvre) **comb. n.** for *Menius tarsalis* Lefèvre.
P. testaceipes Pic.
P. uniformis (Jacoby) **comb. n.** for *Rhembastus uniformis* Jacoby.
P. viridescens Pic.
P. viridiaeneus (Jacoby) **comb. n.** for *Menius viridiaeneus* Jacoby.
P. viridinitens (Bryant) **comb. n.** for *Menius viridinitens* Bryant.
P. viridis (Jacoby) **comb. n.** for *Rhembastus viridis* Jacoby.
P. viriditinctus Pic.
P. wittei (Burgeon) **comb. n.** for *Rhembastus wittei* Burgeon.

GABERELLA gen. n.

(Text-figs. 3, 24)

Type-species : *Menius costatus* Baly, 1877 [Cameroons].

This is a monotypic genus.

Length : 3 mm. *Head* : deeply inserted into the prothorax, sutures indistinct ; eyes flattened, wide apart, lightly emarginate, a distinct sulcus above ; antennae filiform, reaching half-way down the elytra, basal segment globose, second and third segments approximately equal in length. *Thorax* : pronotum at base at least twice as wide as at the anterior end, maximum width 1·78 times the length along the mid-line, surface distinctly punctured, intervals glabrous, sides narrowly margined, anterior setae at the anteroventral corner of the episternum, the anterior edges of the lateral arms of the prosternum convex and not continuous with the rest of the prosternum ; legs slim, femora each with a small ventral tooth, tibiae lightly ridged, front tibiae curved, claws bifid. *Elytra* : gently tapering towards the apex, twice as long as the pronotum, humeri prominent, basal area little raised, deeply punctate-striate, intervals very convex, the intervals between striae five and six from the median suture especially strongly raised for one-third of the way down the elytra from the base.

This genus includes a single highly unusual species formerly placed in *Menius*. It is characterized by the very rounded body, with the head and pronotum turned strongly downwards, the bases of the anterior prothoracic setae on the anteroventral corner of the episternum (Text-fig. 3), and very strongly raised intervals on the

elytra. It is keyed with *Rhembastus* and *Mandollia* from which it differs in the shape of the body, the short costate elytra and the position of the prothoracic setae.

Species examined :—

Gaberella costatus (Baly) **comb. n.** for *Menius costatus* Baly.
Menius sjoestedt Jacoby **syn. n.**

RHEMBASTUS Harold

(Text-figs. 4, 23)

Rhembastus Harold, 1877 : 101. Type-species : *Rhembastus variabilis* Harold, 1877 [Mozambique]. By present designation.

Length : approximately 5 mm. *Head* : sutures shallow but distinct ; frontoclypeus broader than long ; eyes dorsoventrally elongated, prominent but not protuberant, very wide apart, a shallow but wide sulcus above ; antennae short, reaching one-quarter of the way down the elytra, basal segment globular, terminal five segments twice as wide as segments three to six. *Thorax* : pronotum almost as wide as the elytra, maximum width more than 1·45 times the length at the mid-line, anterior setae approximately at the mid-point of the anterior edge of the episternum, well below the margin of the pronotum, anterior edges of the lateral arms of the prosternum convex ; legs short, stout, femora strongly armed, tibiae strongly ribbed. *Elytra* : approximately 3 times as long as the pronotum at the mid-line, punctures deep, intervals flat or almost flat, sides parallel.

This formerly very large genus is now reduced in size by the transfer to other genera of forty-five species, including twenty-seven to *Paraivongius*, five to *Massartia* and five to *Sarum*. *Rhembastus* is characterized by having the base of the pronotum less than twice as wide as the anterior end, with the anterior setae arising well below the lateral edges of the pronotum at approximately the mid-part of the anterior edge of the episternum (Text-fig. 4). The elytra are approximately three times as long as the pronotum, with the intervals flat or almost flat and the frontoclypeus is broader than long. *Rhembastus* is most closely related to *Mandollia* and *Gaberella*, from which it differs in the characters given in the key (p. 168). It differs from *Paraivongius* in the position of the anterior prothoracic setae. In *Rhembastus* the elytra are punctate-striate, whereas the elytra of *Massartia* and *Sarum* are confusedly punctured or have punctures in irregular rows or in double rows.

Species examined :—

Rhembastus apicicollis Burgeon.
R. brevicornis (Jacoby) **comb. n.** for *Menius brevicornis* Jacoby.
R. laticollis Burgeon.
R. mechowi (Weise) **comb. n.** for *Syagrus mechowi* Weise.
R. natalensis Lefèvre.
R. variabilis Harold.

MANDOLLIA gen. n.

(Text-fig. 18)

Type-species : *Rhembastus affinis* Jacoby, 1900 [Mashonaland].

Length : less than 3 mm. *Head* : lightly inserted into the prothorax, deeply punctured and

lightly setate, sutures distinct ; eyes slightly dorsoventrally elongated, emarginate, a suture above ; antennae short, reaching approximately one-third of the way down the elytra, basal segment globose, terminal five segments broader than segments three to six second segment a little longer than the third. *Thorax* : pronotum very lightly pubescent, transverse, narrowing anteriorly, margins convex but never dentate, anterior setae arising just below the level of the lateral margins of the pronotum, punctures deep, large and close together ; lateral arms of the prosternum terminating well below the level of the lateral margins of the pronotum, quite separate from the rest of the prosternum, anterior edges convex ; legs, femora each with a ventral tooth, tibiae strongly ridged. *Elytra* : elongate, 1·4 to 1·6 times as long at the mid-line as they are wide at the humerus, punctures deep and in stride, intervals convex, humerus prominent, basal area little raised.

Mandollia is closely related to *Rhembastus*, from which it may be separated by the more elongated body, the more anteriorly narrowing pronotum, the elytra with strongly raised intervals, and the head and pronotum often lightly pubescent, with deep pit-like punctures.

Species examined :—

Mandollia affinis (Jacoby) **comb. n.** for *Rhembastus affinis* Jacoby.
M. semibrunneus (Jacoby) **comb. n.** for *Rhembastus semibrunneus* Jacoby.

Index of the Taxonomic Changes in the African Genera of the Tribe NODINI

Old name	New name
Amblynetes (p. 147)	
A. bottegoi Jacoby	—
Aphthonesthis (p. 146)	*Colposcelis* (Synonym)
A. cameruense (Jacoby)	*Colposcelis cameruense* (Jacoby)
A. concinna Weise	*C. concinna* (Weise)
Chiridea (p. 146)	
C. chapuisi Baly	—
Colposcelis (p. 146)	
C. gossypii (Bryant)	—
C. liturata (Lefèvre)	—
C. suturalis (Lefèvre)	—
C. varians (Lefèvre)	—
Eurydemus (p. 150)	
E. armatus Achard	*Afroeurydemus armatus* (Achard)
E. bredoi Burgeon	*A. bredoi* (Burgeon)
E. brevilineatus Jacoby	*A. brevilineatus* (Jacoby)
E. dentatus Bryant	*Obelistes dentatus* (Bryant)
E. flavicans Harold	*Afroeurydemus flavicans* (Harold)
E. geniculatus Jacoby	*A. geniculatus* (Jacoby)
E. ghesquierei Burgeon	*A. ghesquierei* (Burgeon)
E. gossypii Bryant	*Microsyagrus gossypii* (Bryant)
E. gussfeldi Karsch	*Afroeurydemus gussfeldi* (Karsch)
E. holubi Jacoby	*A. holubi* (Jacoby)
E. jansoni Baly	*A. jansoni* (Baly)
E. maculipennis Jacoby	*A. maculipennis* (Jacoby)
E. maculosus Harold	*A. maculosus* (Harold)
E. marginatus Jacoby	*A. marginatus* (Jacoby)

Old name	New name
Eurydemus cont.	
E. nigriceps Jacoby	*A. nigriceps* (Jacoby)
E. nigrosuturatus Bryant	*Colposcelis nigrosuturatus* (Bryant)
E. nubienis Harold	*Afroeurydemus nubiensis* (Harold)
E. porosicollis Jacoby	*Colposcelis porosicollis* (Jacoby)
E. quadrimaculatus Jacoby	*Afroeurydemus quadrimaculatus* (Jacoby)
E. semivittatus Jacoby	*Microeurydemus semivittatus* (Jacoby)
E. suturalis Bryant	*Colposcelis mahembensis* n. n.
E. vrijdaghi Burgeon	*Afroeurydemus vrijdaghi* (Burgeon)
Ivongius	
I. parvulus Jacoby	*Proliniscus parvulus* (Jacoby)
I. puncticollis Jacoby	*P. puncticollis* (Jacoby)
Liniscus (p. 149)	
L. dombeyae Bryant	*Proliniscus dombeyae* (Bryant)
L. interstitialis Jacoby	*Syagrus interstitialis* (Jacoby)
L. mashonanus Jacoby	*Microsyagrus mashonanus* (Jacoby)
L. natalensis Lefèvre	*Proliniscus natalensis* (Lefèvre)
L. perpuncticollis Burgeon	*Syagrus perpuncticollis* (Burgeon)
L. ruandicus Weise	*Paraivongius ruandicus* (Weise)
L. sansibaricus Lefèvre	—
L. strigaticeps Lefèvre	*Syagrus strigaticeps* (Lefèvre)
L. zeae Burgeon	*Microsyagrus zeae* (Burgeon)
Meniellus (p. 155)	
M. kohlschutteri Weise	—
M. maculicollis (Jacoby)	—
Menius (p. 151)	
M. brevicornis Jacoby	*Rhembastus brevicornis* (Jacoby)
M. chalceatus Lefèvre	*Paraivongius chalceatus* (Lefèvre)
M. coeruleus Bryant	*P. coeruleus* (Bryant)
M. collarti Burgeon	*P. collarti* (Burgeon)
M. conradti Jacoby	—
M. costatus Baly	*Gaberella costatus* (Baly)
M. distanti Jacoby	*Paraivongius distanti* (Jacoby)
M. flavimanus Jacoby	*P. flavimanus* (Jacoby)
M. flavitarsis Jacoby	*P. flavitarsis* (Jacoby)
M. fulvicornis Jacoby	*P. fulvicornis* (Jacoby)
M. gossypii Bryant	*P. gossypii* (Bryant)
M. katangensis Burgeon	*P. katangensis* (Burgeon)
M. lacordairei Chapuis	—
M. lepesmei Burgeon	*P. lepesmei* (Burgeon)
M. micans Gerstaecker	*P. micans* (Gerstaecker)
M. murrayi Baly	*P. murrayi* (Baly)
M. parvulus Jacoby	*P. parvulus* (Jacoby)
M. plagiatus Lefèvre	*P. plagiatus* (Lefèvre)
M. pauliani Burgeon	*P. pauliani* (Burgeon)
M. rufipes Lefèvre	*P. jacobii* n. n.
M. ruwenzoricus Burgeon	*P. ruwenzoricus* (Burgeon)
M. semipiceus Jacoby	*P. semipiceus* (Jacoby)
M. sjoestedt Jacoby	*Gaberella costatus* (Baly)
M. splendidus Jacoby	—
M. subcostatus Jacoby	—
M. tarsalis Lefèvre	*Paraivongius tarsalis* (Lefèvre)

Old name	New name
Menius cont.	
M. viridiaeneus Jacoby	*P. viridiaeneus* (Jacoby)
M. viridinitens Bryant	*P. viridinitens* (Bryant)
Microeurydemus (p. 149)	
M. ongepres Pic	—
Microsyagrus (p. 152)	
M. trinotatus Pic	—
Paraivongius (p. 156)	
P. curtus Pic	—
P. diversicolor Pic	—
P. diversitarsis Pic	—
P. metallicus Pic	—
P. mimicus Pic	—
P. pallidior Pic	—
P. testaceipes Pic	—
P. viridescens Pic	—
P. viriditinctus Pic	—
Pseudivongius (p. 147)	
P. aenius Jacoby	—
P. apicicornis Jacoby	—
P. lamottei Selman	—
P. natalensis Jacoby	—
Pseudosyagrus	
P. africanus Jacoby	*Microeurydemus africanus* (Jacoby)
Rhembastus (p. 159)	
R. affinis Jacoby	*Mandollia affinis* (Jacoby)
R. albertianus Burgeon	*Massartia albertianus* (Burgeon)
R. apicicollis Burgeon	—
R. armatus Burgeon	*Paraivongius armatus* (Burgeon)
R. bayeri Burgeon	*P. bayeri* (Burgeon)
R. bequaerti Burgeon	*P. bequerti* (Burgeon)
R. bicolor Lefèvre	*P. bicolor* (Lefèvre)
R. coffeae Bryant	*P. coffeae* (Bryant)
R. colasposomoides Burgeon	*Massartia colasposomoides* (Burgeon)
R. congoensis Burgeon	*Paraivongius congoensis* (Burgeon)
R. costatus Jacoby	*P. costatus* (Jacoby)
R. cyanipennis Gerstaecker	*P. cyanipennis* (Gerstaecker)
R. cylindriformis Jacoby	*Proliniscus cylindriformis* (Jacoby)
R. elizabethanus Burgeon	*Paraivongius elizabethanus* (Burgeon)
R. emaliensis Bryant	*P. emaliensis* (Bryant)
R. geminatus Jacoby	*Sarum geminatus* (Jacoby)
R. hypomelas Lefèvre	*Paraivongius hypomelas* (Lefèvre)
R. inermis Jacoby	*Sarum inermis* (Jacoby)
R. interstitialis Jacoby	*Paraivongius interstitialis* (Jacoby)
R. irregularis Jacoby	*Massartia irregularis* (Jacoby)
R. ituriensis Weise	*Afroeurydemus ituriensis* (Weise)
R. kraatzi Jacoby	*Paraivongius kraatzi* (Jacoby)
R. laticollis Burgeon	—
R. mashonanus Jacoby	*Sarum mashonanus* (Jacoby)
R. maynei Burgeon	*Paraivongius maynei* (Burgeon)
R. milliani Burgeon	*Paraivongius milliani* (Burgeon)

Old name	New name
Rhembastus cont.	
R. minimus Burgeon	*Massartia minimus* (Burgeon)
R. motoensis Burgeon	*P. araivongius motoensis* (Burgeon)
R. natalensis Lefèvre	—
R. nigripes Jacoby	*P. nigripes* (Jacoby)
R. nigritarsis Lefèvre	*P. nigritarsis* (Lefèvre)
R. obscurellus Gerstaecker	*Sarum obscurellus* (Gerstaecker)
R. pergeminatus Burgeon	*S. pergeminatus* (Burgeon)
R. pomorum Bryant	*Paraivongius pomorum* (Bryant)
R. pseudobscurellus Burgeon	*P. pseudobscurellus* (Burgeon)
R. pseudoparvulus Burgeon	*P. pseudoparvulus* (Burgeon)
R. puncticollis Harold	*Syagrus puncticollis* (Harold)
R. recticollis Jacoby	*Paraivongius recticollis* (Jacoby)
R. rotundatus Burgeon	*P. rotundatus* (Burgeon)
R. rufipes Weise	*P. rufipes* (Weise)
R. scapularis Burgeon	*P. scapularis* (Burgeon)
R. schoutedeni Burgeon	*Massartia schoutedeni* (Burgeon)
R. semibrunneus Jacoby	*Mandollia semibrunneus* (Jacoby)
R. sjoestedi Jacoby	*Gaberella costatus* (Baly)
R. subaeneus Jacoby	*Paraivongius subaeneus* (Jacoby)
R. uniformis Jacoby	*P. uniformis* (Jacoby)
R. variabilis Harold	—
R. viridis Jacoby	*Pseudivongius viridis* (Jacoby)
R. wittei Burgeon	*Paraivongius wittei* (Burgeon)
Syagrus (p. 153)	
S. alluaudi Lefèvre	*Afroeurydemus alluaudi* (Lefèvre)
S. antennatus Jacoby	*Proliniscus antennatus* (Jacoby)
S. bimaculatus Lefèvre	*Afroeurydemus bimaculatus* (Lefèvre)
S. bipunctatus Weise	*A. bipunctatus* (Weise)
S. calcaratus Fabricius	—
S. caliginosus Lefèvre	*Afroeurydemus caliginosus* (Lefèvre)
S. carinatus Bryant	*A. carinatus* (Bryant)
S. fulvimanus Jacoby	*Microsyagrus fulvimanus* (Jacoby)
S. fuscoaeneus Fairmaire	—
S. hopei Bryant	*Afroeurydemus hopei* (Bryant)
S. insignitus Jacoby	*Microsyagrus insignitus* (Jacoby)
S. koullmannensis Selman	*Liniscus koullmannensis* (Selman)
S. mashonanus Jacoby	*Microsyagrus marshalli* n. n.
S. mechowi Weise	*Rhembastus mechowi* (Weise)
S. morio Harold	—
S. nigrolimbatus Ritsema	*Afroeurydemus nigrolimbatus* (Ritsema)
S. nigrostriatus Jacoby	*A. nigrostriatus* (Jacoby)
S. opacus Jacoby	—
S. ortobiensis Selman	—
S. puncticollis Bryant	*Afroeurydemus puncticollis* (Bryant)
S. rosae Bryant	*Microsyagrus rosae* (Bryant)
S. rufonitens (Thomson)	*Afroeurydemus rufonitens* (Thomson)
S. rufulus Thomson	*A. rufulus* (Thomson)
S. rugiceps Lefèvre	—
S. rugifrons Baly	—
S. striatipennis Lefèvre	*Afroeurydemus striatipennis* (Lefèvre)
S. tristis Jacoby	—

Eumolpini

In this tribe eight genera are found to have senior synonyms and one new genus is described.

MELINDEA Lefèvre

Melindea Lefèvre, 1884 : 65. Type-species, *Melindea abyssinica* Lefèvre, 1884 [Abyssinia].
Mashonania Jacoby, 1901 : 247. **syn. n.**
Casmenella Jacoby, 1904 : 266. **syn. n.**
Falsoparnops Pic, 1923 : 16. **syn. n.**

COLASPOSOMA Castelnau

Colasposoma Castelnau, 1833 : 22. Type-species, *Colasposoma senegalense* Castelnau, 1833 [Senegal]
Palesida Harold, 1874 : 23. **syn. n.**
Pseudomacetes Linell, 1895 : 695. **syn. n.**
Dasychlorus Fairmaire, 1898 : 19. [syn. confirmed.]
Chiriphyle Jacoby, 1901 : 241. **syn. n.**

Dasychlorus Fairmaire was synonymised with *Colasposoma*, Jacoby (1900). It contained two species, *D. passeti* Fairmaire (1898) and *D. varicolor* Fairmaire (1898), which Jacoby (1900) synonymised with *Colasposoma pradieri* Lefèvre (1877) and *C. fairmairei* Lefèvre (1877) respectively. Unfortunately Burgeon (1941) resurrected the genus *Dasychlorus* but included in it only the type-species *D. passeti* Fairmaire. The other species *D. varicolor* Fairmaire (1898), (W. Africa), Burgeon confused with *Teichostola varicolor* Fairmaire (1887), (Somaliland), an entirely different species. *D. passeti* Fairmaire is undoubtedly larger and has more regularly-punctured elytra than most species of *Colasposoma*. However, the general form and basic characters clearly show *D. passeti* to be a species of *Colasposoma*. *D. varicolor* (Fairmaire) is a very typical species of *Colasposoma*. Therefore Jacoby's original synonymies are here confirmed.

EUMOLPOPSIS Jacoby

Eumolpopsis Jacoby, 1894 : 16. Type-species, *Eumolpopsis dimidiatus* (Jacoby, 1893) [Gaboon].
Favarelius Pic 1938 : 2. **syn. n.**

Favarelius atrimembris Pic (1938) is a junior synonym of *Eumolpopsis dimidiatus* Jacoby (1894). **syn. n.**

MONARDIELLA Pic

Monardiella Pic, 1940 : 360. Type-species, *Monardiella subacuminata* Pic, 1940 [Angola].
Pausiropsis Burgeon, 1941 : 368. **syn. n.**

OBELISTES Lefèvre

It is found that *Eurydemus dentatus* Bryant (1954) was described in an incorrect

genus and tribe. It is now transferred to the genus *Obelistes* of the Eumolpini (p. 160).

Eurydemus dentatus Bryant (1954) =*Obelistes dentatus* (Bryant). **comb. n.**

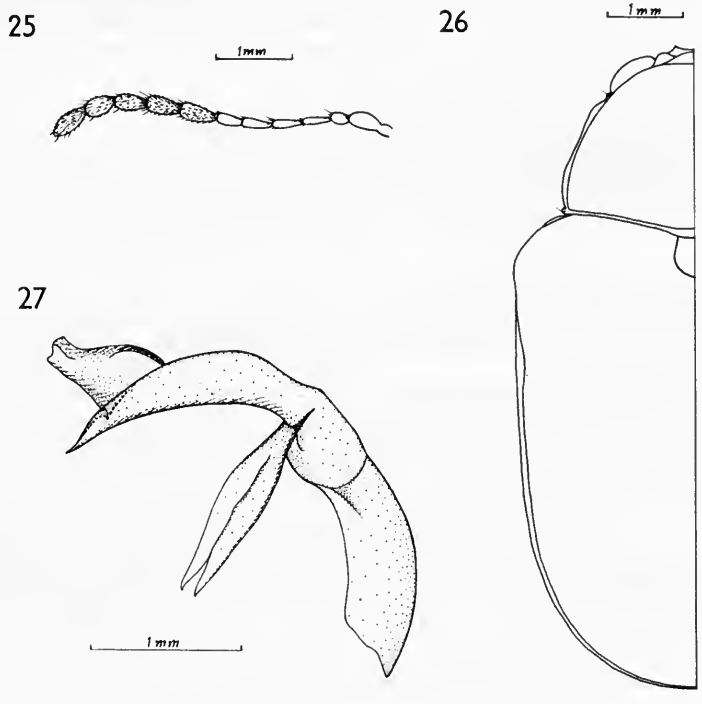
TIMENTES gen. n.

(Text-figs. 25-27)

Type-species, *Timentes flavipes* sp. n.

Length : 6·5–7·0 mm. *Colour* : black with a sheen. *Head* : epicranium and frontoclypeus fused ; eyes not marginate ; antennae short, with the two basal segments swollen. *Thorax* : pronotum with the sides lightly and evenly curved, converging from posterior to anterior, lateral arms of the prosternum separated from the sternum : legs, the femora each with a small ventral tooth, tibiae not emarginate, claws bifid. *Elytra* : much broader than the pronotum, confusedly punctate, parallel-sided.

This genus is closely related to *Thysbina* Weise. In *Timentes*, however, the body is slimmer, the pronotum much narrower in comparison with the elytra, the legs much slimmer, the body more glabrous and less setose and the antennae shorter.



FIGS. 25–27. *Timentes flavipes*. 25. dorsal view of left antenna ; 26. outline of left hand side of the dorsal surface ; 27. male genitalia, side view of aedeagus.

Timentes Flavipes sp. n.

(Text-figs. 25-27)

♂, ♀. *Length* : 6·5–7·0 mm. *Colour* : glossy black with a greenish sheen, the basal six segments of the antennae, labrum, maxillae, labium, legs and abdomen a light reddish brown. *Head* : epicranium lightly punctured, lightly setose at the sides, interstices glabrous, epicranial suture indistinct, sides of the epicranium diverging from posterior to anterior ; eyes large and protuberant ; antennae reaching one-quarter of the way down the elytra, first segment approximately equal in length to segments three to eleven, second segment short, terminal segments slightly swollen and highly pubescent. *Thorax* : pronotum transverse, lightly and minutely punctured, interstices glabrous, lateral margins broad, especially at the anterior end, anterior setae above the level of the lateral margin, anterior edges of the lateral arms of the prosternum slightly convex at the ventral end, prosternum heavily setose with the surface deeply sculptured, episternum deeply and closely punctured ; legs with tibiae equal in length to the femora, tibiae lightly setose, curved, with a single small terminal spine, the third tarsal segment deeply split. *Scutellum* : cordiform with a flat base, impunctate, glabrous. *Elytra* : elongate, humeri slightly raised, basal area not raised, humeral sulcus broad, surface very lightly punctured, punctures very small, interstices glabrous, epipleura broad at the base, narrowing steadily to the apices of the elytra.

Holotype ♂ : "EAST AFRICA", probably TANGANYIKA, date unknown but probably 1885–86 (*P. Staudinger*), from the Jacoby collection. In the British Museum (Nat. Hist.).

Paratypes : one ♂, and one ♀, data as above.

This genus and species was named but not described by Weise from material in the Jacoby collection and now in the British Museum (Nat. Hist.). The specimens described here are the original ones seen by Weise and preserve Weise's manuscript name.

ADOXINI

The genera *Macrocoma*, *Pseudocolaspis*, and *Eubrachis* have already been revised (Selman, 1964). In the tribe Adoxini two genera are found to have senior synonyms.

SCELODONTA Westwood

Scelodonta, Westwood, 1837 : 129. Type-species, *Scelodonta curculionoides* Westwood, 1837 [Manilla].

Scelodontomorpha, Pic, 1938 : 26. **syn. n.**

Scelodontomorpha tricostata Pic (1938), **syn. n.**, is a junior synonym of *Scelodonta costata* Jacoby (1894).

SEMMIONA Fairmaire

Semmiona Fairmaire, July 8th, 1885 : 127. Type-species, *Semmiona squameoguttata* Fairmaire 1885 [Belgian Congo].

Himerida Lefèvre, December, 1885 : 90. **syn. n.**

Himerida clavareaui Jacoby (1901), **syn. n.**, is a junior synonym of *Semmiona squameoguttata* Fairmaire (1885).

Key to the Genera of the Eumolpidae of Africa

1 Body usually glabrous above, prothorax transverse, pygidium without a median groove 2
– Body usually pubescent, prothorax cylindrical and often lacking a lateral margin or with a pygidium with a well-defined median groove 3
2 Elytra longitudinally punctured, mid and hind tibiae distinctly emarginate pre-apically . . . . . ***Nodini***
– Elytra punctured irregularly, or in very irregular rows, mid and hind tibiae not distinctly emarginate pre-apically . . . . . ***Eumolpini***
3 Pygidium not medially grooved, prothorax cylindrical or sub-cylindrical, rarely with a lateral margin . . . . . ***Adoxini***
– Pygidium distinctly grooved medially, prothorax transverse or cylindrical, distinctly margined at the side, dorsum often glabrous, mesosternum produced at the middle of the apex . . . . . ***Colaspoidini***

Nodini

1 Claws appendiculate 2
– Claws bifid 3
2 Pronotum with sides multiserrate, elytra broader near the apex than at the base ***CHIRIDEA***
– Pronotum with sides with a single tooth, elytra with sides approximately parallel ***COLPOSCELIS***
3 Head, pronotum and elytra heavily granulate, almost obscuring the punctation, legs stout, lateral arms of prosternum with anterior edge convex . ***AMBLYNETES***
– Interstices not heavily granulate 4
4 Elytra ovate, width at middle 1·5 times as wide as at the base, anterior femora not armed, scutellum an equilateral triangle. . . . . ***PSEUDIVONGIUS***
– Elytra not ovate, but with sides approximately parallel 5
5 Pronotum flattened dorsoventrally, very strongly transverse (Text-fig. 11) with sides heavily margined, front femur with a very large tooth in the form of an equilateral triangle (Text-fig. 6), basal width and height of tooth much greater than the maximum width of the tibia, eyes very close together . . ***MICROEURYDEMUS***
– Without the above combination of characters 6
6 Eyes round and large, their width as seen from above not less than the distance between the two eyes ; elytra heavily punctured, with intervals often raised . 7
– Eyes smaller, often dorsoventrally elongated, distance between the two eyes as seen from above greater than their width 8
7 Pronotum hood-like, head turned under, elytra elongate and at least 1·43 times as long as they are wide across the humeri, at the mid-line more than 2·5 times as long as the hind tibia, legs short and stout . . . . ***LINISCUS***
– Pronotum not hood-like, elytra broader at the mid-line than in *Liniscus*, not more than 1·42 times as long as they are wide across the humeri, at the mid-line less than 2·5 times as long as the hind tibia, legs elongate and stout . ***AFROEURYDEMUS***
8 Insects longer than 5 mm., the eyes protuberant, with a very large crescent-shaped sulcus above, the sulcus extending to a point well behind the mid-point of the eye (Text-fig. 1), the epicranium protuberant, the basal segment of the antennae twice as wide as the second segment, the pronotum cylindrical with a narrow margin, the maximum width of the pronotum less than 1·5 times the length of the pronotum along the mid-line, the elytra punctate-striate but in some species the punctures are in paired striae and may be very confused, intervals flat and glabrous . . . . . ***MENIUS***

– Eyes without a sulcus or with a very narrow one ; if there is a large sulcus, the epicranium and eyes are not protuberant and/or the maximum width of the pronotum is greater than 1·5 times the length along the mid-line and/or the sulcus is partially filled by a raised area (Text-fig. 2) and/or does not extend beyond a point immediately above the middle of the eye 9

9 Antennae with that part of the first segment distal to the constriction elongated, prothorax with the origins of the anterior setae well below the margins of the pronotum, antennae with the third segment approximately equal in length to the second segment, extending to less than half-way down the elytra, elytra with the punctures deeply impressed, intervals often slightly convex . ***MICROSYAGRUS***

– Antennae with that part of the first segment distal to the constriction globular or at least greatly expanded 10

10 Pronotum often cylindrical, maximum width of the pronotum less than 1·45 times the length of the pronotum along the mid-line 11

– Maximum width of the pronotum greater than 1·45 times the length along the mid-line 12

11 Pronotum with shallow punctures, cylindrical, margins curved and never dentate ***PROLINISCUS***

– Elongated insects with a hood-like pronotum, in which the anterior half is wider than the posterior half (Text-fig. 17), the punctures broad and deep, and the lateral margins very convex and usually dentate ; some species show a tendency to confusion of the punctures and to pubescence . . . . . ***SYAGRUS***

12 Elytra confusedly punctate or with punctures in irregular bands or double rows, with scattered micropunctures between 13

Elytra punctate-striate 15

13 Pronotum less than 1·6 times as broad as long at the mid-line, pronotum and elytra often lightly pubescent, the eye with a short, broad, crescent-shaped area above the sulcus of the eye, the surface granular and heavily setose (Text-fig. 2) . ***SARUM***

– Pronotum more than 1·6 times as broad as long at the mid-line, pronotum and elytra non-setose 14

14 Body spherical, surface non-metallic and frequently patterned with spots, elytra with punctures in single rows confused by punctures of equal size lying in between the rows, the punctures very large, pronotum more than 1·85 times as wide as the length at the mid-line . . . . . ***MENIELLUS***

– Body more elongated, surface often metallic, elytra with punctures smaller and usually in confused double rows, pronotum less than 1·85 times as wide as the length at the midline . . . . . ***MASSARTIA***

15 Anterior setae of the prothorax arising above or on a level with the lateral edges of the pronotum (Text-fig. 5), elytra with intervals either flat or highly convex ***PARAIVONGIUS***

– Anterior setae of the prothorax arising on the episternum well below the lateral edges of the pronotum (Text-figs. 3, 4), elytra with the intervals flat or highly convex 16

16 Pronotum at the base at least twice as wide as at the anterior end, anterior setae of the pronotum at the anteroventral corner of the episternum (Text-fig. 3). Elytra approximately twice as long as the pronotum, with the intervals strongly raised . . . . . ***GABERELLA***

– Pronotum at the base less than twice as wide as at the anterior end, anterior setae of the prothorax arising at approximately the mid point of the anterior edge of the episternum (Text-fig. 4). Elytra much more than twice as long as the pronotum, with the intervals either flat or strongly raised 17

17 Elytra with intervals flat or almost flat, head and pronotum with the surface glabrous and the punctures shallow . . . . . ***RHEMBASTUS***

– Elytra with intervals strongly raised, head and pronotum with the surface often lightly pubescent and with deep pit-like punctures . . . ***MANDOLLIA***

Eumolpini

1 Claws bifid 2
– Claws appendiculate 8
2 Body covered with fine scale-like setae interspersed with a few hair-like setae ***TRICHOSTOLA***
– Never with scale-like setae, either glabrous or setose 3
3 Entire surface thickly covered in setae, body clearly more than twice as long as wide ***MELINDEA***
– Glabrous, but if setate, body approximately twice as long as broad 4
4 Pronotum as broad as the elytra or only a little narrower 5
– Pronotum much narrower than the elytra 6
5 The lateral arms of the prosternum with anterior edge straight or convex, and separated from the sternum . . . . . ***THYSBINA***
– The lateral arms of the prosternum with anterior edge straight or concave, and continuous with the sternum . . . . . ***COLASPOSOMA***
6 Pronotum with sides approximately straight and diverging from posterior to anterior, distance between the eyes 2·5–3·0 times the height of the eyes, antennae with terminal segments much enlarged 7
– Not as above . . . . . ***TIMENTES***
7 Pronotum much longer than broad, head sutures distinct . . ***EUMOLPOPSIS***
– Pronotum broader than long, head sutures indistinct . . . . ***EURYOPA***
8 Upper side of body pubescent 9
– Upper side of body glabrous 10
9 Pronotum with a broad margin, elytra glabrous, third segment of antennae as long as the fourth . . . . . ***MICROHERMESIA***
– Pronotum with a very narrow margin, elytra highly pubescent, third segment of antennae much shorter than the fourth . . . . . ***CHIRIDELLA***
10 Femora armed with several spines in a row . . . . . ***OBELISTES***
– Femora unarmed or with a single spine 11
11 Brilliant metallic species, elytra with punctures confused or in double rows, humeri prominent, longitudinally ribbed, antennae filiform, with all segments very elongated . . . . . ***PRASOIDEA***
– Species which, if metallic, are not brilliant, elytra with punctures in rows and lacking longitudinal ribs 12
12 Pronotum strongly transverse and weakly convex, elytra finely punctured, interstices flat, antennae stout . . . . . ***LEFEVREA***
– Pronotum strongly convex, elytra boldly punctured, antennae filiform . . . 13
13 Pronotum 1·5 times as broad as long, femora with a massive spine . . ***PHASCUS***
– Pronotum less than 1·5 times as broad as long, femora unarmed or with a very small spine . . . . . ***TAPHIUS***

Adoxini

1 Tarsal claws appendiculate or simple, pronotum margined 2
– Tarsal claws bifid 4
2 Body covered in small scales, length approximately 2·5 mm., antennae short, with distal five segments broadened, pronotum elongate . . . ***PACHNEPHORUS***
– Non-pubescent, larger insects with long antennae 3
3 Pronotum cylindrical, with lateral margin poorly developed, antennae with third segment more than twice as long as the second segment . . ***DERMOXANTHUS***

– Pronotum transverse, with lateral margin well developed, antennae with third segment approximately equal to the second . . . . . ***PSEUDEDUSEA***

4 Pronotum with margin dentate or crenellated 5

– Pronotum with margin, if present, not strongly dentate 9

5 Elytra with obvious transverse rugosities, particularly near the humerus . . 6

– Elytra without obvious transverse rugosities 7

6 General appearance glabrous, setae on elytra minute, setae on the pronotum and head very small, curved and brown 28

– General appearance glabrous but rugose, setae on the elytra and pronotum prominent and often of two types, one white and adpressed, the other brown and more erect . . . . . ***NERISSUS***

7 Third antennal segment clearly twice as long as the second segment, anterior femur with a massive spine, body strongly elongated . . . . . ***CASMENA***

– Third antennal segment clearly much less than twice as long as second segment, anterior femur without a spine or with a small spine 8

8 Large broad insects, elytra heavily pubescent with scale-like adpressed setae interspersed with round spots of stout, black, erect, spine-like setae . . ***UHELIA***

– Small, slim insects, surface of pronotum and head with raised reticulate sculpture, each cell so formed coarsely granulate, with a single seta in the centre ***CHIRIDISIA***

9 Elytra short with the sides highly convex 10

– Elytra with at least the anterior half of the sides straight 14

10 Anterior edge of the pronotum very much shorter than the posterior edge . . 11

– Anterior edge of the pronotum approximately equal to or just shorter than the posterior edge 12

11 Anterior femora considerably more swollen than the middle and hind femora, body almost spherical, glabrous but minutely setate along the sides of the elytra and pronotum. When viewed from above the lateral sides of the pronotum are evenly curved . . . . . ***ECHTRUSIA***

– Anterior femora not more swollen than the middle and hind femora, body rounded but not spherical, closely setose, when viewed from above the lateral sides of the pronotum are strongly constricted posteriorly, with anterior portion of the sides almost straight . . . . . ***PALLENA***

12 Antennal segments three to six not more than 1·5 times as long as broad, segments seven to ten rounded 13

– Antennal segments three to six twice as long as broad, segments seven to ten much longer than broad, reaching more than half-way down the elytra, tarsi elongated, femur with a well-developed tooth, setae on the elytra of two types, one curved, adpressed, laterally-flattened and tending to form bands, the other straight, upright and often of even distribution, pronotum not domed and with indistinct margins . . . . . ***MONARDIELLA***

13 Pronotum domed with the margins distinct, sides highly convex, anterior edge approximately equal in length to the posterior edge, body strongly waisted between the elytra and the pronotum, glabrous but very lightly setose along the sides of the pronotum and elytra, setae uniform and somewhat scale-like, antennae reaching one-fifth of the way down the elytra, second segment approximately equal to the third . . . . . ***PAUSIRUS***

– Pronotum not domed, lacking lateral margins and with the sides less convex, anterior edge of the pronotum a little shorter than the posterior edge, tarsi very short, body covered thinly with scattered setae, setae uniform and especially scale-like on the elytra, less so on the pronotum, antennae with second segment twice as long as the third . . . . . ***BADENSIS***

14 Body short and rounded, heavily pubescent, anterior femora strongly armed, the base of the pronotum almost as wide as the elytra . . . . . ***SEMMIONA***

– Body elongated or the pronotum obviously much narrower than the elytra . . 15
15 Anterior femur strongly toothed 16
– Anterior femur without a tooth or with a very small tooth 17
16 Antennae with the third segment much longer than the second segment . . 18
– Antennae with the third segment approximately equal to the second segment . 19
17 Antennae with the second segment twice as long as the third, head narrow and very elongate, eyes recessed and flat . . . . . ***NERISSELLA***
– Antennae with the third segment as long as or longer than the second segment, head broad, eyes convex and prominent 24
18 Elytra with the sides strongly tapering towards the apex, eyes highly protuberant, a deep suture above each eye, pronotum cylindrical with lateral margin indistinct ***SCELODONTA***
– Elytra with the sides not strongly tapering towards the apex, eyes not protuberant and without a suture above each eye, pronotum strongly transverse with a broad lateral margin showing traces of dentations, femoral spines poorly developed ***DICONERISSUS***
19 Large insects, more than 1 cm. long, humerus very prominent, apex pointed, setae fine, erect and obscure, general appearance glabrous . . . ***ENNODIUS***
– Small insects, less than 1 cm. long, setae flattened, adpressed and obvious, general appearance pubescent 20
20 Pronotum transverse, not globose, sides strongly converging from posterior to anterior, heavily pubescent, setae adpressed, elytra short, not strongly tapering, eyes emarginate, less than half exposed . . . . . ***MACETES***
– Pronotum not transverse, more globose, elytra distinctly tapering from anterior to posterior, the degree of pubescence varying, eyes scarcely emarginate, pygidium either completely covered by the elytra or more than half exposed . . . 21
21 Pygidium more than half exposed, scutellum usually bi- or tri-cuspid, anterior edge of the lateral arms of the prosternum convex, though in many of the smaller species the convexity is lost or almost lost, elytra short, pronotum globose with the sides evenly curved, body setose, the density of the setae variable, setae usually scale-like, femur never with more than one ventral tooth ***PSEUDOCOLASPIS***
– Pygidium covered by the elytra, scutellum cordiform, not bi- or tri-cuspid, anterior edge of the lateral arms of the prosternum flat, elytra long and slender . . 22
22 General appearance usually non-setose, femur usually with more than one ventral tooth, anterior and middle tibiae approximately equal in length, elytra and pronotum very strongly sculptured, elytra strongly narrowed distally, often with longitudinal costae and with setae sparse and stubble-like, pronotum with the sides evenly curved, anterior end approximately equal in length to the posterior end ***TANYBRIA***
– General appearance usually setose, femur never armed with more than one ventral tooth, middle tibiae shorter than the anterior tibiae, elytra and pronotum smooth and not strongly sculptured, elytra only gradually narrowing distally and never with longitudinal costae, usually covered in a dense mass of silvery scale-like setae, pronotum often with the sides tapering anteriorly, with the anterior end shorter than the posterior end . . . . . ***MACROCOMA***
23 Pronotum transverse, anterior corners angular, toothing of sides prominent, anterior and posterior edges approximately parallel, body longer than 5 mm. ***DICOLECTES***
– Pronotum globose, hood-like, anterior corners not angular, toothing of sides not prominent, anterior and posterior edges not parallel, body shorter than 5 mm. ***MECISTES***
24 Pronotum as long as or longer than wide, head across the eyes wider than the pronotum, body less than 4 mm. in length 25

– Pronotum clearly wider than long, head across the eyes narrower than the pronotum, body greater than 4 mm. in length 26
25 Middle tibiae emarginate at the apex . . . . . ***MALEGIA***
– Middle tibiae not emarginate at the apex . . . . . ***PSEUDOMALEGIA***
26 Elytra with glabrous raised areas and heavily setose depressions, the punctures deep and wide apart, pronotum with a deep and complex surface sculpture . . . 27
– Elytra heavily and more or less evenly setose without raised glabrous areas, the punctures fine and very close together, pronotum surface smooth 28
27 Elytra with shallow depressions in the form of anastomosing gilded patches covered in a dense felt of stout confused white setae, the pronotum with a few setae, the punctures very large and elongated, and with a large fovea on either side, antennae stout and reaching one-quarter of the way down the elytra, the distal five segments almost as wide as they are long . . . . . ***DIDALSIS***
– Elytra with deep, anastomosing, longitudinal depressions densely lined with setae, the pronotum setose, especially along the lateral sides, the surface densely punctured and deeply sculptured, the antennae elongate, reaching half-way down the elytra, the distal segments much longer than wide . . . . . ***SYRICTA***
28 Setae hair-like, elytra with prominent humeri and the sides tapering from base to apex, pronotum with anterior edge almost as long as the posterior edge, a slight depression on either side, eyes strongly emarginate, head prognathous . ***CYNO***
– Setae scale-like, elytra with the humeri not prominent and the sides almost parallel, pronotum with the anterior edge almost as long as the posterior edge, eyes entire head hypognathous . . . . . ***ERYXIA***

Colaspoidini

1 Pronotum cylindrical, antennae with five terminal segments greatly enlarged and flattened, deeply sulcate above the eyes, tibiae not emarginate . . ***CORYNODES***
– Pronotum transverse, posterior and median tibiae emarginate . ***ODONTOMORPHA***

APPENDIX

In the course of this work the following Madagascan species of the genus *Syagrus* Chapuis were found to belong to the genus *Pheloticus* Harold.

Pheloticus achardi (Bechyne) **comb. n.** for *Syagrus achardi* Bechyne.
P. bipartitus (Fairmaire) **comb. n.** for *Syagrus bipartitus* Fairmaire.
P. costatipennis (Jacoby) **comb. n.** for *Syagrus costatipennis* Jacoby.
P. dilutus (Lefèvre) **comb. n.** for *Syagrus dilutus* Lefèvre.
P. distantus (Bechyne) **comb. n.** for *Syagrus distantus* Bechyne.
P. lefevrei (Jacoby) **comb. n.** for *Syagrus lefevrei* Jacoby.
P. nigricollis (Jacoby) **comb. n.** for *Syagrus nigricollis* Jacoby.
P. pallidipennis (Jacoby) **comb. n.** for *Syagrus pallidipennis* Jacoby.
P. perroti (Jacoby) **comb. n.** for *Syagrus perroti* Jacoby.
P. rogezianus (Bechyne) **comb. n.** for *Syagrus rogezianus* Bechyne.
P. rugicollis (Jacoby) **comb. n.** for *Syagrus rugicollis* Jacoby.

All the Madagascan species of *Syagrus* seen by the author have proved to belong to *Pheloticus*. It is highly probable that *Syagrus* is a genus restricted to the mainland of Africa and that *Pheloticus* is a genus restricted to Madagascar.

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Pp. 175–239; 23 *Text-figures*

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CONTENTS

SYNOPSIS

Fourteen species of soft scales are redescribed, including the black scale *Saissetia oleae* (Bernard, 1782), which according to the author's conclusion does not occur in Africa south of the Sahara. Six more African species are described as new. Records from new hosts and localities of a few old species are given. The new generic name of *Kilifia* is proposed for *Platycoccus* Takahashi, 1959 [*non* Stickney, 1934].

INTRODUCTION

Following the new taxonomic concepts introduced by the late Prof. G. F. Ferris, an interesting revival has occurred in the study of many groups of Coccoidea. However, the soft scale family Coccidae has received very little attention. Our knowledge of this family, in spite of including several species of prominent economic importance, is on the whole not better than it was twenty, fifty, or more years ago. The majority of the species cannot be properly recognized from the descriptions available because the few diagnostic characters used in the past are either unreliable or of minor taxonomic value. A re-examination of material identified on the basis of such characters may at times prove to include different species, as in the case of *Saissetia oleae* discussed in this paper. The present generic classification, too, is far from satisfactory. Of 120–130 genera so far erected, hardly a dozen, that is only one-tenth of the total, are sufficiently known for a critical study of their composition. Many of the remainder are still based on rather superficial features.

The prospects for a general revision of the family are rather remote. Types, where available, are often in such a condition as to be of little or no use at all, and supplementary specimens have to be discovered. Obviously this task is beyond the reach of any single worker.

In the present series of papers, chiefly concerned with the fauna of Africa south of the Sahara, genera and species are reviewed as adequate material comes to hand. The writer is fully aware of the inconvenience that this procedure implies, but the present state of the group does not permit alternative courses.

DESCRIPTIONS AND RECORDS OF SPECIES

AKERMES Cockerell, 1902

Akermes Cockerell, 1902: 89.

Type-species: *Akermes bruneri* Cockerell, 1902.

Very little is known on the morphology of the type-species of this genus, except that full grown females are globular and legs and antennae are wanting. According to Cockerell, the skin is marked with a polygonal reticulation as in *Eulecanium* and with "a number of large dark chitinous areas". Whether or not *andersoni* is actually congeneric with *bruneri* is uncertain. Eventually it may be transferred to the genus *Cribrolecanium* Green, 1921 (type-species: *C. formicarum* Green, 1921) into which it seems to fit adequately.

Akermes andersoni Newstead, 1917

(Text-fig. 1)

Akermes andersoni Newstead, 1917: 347.
Akermes andersoni Newstead; Hall, 1937: 122.

First described on specimens infesting orange leaves in Kabete, Nairobi, KENYA (Newstead, 1917) and later recorded by Hall (1937) as occurring on leaves of grapefruit in SOUTHERN RHODESIA.

Adult female "completely covered with a rather dense, dusky-white, mealy secretion, which also spreads over the surrounding portions of the food-plant, giving the infested leaves an almost uniform mealy appearance. Colour, on the removal of the secretion, rich dark piceous or very dark castaneous, shining; younger examples varying from reddish brown to dusky buff. Form irregular oval, asymmetrical, and more or less narrowed in front; sometimes broadly ovate or subcircular. Flat or very low convex with a faint median keel in the abdominal region; sides well within the margin, with a series of widely separated *truncate tubercles*; these structures vary in number and are often asymmetrical. Derm densely chitinised, more especially towards the margins, where innumerable minute, translucent, poreless 'cells' are present." (Newstead, *loc. cit.*).

The following redescription is based on a series of young adult specimens from East Africa as listed below. Mounted females broadly rounded behind and acutely tapering in front; or irregularly deltoides, due to their position on the leaves; mouth parts, antennae and legs often displaced from the median line of the body; length 2·1–3·3 mm. Dorsum with altogether seven —occasionally eight—large, rounded, heavily sclerotized cribriform plates, symmetrically

arranged on the submarginal area; close to the margin of the body are scattered 11 to 16 other cribriform plates much smaller in diameter. Dorsal setae small, but stout; pointed. Dorsal pores absent. Paraopercular pores* set in a loose elongate group of 6 to 17 in front of the anal opercula. Submarginal pores wanting. Anal opercula with posterior lateral margin remarkably longer than the anterior lateral one; outer angle pointed; each operculum carries a longish, finely pointed discal seta, and one long robust and two small slender apical ones; length 95–125μ; combined width 110–140μ. Marginal setae rather slender and finely pointed, somewhat variable in size, ranging from 44 to 58μ in length; 20 to 40 setae occur on the margin between the anterior and posterior stigmatic clefts. Stigmatic spines three, small, cylindrical; median 10 to 20μ in length; laterals about half as long. Multilocular pores not numerous around the genital opening and extending in irregular loose transverse rows on all preceding abdominal segments. Quinquelocular pores few and arranged in bands one pore wide. Tubular ducts entirely lacking. Legs reduced to a very small spur, each with a minute claw on the apex. Antennae rudimentary, obscurely divided in four or five—occasionally six—segments; apical segment with 5 or 6 digitiform setae; total length 100–150μ. Fold of the anal invagination with four setae altogether. Ventral submedian setae on the abdominal segments anterior to the genital opening absent.

KENYA: Nairobi, 14.ii.1951, on *Ficus verrucocarpa* Warb. (Moraceae) (*G. De Lotto*); 20.vi.1951, on *Ehretia silvatica* Guerke (Boraginaceae) (*G. De Lotto*); 2.vii.1941, on *Callistemon* sp. (Myrtaceae) (*R. H. Le Pelley*). Ruiru, 15.i.1957, on *Passiflora edulis* Linn. (Passifloraceae) (*D. J. McCrae*). Taveta, 15.x.1955, on *Citrus* sp. (Rutaceae) (*P. E. Wheatley*).

SOUTH AFRICA: Transvaal, Nelspruit, 18.ii.1964, on *Passiflora edulis* Linn., (*I. B. Kok*).

CEROPLASTES Gray, 1828

Ceroplastes Gray, 1828: 7.

Type-species: *Coccus janeirensis* Gray, 1828.

After the Linnean *Coccus*, *Ceroplastes* is the oldest of the genera of the coccoid family Coccidae. Originally introduced as a section of *Coccus*, it was raised to generic rank by Vigor (1829). Two species were initially referred to it: *Coccus* (*Ceroplastes*) *chilensis*, which according to Green (1899) was described on preadults of the older *Coccus cerifer* Anderson, 1791; and *C.* (*C.*) *janeirensis* which was fixed, apparently by Fernald (1903), as the type-species of the genus. Lindinger's designation (1937) of *chilensis* is entirely invalid.

Specimens of the type-species and types, paratypes or other material of nearly all species known from Africa south of the Sahara have been seen by the present writer. On the basis of the arrangement of the stigmatic spines, the species are here grouped in two genera: *Ceroplastes* and *Gascardia*. In the former are retained species in which the spines are disposed in a linear row on either side of the stigmatic clefts along the margin of the body; in the latter are placed those having the spines set in more or less compact transverse groups which extend on the dorsum. In species of *Ceroplastes* the wax test is divided in a series of plates well recognizable throughout

* These are the tubercle-like pores of authors.

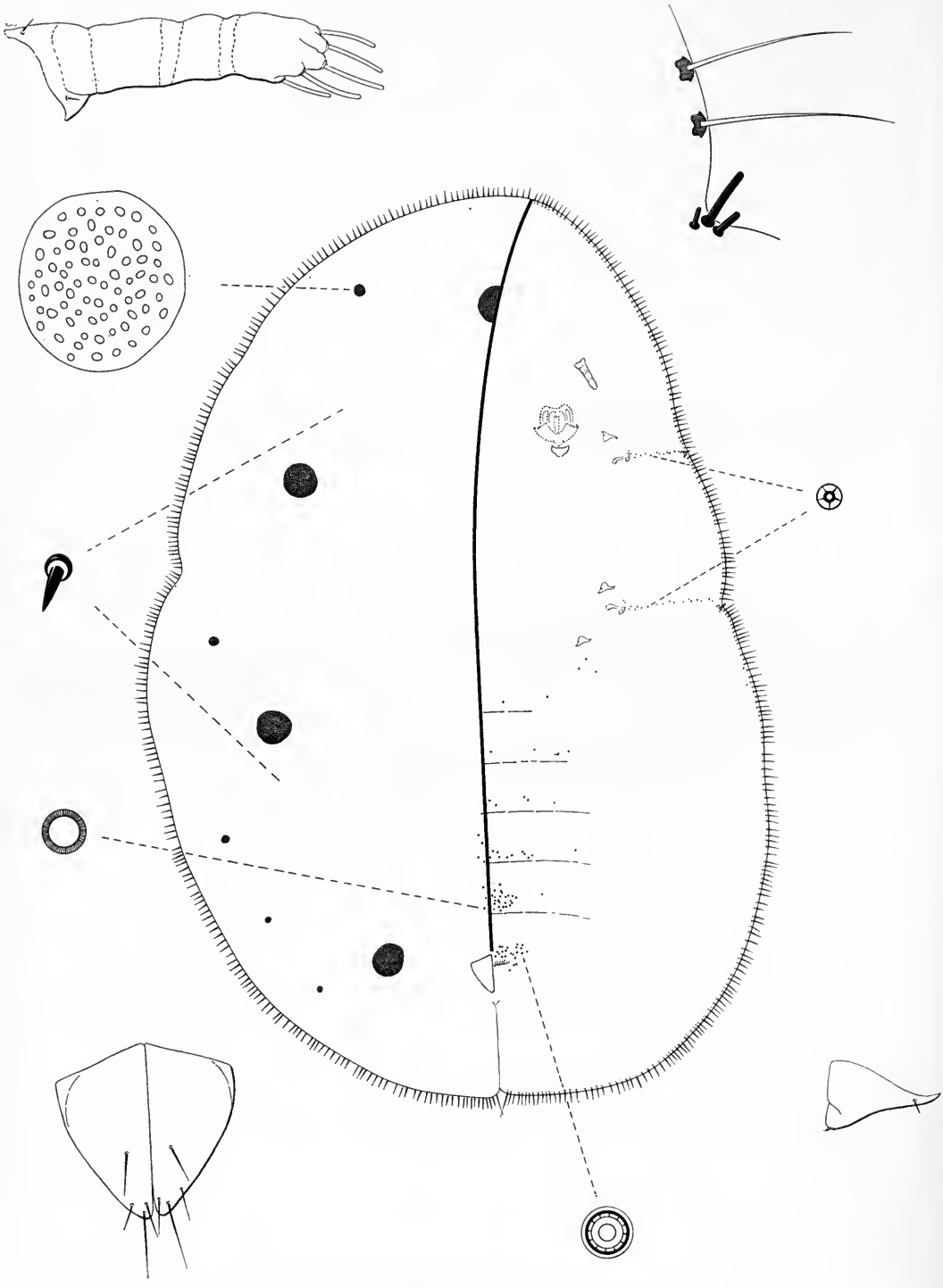

FIG. 1. *Akermes andersoni* Newstead.

the adult stage; while in those of *Gascardia*, a few days after the last moult, such division is not longer discernible and the covering assumes the aspect of a single solid mass of wax. In both instances there are however some exceptions.

The genus *Columnea* Targioni-Tozzetti, 1866 (type-species: *C. testudiniformis* Targioni-Tozzetti, 1866=*Coccus rusci* Linnaeus, 1758) is a subjective synonym of *Ceroplastes*. The genera *Ceroplastidia* Cockerell, 1910 (type-species: *Ceroplastes bruneri* Cockerell, 1902) and *Ceroplastina* Cockerell, 1910 (type-species: *Ceroplastes lahillei* Cockerell, 1910) are very likely subjective synonyms of *Gascardia*. Both were originally established as subgenera of *Ceroplastes* and were raised to generic rank by MacGillivray (1921). The nomenclatural status of *Coccicaccia* Amyot, 1847, a name formed by the union (and mis-spelling) of *Coccus cassiae* Chavannes, 1848, and *Coccopsidia* Amyot, 1847, for *Coccus psidii* Chavannes, 1848, is uncertain.

Nearly 150 species, varieties or subspecies of *Ceroplastes* are known up to present from the literature; the majority of them from tropical or subtropical countries. The following is an alphabetical list of the forms described or recorded from Africa south of the Sahara and their synonyms, with notes on their generic assignment.

africanus Green, 1899 . . . . . = *mimosae* Signoret, 1872.
africanus cristatus Green, 1899 . . . . = *egbarum* Cockerell, 1899.
africanus senegalensis Marchal, 1909 . . . = *mimosae* Signoret, 1872.
berliniae Hall, 1931 . . . . . referable to *Gascardia*.
berliniae enkeldoorni Hall, 1931 . . . . referable to *Gascardia*.
bipartitus Newstead, 1917 . . . . . transferred to *Gascardia*.
brevicauda Hall, 1931 . . . . . transferred to *Gascardia*.
= *destructor brevicauda* Hall, 1931
= *luteolus* De Lotto, 1955
bussei Newstead, 1906 . . . . . *nomen nudum*.
candela Cockerell, 1902. . . . . referable to *Gascardia*.
cerifer auctorum [*non* Anderson, 1791]* . . . = *destructor* Newstead, 1917.
combreti Brain, 1920 . . . . . referable to *Gascardia*.
coniformis Newstead, 1917 . . . . . referable to *Gascardia*.
deceptrix De Lotto, 1965 . . . . . here described as *Gascardia*.
destructor Newstead, 1917 . . . . . transferred to *Gascardia*.
= *cerifer* auctorum [*non* Anderson, 1791]*
destructor brevicauda Hall, 1931 . . . . = *brevicauda* Hall, 1931.
egbarum Cockerell, 1899 . . . . . referable to *Gascardia*.
= *africanus cristatus* Green, 1899
egbarum fulleri Cockerell, 1902 . . . . referable to *Gascardia*.
egbarum rhodesiensis Hall, 1931 . . . . referable to *Gascardia*.
erythraeus Leonardi, 1913 . . . . . referable to *Gascardia*.
eucleae Brain, 1920 . . . . . to be retained in *Ceroplastes*.
ficus Newstead, 1910 . . . . . retained in *Ceroplastes*.
= *pallidus* Brain, 1920
floridensis Comstock, 1881 . . . . . retained in *Ceroplastes*.
galeatus Newstead, 1911 . . . . . not seen.
helichrysi Hall, 1931 . . . . . referable to *Gascardia*.
helichrysi sinoiae Hall, 1931 . . . . . = *sinoiae* Hall, 1931.
lamborni Newstead, 1917 . . . . . not seen.

* This synonymy applies to East African records only.

longicauda Brain, 1920 . . . . . transferred to *Gascardia*.
longicauda sapii Hall, 1931 . . . . . referable to *Gascardia*.
luteolus De Lotto, 1955 . . . . . = *brevicauda* Hall, 1931.
mimosae Signoret, 1872 . . . . . referable to *Gascardia*.
= *africanus* Green, 1899
= *africanus senegalensis* Marchal, 1909
mimosae neghelii Bellio, 1939 . . . . . referable to *Gascardia*.
myricae (Linnaeus, 1767) . . . . . unrecognizable.
pallidus Brain, 1920 . . . . . = *ficus* Newstead, 1910.
personatus Newstead, 1898 . . . . . not seen.
quadrilineatus Newstead, 1910 . . . . . referable to *Gascardia*.
quadrilineatus royenae Hall, 1931 . . . . . referable to *Gascardia*.
quadrilineatus simplex Brain, 1920. . . . . = *simplex* Brain, 1920.
rubens Maskell, 1892 . . . . . retained in *Ceroplastes*.
rusci (Linnaeus, 1758) . . . . . to be retained in *Ceroplastes*.
rusci eugeniae Hall, 1931 . . . . . to be retained in *Ceroplastes*.
rusticus De Lotto, 1961 . . . . . transferred to *Gascardia*.
simplex Brain, 1920 . . . . . retained in *Ceroplastes*.
= *quadrilineatus simplex* Brain, 1920
singularis Newstead, 1910 . . . . . not seen.
sinoiae Hall, 1931 . . . . . transferred to *Gascardia*.
= *helichrysi sinoiae* Hall, 1931
spicatus Hall, 1937 . . . . . to be retained in *Ceroplastes*.
= *toddaliae spicatus* Hall, 1937
stellifer (Westwood, 1871) . . . type-species of *VINSONIA* Signoret, 1872.
stenocephalus De Lotto, 1961. . . . . transferred to *Gascardia*.
subdenudatus Newstead, 1917 . . . . . referable to *Gascardia*.
subsphaericus Newstead, 1911 . . . . . not seen.
tachardiaformis Brain, 1920 . . . . . referable to *Gascardia*.
theobromae Newstead, 1908 . . . . . not seen.
toddaliae Hall, 1931 . . . . . to be retained in *Ceroplastes*.
toddaliae spicatus Hall, 1937 . . . . . = *spicatus* Hall, 1937.
upacae Hall, 1931 . . . . . to be retained in *Ceroplastes*.
uapacae chrysophylli Hall, 1931 . . . . to be retained in *Ceroplastes*.
ugandae Newstead, 1911 . . . . . referable to *Gascardia*.
uvariae Marchal, 1911 . . . . . referable to *Gascardia*.
vinsonioides Newstead, 1911 . . . . . retained in *Ceroplastes*.
vuilleti Marchal, 1909 . . . . . referable to *Gascardia*.
zonatus Newstead, 1917 . . . . . referable to *Gascardia*.

In most wax scales, the study of the morphological structures is greatly hampered by large distortions of the integument, due in part to the high convexity of the body and in part to the presence of the caudal process. The strong sclerotization of this organ, moreover, obstructs the view of a wide area around the genital opening.

Besides the sclerotized caudal process, many species are provided with a series of dorsal and lateral membranous processes. Altogether eight are recognizable: one on the dorsum; one on the head; and three on either side of the body. These processes are normally pointed, except in *Ceroplastes ficus* and apparently in *C. simplex* in which they are broad, flat and somewhat dilated at the apex. Conversely in *Gascardia deceptrix, rustica* and *stenocephala*, and in *Ceroplastes floridensis, rubens* and *vinsonioides* they are obsolete.

Two kinds of dorsal pores, here designated pores of the simple or of the modified type, both having two to four loculi, occur in *Ceroplastes* and *Gascardia*. In pores of the simple type the loculi are oval, semicircular or triangular in shape and often of different size. In those of the modified type they are circular, all alike and always separated by a narrow, very elongate opening.

On either side of the ventral surface of the abdomen the body integument is deeply folded. This feature, called uro-ventral invagination, was found in all species of *Gascardia* and *Ceroplastes* examined so far.

The remaining morphological structures and the terms adopted for them do not need any particular mention, being common to all soft scales.

The following is a provisional key to the species from Africa south of the Sahara retained in *Ceroplastes* and dealt with in the following pages.

1		Dorsal pores of the modified type; tubular ducts with the inner duct greatly enlarged, and set in a band along the ventral submarginal area of the body	***floridensis***
		Dorsal pores of the simple type; tubular ducts with inner duct slender; when present the ducts are set in groupings on the fold of the uro-ventral invagination and on the cephalic area between the antennae only	2
2	(1)	Legs with a well developed tibio-tarsal articulatory sclerosis	3
		Tibio-tarsal articulatory sclerosis lacking	4
3	(2)	Dorsal setae cylindrical; ventral cephalic area with a group of tubular ducts between the antennae	***ficus***
		Dorsal setae stoutly spiniform and bluntly pointed; tubular ducts on the cephalic area wanting	***simplex***
4	(2)	Legs very small with tibia and tarsus fused together; stigmatic spines hemispherical	***rubens***
		Legs normal; stigmatic spines stoutly conical	***vinsonioides***

Ceroplastes ficus Newstead, 1910
(Text-fig. 2)

Ceroplastes ficus Newstead, 1910*a*: 190.
Ceroplastes ficus Newstead; Lindinger, 1913: 80.
Ceroplastes ficus Newstead; Newstead, 1917*b*: 128.
Ceroplastes pallidus Brain, 1920: 33.
Ceroplastes ficus Newstead; Hall, 1931: 294.

Newstead (1910*a*) first described *C. ficus* from TANGANYIKA on specimens collected on *Ficus* sp., and later (Newstead, 1917*b*) recorded it from SOUTH AFRICA on *Ochra pulchella** and from GHANA on *Annona* sp. The species was again described by Brain (1920) from SOUTH AFRICA under the name of *C. pallidus*. Hall (1931) after examining the types of both species came to the conclusion that they are identical, and sank the name of *pallidus* in synonymy with *ficus*. His views are here accepted.

"Test of the adult female more or less hemispherical, thin, semitransparent, hard and brittle, shaded with horn-coloured greys and browns; the large dorsal area comparatively smooth, with distinct lines radiating from the central nucleus, the larger ones being widely separated and

* Very likely a mis-spelling for *Ochna pulchra* Hook. (Ochnaceae).

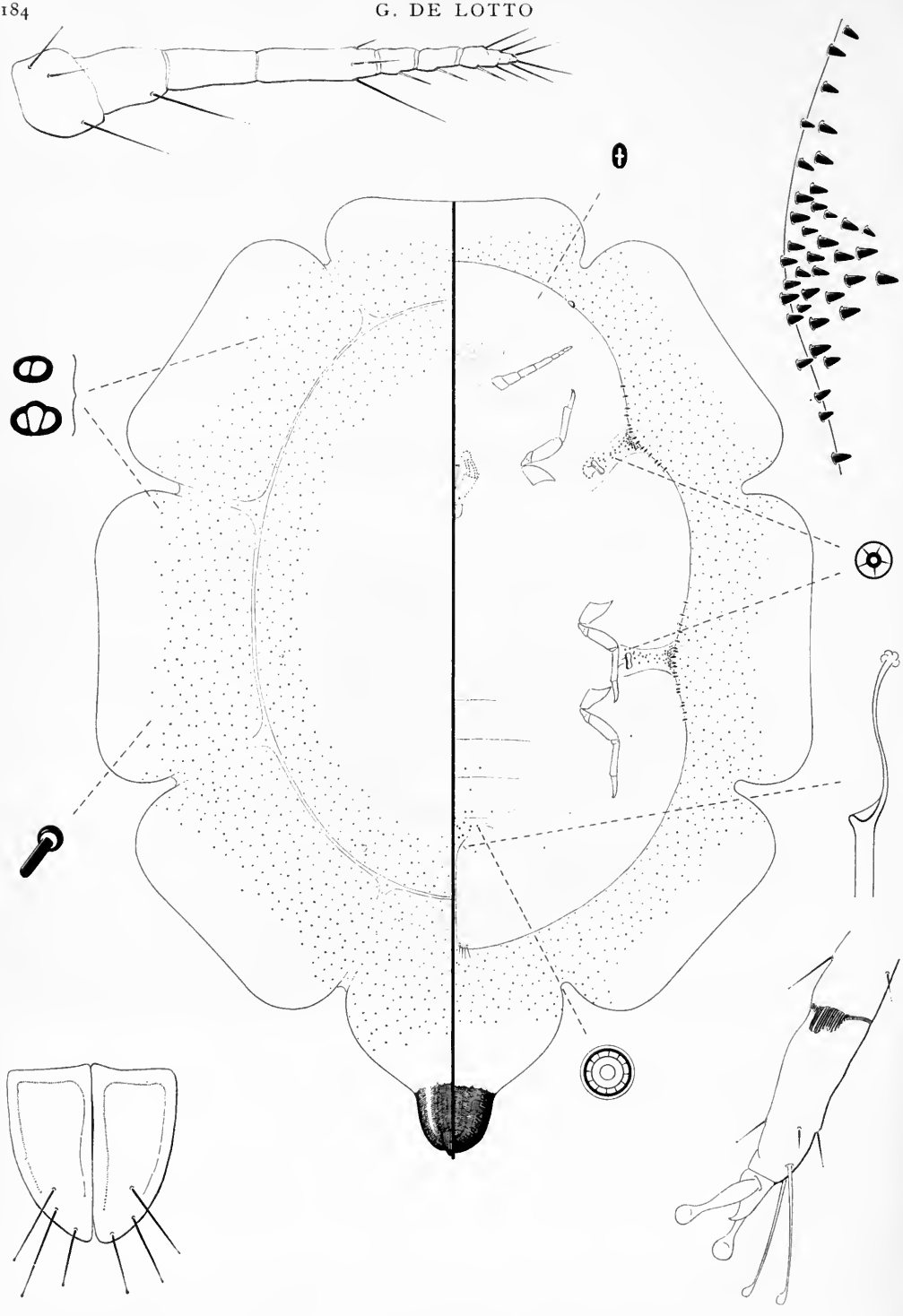

FIG. 2. *Ceroplastes ficus* Newstead.

equidistant. Besides these there are also some faint concentric ones visible in some of the examples. Lateral plates narrowly rectangular, length much greater than width, outer angles produced and darker than the rest; caudal process triangular, with the angle rounded; anal valves nude, minute, and only visible under a rather strong magnification. Length 6–6·5 mm.; width 5–5·25 mm." (Newstead, 1910*a*).

Mounted specimens 3–5 mm. long. Dorsal membranous process obsolete; cephalic and lateral ones very conspicuous, flat, broad and somewhat dilated at the apex, as shown in Text-figure 2. Dorsal setae very small, cylindrical. Dorsal pores of the simple type with two or three loculi. Setae and pores are lacking on the medio-dorsal area and on the apex of the membranous processes. Caudal process well developed, triangular but the sclerotization is reduced to a small area near the apex. Anal opercula 95–125μ long; each with three longish, robust setae. Stigmatic spines conical, not appreciably differentiated in size; each group is formed with 25 to 45 spines. Tubular ducts very few on the fold of the uro-ventral invagination and on the cephalic area between the antennae. Multilocular pores numerous around the genital opening; a few extend on the preceding abdominal segments. Quinquelocular and cruciform pores presenting nothing distinctive. Legs rather short otherwise normal, with a well developed tibio-tarsal articulatory sclerosis; ungual digitules attaining the same size and shape; dimensions of legs (iii): trochanter plus femur 180–205μ; tibia plus tarsus 195–210μ. Antennae with six or seven segments; total length 275–340μ.

UGANDA: Kampala, 9.vi.1958, on *Ficus* sp. (Moraceae) (*G. De Lotto*).

Ceroplastes floridensis Comstock, 1881

Ceroplastes floridensis Comstock; Green, 1916: 375.

Once only recorded from ZANZIBAR by Green (1916) on specimens living on *Citrus* sp.

The species is promptly separable from those from Africa south of the Sahara retained in the genus *Ceroplastes* by the presence of a ventral submarginal band of tubular ducts, all having the inner duct greatly enlarged. An excellent redescription and diagram of the species have been published by Ferris (1950).

As pointed out by Green (*in* Mamet, 1949), *C. floridensis* is very likely the same species which Signoret (1872) earlier described from MAURITIUS under the name of *C. vinsonii*.

Ceroplastes janeirensis (Gray, 1828)

(Text-fig. 3)

Coccus (*Ceroplastes*) *janeirensis* Gray, 1828: 7.
Ceroplastes janeirensis (Gray); Signoret, 1872: 42.
Ceroplastes janeirensis (Gray); Fernald, 1903: 153.

This species was very briefly described by Gray (1828) on specimens found on an unidentified *Solanum* in BRAZIL. The following redescription is based on three mounted young adult females ex Hempel's collection deposited in the British Museum (Natural History), London.

Mounted specimens 1·8–2·9 mm. long. Dorsal and cephalic membranous processes apparently obsolete; lateral ones poorly developed. Dorsal setae minute, cylindrical. Dorsal pores of the simple type with two loculi, among which are intermingled a few with three loculi. Setae and

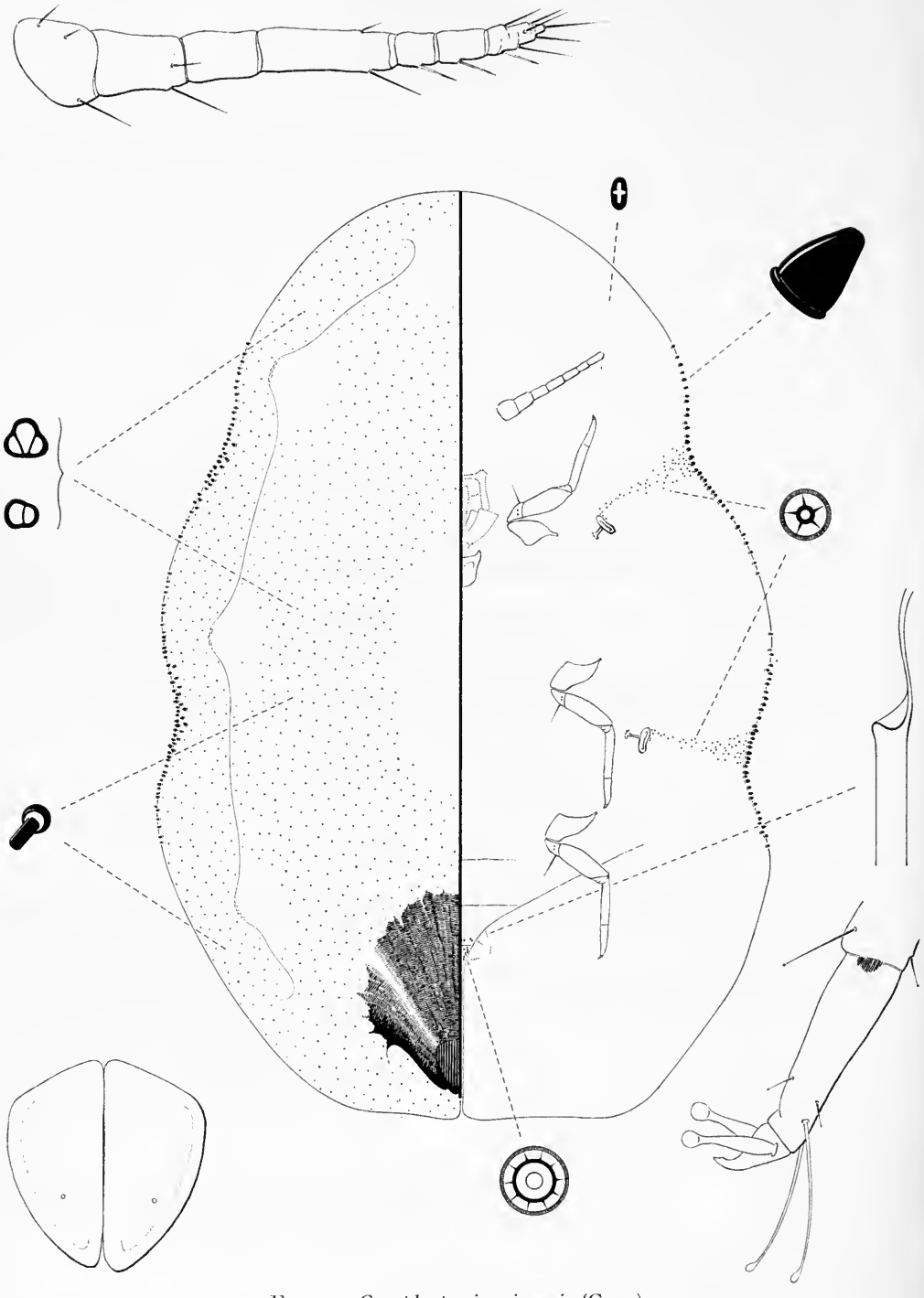

FIG. 3. *Ceroplastes janeirensis* (Gray)

pores are lacking on the central area of the dorsum and on the apex of the membranous processes. Caudal process short and stout, strongly sclerotized. Anal opercula 140–155μ long; combined width 110–145μ. The number and arrangement of the setae on each operculum could not be seen properly in the material examined, except for a seta socket occurring on the discal area. Stigmatic spines conical, at times truncate at the apex; variable in size and arranged in elongate rows, each of which is formed with 30–55 spines. Tubular ducts very few on the fold of the uro-ventral invagination only. Multilocular pores rather few on the last abdominal segments. Quinquelocular and cruciform pores as normal in the genus. Legs well developed with a tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in size and shape, both stout and knobbed at the apex; claws with a small denticle; dimensions of legs (iii): trochanter plus femur 180–195μ; tibia plus tarsus 200–215μ. Antennae normally 7-segmented, total length 275–315μ. Eyes lacking.

BRAZIL: Ypiranga, collecting date and host plant not stated.

This species bears a close morphological resemblance to *C. rusci* (Linnaeus, 1758). The latter however differs from *janeirensis* in having a group of tubular ducts on the ventral cephalic area between the antennae; six segments to the antennae and in the absence of the denticle on the claws.

Ceroplastes rubens Maskell, 1893

Ceroplastes rubens Maskell; Newstead, 1917*b*: 129.

Previously known only from ZANZIBAR on *Citrus* sp. (Newstead, 1917*b*). The records listed below tend to indicate that, though not common, *C. rubens* is widely distributed along the eastern coast of Africa.

The material at hand agrees well with the redescription and diagram of the species presented by Ferris (*in* Zimmerman, 1948).

KENYA: Mombasa, 26.i.1960, on *Mangifera indica* Linn. (Anacardiaceae) (*G. De Lotto*).

SOUTH AFRICA: Natal, Durban, 15.x.1961, on *Phymatodes scolopendria* (Burm.) Chinq. (Polypodiaceae) (*W. Quednau*); 17.v.1961, on *Barringtonia racemosa* Roxb. (*D. P. Annecke*).

ZANZIBAR: 13.ii.1956, on *Cinnamomum* sp. (Lauraceae) (*R. H. Le Pelley*).

Ceroplastes simplex Brain, 1920 **stat. n.**

Ceroplastes quadrilineatus simplex Brain, 1920: 33.

Originally described by Brain (1920) as a variety of *C. quadrilineatus* Newstead, 1911, the insect is here raised to specific rank and retained in *Ceroplastes*. In *quadrilineatus* the stigmatic spines are arranged in fairly compact groups as typical of the genus *Gascardia* to which it should be transferred.

A redescription of *C. simplex* will be presented as soon as supplementary fresh material is available.

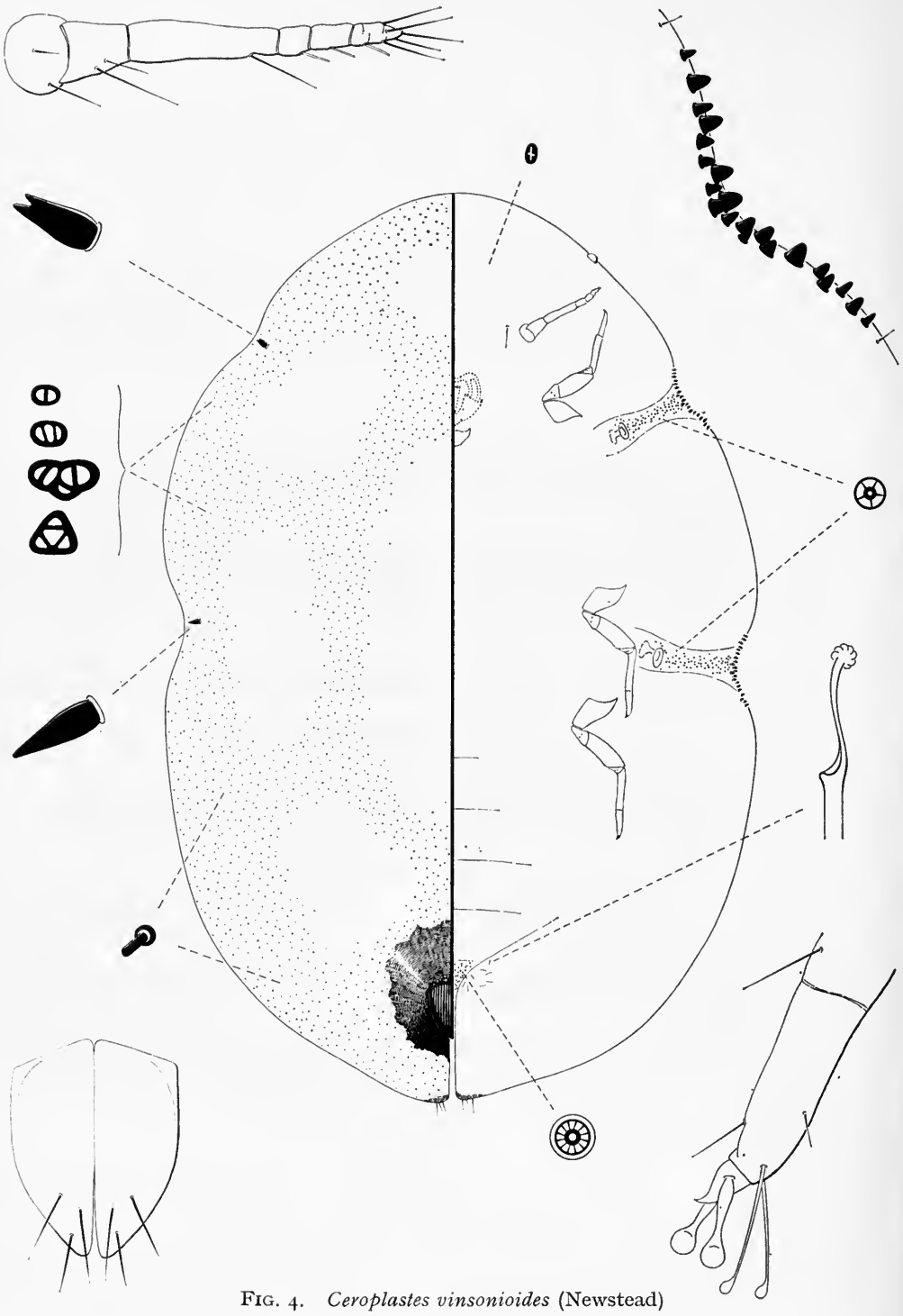

FIG. 4. *Ceroplastes vinsonioides* (Newstead)

Ceroplastes vinsonioides Newstead, 1911

(Text-fig. 4)

Ceroplastes vinsonioides Newstead, 1911*a*: 96.
Ceroplastes vinsonioides Newstead; Lindinger, 1913: 82.
Ceroplastes vinsonioides Newstead; Newstead, 1917: 129.

Originally described from UGANDA on specimens living on coffee. Known to occur in the same country on *Baikaea eminii* Taub. Lindinger's record from Tanganyika was also from coffee.

"Test of the adult female: dusky crimson, or brownish with faint tinge of dusky crimson; anterior margin sometimes paler (possibly pale crimson or pink when fresh); form rather broader than long; flattish above, with central nucleus; sides slightly recurved and projecting, and radiating from them are four short, thick, elevated arms; the anterior pair sometimes deeply concave dorsally, and all of them may be tipped with white wax. Test of young adult female: similar in colour to that of the older examples; flat, with central area slightly raised and nucleated; sides with four large and two small arms, the posterior pair shortest and tipped with greyish wax. . . . Length of old examples, 4–5 mm.; width, 5–6 mm.; height, 1–1·5 mm." (Newstead, 1911*a*). The following redescription is based on a series of newly collected specimens from Kenya as listed below. Mounted young adult females elliptical in outline, 1·4–2·5 mm. long. Medio-dorsal and lateral membranous processes not developed. Dorsal setae minute, cylindrical. Dorsal pores of the simple type with two to four loculi; often one or more pores are fused together, assuming an irregular shape and having up to five or six loculi. A large medio-dorsal area, one rounded or elongate area on the head and three on either side of the body are entirely devoid of setae and pores. Caudal process very short, heavily sclerotized. Anal opercula elongate, each of which is provided with two subdiscal and one subapical longish setae; length 145–160μ; combined width 110–125μ. Just in front of the anal opercula there is a transverse group of 10 to 20 small circular clear areas which very likely are homologous with the paraopercular pores of other soft scales. Stigmatic spines conical with the apex bluntly pointed, somewhat variable in size. On the dorsum, slightly displaced from the margin of the cleft, is inserted a large, isolated spine, often bidentate at the apex. Altogether 15 to 30 spines are associated with the anterior stigmatic clefts; and 20 to 25 with the posterior ones. Tubular ducts very few on the fold of the uro-ventral invagination only. Multilocular pores grouped around the genital opening and preceding abdominal segments. Quinquelocular and cruciform pores as usual in the genus. Legs normal, without tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size; dimensions of legs (iii): trochanter plus femur 125–180μ; tibia plus tarsus 130–190μ. Antennae with six segments, measuring together 190–260μ.

KENYA: Nairobi, 7.i.1954, on *Strychnos* sp. (Loganiaceae) (*G. De Lotto*); 24.i.1956, on *Coffea arabica* Linn. (Rubiaceae) (*R. H. Le Pelley*).

COCCUS Linnaeus, 1758

Coccus Linnaeus, 1758: 455.
Calymmata O. Costa, 1828: 452.
Calypticus O. Costa, 1835: 8.
Lecanium Burmeister, 1835: 69.

Type-species: *Coccus hesperidum* Linnaeus, 1758.

As I have already pointed out (De Lotto, 1959) the composition of the genus *Coccus* is far from satisfactory. Many of the species still referred to it have little or no affinity at all with the type-species. However no attempt is here made to undertake a revision.

Altogether 28 species have been recorded or described so far from Africa, south of the Sahara. In the following provisional key the species are separated without any implication on their relationship.

1		Legs always present	2
		Legs entirely absent	***msasae***
2	(1)	Claws without denticle	3
		Claws with a small denticle	25
3	(2)	Dorsal setae cylindrical or slightly swollen apically	4
		Dorsal setae finely or bluntly pointed	11
4	(3)	Anal opercula very elongate, pyriform, with the anterior lateral margin about twice as long as the posterior lateral one	***mangiferae***
		Anal opercula roughly quadrate or, if elongate, with the anterior lateral margin somewhat shorter than the posterior lateral one	5
5	(4)	Dorsal setae of different size; ventral tubular ducts entirely absent	***acutissimus***
		Dorsal setae all attaining the same size; ventral tubular ducts, though at times strongly reduced in number, always present	6
6	(5)	Paraopercular pores numerous, large, nearly spherical, and set in a loose elongate group on the median and submedian dorsal areas as far as the head	***subacutus***
		Paraopercular pores, when present, small, flattish or conical and arranged in a small group in front of the anal opercula only	7
7	(6)	With a supplementary group of tubular ducts near the attachment of each antenna	***asiaticus***
		Without tubular ducts near the attachment of the antennae	8
8	(7)	With a few tubular ducts on either side of the genital opening only; tibio-tarsal articulatory sclerosis missing	***viridulus***
		With groupings of tubular ducts near the attachment of one or all legs; articulatory sclerosis well developed	9
9	(8)	Dorsum with a submarginal row of altogether 24–26 tubular ducts	***moestus***
		Tubular ducts on the dorsum entirely absent	10
10	(9)	Antennae with 8 segments; tubular ducts crowded near the attachment of all legs	***alpinus***
		Antennae 7-segmented; tubular ducts associated with middle and hind legs only	***viridis***
11	(3)	Anal opercula together oval, with lateral margins fused and forming a continuous curve	12
		Anal opercula roughly quadrate	13
12	(11)	Stigmatic clefts with 20 or more spines	***adersi***
		Stigmatic clefts with 3 spines only	***bicruciatus***
13	(11)	Ventral tubular ducts present	14
		Tubular ducts entirely lacking	20
14	(13)	Antennae with 8 segments	15
		Antennae with 7 segments	18

15 (14) Pale areas of the dorsal dermis large and close together near the margin and tending to be smaller and set rather widely apart near the centre of the body 16
Dorsal pale areas not differentiated in size and uniformly distributed ***aethiopicus***

16 (15) With a few ventral tubular ducts scattered on the marginal and submarginal area of the abdomen; multilocular pores crowded around the genital opening only . . . . . ***africanus***
Ventral tubular ducts set in a loose marginal and submarginal band all around the body; multilocular pores extending in transverse rows on all preceding abdominal segments 17

17 (16) With groupings of tubular ducts near the attachment of all legs and extending across the median area of the thorax . . . . . ***celatus***
Tubular ducts on the median area of the thorax and near the attachment of legs absent . . . . . ***consimilis***

18 (14) With a small group of tubular ducts about the genital opening only ***subhemisphaericus***
Tubular ducts set in groupings near the attachment of the legs and tending to extend across the median area of the thorax 19

19 (18) Legs with a tibio-tarsal articulatory sclerosis; marginal setae short and slender ***hesperidum***
Tibio-tarsal articulatory sclerosis absent; marginal setae fairly long and robust ***smaragdinus***

20 (13) Paraopercular pores arranged in an elongate group in front of the anal opercula 21
Paraopercular pores lacking . . . . . ***sordidus***

21 (20) Multilocular pores few about the genital opening and preceding abdominal segment 22
Multilocular pores extending in loose transverse rows on all preceding segments 23

22 (21) Marginal setae slender and finely pointed or slightly frayed at the apex . ***elongatus***
Marginal setae stout and slightly swollen apically . . ***pseudelongatus***

23 (21) Dorsum with numerous long setae arranged in three longitudinal fringes . ***oculatus***
Dorsal longitudinal fringes of setae absent 24

24 (23) Paraopercular pores in a group of 22–34 . . . . . ***rhodesiensis***
Paraopercular pores 3 to 9 altogether. . . . . ***ehretiae***

25 (2) Tibio-tarsal articulatory sclerosis absent; stigmatic clefts with 2 spines only . 22
Legs with a tibio-tarsal articulatory sclerosis; stigmatic clefts with 3 spines . 67

26 (25) Marginal setae small, spiniform; dorsum with a median longitudinal chitinized band extending as far as the head . . . . . ***durbanensis***
Marginal setae cylindrical; dorsal longitudinal chitinized band absent . ***proteae***

27 (25) Marginal setae slender, cylindrical . . . . . ***anneckei***
Marginal setae flattened and frayed at the apex . . . . . ***cajani***

Coccus aethiopicus De Lotto, 1959

Lecanium (*Coccus*) *viride* Green; Newstead, 1917*b*: 130 [misidentification].
Lecanium africanum Newstead; Brain, 1920: 4 [misidentification].
Coccus aethiopicus De Lotto, 1959: 156.
Coccus aethiopicus De Lotto; De Lotto, 1960: 401.

NORTHERN RHODESIA: Lusaka, 6.vi.1963, on *Coffea* sp. (Rubiaceae) (*C.J. Hodgson*).

Coccus alpinus De Lotto, 1960

Lecanium africanum Newstead; Newstead, 1917: 357 [misidentification].
Coccus africanus (Newstead) De Lotto, 1957*a*: 296 [misidentification].
Coccus alpinus De Lotto, 1960: 393.

Ethiopia: Harar, 19.xi.1961, on *Coffea* sp. (Rubiaceae) (*B. G. Hill*). Alemaya, 3.ii.1964, on *Carissa edulis* (Apocynaceae) (*B. G. Hill*).

Coccus elongatus (Signoret, 1874)

Lecanium elongatum Signoret; Newstead, 1911*a*: 92.
Lecanium acaciae Newstead, 1917: 355.
Lecanium elongatum Signoret; Brain, 1920: 5.
Lecanium wistariae Brain, 1920: 8. [*non* Signoret, 1874].
Lecanium kraunhiarum Lindinger, 1928: 107. [*n.n.*].
Lecanium elongatum Signoret; Hall, 1935: 74.
Coccus elongatus (Signoret) Strickland, 1947: 499.
Coccus elongatus (Signoret); De Lotto, 1957*a*: 301.
Parthenolecanium wistaricola Borchsenius, 1957: 349 [*n.n.*] **syn. n.**
Coccus elongatus (Signoret); De Lotto, 1959: 160.

To the list of synonyms of this species should be added *Parthenolecanium wistaricola*, a new name proposed by Borchsenius (1957) for *Lecanium wistariae* Brain, 1920 [*non* Signoret, 1874]. The species had already been re-named by Lindinger (1928) as *Lecanium kraunhiarum*.

Coccus hesperidum Linnaeus, 1758

Lecanium minimum pinicola Maskell, 1897: 310.
Lecanium hesperidum (Linnaeus); Newstead, 1906: 71.
Coccus hesperidum Linnaeus; Sanders, 1909: 436.
Lecanium hesperidum (Linnaeus); Newstead, 1910*a*: 187.
Lecanium hesperidum (Linnaeus); Newstead, 1911: 164.
Lecanium hesperidum (Linnaeus); Vayssière, 1913: 430.
Lecanium hesperidum (Linnaeus); Lindinger, 1913: 82.
Lecanium punctuliferum Green; Lindinger, 1913: 83.
Lecanium hesperidum (Linnaeus); Green, 1916: 375.
Lecanium (*Coccus*) *hesperidum* (Linnaeus); Newstead, 1917*b*: 130.
Lecanium hesperidum (Linnaeus); Brain, 1920: 3.
Lecanium (*Coccus*) *hesperidum* (Linnaeus); Ghesquière, 1927: 314.
Lecanium hesperidum (Linnaeus); Hall, 1935: 74.
Coccus hesperidum Linnaeus; De Lotto, 1959: 160.

Ethiopia: Alemaya, 17.viii.1960, on *Citrus* sp. (Rutaceae); 13.xi.1963, on *Carica papaya* Linn. (Passifloraceae); 18.xii.1963, on *Ceiba pentandra* (Linn.) Gaertn. (Bombacaceae); 1.iv.1964, on *Agave* sp. (Amaryllidaceae) (*B. G. Hill*).

Northern Rhodesia: Mazabuka, 21.vi.1963, on *Citrus* sp. (Rutaceae) (*C. J. Hodgson*).

Coccus smaragdinus sp. n.

(Text-fig. 5)

Fully mature adult females not seen. Young adult ones elongate, flattish; evenly light green in colour. Mounted specimens elliptical in outline, 1·8–2·8 mm. long. Dorsal dermis without areolate or reticulate pale areas; apparently its sclerotization begins from the margin and progressively extends towards the centre of the dorsum. Dorsal pores minute, circular, numerous. Dorsal setae slender, finely pointed; all attaining the same size and distributed without any pattern. Paraopercular pores flat, with a granulate surface, set in an elongate, loose group of 10–25 in front of the anal opercula. Submarginal pores 6–9 altogether. Anal opercula together roughly quadrate, with two or three small, slender apical setae; discal seta lacking; outer angle pointed; posterior lateral margin broadly rounded; length 117–124μ; combined width 124–139μ. Marginal setae robust, flattened and deeply frayed at the apex; length 29–44μ; 20 to 29 setae occur between the anterior and posterior stigmatic clefts. Stigmatic spines three; median 40–50μ; laterals 15–22μ. Multilocular pores few about the genital opening only. Quinquelocular pores set in bands one or two pores wide. Tubular ducts arranged in small groups near the attachment of all legs and extending across the median area of the meso- and metathorax. Legs well developed without tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in form and size; dimensions of legs (iii): trochanter plus femur 146–161μ; tibia plus tarsus 153–182μ. Antennae 7-segmented with a pseudoarticulation on the fourth segment; total length 292–328μ. Fold of the anal invagination with altogether four setae.

KENYA: Nairobi, 18.i.1961, ♀ holotype and 11 ♀♀ paratypes collected on branches of *Strychnos* sp. (Loganiaceae) (*G. De Lotto*).—Coll. No. 2568.

The holotype and seven paratypes have been deposited in the British Museum (Natural History), London; and three paratypes in the U.S. National Collection of Coccoidea, Washington, D.C.

EUCALYMNATUS Cockerell, 1901

Eucalymnatus Cockerell, *in* Cockerell & Parrott, 1901: 57.

Type-species: *Lecanium tessellatum* Signoret, 1873.

This genus was originally introduced as a section of *Coccus*, and raised to generic rank by Cockerell himself (1902*a*). The conspicuous tessellated pattern of the dorsal derm is the main distinctive feature in which *Eucalymnatus* differs from *Coccus*. In all other characters the two genera are identical.

A redescription and a diagram of the type-species have been presented by Ferris (*in* Zimmerman, 1948).

Eucalymnatus tessellatus (Signoret, 1873)

Lecanium tessellatum Signoret; Lindinger, 1913: 83.
Eucalymnatus tessellatus (Signoret); Mamet, 1956: 136.

Previous records of this species are from TANGANYIKA (Lindinger, 1913) and from ZANZIBAR (Mamet, 1956). Its area of distribution in East Africa is apparently restricted to the coastal districts and offshore islands.

KENYA: Gazi, 24.ii.1951, on *Mangifera indica* Linn. (Anacardiaceae) (*R. H. Le Pelley*).

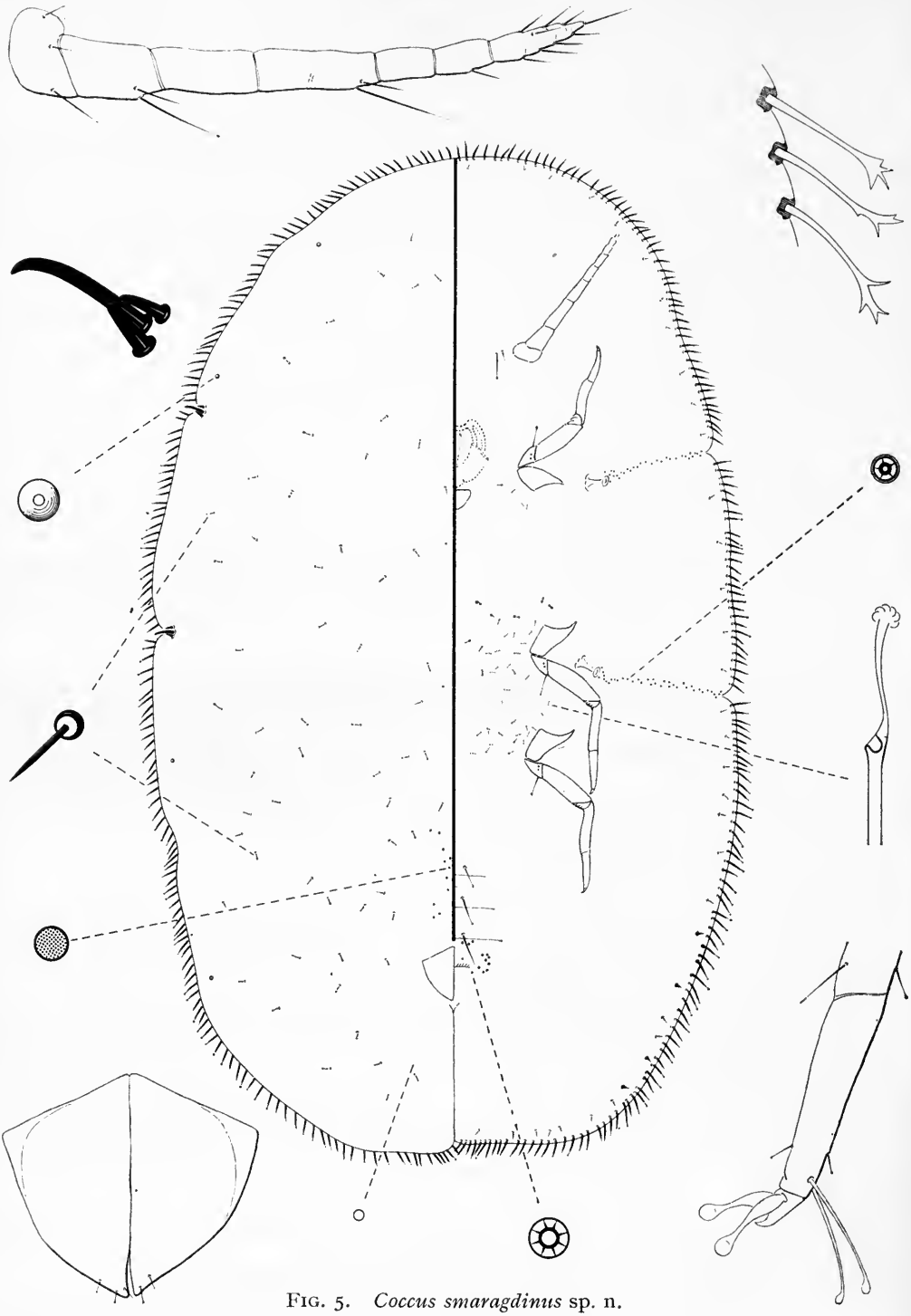

FIG. 5. *Coccus smaragdinus* sp. n.

GASCARDIA Targioni-Tozzetti, 1893

Gascardia Targioni-Tozzetti, *in* Gascard, 1893: 88.

Type-species: *Gascardia madagascariensis* Targioni-Tozzetti, 1893.

The monotypic genus *Gascardia* has nothing in common with the lac insects into which Targioni-Tozzetti originally placed it. As it has been pointed out by Newstead (1908), who presented a fairly detailed redescription of the type-species, the genus is morphologically related to *Ceroplastes*.

In the writer's opinion *Gascardia* is a good genus, to be used for the inclusion of those wax scales having the stigmatic spines set in more or less compact groups which extend from the stigmatic clefts towards the dorsum.

The species reviewed in the present paper can be separated by using the following provisional key:

1		Dorsal setae spiniform or conical 2
		Dorsal setae cylindrical 6
2	(1)	Legs with a tibio-tarsal articulatory sclerosis 3
		Tibio-tarsal articulatory sclerosis lacking . . . . . ***rustica***
3	(2)	Medio-dorsal and lateral membranous processes not developed; ventral tubular ducts entirely absent . . . . . ***stenocephala***
		Membranous processes well developed; tubular ducts set in groupings on the uro-ventral invagination and on the cephalic area between the antennae . 4
4	(3)	Multilocular pores extending in transverse rows on all abdominal segments anterior to the genital opening 5
		Multilocular pores on the first abdominal segments lacking . . . ***longicauda***
5	(4)	Caudal process short and conical; stigmatic spines set in groups of 15 to 25 ***sinoiae***
		Caudal process rather long and nearly cylindrical in shape; stigmatic spines in groups of 60–80 . . . . . ***bipartita***
6	(1)	Dorsal pores of the simple type . . . . . ***deceptrix***
		Dorsal pores of the modified type 7
7	(6)	Caudal process short . . . . . ***brevicauda***
		Caudal process long and very stout . . . . . ***destructor***

Gascardia bipartita (Newstead, 1917) comb. n.

(Text-fig. 6)

Ceroplastes bipartitus Newstead, 1917*a*: 25.
Ceroplastes bipartitus Newstead; Brain, 1920: 26.
Ceroplastes bipartitus Newstead; Hall, 1931: 293.

First described from South Africa from an unknown plant (Newstead, 1917*a*) and later recorded by Hall (1931) from Southern Rhodesia. Brain's record (1920) did not introduce any new information about the distribution of the species and its host plants. According to Hall, in the specimens from Southern Rhodesia the spines associated with the stigmatic clefts were fewer, and the caudal process longer than in Newstead's types.

"Female test. Colour, in dried specimens, very like pale dirty beeswax. In the young adults the test is broadly oval, somewhat hemispherical and divided into nine plates: three bilateral, one cephalic, one anal and one dorsal, the last-named with a conspicuous dark brown or blackish, oval spot, with a central elongate patch of pure white wax; the nuclear spots to the lateral plates are smaller and generally much less conspicuous than the dorsal one. Margin over the stigmatic areas with a pair of laterally compressed and somewhat disc-shaped extensions, each extension carrying *on its edge* a narrow strip of opaque white wax, the tip of which sometimes reaches the dark nuclear spot of the lateral thoracic plate. In very old examples the test has increased in thickness considerably, but this has been so much damaged in transit as to render it useless for descriptive purposes; however, one can trace the curious marginal extensions, which are somewhat like a narrow-waisted and distorted bobbin, or the toy in the once popular game "diabolo". Average length of young adults, 3 mm.; height, 1·6–2 mm.; average length of old adults, 6 mm.; height doubtful (Newstead, *loc. cit.*). The following redescription is based on three newly collected specimens which were compared with Newstead's paratypes, with which they agree well, except in that the stigmatic spines tend to be more numerous. Mounted specimens 3·5–4·2 mm. long. Medio-dorsal and lateral membranous processes fairly well developed. Dorsal setae very small, spiniform. Dorsal pores of the modified type with two or three loculi. Caudal process strongly sclerotized, subcylindrical, attaining about one fourth of the total length of the body. Anal opercula 145–160μ long; each with three longish but rather slender setae. Stigmatic spines somewhat variable in size, all conical and bluntly pointed at the apex; each stigmatic group is composed of 60 to 80 spines. Tubular ducts set in small groupings on the fold of the uro-ventral invagination and on the cephalic area between the antennae. Multilocular pores numerous around the genital opening and extending in loose transverse rows on all preceding abdominal segments. Quinquelocular and cruciform pores presenting nothing distinctive. Legs short, otherwise normal, with a well developed tibio-tarsal articulatory sclerosis; ungual digitules attaining the same size and shape; dimensions of legs (iii): trochanter plus femur 180–205μ; tibia plus tarsus 210–235μ. Antennae 6-segmented with a pseudoarticulation on the third segment; total length 370–395μ.

South Africa: Transvaal, Magoebaskloof, no date, on *Croton sylvaticus* Hochst. (Euphorbiaceae) (*J. H. Grobler*).

Gascardia brevicauda (Hall, 1931) **comb. n.**

(Text-fig. 7)

Ceroplastes destructor brevicauda Hall, 1931: 293.
Ceroplastes brevicauda Hall; De Lotto, 1955: 267.
Ceroplastes luteolus De Lotto, 1955: 268 **syn. n.**

This wax scale was briefly described by Hall (*loc. cit.*) as a variety of *Ceroplastes destructor* Newstead, 1917, on material collected in Southern Rhodesia on *Citrus aurantium* Linn., *Toddalia asiatica* Lam. (=*T. aculeata* Pers.) and *Cedrela toona* Roxbg. It has been raised to specific rank by the present writer (De Lotto, 1955). Under the name of *Ceroplastes luteolus* De Lotto, 1955, the species was again described from Kenya on specimens living on *Coffea arabica* Linn., *Citrus maxima* Merrill and *Markhamia platycalyx* (Baker) Sprague. A re-examination of the types of both species and the study of supplementary material from the same countries and other parts of Africa led to the conclusion that the small differences originally observed in *luteolus* come within the range of variation of *brevicauda* and do not warrant the recognition of a distinct species. The name of *luteolus* is therefore sunk as a synonym of *brevicauda*.

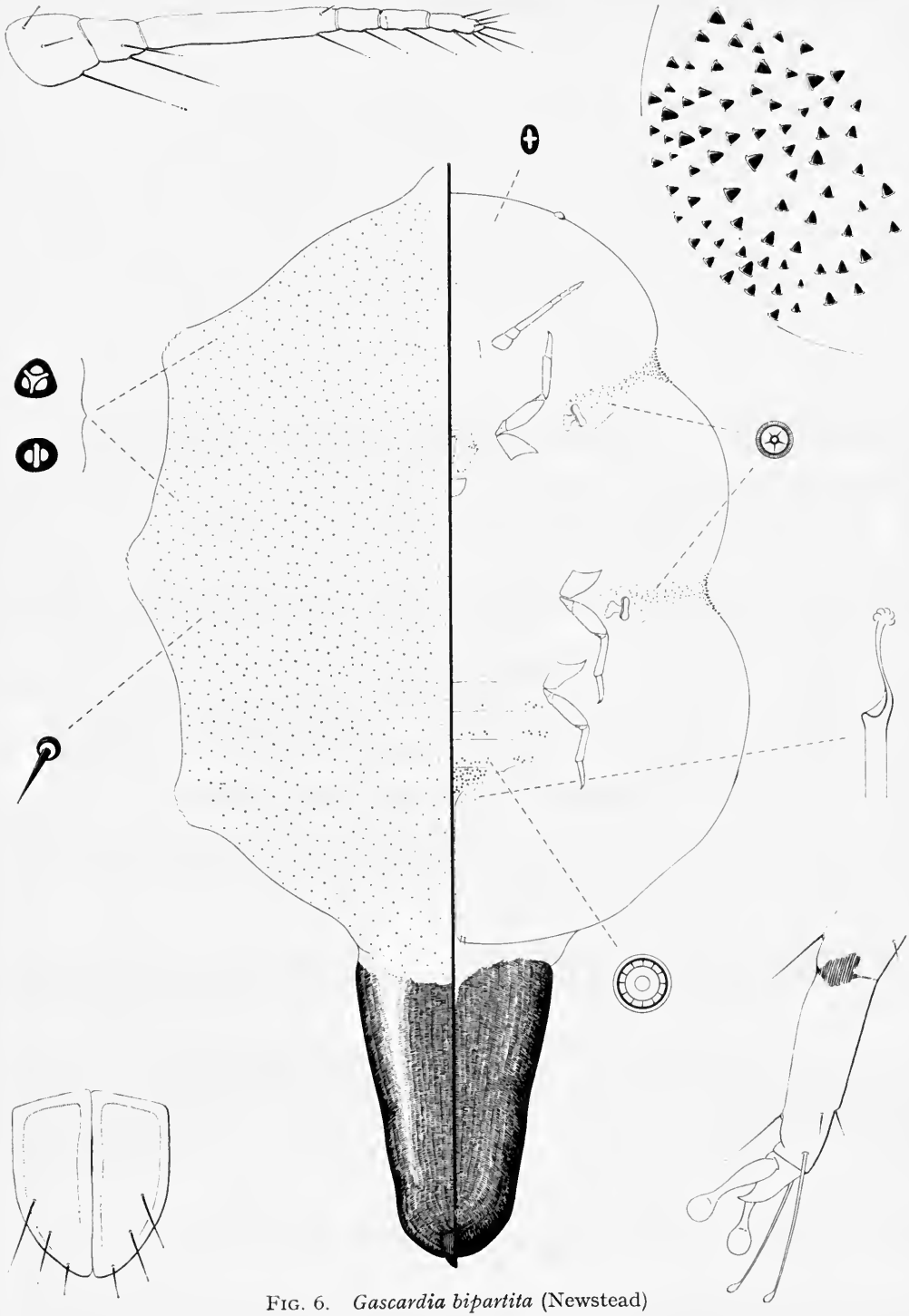

FIG. 6. *Gascardia bipartita* (Newstead)

Test of the living adult female at the beginning of the stage strongly convex, with a deep submarginal depression; test not divided in plates; centre of the dome with a minute elongate white boss; wax very soft; colour uniformly pure white to light creamy yellow, with four bands of opaque white wax arising from the stigmatic clefts. In old adults the submarginal depression is almost obliterated and the test is hemispherical or nearly so. Very young mounted adult females 1·7–2·5 mm. long. Dorsal setae minute, cylindrical. Dorsal pores of the modified type, with two or three small circular loculi. Both setae and pores are missing on the apex of the medio-dorsal and lateral membranous processes. Caudal process short, stout, strongly sclerotized. Anal opercula each with three robust subdiscal setae; length 140–160μ; combined width 120–135μ. Stigmatic spines conical, bluntly rounded at the apex and variable in size; 18 to 30 spines are associated with each anterior stigmatic cleft; 20 to 35 with the posterior ones. Tubular ducts set in a small group on the fold of the uro-ventral invagination. Multilocular pores numerous about the genital opening and last abdominal segments. Quinquelocular and cruciform pores presenting nothing distinctive. Legs short otherwise normal; tibio-tarsal articulatory sclerosis lacking; one of the ungual digitules stout, the opposite slender; both are knobbed at the apex; dimensions of legs (iii): trochanter plus femur 75–95μ; tibia plus tarsus 85–105μ. Antennae 6-segmented; total length 200–220μ.

Additional records of the species from Africa south of the Sahara, are:

Angola: Luanda*, on *Coffea stenophylla* Don. (Rubiaceae) (*A. P. da Fonseca*).

Eritrea: Asmara, on *Nerium oleander* Linn. (Apocynaceae) and *Schinus molle* Linn. (Anacardiaceae) (*G. De Lotto*). Material identified by Dr. W. J. Hall.

Kenya: Nairobi, on *Acokanthera longiflora* Stapf (Apocynaceae) (*G. De Lotto*). Ruiru, on *Citrus aurantium* Linn. (Rutaceae) and *Coffea arabica* Linn. (*T. J. Crowe*).

South Africa: Transvaal, Zebediela, 15.iv.1962, on *Citrus* sp. (*C. J. Cilliers*). Nelspruit, 1.x.1963, on *Citrus* sp. (*D. P. Annecke*).

Southern Rhodesia: Hatfield, on *Bidens pilosa* Linn. (Compositae) (*W. J. Hall*).

Uganda: South Bugishu, on *Coffea arabica* Linn. (*D. N. McNutt*). Kampala, on *Coffea robusta* Lindl. (*D. N. McNutt*).

The remarkable reduction in size of the caudal process and the smaller number of spines associated with the stigmatic clefts are the main characters by which *G. brevicauda* can be distinguished from the very closely allied *G. destructor* (Newstead, 1917).

The species seems to be widely distributed in Africa south of the Sahara. Reports received by the writer tend to indicate that in some areas the species may rank as a pest of some economic importance.

Gascardia cerifera (Anderson, 1791) **comb. n.**

Records of this species from Uganda and Tanganyika (Lindinger, 1907 and 1913; Newstead, 1910; 1910*a* and 1911) are to be understood as misidentifications of *G. destructor* (Newstead, 1917). Anderson's species does not occur in East Africa.

* Owing to an accidental oversight, the dates of collection of some records based on material studied and deposited at the Scott Agricultural Laboratories, Nairobi, cannot be supplied.

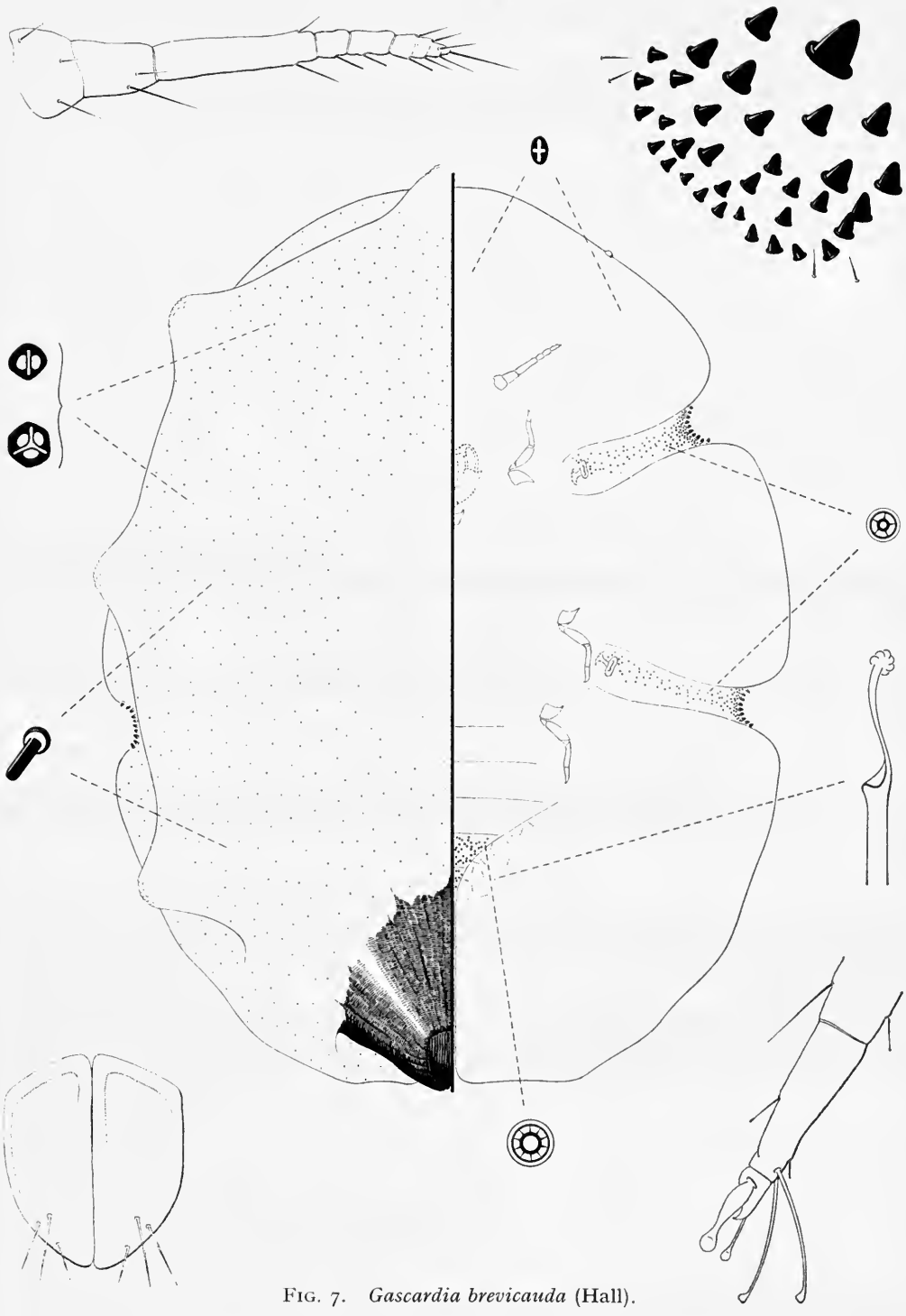

FIG. 7. *Gascardia brevicauda* (Hall).

Gascardia deceptrix sp. n.

(Text-fig. 8)

Young adult females moderately convex, elliptical, about 3 mm. long; wax test thin, fairly hard and brittle, not divided into plates; dorsum with a small depression at the centre of which is a minute elongate opaque white boss; colour semitransparent white; lateral margin with two narrow bands of snow-white wax arising from the stigmatic clefts. Full grown adult females not seen. Mounted young females broadly rounded behind and tapering in front; length 1·4–1·7 mm. Medio-dorsal and lateral membranous processes absent. Dorsal setae minute, cylindrical. Dorsal pores of the simple type with two to four loculi. Setae and pores are evenly scattered, except on the centre where they tend to be less numerous. Caudal process rather short and stout. Anal opercula each with three long, robust setae on the discal area, and a small slender one on the apex; length 125–140μ. Stigmatic spines stoutly conical and bluntly pointed; somewhat variable in size. Anterior groups formed by 35 to 50 spines; the posterior ones by 30 to 45. Few tubular ducts are scattered on the fold of the uro-ventral invagination and on the submarginal area of the meso- and, occasionally, metathorax; a group of ducts occurs on the cephalic area between the antennae. Multilocular pores numerous around the genital opening; a few pores are scattered on the preceding abdominal segments. Quinquelocular and cruciform pores presenting nothing distinctive in their arrangement. Legs normal, without tibio-tarsal articulatory sclerosis; ungual digitules not appreciably differentiated in shape and size; dimensions of legs (iii): trochanter plus femur 110–140μ; tibia plus tarsus 155–170μ. Antennae with six or seven segments; total length 225–255μ.

South Africa: Cape Province, Clanwilliam District, 17.v.1962, ♀ holotype and 4 ♀♀ paratypes collected on branches of *Rhus undulata* Jacq. (Anacardiaceae) (*J. Munting*).—Coll. No. 2792.

The holotype and one paratype have been deposited in the British Museum (Natural History), London; two paratypes in the South African National Collection of Insects, Pretoria; and one paratype in the U.S. National Collection of Coccoidea, Washington, D.C.

This species closely resembles *G. rustica* (De Lotto, 1961) but differs in having the dorsal pores of the simple type, the dorsal setae cylindrical, and in the absence of tubular ducts in the midregion of the abdomen.

Gascardia destructor (Newstead, 1917) comb. n.

(Text-fig. 9)

Ceroplastes cerifer (Anderson); Lindinger, 1907: 359 [misidentification].
Ceroplastes ceriferus (Anderson); Newstead, 1910: 66 [misidentification].
Ceroplastes ? ceriferus (Anderson); Newstead, 1910*a*: 195 [misidentification].
Ceroplastes ceriferus (Anderson); Newstead, 1911: 167 [misidentification].
Ceroplastes cerifer (Anderson); Lindinger, 1913: 80 [misidentification].
Ceroplastes destructor Newstead, 1917*a*: 26.
Ceroplastes destructor Newstead; Brain, 1920: 28.
Ceroplastes destructor Newstead; Hall, 1931: 293.
Ceroplastes destructor Newstead; Strickland, 1947: 498.

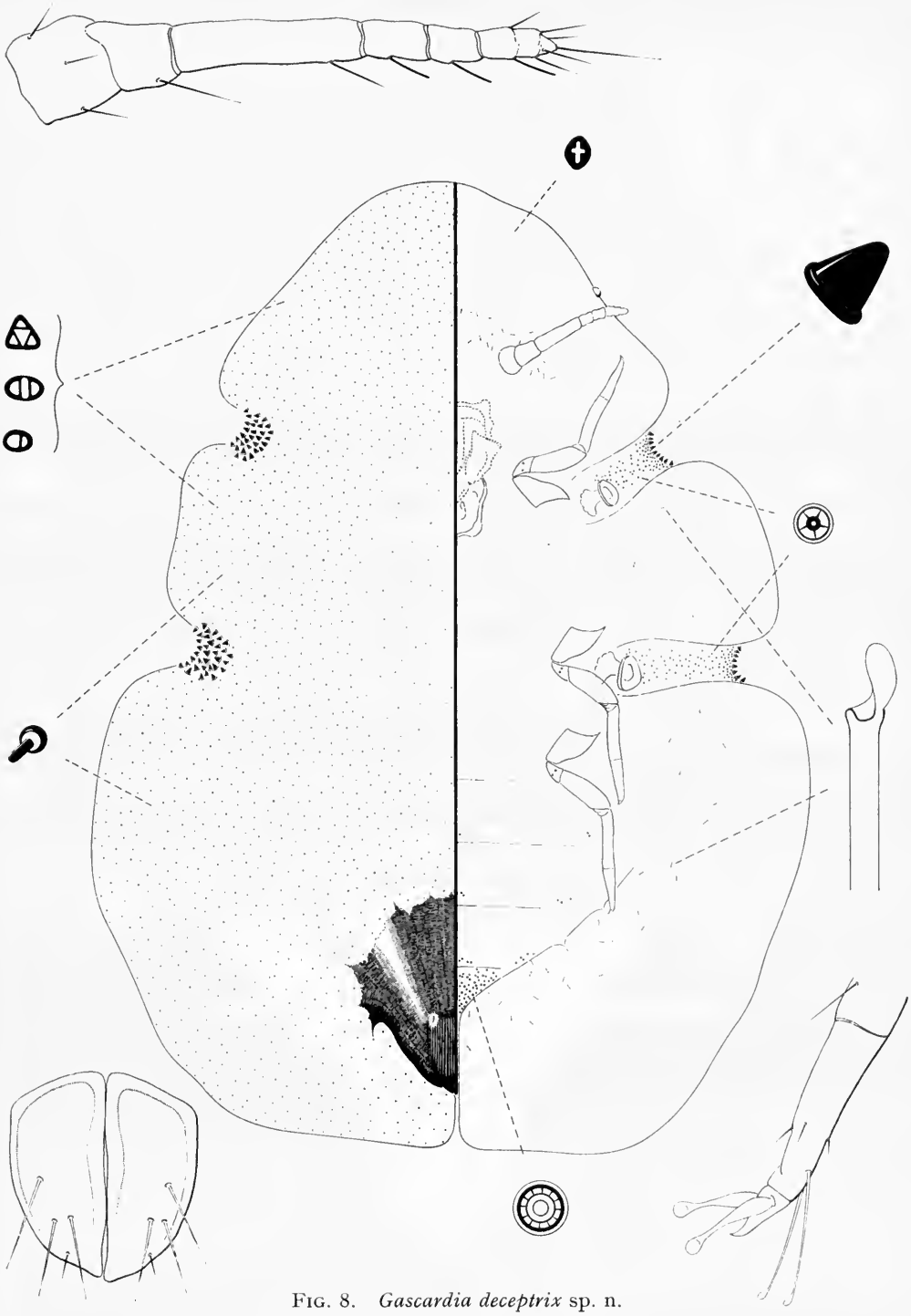

FIG. 8. *Gascardia deceptrix* sp. n.

"Female test white, creamy white or dirty white; exceedingly soft and containing an excess of moisture. Form irregular, with large but ill-defined gibbose protuberances; sides normally with two narrow opaque lines of secretion from the stigmatic clefts. No trace of lateral plates. Length 5–8 mm." (Newstead, 1917*a*). Young mounted adult females 3–5 mm. long. Dorsal setae very small, cylindrical. Dorsal pores of the modified type with two or three small circular loculi. Setae and pores are missing on the apical area of the medio-dorsal and lateral membranous processes. Caudal process fairly long, attaining about one-third of the total length of the insect; very stout and strongly chitinized. Anal opercula 130–170μ long; each bearing three longish, robust setae. Stigmatic spines conical, bluntly rounded at the apex, not appreciably differentiated in size, except one, normally the most external in position, which is about twice as large as the remaining spines; 35 to 85 spines are associated with the anterior stigmatic clefts; 40 to 90 with the posterior ones. Tubular ducts not numerous and set in an irregular group on the fold of the uro-ventral invagination. Multilocular pores very abundant about the genital opening and last abdominal segments. Quinquelocular and cruciform pores as normal. Legs short, without tibio-tarsal articulatory sclerosis; one of the ungual digitules slender; the opposite stout; both knobbed at the apex; dimensions of legs (iii): trochanter plus femur 80–100μ; tibia plus tarsus 85–110μ. Antennae with six segments; total length 195–250μ.

Congo: Rutshuru, 15.ii.1958, on *Coffea arabica* Linn. (Rubiaceae) (*D. J. McCrae*).

Kenya: Nairobi, 12.viii.1953, on *Gymnosporia* sp. (Celastraceae) (*G. De Lotto*). Kisii, 20.v.1954, on *Citrus* sp. (Rutaceae) (*T. J. Crowe*).

Mozambique: Vila Pery, March 1962, on *Citrus maxima* Merrill (*D. P. Annecke*).

South Africa: Cape Province, Grahamstown, March 1962, on *Citrus* sp. (*D. P. Annecke*). Transvaal, Naboomspruit, 19.x.1961, on *Psidium guajava* Linn. (Myrtaceae) (*D. P. Annecke*). Buffelspoort, July 1962, on *Poncirus trifoliata* (Linn.) Raf. (Rutaceae) (*J. Munting*).

Uganda: Entebbe, 2.vii.1954, on *Coffea robusta* Lindl. (*W. R. Ingram*).

The close resemblance of the wax test of this species to that of *G. cerifera* very likely accounts for the misidentifications of earlier authors. In slide mountings the two species may easily be distinguished from the shape of the caudal process, which in *cerifera* is very slender, nearly cylindrical, while in *destructor* it is stoutly conical.

Gascardia longicauda (Brain, 1920) **comb. n.**

(Text-fig. 10)

Ceroplastes longicauda Brain, 1920: 31.

"Adult female covered with a very thick layer of soft, white wax forming a test like a large *ceriferus* specimen, i.e., a little more elevated than *egbarum*. Largest specimen seen measured 18 mm. long, 11 mm. wide and 12 mm. high; marginal area prominent, forming a wide fold at the base of the central dome. The waxy appendages from the stigmatic clefts only project slightly from the main mass of the fold." (Brain, *loc. cit.*). In young living specimens observed in Kenya the wax covering was whitish with the dome suffused by a light mauve tinge, which turned to white or dirty white at full maturity.

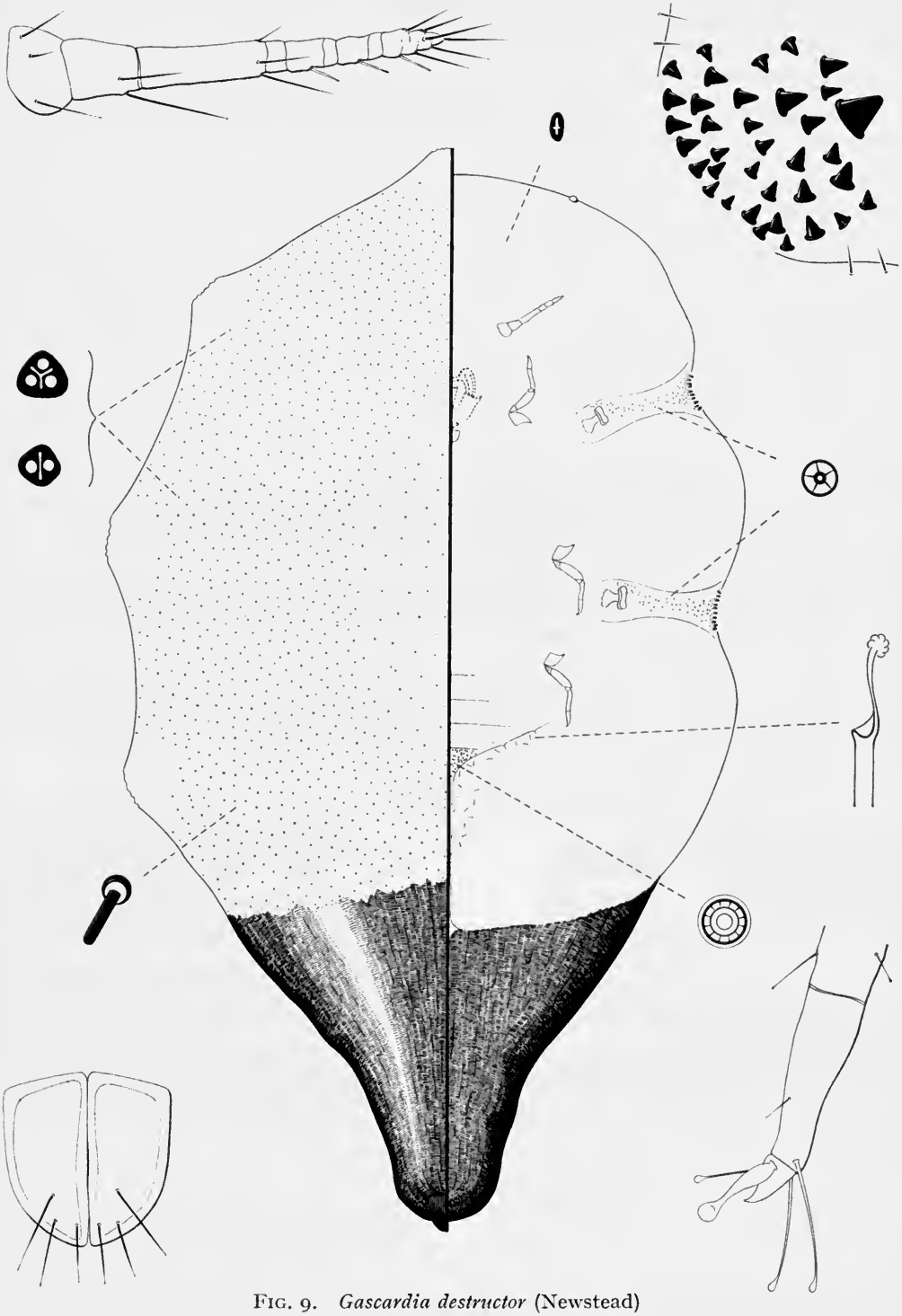

FIG. 9. *Gascardia destructor* (Newstead)

The following redescription is based on three paratypes deposited in the South African National Collection of Insects, Pretoria, and on a series of young mounted specimens from Kenya as listed below.

Mounted specimens 4·5–6·5 mm. long. Dorsal pores of the modified type, with two or three small circular loculi. Dorsal setae minute, spiniform and finely pointed. Setae and pores are distributed all over the dorsum, except on the apex of the medio-dorsal and lateral membranous processes, where they are entirely lacking. Caudal process very strongly sclerotized, slender and attaining about two thirds of the length of the body. Anal opercula 125–130μ long; each opercula is provided with one discal, one subdiscal and one apical seta; all robust and finely pointed. Stigmatic spines slightly variable in size, conical and bluntly rounded apically; each group is built up with 35–55 spines. Tubular ducts set in a small group on the fold of the uro-ventral invagination; at times a few ducts occur on the median cephalic area just in front of the attachment of the antennae. Multilocular pores numerous about the genital opening and last abdominal segments. Quinquelocular and cruciform pores arranged as usual. Legs all short otherwise normal, with a well developed tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size, both stout and knobbed at the apex; dimensions of legs (iii): trochanter plus femur 175–190μ; tibia plus tarsus 205–215μ. Antennae with six segments, with one or two pseudoarticulations on the third*; total length 255–335μ.

KENYA: Nairobi, 2.ix.1951 and 17.v.1954, on *Jacaranda mimosaefolia* D. Don (Bignoniaceae) (*G. De Lotto*).

SOUTH AFRICA: Natal coast, July 1915, on stems of a native shrub (*G. Fuller*).— Coll. No. C.K.B. 334 (type-series).

This species comes close to *Gascardia cerifera* (Anderson, 1791) but differs in having the dorsal setae spiniform and all legs with a well developed articulatory sclerosis between the tarsus and tibia. Furthermore in *longicauda* the caudal process is longer and stouter than in *cerifera*.

The var. *sapii* described by Hall (1931) from Southern Rhodesia on specimens collected on *Sapium* sp. (Euphorbiaceae) is strongly suspected to be identical with *longicauda*. However no final conclusion about its identity could be reached, owing to the very poor condition of the two paratypes seen.

Gascardia rustica (De Lotto, 1961) **comb. n.**

Ceroplastes rusticus De Lotto, 1961: 318.

SOUTH AFRICA: Cape Province, Grahamstown, 28.x.1961, on *Selago corymbosa* Linn. (Scrophulariaceae) (*D. P. Annecke*).

Gascardia sinoiae (Hall, 1931) **comb. n.**
(Text-fig. 11)

Ceroplastes helichrysi sinoiae Hall, 1931: 296.

Very briefly described by Hall (1931) as a variety of *Ceroplastes helichrysi* Hall, 1931, on specimens collected on *Ficus* sp. in SOUTHERN RHODESIA. The morphological differences between the two forms discussed below fully warrant, in my opinion, the erection of var. *sinoiae* to specific rank.

* In all specimens examined, including the three paratypes, none of the antennae was found with 7 or 8 segments, as stated by Brain in his original description.

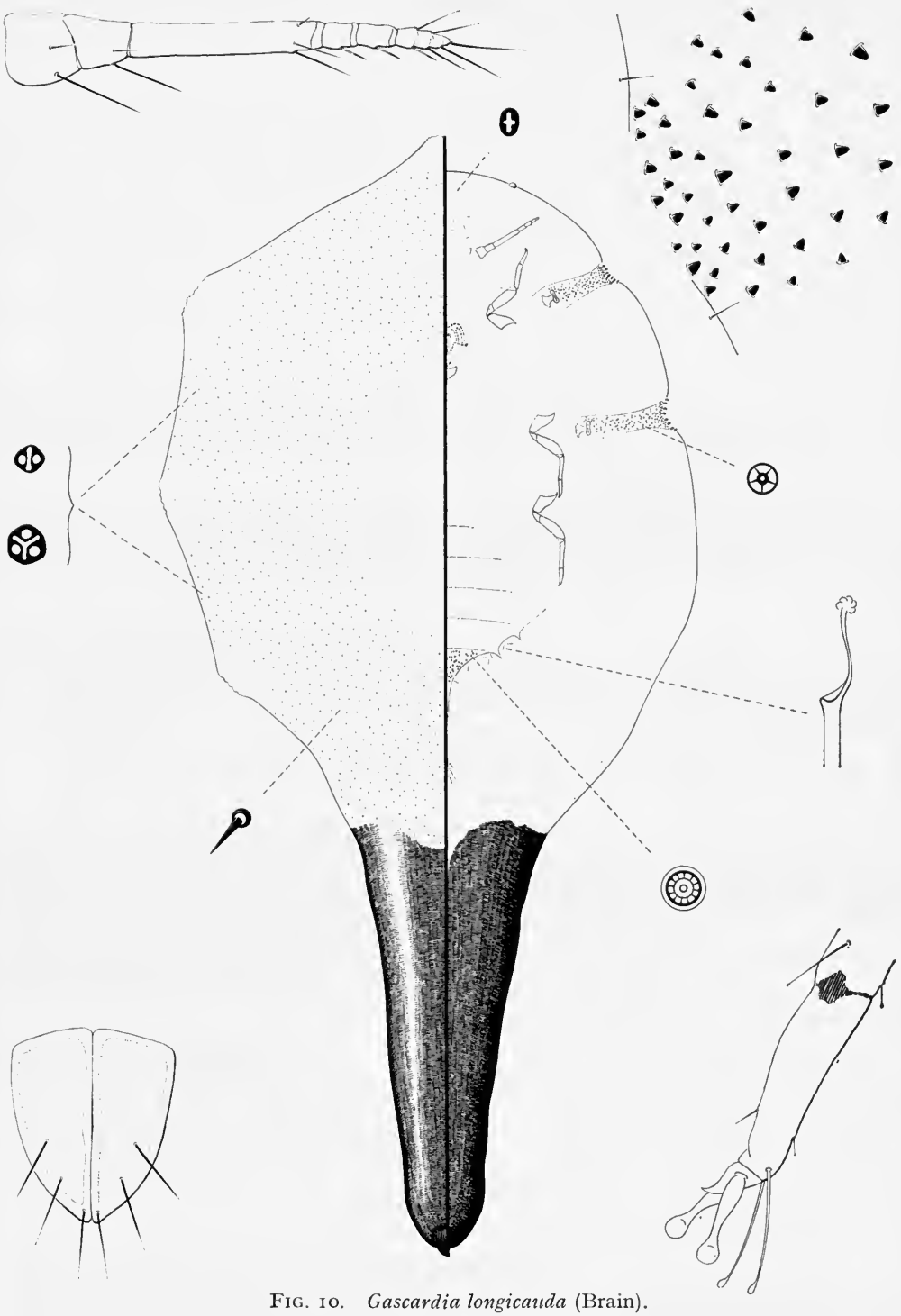

FIG. 10. *Gascardia longicauda* (Brain).

Test of full grown adult female hemispherical, not divided in plates, with a shallow medio-dorsal depression at the centre of which is situated a minute elongate boss; wax evenly white in colour; average dimensions: 8 mm. long; 8 mm. wide; 6 mm. high. Mounted young adult females 1·4–1·9 mm. Medio-dorsal and lateral membranous processes well developed. Dorsal setae small, conical, with tip bluntly pointed. Dorsal pores of the modified type, with two or three circular loculi. Both setae and pores are missing on the apical area of the membranous processes. Caudal process rather short, stout to very stout; strongly sclerotized. Anal opercula elongate, each with three longish, robust setae; length 145–155μ; combined width 120–130μ. Stigmatic spines slightly variable in size, all conical and rounded apically; 15 to 20 spines occur on the anterior stigmatic clefts; 20 to 25 on the posterior one. Tubular ducts set in small groups on the fold of the uro-ventral invagination and on the cephalic area between the attachment of the antennae. Multilocular pores numerous around the genital opening and extending in irregular transverse rows on all preceding abdominal segments. Quinquelocular and cruciform pores as normal. Legs well developed with a large tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size; both stout and knobbed at the apex; dimensions of legs (iii): trochanter plus femur 220–225μ; tibia plus tarsus 215–230μ. Antennae with six segments; total length 285–325μ.

South Africa: Transvaal, Pretoria, 9.vii.1963, on *Jacaranda mimosaefolia* D. Don. (Bignoniaceae) (*E. C. G. Bedford*); 8.vii.1963, on *Ficus burkei* Miq. (Moraceae) (*E. G. G. Bedford*); 7.iv.1964, on *Hypericum revolutum* Vahl (Guttiferae) (*G. De Lotto*).

This species actually bears a close resemblance to *helichrysi*, but differs in that all legs are provided with a well developed tibio-tarsal articulatory sclerosis and the dorsal setae are stoutly spiniform. Furthermore, as indicated by Hall (1931), the ungual digitules are of equal size and shape.

Gascardia stenocephala (De Lotto, 1961) **comb. n.**

Ceroplastes stenocephalus De Lotto, 1961: 320.

In the diagram accompanying the original description of this species, the body structures on the ventral midregion of the abdomen are not clearly visible. A new diagram is presented in Text-fig. 12.

KILIFIA **n. n.**

Platycoccus Takahashi, 1959: 75 [*non* Stickney, 1934]

Type-species: *Lecanium acuminatum* Signoret, 1873.

The name *Platycoccus* was first made available in our nomenclature by Stickney (1934) for a genus of the diaspidid subfamily Phoenicococcinae. For Takahashi's genus *Platycoccus* the new name of *Kilifia* is here proposed.

In the writer's opinion the peculiar enlargement of the middle and hind legs and the shape of the anal opercula afford enough ground for the separation of *Kilifia* from *Coccus*. On the basis of the form of the anal opercula, Steinweden (1929) included *Lecanium acuminatum* in the genus *Protopulvinaria* Cockerell, 1894 (type-species: *Pulvinaria pyriformis* Cockerell, 1894). The latter however differs from *Kilifia* in having all legs normally developed and in the presence of a ventral sub-marginal band of tubular ducts.

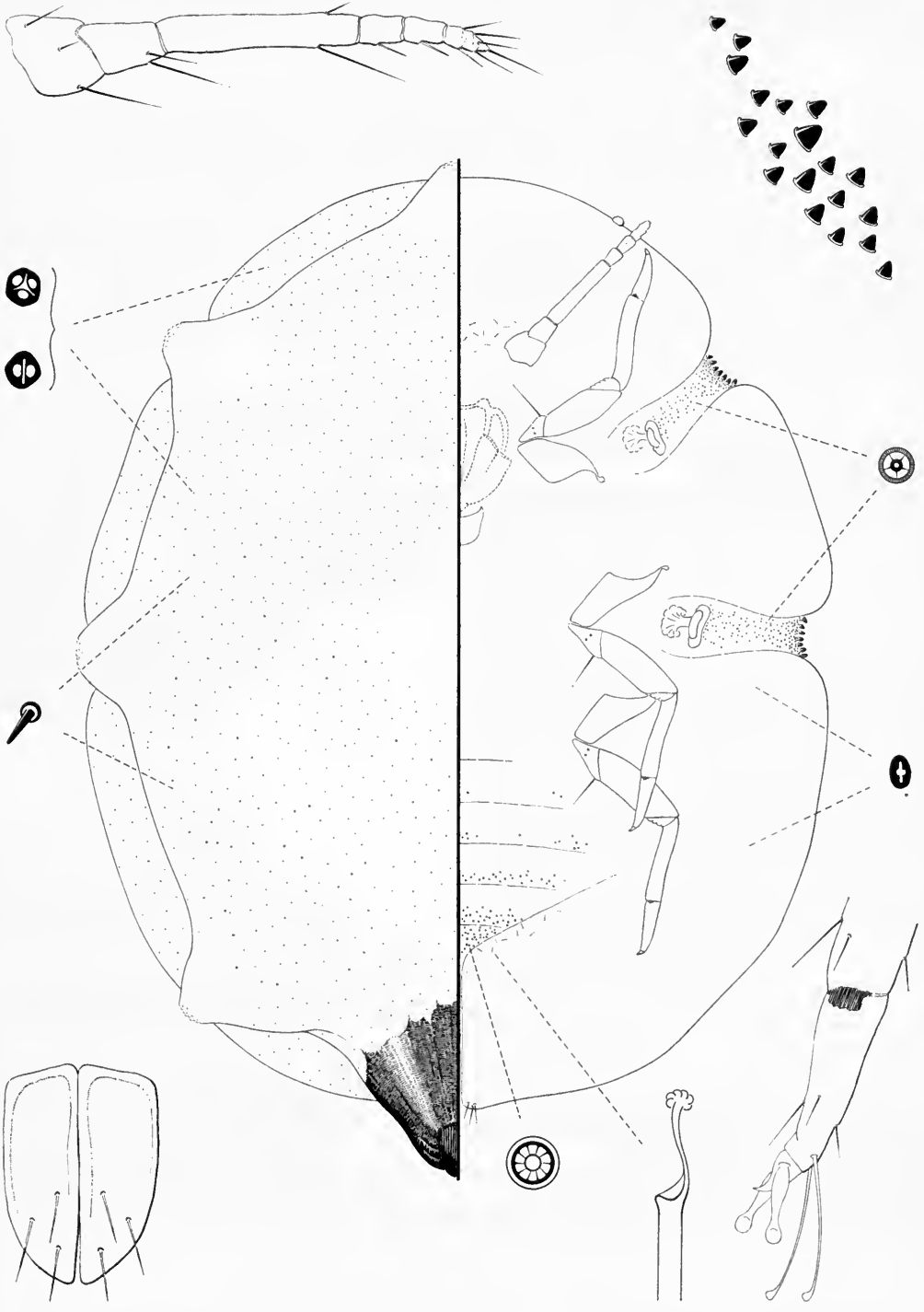

FIG. 11. *Gascardia sinoiae* (Hall).

Besides the type-species and *K. deltoides* here described as new, the genus *Kilifia* should include *Coccus diversipes* Cockerell, 1905, from the Philippine Islands. The following key to the species has been tentatively constructed from characters of *acuminata* and *diversipes* discussed by Ferris (*in:* Zimmerman, 1948).

1 Dorsum with a band of small 8-shaped pores extending as far as the head ***diversipes***

Dorsal median band of 8-shaped pores lacking; paraopercular pores, if present, set in small group in front of the anal opercula only 2

2 (1) Tibia of middle and hind legs with a well developed spur-like membranous process . . . . . ***deltoides***

Spur-like process on middle and hind tibiae lacking . . . . ***acuminata***

According to Williams (1963) *Lecanium wardi* Newstead, 1917, which Ferris (*loc. cit.*) considered closely related to *K. acuminata*, is a synonym of *Coccus mangiferae* (Green, 1889).

Kilifia acuminata (Signoret, 1873) **comb. n.**

Lecanium acuminatum Signoret, 1873: 397.
Lecanium acuminatum Signoret; Atkinson, 1889: 8.
Lecanium acuminatum Signoret; Maskell, 1893: 219.
Lecanium acuminatum Signoret; Green, 1904: 195.
Protopulvinaria acuminata (Signoret) Steinweden, 1929: 223.
Coccus hesperidum Linnaeus; Lindinger, 1935: 138.
Coccus acuminatus (Signoret); Ferris, *in* Zimmerman, 1948: 294.
Platycoccus acuminatus (Signoret); Takahashi, 1959: 76.

There is strong evidence that the species currently referred to under this name is not that actually described by Signoret as *Lecanium acuminatum* from orchids in greenhouses in Luxemburg. Signoret, who to a large extent based the diagnoses of the several species of *Lecanium* dealt with by him on the form and segmentation of legs and antennae, said nothing about the unusual development of the middle and hind legs so peculiar in this species. In a small diagram showing the ventral view of the adult female he presented on plate xi, fig. 1, all legs look subequal.

Identifications of *L. acuminatum* by later authors from the Hawaiian Islands (Maskell, 1893) and Ceylon (Atkinson, 1889; Green, 1904) merely rested on the outline of the body and shortness of the tarsi.

Without giving any reason for doing so, Lindinger (1935) sank Signoret's species in synonymy with *C. hesperidum* Linnaeus, 1758. His action can hardly be confuted because the types do not exist any longer.

Kilifia deltoides **sp. n.**

(Text-fig. 13)

Young living adults flat, emerald-green in colour, with some black or very dark brown minute dots set in irregular radiating rows near the margin of the body; old adults flattish, colour evenly dark brown. Mounted specimens broadly oval in outline, often asymmetric, 1–2 mm. long. Chitinization of the dorsal dermis apparently uniform. Dorsal pores small, elliptical, with two

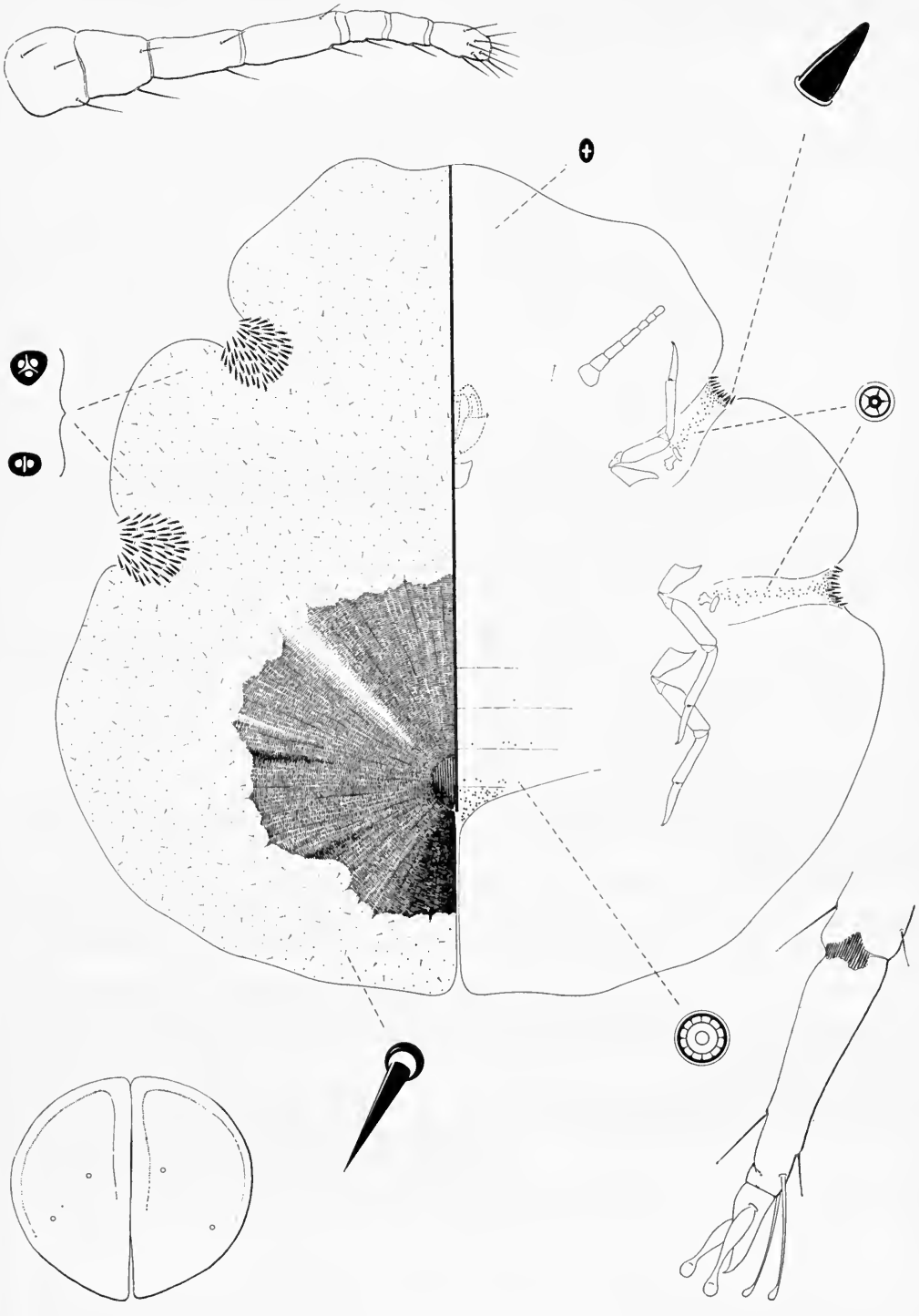

FIG. 12. *Gascardia stenocephala* (De Lotto)

loculi. Dorsal setae small, cylindrical. Both pores and setae are arranged in a fairly regular reticulated pattern, except on the marginal and median areas where they are entirely lacking; among them are intermingled numerous minute simple pores. Paraopercular pores small, flat, with a granulate surface, set in an elongate group of 33–36 along the median area in front of the anal opercula. Submarginal pores 5 to 9 altogether. Anal opercula elongate; anterior and posterior lateral margins straight; each operculum bears one subapical and three apical small, slender setae; length 167–182μ; combined width 117–131μ. Marginal setae flattened and deeply branched at the apex, 14–18μ long; 23 to 31 setae occur between the anterior and posterior stigmatic clefts. Stigmatic spines three; median 13–16μ; laterals 4–5μ. Multilocular pores arranged in two small groups on the submedian area just caudad to the genital opening. Quinquelocular pores associated with the stigmatic openings set in bands one or two pores wide. Tubular ducts entirely lacking. Legs with a fairly well developed tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size, both stout and apically knobbed; coxa, trochanter and femur of the middle and hind legs very large and with the distal end of the tibia provided with a well developed membranous spur; dimensions of legs (iii): trochanter plus femur 285–314μ; tibia plus tarsus 168–182μ. Antennae 7-segmented; at times reduced to six segments with a pseudoarticulation on the third; total length 241–256μ. Fold of the anal invagination with altogether four setae. Medio-ventral abdominal setae reduced to one couple on the segment anterior to the genital opening.

KENYA: Kilifi, 5.ii.1963, ♀ holotype and 7 ♀♀ paratypes collected on leaves of *Mangifera indica* Linn. (Anacardiaceae) (*G. De Lotto*).—Coll. No. 2793.

The holotype and four paratypes have been deposited in the British Museum (Natural History), London; three paratypes in the U.S. National Collection of Coccoidea, Washington, D.C.

Other records of the same species on material not included in the type series, are:

KENYA: Mombasa, 24.v.1951, on *Anacardium occidentale* Linn. (Anacardiaceae) (*R. H. Le Pelley*).

ZANZIBAR: 11.ii.1956, on *Eugenia* sp. (Myrtaceae) (*R. H. Le Pelley*).

MARSIPOCOCCUS Cockerell & Bueker, 1930

Marsipococcus Cockerell & Bueker, 1930: 7.

Type-species: *Lecanium marsupiale* Green, 1904.

Certainly a valid genus as far as its separation from *Coccus* is concerned. At present only the type-species is referred to it.

Marsipococcus marsupialis (Green, 1904)

(Text-fig. 14)

Lecanium marsupiale Green, 1904: 212.
Lecanium marsupiale Green; Lindinger, 1913: 82.

This species was first described from CEYLON (Green 1904) as living on the upper surface of leaves of *Piper nigrum* Linn. (Piperaceae) and on other species of pepper; on *Pothos scandens* Linn. (Araceae); and occasionally on *Annona* sp. (Annonaceae). According to Green it also occurs in southern India on cultivated pepper vines.

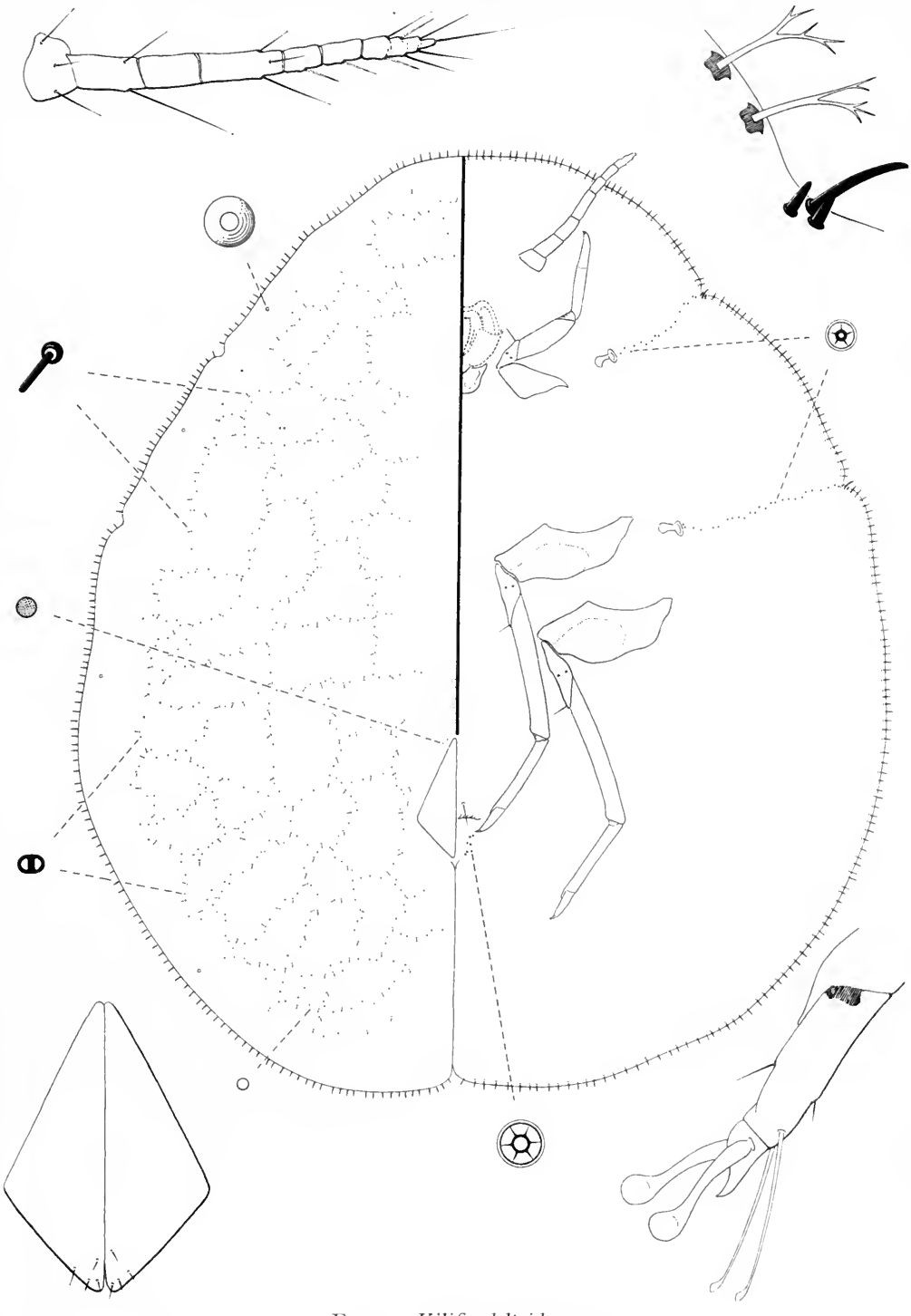

FIG. 13. *Kilifia deltoides* sp. n.

In 1913 Lindinger recorded the species from Amani, Tanganyika, on specimens found on the under surface of leaves of *Manihot glazioui* Muell. (Euphorbiaceae).

"Adult female very flat and broad; posterior half widest; extremities either rounded or bluntly pointed. Median area deep reddish brown, mottled with darker brown. A broad, greenish, marginal zone, sharply demarked from the median reddish area. Eyes minute, black, close to the inner edge of marginal zone. . . . Under surface with a deep pouch on each side of abdomen, in which the young larvae are sheltered for some time after birth. Limbs so closely pressed into surface of body as to be practically invisible on the living insects. . . . Length of well-grown example 9 mm. Breadth 6 to 6·5 mm. The early adult female, before gestation, is very thin and transparent, the median area mottled with pale reddish brown. When in position on the leaf, it is scarcely visible, except by its glistening surface. Delicate glassy filaments are secreted from the marginal hairs". (Green, 1904).

The following redescription is based on a single mounted specimen in fairly good condition, examined at the Department of Entomology, British Museum (Natural History), London.

Body elongate, rather acutely tapering at both ends; length 8 mm. Dorsal dermis membranous, plain. According to Green the dorsum is marked with "small scattered translucent pores, and some irregular nebulous pale streaks on the marginal area" not visible on the specimen examined. Dorsal pores very small, circular, with two loculi; not numerous and scattered. Dorsal setae minute, bluntly pointed. Paraopercular pores small, flat, very numerous and arranged in a fairly regular band along the median line of the body and extending as far as the head. Submarginal pores lacking. Anal opercula somewhat elongate, with outer angle broadly rounded and with two small apical setae; length 204μ; combined width 175μ. Dorsal dermis all around the opercula heavily sclerotized. Stigmatic clefts deep, conspicuous, with the inner edge dorsally marked with a densely sclerotized band, on either end of which is inserted a conical spine 29–35μ long; no spines or setae occur in the centre of the clefts. Setae of the marginal fringe stoutly spiniform, 30–46μ long; the number of setae occurring between the anterior and posterior stigmatic clefts is 43 in one side and 49 in the opposite one. Paragenital pores of the quinquelocular type, very few about the genital opening only. Quinquelocular pores associated with the stigmatic openings set in bands two pores wide. Tubular ducts few and crowded on the submedian area on either side of the genital opening. Legs short, otherwise normal; articulation between the tarsus and tibia very poorly marked; sclerosis lacking; ungual digitules very broadly swollen apically; dimensions of legs (iii): trochanter plus femur 350μ; tibia plus tarsus 314μ. Antennae with seven segments with a pseudoarticulation on the fourth; total length 452μ. The setae on the fold of the anal invagination could not be satisfactorily counted.

CEYLON: Peradeniya, January 1902, on *Piper nigrum* Linn. (Piperaceae) (*E. E. Green*).

PARASAISSETIA Takahashi, 1955

Parasaissetia Takahashi, 1955: 26.

Type-species: *Lecanium nigrum* Nietner, 1861.

The main characters used by Takahashi for differentiating his new genus from *Saissetia* were the slenderness of the tarsi and the absence of a free tibio-tarsal articulation; to which he added the polygonal pattern of sclerotization of the dorsal dermis. In his view, while the type-species of *Saissetia* is close to *Pulvinaria*, that of *Parasaissetia* has more affinity with *Lecanium* (=*Coccus*). In my opinion a more

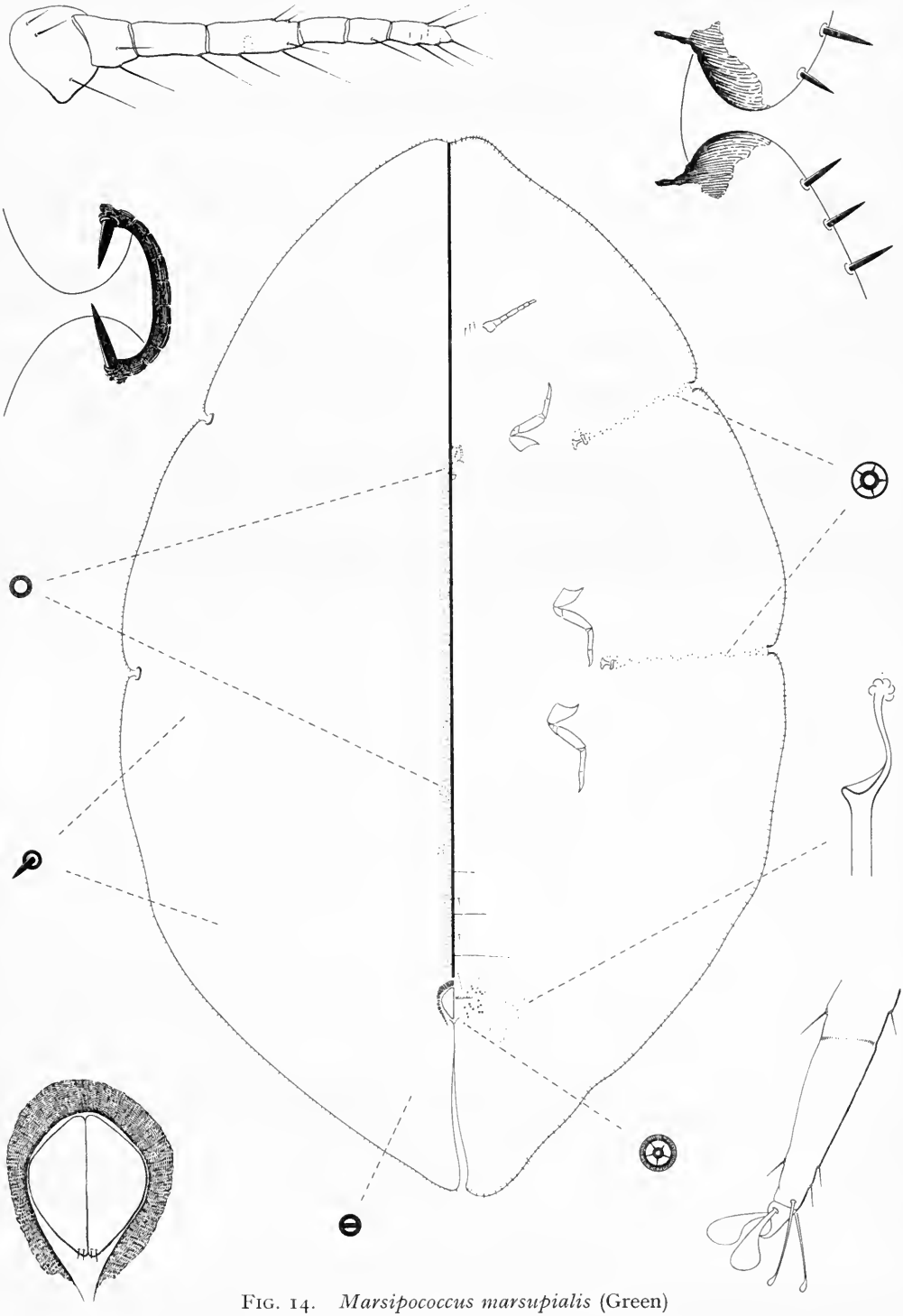

FIG. 14. *Marsipococcus marsupialis* (Green)

reliable character is to be found in the shape of the dorsal setae, which in *Parasaissetia* are cylindrical or slightly swollen at the apex, while in *Saissetia* they are strongly spiniform to stoutly conical.

Thus amended the genus *Parasaissetia*, besides the type-species and *P. ficicola* here described as new, should include *Saissetia nairobica* De Lotto, 1957. The three species can be separated by using the following provisional key:

1 Multilocular pores, though few, always extending in loose transverse rows on the abdominal segments anterior to the genital opening; dorsal dermis marked with polygonal pale areas set close to one another. 2

Multilocular pores about the genital opening only; dorsal dermis with small oval or rounded pale areas set rather widely apart . . . . . ***nairobica***

2 (1) Fold of the anal invagination with numerous small membranous spur-like processes . . . . . ***ficicola***

Fold of the anal invagination finely to broadly crenulate . . . . . ***nigra***

Parasaissetia ficicola sp. n.

(Text-fig. 15)

Living adult females at maturity broadly elliptical, highly convex to nearly conical; dorsal surface smooth; colour evenly very dark brown, almost black; dimensions: length 1·8–3·1 mm.; width 1·3–1·9 mm.; height up to 2 mm. Mounted specimens broadly elliptical, 1·6.2·4 mm. long. Dorsal dermis marked by a fairly regular reticulate pattern as in the common nigra scale. Each polygonal area encloses a minute circular pores with two loculi. Dorsal setae small, cylindrical, at times very slightly swollen at the apex. Paraopercular pores hemispherical, set in two small groups on either side of the median line, in front of the anal opercula; the total number ranges from 12 to 17. Submarginal pores 2 to 10 altogether. Anal opercula roughly quadrate, with two small slender apical setae; outer angle pointed; posterior lateral margin broadly rounded; length 146–160μ; combined width 182–197μ. Marginal setae all broadly flattened and variously dentate at the apex; length 22–30μ; 10 to 15 setae occur between the anterior and posterior stigmatic clefts. Stigmatic spines three; median 44–58μ long; laterals 10–15μ. Multilocular pores rather numerous about the genital opening; a few pores extend in very loose transverse rows on all preceding abdominal segments. Quinquelocular pores arranged in bands one or two pores wide. Tubular ducts numerous and set in a ventral submarginal band, interrupted between the attachment of the antennae and the row of quinquelocular pores associated with the anterior stigmatic openings. Legs well developed without tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size; dimensions of legs (iii): trochanter plus femur 182–197μ; tibia plus tarsus 204–241μ. Antennae 8-segmented, at times reduced to seven segments with a pseudoarticulation on the fourth; total length 314–358μ. Fold of the anal invagination provided with numerous small, spur-like, membranous processes, and with 5 to 7 (normally 6) setae altogether.

KENYA: Nairobi, 14.xii.1960, ♀ holotype and 9 ♀♀ paratypes collected on branches of *Ficus mallatocarpa* Warb. (Moraceae) (*G. De Lotto*). Coll. No. 2525.

The holotype and six paratypes have been deposited in the British Museum (Natural History), London; three paratypes in the U.S. National Collection of Coccoidea, Washington, D.C.

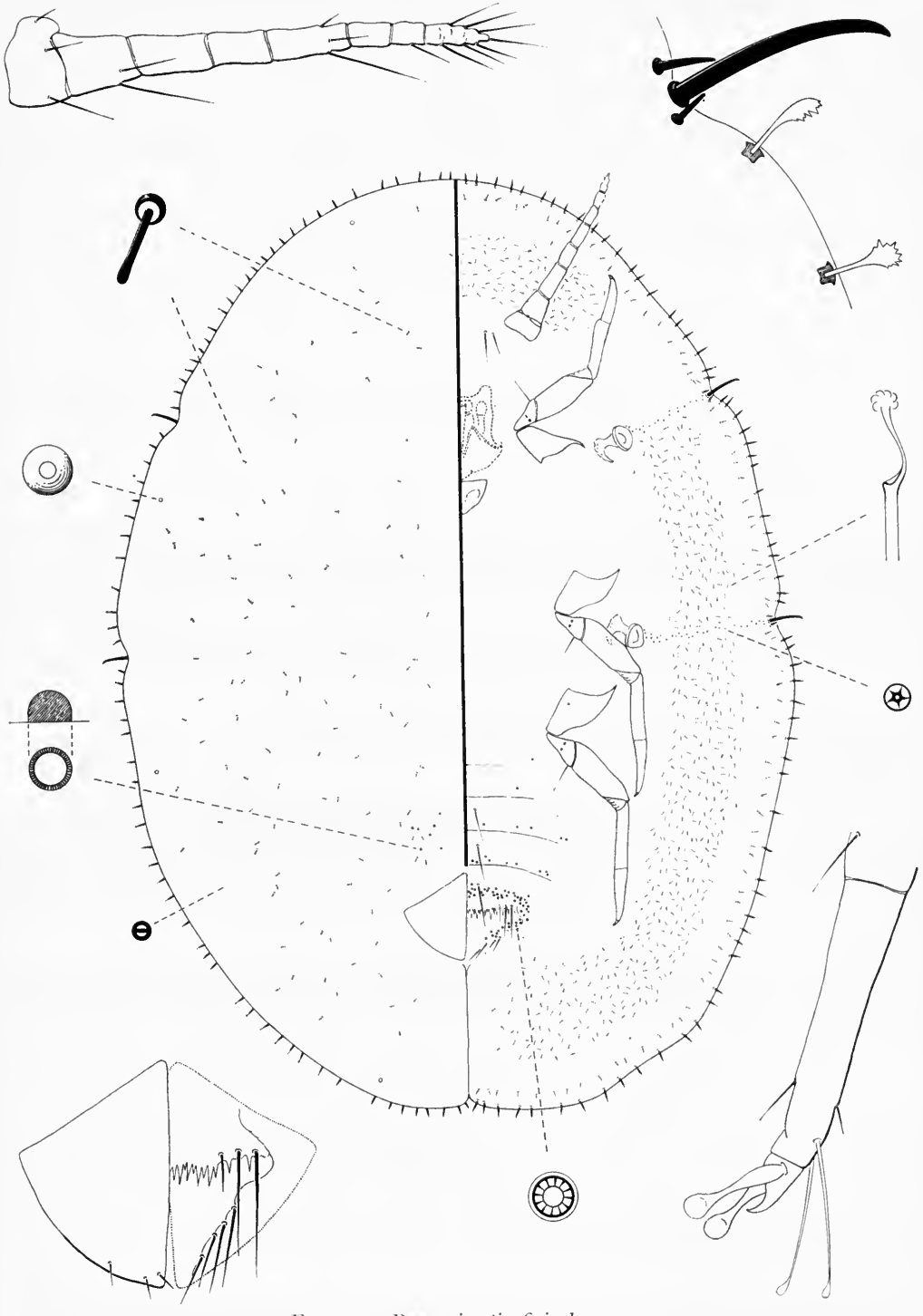

FIG. 15. *Parasaissetia ficicola* sp. n.

Other records of the species on material not included in the type-series, are:

KENYA: Nairobi, 6.i.1956 and 30.xii.1960 on *Ficus* sp. (*G. De Lotto*); 27.viii.1958 on *Ficus* sp. (*K. A. Harrison*). Kisumu, 21.iv.1957 on *Ficus* sp. (*G. De Lotto*).

TANGANYIKA: Mwanza, 20.x.1961 on *Ficus* sp. (*G. De Lotto*).

UGANDA: Entebbe, 22.vi.1961 and 13.xi.1961 on *Ficus populifolia* Vahl (*G. De Lotto*).

This species may easily be confused with some forms of the common *P. nigra*. The only diagnostic character by which the two species can be separated, is the presence in *ficicola* of numerous, small membranous spur-like processes on the fold of the anal invagination, visible only in healthy specimens at the beginning of the adult stage. In the common nigra scale, *P. nigra* (Nietner, 1861), the fold is always finely to broadly crenulate.

It cannot be ruled out that *P. ficicola* may be the same species which King (1902) described as *Saissetia nigrella* from South Africa on *Ficus* sp. From King's original description I understand that the specimens he had at hand were fairly old or fully mature females, hence of no use at all for the solution of this question.

Parasaissetia nairobica (De Lotto, 1957) **comb. n.**

Saissetia nairobica De Lotto, 1957: 173.

TANGANYIKA: Arusha, 25.i.1961, on *Ficus sycomorus* Linn. (Moraceae) (*G. De Lotto*).

PULVINARIA Targioni-Tozzetti, 1867

Ampelocecis Amyot, 1847: 502 [*nomen oblitum*].
Pulvinaria Targioni-Tozzetti, 1867: 13.

Type-species: *Coccus vitis* Linnaeus, 1758.

The genus *Pulvinaria* has been split by Borchsenius (1952, 1953) into many new genera. The identity of the type-species of some of them is not adequately known to me at present.

Into *Pulvinaria* are usually placed species which at maturity produce a cottony ovisac. It seems to me that, at least in some instances, the presence of the ovisac should be retained as a feature of secondary importance. A case in point is represented by *Coccus aethiopicus* De Lotto, 1959; *C. africanus* (Newstead, 1898); *C. celatus* De Lotto, 1960 and *C. consimilis* De Lotto, 1960, which display a closer morphological affinity with *Pulvinaria* than with *Coccus*, though none of them forms an ovisac.

A redescription and a diagram of the type-species *Coccus vitis* Linnaeus, 1758, have been presented by Steinweden (1946). According to Lindinger (1937) the "*Coccus vitis* auct." associated by Targioni-Tozzetti with his genus *Pulvinaria* should be understood as a misidentification of *Coccus betulae* Linnaeus, 1758.

Pulvinaria tenuivalvata (Newstead, 1911) **comb. n.**

(Text-fig. 16)

Lecanium tenuivalvatum Newstead, 1911*a*: 92.

The original description of this species was based on a series of nymphs, most of which were attacked by parasitic Hymenoptera. The insect is here redescribed on a single adult female found among an old batch of other nymphs collected in the type locality and on the type host plant, some of which were compared by me with Newstead's paratypes deposited in the British Museum (Natural History), London.

Ovisac not seen. Body elongate oval; length 3·7 mm. Dorsal dermis membranous. Dorsal pores apparently absent. Dorsal setae short, conical, fairly numerous and apparently distributed without any regular pattern. Paraopercular pores flat, with a granulate surface, set in an elongate group of about 30 in front of the anal opercula. Submarginal pores lacking. Anal opercula roughly quadrate*, with one seta socket on the subdiscal area, and two near the apex, but all setae were broken away; length 170μ; combined width 175μ. Marginal setae stout, spiniform, variable in size, ranging from 22 to 37μ in length. The number of setae occurring between the anterior and posterior stigmatic clefts is 27 in one side and 28 in the opposite side. Stigmatic spines three, all robust and slightly lanceolate in shape; median 35–40μ long; laterals 25–30μ. Multilocular pores not numerous around the genital opening and extending in loose transverse rows on all preceding abdominal segments. Quinquelocular pores set in irregular bands two or three pores wide. Tubular ducts numerous and arranged in a narrow submarginal band, interrupted near the anterior and posterior ends of the body. Legs well developed with a tibiotarsal articulatory sclerosis; claws with a minute denticle; one of the ungual digitules slender; the other stout; both apically knobbed; dimensions of legs (iii): trochanter plus femur 263μ; tibia plus tarsus 277μ. One of the antennae was missing; the other—very likely abnormal—was formed with only six segments; total length 205μ. Fold of the anal invagination with altogether four setae.

Uganda: Entebbe, 18.ii.1910, on citronella grass ** (*C. C. Gowdey*).

The unique specimen, a fairly young adult female, slightly distorted but otherwise in rather good condition, has been deposited in the British Museum (Natural History), London, (coll. No. 2057).

This species is closely related to *Pulvinaria iceryi* (Signoret, 1869) and to *P. elongata* Newstead, 1917, but differs from both in that the claws of all legs are provided with a small denticle; the dorsal setae are conical and in the absence of tubular ducts on the ventral midregion of the abdomen. It should be noted that all three species have been described or recorded only from gramineous plants.

A detailed study on the identity of *elongata* and *iceryi* has been recently presented by Mamet (1958).

* The lateral posterior margin of one operculum was somewhat distorted.

** *Cymbopogon citratus* (D.C.) Stapf (Gramineae).

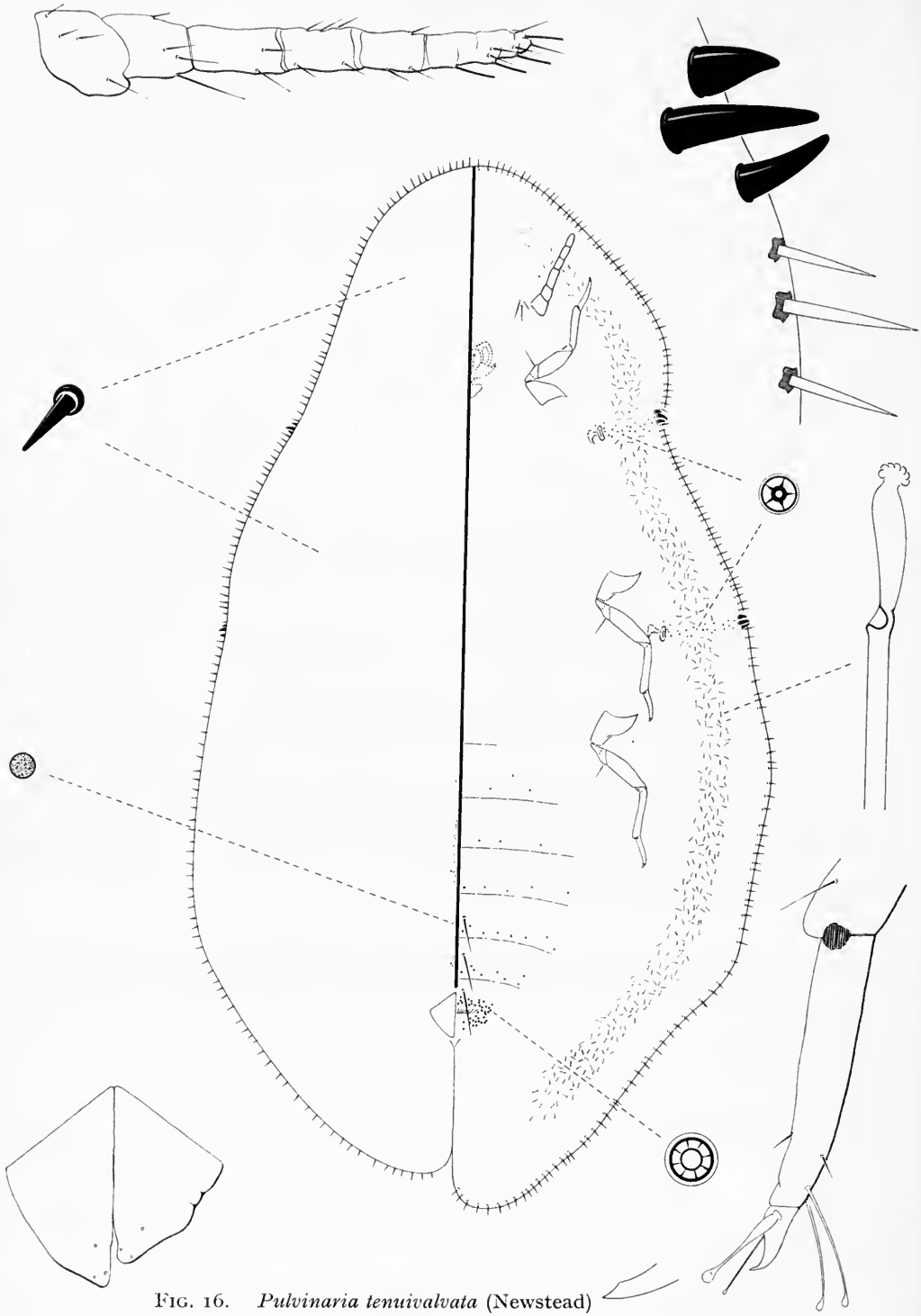

FIG. 16. *Pulvinaria tenuivalvata* (Newstead)

SAISSETIA Déplanche, 1859

Saissetia Déplanche, *in* Eudes-Deslongchamps, 1859: 206.

Type-species: *Lecanium coffeae* Walker, 1852=*Saissetia coffeae* Déplanche, 1859.

Before discussing the characters and composition of this genus, a few words have to be said about its source and the identity of the type species.

The paper published on pages 203-207 of the fourth volume (1859) of the *Bulletin de la Société linnéenne de Normandie*, currently retained the first source of the genus *Saissetia*, is not Déplanche's original work, but a short account of it written by Eudes-Deslongchamps. Déplanche's paper, or memoir, was published in Tahiti sometime earlier. All efforts to trace a copy of it have failed so far.

More important is the problem of the identity of the type-species of the genus, which had nothing to do with the species usually assigned to *Saissetia*. The confusion was originated by Fauvel (1865) who arbitrarily synonymized *S. coffeae* Déplanche with *Lecanium coffeae* Walker. According with the description presented by Eudes-Deslongchamps, the adult females:

"sont caractérisées par un corps peu épais, aplati, mou, de forme ovalaire; par des antennes composées de neuf articles, et par des tarses n'en ayant qu'un seul. Le corps présente des anneaux bien distincts, terminés, de deux en deux, par des languettes diminuant d'arrière en avant. A côté des deux languettes postérieures, inégales et les plus longues, un peu en dehors, sont deux soies noires allongées, terminées en pointe. Toute la surface du corps sécrète une matière blanchâtre, cotonneuse qui la recouvre entièrement . . . . A l'époque de la fécondation, le corps des femelles sécrète la matière cotonneuse en plus grande abondance. Une fois cet acte accompli, elles se cramponnent sur la tige où elles s'étaient établies. La matière cotonneuse disparaît insensiblement et n'est pas renouvelée. Peu après le corps se dessèche, les anneaux s'effacent, il ne reste plus qu'une petite écaille scutiforme, de couleur grisâtre, qui semble se confondre avec l'écorce."

The description leaves no doubts that the insect studied by Déplanche was by no means a hard scale, but very likely a mealy bug. Hence the name *Saissetia* should be dropped and the species at present included in it be transferred to *Neobernardia* Cockerell, 1892, which is the first valid generic name available for them. No changes, however, are introduced here, pending further attempts to secure a copy of Déplanche's original paper.

Several species have been referred to, or described under, the genus *Saissetia* in the present series of papers dealing with the Coccidae of Africa south of the Sahara. A first attempt to split the group was made by Takahashi (1955) with the introduction of the genus *Parasaissetia*. Besides the type-species, two other species from the area under review have been referred to it. More recently a few species characterized in having the anal opercula pyriform have been transferred by the writer (De Lotto, 1963) to the genus *Udinia*. The forms still retained in *Saissetia* may be separated into three small natural groups, which later may be recognized as distinct subgenera or genera. The main features of these groups are:

Group 1: tubular ducts forming the ventral submarginal band having the inner duct as large or larger than the outer duct; dorsal setae slender, spiniform. This group includes at present only the type-species *Lecanium coffeae* Walker, 1852.

Group 2: tubular ducts with the inner duct much smaller than the outer one; dorsal setae spiniform but slender; dorsal dermis marked with pale areas which are large and close to one another along the marginal and submarginal areas, and tend to be smaller and widely apart at the centre of the dorsum. To this group should be referred: *Saissetia chitonoides* De Lotto, 1963; *S. orbiculata* De Lotto, 1963; and *Lecanium somereni* Newstead, 1911. They can be separated by the following provisional key:

1		Legs with an articulatory sclerosis between tarsus and tibia 2
		Tibio-tarsal articulatory sclerosis lacking . . . . . ***somereni***
2	(1)	Marginal setae all attaining the same length; submarginal pores 1 to 8 altogether; number of multilocular pores on the most anterior abdominal segment ranging from 9 to 23; antennae 335–385μ long. . . . . ***chitonoides***
		Marginal setae of different sizes; submarginal pores 22 to 27; multilocular pores on the most anterior abdominal segment 73 to 111; antennae 440–510μ long ***orbiculata***

Lecanium (*Saissetia*) *subpatelliforme* Newstead, 1917, described from GHANA on an unidentified host plant, is strongly suspected to be identical with *somereni*.

Group 3: tubular ducts as in group 2; pale areas of the dorsal dermis all practically attaining the same size and set close to one another; dorsal setae strongly spiniform to conical. This group includes: *Saissetia abyssinica* sp. n.; *S. jocunda* De Lotto, 1957; *S. munroi* De Lotto, 1958, *Chermes oleae* Bernard, 1782; *S. opulenta* De Lotto, 1957; *Lecanium* (*Saissetia*) *persimile* Newstead, 1917; *S. privigna* sp. n.; *S. xerophila* De Lotto, 1957; and *S. zanzibarensis* Williams, 1953. The species can be separated by using the following provisional key:

1		Multilocular pores about the genital opening only 2
		Multilocular pores extending in transverse rows on all abdominal segments . 3
2	(1)	With 6 to 10 marginal setae between the anterior and posterior stigmatic clefts; all setae flattened and frayed at the apex; length up to 22-30μ . . ***xerophila***
		Marginal setae between the stigmatic clefts ranging from 18 to 29, all slender and finely pointed; length up to 95–130μ . . . . ***zanzibarensis***
3	(1)	Marginal setae not differentiated in size . . . . . ***opulenta***
		Marginal setae distinctly different in size 4
4	(3)	Submarginal pores absent 5
		Submarginal pores always present 6
5	(4)	Paraopercular pores set in a small group of 7 to 10 in front of the anal opercula only . . . . . ***munroi***
		Paraopercular pores arranged in a large group of 40 to 150 in front and extending on either side of the anal opercula . . . . . ***persimilis***
6	(5)	Ventral submedian area of the abdominal segments with supplementary groupings of tubular ducts . . . . . ***abyssinica***
		Supplementary groupings of ducts absent 7
7	(6)	With a grouping of dorsal setae on the submedian area in front of the anal opercula; dorsal setae near the margin noticeably smaller than those occurring on the median and submedian areas of the body . . . . ***jocunda***
		Dorsal setae scattered and not appreciably differentiated in size . . . 8
8	(7)	With 15 to 23 marginal setae between the anterior and posterior stigmatic clefts . . . . . ***privigna***
		With only 3 to 12 marginal setae between the stigmatic clefts . . . ***oleae***

The systematic position of *Saissetia monotes* Hall, 1935, described from SOUTHERN RHODESIA on specimens living on *Monotes glaber* Sprague, is uncertain, as no types or other material have been seen yet. The general appearance of *S. monotes pretoriae* Hall, 1939, which was described from SOUTH AFRICA on *Ficus* sp., suggests a close affinity with *S. opulenta*. The condition of the specimens at hand, including some of the paratypes, is however unsuitable for a redescription.

Saissetia abyssinica sp. n.

(Text-fig. 17)

Adult females at full maturity highly convex, nearly hemispherical, with a rather poorly developed H-mark on the dorsum; colour evenly dark brown. Young adults (alcohol material) yellowish white. Mounted specimens 1·6–1·8 mm. long. Dorsal dermis marked with numerous rounded or oval pale areas, not differentiated in size and set close to one another; each pale area encloses a minute pore. Dorsal setae robust, bluntly pointed; all setae attain the same size and are distributed without any regular pattern. Paraopercular pores hemispherical, very slightly variable in diameter, and set in a close group of 16–25 in front of the anal opercula. Submarginal pores reduced to one only on the head or mesothorax. Anal opercula together roughly quadrate, with a short, robust, discal seta, and three slender, apical ones; posterior lateral margin broadly rounded; outer angle pointed; length 175-182μ; combined width 196–210μ. Setae of the marginal fringe short, stout, rather deeply frayed at the apex; length 28-31μ. Among these setae are irregularly intermingled others which are either similar in shape or pointed, but shorter, being only 17–21μ long. On the margin of the body between the anterior and posterior stigmatic clefts are inserted 9 to 16 setae, of which 8–11 are large and 1–5 small. Stigmatic spines three; median 70–77μ; laterals 20–24μ. Multilocular pores numerous around the genital opening and extending in transverse rows on all preceding abdominal segments. Quinquelocular pores set in bands two or three pores wide. Tubular ducts numerous and arranged in a ventral submarginal band. Other ducts similar to those of the submarginal band, but shorter, are crowded on the submedian area of all abdominal segments. Antennae 8-segmented; total length 357–385μ. Legs well developed without tibio-tarsal articulatory sclerosis; ungual digitules of same size and shape; dimensions of legs (iii): trochanter plus femur 210–217μ; tibia plus tarsus 224–231μ. Fold of the anal invagination with 4 or 5 robust setae.

ETHIOPIA: Dire Dawa, 27.x.1963, ♀ holotype and 2 ♀♀ paratypes collected on branches of *Duranta repens* Linn. (Verbenaceae) (*B. G. Hill*). Coll. No. H.C. 762.

The holotype and one paratype are in the South African National Collection of Insects, Pretoria; one paratype will be deposited in due course in the British Museum (Natural History), London.

Saissetia coffeae (Walker, 1852)

Lecanium hemisphaericum Targioni-Tozzetti; Lindinger, 1913: 82.
Lecanium (*Saissetia*) *hemisphaericum* Targioni-Tozzetti; Newstead, 1917 *b;* 130.
Saissetia hemisphaerica (Targioni-Tozzetti) Brain, 1920: 9.
Saissetia coffeae (Walker) Laing, 1928: 215.
Saissetia hemisphaerica (Targioni-Tozzetti); Hall, 1935: 78.
Saissetia hemisphaerica (Targioni-Tozzetti); De Lotto, 1956: 240.

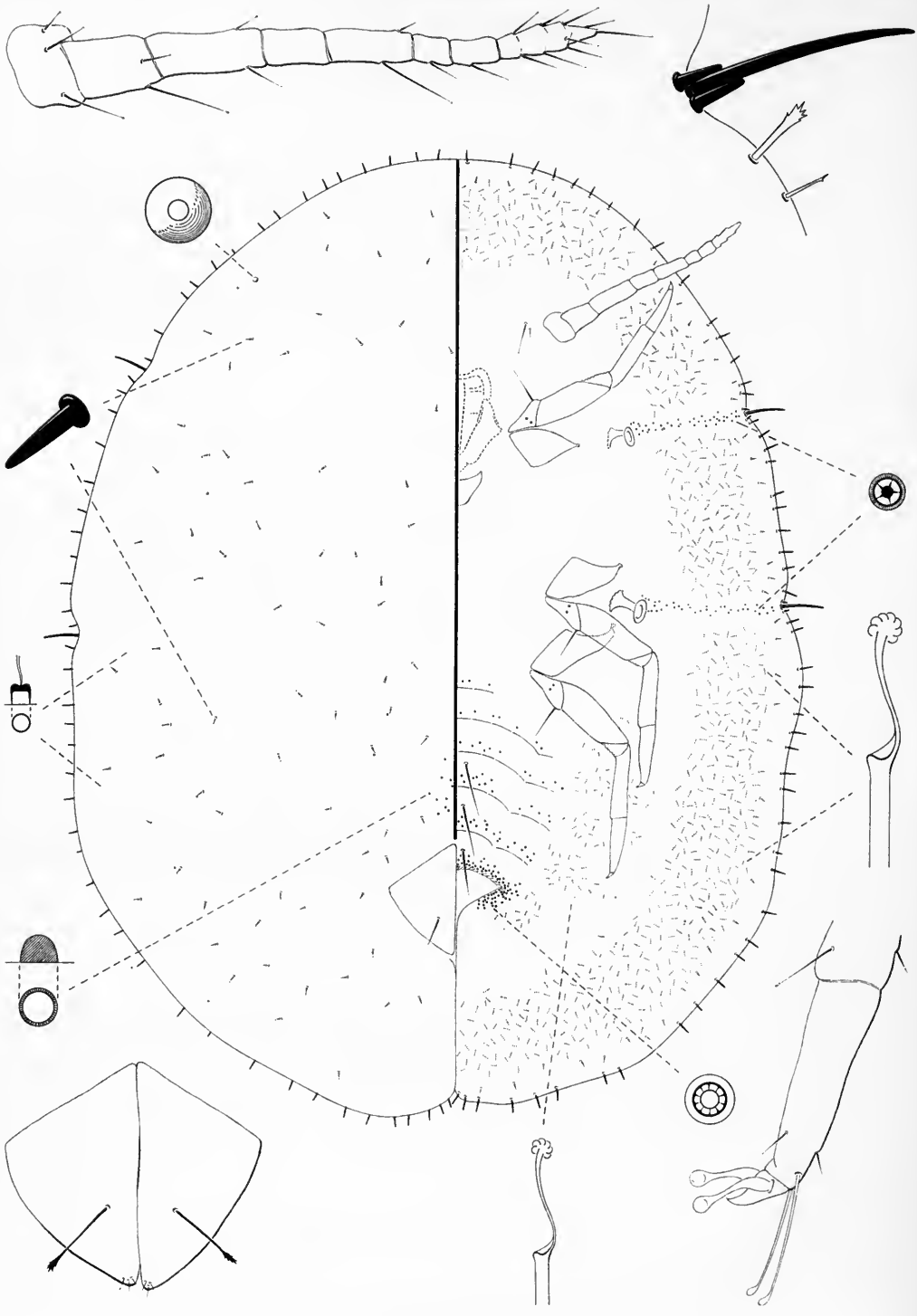

FIG. 17. *Saissetia abyssinica* sp. n.

The identity and nomenclatural status of this species have been recently discussed by Williams (1957), who pointed out that the name *Lecanium coffeae* Walker, 1852, should be used in place of *L. hemisphaericum* Targioni-Tozzetti, 1867. The present writer fully concurs with his views.

KENYA: Nairobi, 13.i.1955, on *Nephrolepis* sp. (Polypodaceae), 30.xii.1960, on *Markhamia platycalyx* (Baker) Sprague (Bignoniaceae), 31.xii.1960, on *Schinus molle* Linn. (Anacardiaceae) (*G. De Lotto*). Kisii, 20.iv.1959, on roots of *Coffea arabica* Linn. (Rubiaceae) (*A. R. Melville*).

Saissetia oleae (Bernard, 1782)

(Text-figs. 18-20)

Chermes oleae Bernard, 1782: 108.

On account of the views here held about the distribution of *S. oleae* in Africa, all references of the species from this continent have purposely been omitted.

For a long time the identification of this species merely rested on the well known H-mark occurring on the dorsum of the adult female. Later, authors gave short descriptions of the antennae, legs, stigmatic spines, etc. Though some of these features may have a taxonomic significance, the fact that they were dealt with very superficially, compounded with the utter disregard to other characters, make their diagnosis entirely unreliable. The first comprehensive account of *oleae* was presented by Ferris (*in* Zimmerman, 1948). His description, however, was made on material from California, and lacks of all quantitative data.

The following redescription is based on a long series of specimens from many countries of the Palaearctic Region as listed below. A young adult female collected on *Olea europaea* Linn. at Enna (Sicily) was used for the accompanying diagram.

Dorsal areolation and dorsal pores as typical of the group. Dorsal setae robust, spiniform, very slightly blunted at the apex, and tending to be only very slightly smaller towards the margin of the body. The setae are scattered without any regular pattern. Paraopercular pores hemispherical, somewhat variable in diameter, and set in a group of 3 to 46 in front of the anal opercula. Submarginal pores ranging from 4 to 16 altogether. Anal opercula together roughly quadrate; length 139–182μ; combined width 153–219μ. Each operculum is provided with a longish, robust discal or subdiscal seta, and three small, slender apical ones. Marginal setae of two sizes. The larger ones are robust, tapering towards the apex, with tips either rounded or with a few minute indentations; length 36–51μ. The small setae are only 18–33μ long and are often finely pointed. The number of setae occurring between the anterior and posterior stigmatic clefts varies from 3 to 12, of which 3–9 are large and 0–4 small. Stigmatic spines three; median 69–118μ; laterals 15–33μ. Multilocular pores numerous about the genital opening and extending in rather irregular transverse rows on all preceding abdominal segments. Quinquelocular pores arranged in bands one or two pores wide. Tubular ducts arranged in a submarginal band on the ventral side of the body, as normal in all species of the genus so far studied. Antennae 8-segmented; occasionally one antenna may be reduced to seven segments, one of which being marked with a pseudoarticulation; total length 287–365μ. Legs well developed; ungual digitules of the same size and shape, both stout and knobbed at the apex; tibio-tarsal articulatory sclerosis normally lacking. At times some of the legs (very seldom all) are provided with a sclerosis which, however, is much reduced in size. Dimensions of legs (iii): trochanter plus femur 161–204μ; tibia plus tarsus 168–241μ. Fold of the anal invagination with 6, 7 or 8 setae.

Altogether 91 specimens have been examined. Many of them were intercepted at the plant quarantine inspection stations in U.S.A.

ALGERIA: Algiers, on lemon twigs; at New York, 15.iii.1943 (*Byars & Ortiz*), N.Y. 93153. Algiers, on zutima navel orange; at Washington, D.C., 27.iii.1926 (*W. B. Wood*), F.H.B. 61194. Algiers, on *Citrus* sp. (navel orange); at Washington, D.C., 27.iii.1926 (*W. B. Wood*), F.H.B. 61195. No locality, on *Pyrus longipes*; at Washington, D.C., 6.ii.1926 (*O. K. Courtney*), F.H.B. 60293.

AUSTRIA: Tyrol, Innsbruck, 17.ix.1953, on *Viscum album* ex *Pinus sylvaticus* (*K. Boratynski*).

CYPRUS: Famagusta, 28.iv.1930, on *Cydonia* sp. and quince (*H. M. Morris*).

ENGLAND: Kent, Yalding: no date, on *Nerium oleander* (under glass) (*E. E. Green?*). Cambridge, 6.ii.1935, on *Nerium* sp. (*H. C. James*), No. 13. Locality unknown, on *Olearia* sp. leaves; at Seattle, 18.iv.1959 (*W. J. N. Brown*), Seattle 14700.

FRANCE: Antibes, 7.i.1958, on olive and myrtus (*H. L. Parker*), 5752. Nancy, on *Abutilon*, at D.C., 23.iv.1934 (*W. B. Wood*), B.P.Q. A.25909. Localities unknown; on *Osteospermum* sp.; at D.C., 7.v.1957 (*J. F. Schoen*), W. 5423. On *Ilex wilsoni*; at D.C., 16.vii.1957 (*J. F. Schoen*), W. 5729.

ITALY: Naples, 12.iv.1961, on *Olea europaea* Linn. (*E. Tremblay*). Reggio Calabria, 23.iv.1960, on *Nerium oleander* Linn. (*G. De Lotto*). Near Varazze, no date, on *Erica arborea* Linn. (*O. Japp*), Japp Coll. No. 155. Taranto, 1.xi.1917, on olive (coll. unknown), 12469. Localities unknown. On *Abutilon* sp. (ex Leonardi's *Chermotheca italica*). On citrus leaves; at New York, 2.ii.1960 (*P. Snowden & N. Kitazaki*), N.Y. 159598. On lemon; at New York, 30.iii.1939 (*Woodbury*), N.Y. 80987. On lemon leaves; at New York, 1.vi.1931 (*A. M. Bulbulia*), N.Y. 16835. On lemon leaves; at New Orleans, 24.iv.1931 (*Moore & Pritchett*), N.O. 4817. On *Nerium oleander*; at Chicago, 24.xii.1924 (*L. M. Scott*), Chicago 241. On *Cheirostemon platanoides*; at D.C., 21.v.1957 (*J. F. Schoen*), W. 5450. On olive leaves; at New York, 30.iii.1933 (*Shemin, Sartor & all.*), N.Y. 20409. On *Citrus limonia*; at Philadelphia, 23.iv.1933 (*A. B. Wells*), Phila 7408. On oleander leaves; at Boston, 14.x.1955 (*E. C. Hodson & J. D. Crump Jr.*), Boston 22132. On oleander?; at Chicago, 27.viii.1947 (*F. O. Dodd*), Chicago 1328. On oleander; at Hoboken, 29.viii.1947 (*Adams*), Hoboken 9704. On pear fruit; at New York, 28.xi.1935 (*Sartor*), N.Y. 49797. On orange twigs; at Philadelphia, 10.ii.1934 (*A. B. Wells*), Phila 20750. On *Nerium oleander*; [at Boston], 12.ix.1953 (*E. C. Hodson & M. F. Crowell*), Boston 20392. On lemon peduncle; [at New York], 19.iv.1960 (*F. Burke & D. Linchan*), N.Y. 162205.

PORTUGAL: Faro, 28.vii.1931, on peach tree (*H. Stiner*).

SICILY: Enna, 15.iv.1961, on *Olea europaea* Linn. (*P. Buchner*). Siracusa, 18.iv.1961, on *Olea europaea* Linn. (*do.*). Locality unknown: on orange, at Baltimore, 26.v.1931 (*W. A. Ranck*), Baltimore 237.

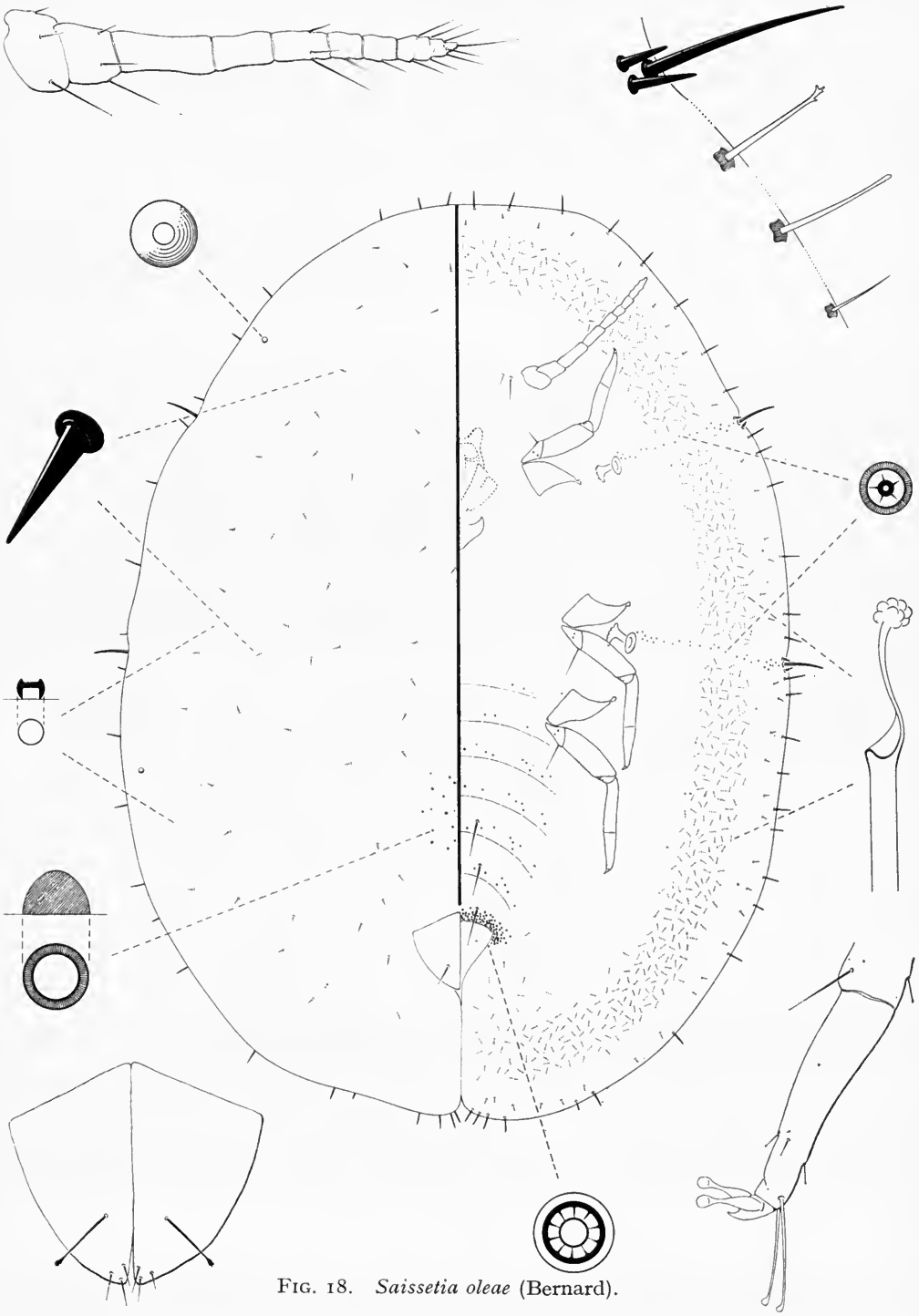

FIG. 18. *Saissetia oleae* (Bernard).

SPAIN: Saville, on olive (bark), at D.C., 17.iii.1928 (*R. G. Coqswell*), F.H.B. 73739. Locality unknown; on *Evonymus* leaves; at New York, 21.xii.1935 (*C. P. Daley*), N.Y. 50867.

SWITZERLAND: Basle, 14.ii.1961, on *Metroxylon* sp. (in greenhouse) (*R. Weiniger*).

The structures which in the course of the present study have been found to have a major significance on determining the facies of the species and hence on clearing up its morphological relationship with other African forms close to it, are the absence or strong reduction of the tibio-tarsal articulatory sclerosis and the number and shape of the setae of the marginal fringe.

The articulatory sclerosis in *oleae* is normally lacking or, when present, it tends to be much reduced in size. In an attempt to represent graphically its occurrence and range of variation, legs were arranged in four classes. In class **0** were grouped legs

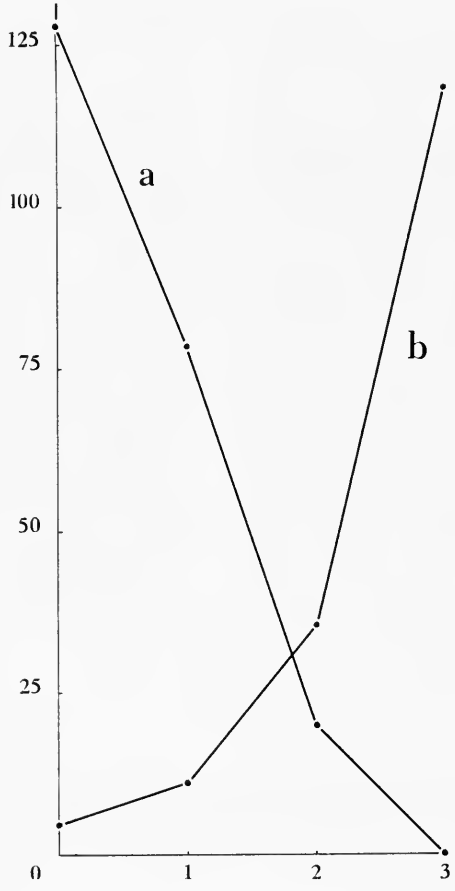

FIG. 19. Occurrence and development of the tibio-tarsal articulatory sclerosis in *Saissetia oleae* (Bernard): **(a)** in typical specimens from the palaearctic region: **(b)** in specimens from South Africa.

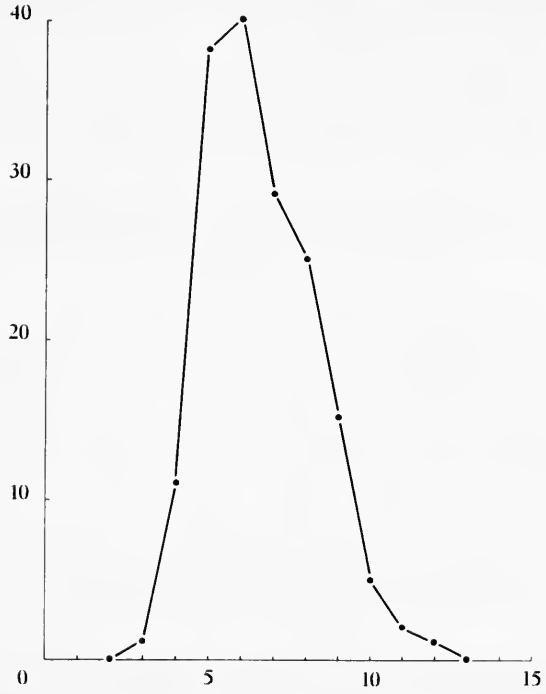

FIG. 20. Frequency distributions of the number of marginal setae occurring between the stigmatic clefts in *Saissetia oleae* (Bernard).

entirely devoid of any sclerosis, while to classes **1, 2** and **3** were referred those in which the sclerosis was poorly, moderately or strongly developed respectively. Fig. 19*a* shows the frequency distributions found in 38 specimens from *Olea europaea* Linn. collected at Enna, Siracusa (Sicily) and Naples (Italy); and from *Metroxylon* sp. at Berne (Switzerland)*. Out of 91 specimens examined, fifteen (that is 16.5% of the total) did not apparently agree with the general pattern, for the sclerosis looked strongly developed. It should however be noted that the conditions of these specimens were far from being satisfactory. They were either overstained or attacked by fungi or the tissues of the derma were badly damaged very likely by the action of bacteria or viruses.

In *oleae* the marginal setae are of two sizes. The fringe is formed mostly by setae of the larger size, usually set widely apart from one another, among which are irregularly intermingled a few small ones. Though the number of setae varies remarkably, even among specimens of the same population, its variation stretches

* There was no bias on the use of these specimens. Their choice was simply motivated by the fact that they were collected from healthy populations, mounted at the right stage and properly stained, therefore better suitable for this sort of observations. The whole lot will be deposited in due course in the collection of the British Museum (Natural History), London.

within definite limits. From Fig. 20, which represents the frequency distributions of the number of setae occurring between the anterior and posterior stigmatic clefts on either side of the body (167 samples), we can deduce that in *oleae* specimens with less than 3 or more than 12 setae are extremely rare or may not occur at all.

As indicated in the description, the setae of the larger size are slightly tapering towards the apex and have their tips rounded or with a few minute indentations. They are never flattened and frayed at the apex.

If, in spite of the seemingly contradictory but undecisive data observed in some specimens, we assume that in *oleae* the occurrence and variability of the tibio-tarsal articulatory sclerosis constantly conform with the pattern found on the material examined, then we have to conclude that the species does not occur in Africa, except in the north western areas as Algeria and very likely Tunisia.

The specimens from Africa that most closely resemble *oleae* are those from the southern districts of the Cape Province of South Africa. They, however, differ from *oleae* in that the sclerosis is normally strongly developed as shown in Fig. 19*b* which represents the frequency distributions obtained in 27 specimens. In the writer's opinion the specimens from South Africa are referable to a geographic subspecies, for which the name of *Lecanium pumilum* Brain, 1920 is eventually available.

Most of the remaining material from Africa seen was referable to *S. privigna*, a new species in which the setae of the marginal fringe are much more numerous than in *oleae*.

The identity of a few other forms was unknown. The condition and limited number of specimens available did not permit their description.

Saissetia persimilis (Newstead, 1917)

Lecanium (*Saissetia*) *persimile* Newstead, 1917: 362.
Saissetia oleae (Bernard); Lindinger, 1928: 107 [misidentification].
Saissetia persimilis (Newstead) De Lotto, 1956: 243.

Brain's record (1920) from South Africa is omitted, as the specimens identified by him as *S. persimilis* do not actually belong to this species. They are still under study.

KENYA: Mombasa, 31.x.1957, on *Harrisonia abyssinica* Oliv. (Smiarubaceae). Nairobi, 14.xii.1960, on *Grewia* sp. (Tiliaceae); 25.xii.1960, on *Gymnosporia* sp. (Celastraceae); 5.i.1961, on *Hibiscus fuscus* Garke (Malvaceae); 30.xii.1960, on *Croton* sp. (Euphorbiaceae); 30.xii.1956, on *Cordia ovalis* R. Br. (Boraginaceae) (*G. De Lotto*).

SOUTH AFRICA: Transvaal, Pretoria, 28.ii.1957, on *Ficus* sp. (Moraceae) (*G. De Lotto*).

TANGANYIKA: Arusha, 25.i.1961, on *Nerium oleander* Linn. (Apocynaceae), *Ficus* sp and *Hibiscus fuscus* Garke (*G. De Lotto*).

UGANDA: Entebbe, 22.vii.1961, on *Antiarix toxicaria* Lesch. (Urticaceae) (*G. De Lotto*).

Saissetia privigna sp. n.

(Text-fig. 21)

Saissetia oleae (Bernard); De Lotto, 1956: 241 [misidentification].

Fully mature females strongly convex, up to 3 mm. long and 2·5 mm. wide; dorsum with two transverse ridges connected by a longitudinal one, forming the well known H-mark; colour evenly brown. Young adults creamy white. Mounted specimens 1·5–2·7 mm. long. Dorsal dermis with numerous rounded or oval pale areas set closely together and not appreciably differentiated in size. Dorsal setae conical, all attaining the same size and scattered without any pattern. Paraopercular pores hemispherical, set in a loose group of 5 to 9 in front of the anal opercula. Submarginal pores 13 to 22 altogether. Anal opercula together roughly quadrate, with a long, robust, apically frayed discal seta; and three small, slender apical ones; posterior lateral margin broadly rounded; outer angle pointed; length 182–204μ; combined width 182–219μ. Setae of the marginal fringe of two sizes. The larger setae are flattened and frayed or slightly tapering and with a few indentations at the apex; length 66–88μ. The small setae are similar in shape to the larger ones, or pointed; length 29–40μ. On the margin of the body between the anterior and posterior stigmatic clefts there are 15 to 23 setae, of which 9–14 are large and 5–11 small. Stigmatic spines three; median 77–91μ; laterals 26–36μ. Multilocular pores numerous around the genital opening and extending in transverse rows on all preceding abdominal segments. Quinquelocular pores set in bands one or two pores wide. Tubular ducts fairly numerous and forming a submarginal band on the ventral side of the body. Antennae 8-segmented; total length 365–400μ. Legs provided with a well developed tibio-tarsal articulatory sclerosis; ungual digitules of the same size and shape; dimensions of legs (iii): trochanter plus femur 204–226μ; tibia plus tarsus 248-277μ. Fold of the anal invagination with 7 or 8 robust setae altogether.

KENYA: Ruiru, 17.x.1962, ♀ holotype and 9 ♀♀ paratypes collected on branches of *Coffea arabica* Linn. (Rubiaceae) (*G. De Lotto*). Coll. No. 2774.

The holotype and six paratypes have been deposited in the British Museum (Natural History), London; the remaining three paratypes in the U.S. National Collection of Coccoidea, Washington, D.C.

Other records of the species on material not included in the type-series are:

KENYA: Nairobi, 22.x.1951, on *Coffea arabica* Linn.; 12.iii.1953, on *Olea europaea* Linn. (Oleaceae); 21.vi.1953, on *Markhamia platycalyx* (Baker) Sprague (Bignoniaceae); 1.i.1961 and 16.iv.1961, on *Hibiscus fuscus* Garke (Malvaceae) (*G. De Lotto*).

TANGANYIKA: Arusha, 25.i.1961, on *Hibiscus fuscus* Garke (*G. De Lotto*).

The true identity of *S. oleae* having been cleared up, the specific characters of *privigna* become quite evident. In the latter all legs are provided with a well developed tibio-tarsal articulatory sclerosis and the setae of the marginal fringe are twice as many as in the former. The lowest number of setae between the anterior and posterior stigmatic clefts is in *privigna* higher than the maximum occurring in *oleae*. Furthermore in the new species marginal spines, legs and antennae are remarkably longer than in *oleae*.

The area of distribution of *S. privigna* extends from EGYPT and ERITREA to NORTHERN and SOUTHERN RHODESIA. Small variations on some characters were observed in samples from these territories which suggest the presence of a complex of geographical forms or subspecies.

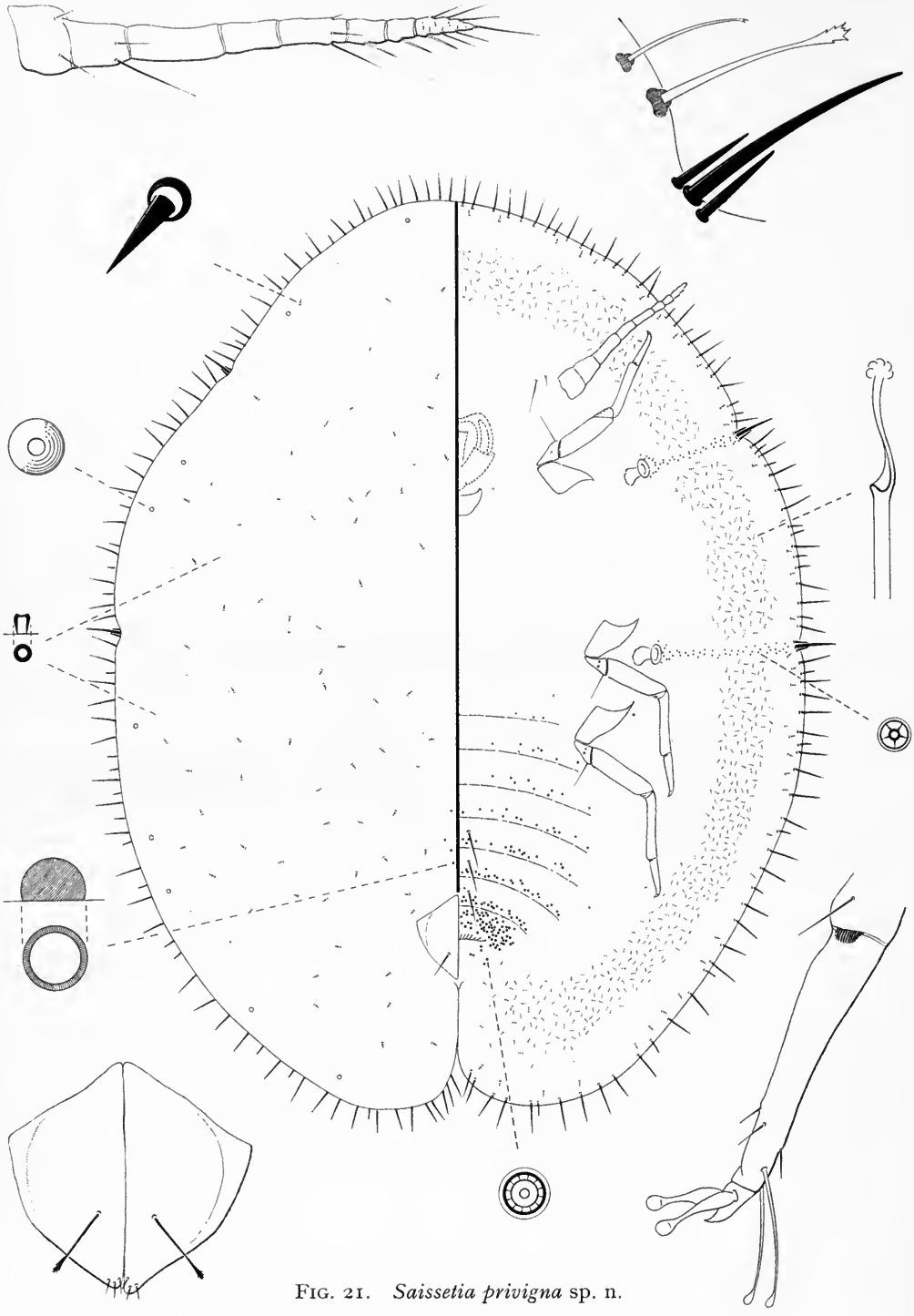

FIG. 21. *Saissetia privigna* sp. n.

Saissetia somereni (Newstead, 1910)

Lecanium mori somereni Newstead, 1910*a*: 187.
Lecanium (*Eulecanium*) *tremae* Newstead, 1911: 162.
Lecanium (*Eulecanium*) *tremae* Newstead; Newstead, 1911*a*: 93.
Lecanium (*Eulecanium*) *somereni* Newstead; Newstead, 1913: 76.
Lecanium somereni Newstead; Lindinger, 1913: 83.
Lecanium (*Eulecanium*) *somereni* Newstead; Newstead, 1917*b*: 130.
Saissetia somereni (Newstead); De Lotto, 1956: 247.

Records of *S. subpatelliformis* (Newstead, 1917) from Southern Rhodesia (Brain, 1920; Hall, 1935) are very likely referable to *S. somereni*. The two species are believed to be identical.

ETHIOPIA: Alemaya, 8.iv.1964, on *Ficus dekdekena* A. Rich. (Moraceae) (*B. G. Hill*).

KENYA: Nairobi, 23.iii.1955, on *Cordia holstii* Guerke (Boraginaceae) (*R. H. Le Pelley*).

SOUTH AFRICA: Transvaal, Zebediela, 5.ii.1957, on *Citrus* sp. (Rutaceae) (*G. De Lotto*). Rustenburg, 15.xii.1956, on *Citrus* sp. (*H. J. Smith*).

SOUTHERN RHODESIA: Que Que, 10.x.1963, on *Citrus* sp. (*C. J. Hodgson*).

TANGANYIKA: Arusha, 25.i.1961, on *Croton* sp. (Euphorbiaceae) (*G. De Lotto*).

UDINIA De Lotto, 1963

Udinia De Lotto, 1963: 194.

Type-species: *Udinia scitula* De Lotto, 1963.

To the six African species originally assigned to this genus, should be added *Lecanium* (*Saissetia*) *farquharsoni* Newstead, 1922, described from Southern Nigeria.

The following is a revised key for the separation of the species:

1		Paraopercular pores very numerous and arranged in a loose group extending on either side of the anal opercula	2
		Paraopercular pores few and set close to the median line of the body in front of the anal opercula only	6
2	(1)	Dorsal setae scattered; submarginal pores lacking	3
		Dorsal setae present only on the marginal area, where they are set in a continuous irregular fringe; submarginal pores present	***glabra***
3	(2)	Anal opercula each with two to five discal or subdiscal setae	4
		Anal opercula each with one discal seta only	5
4	(3)	Anal opercula each with two or three discal or subdiscal setae; setae of the marginal fringe between the anterior and posterior stigmatic clefts ranging from 17 to 25	***scitula***
		Anal opercula each with one discal and four subdiscal setae; margin of the body between the stigmatic clefts with 35–36 setae	***farquharsoni***
5	(3)	Setae of the marginal fringe long and finely pointed	***exoleta***
		Marginal setae short and variously frayed at the apex	***paupercula***
6	(1)	Legs with an articulatory sclerosis between tarsus and tibia; anal opercula each with one discal seta	***pterolobina***
		Legs without tibio-tarsal articulatory sclerosis; anal opercula without discal setae	***setigera***

Udinia farquharsoni (Newstead, 1922) **comb. n.**

(Text-fig. 22)

Lecanium (*Saissetia*) *farquharsoni* Newstead, 1922: 530.

According to Newstead (1922) the adult female is "hemispherical, or narrowly ovate and highly convex; margin very thick, forming a distinct rounded moulding or bead. Integument with a faintly matted surface when preserved in alcohol, due apparently to secretion of foreign matter, on the removal of which, by slight friction, the derm presents a polished appearance. Colour rich dark castaneous; immature examples dusky buff." The following redescription is based on a rather young adult female designated as "type" though the date of collection is not the same of that given by Newstead in his original description.

Outline of the body nearly circular; length 2·9 mm. Dorsal dermis with numerous pale areas which are fairly large and close together near the margin of the body, and tend to be smaller and rather widely apart from one another near the centre; each pale area encloses a minute pore. Dorsal setae conical, all attaining the same size and evenly distributed. Paraopercular pores hemispherical, set in a loose group of 66 in front and on either side of the anal opercula. Submarginal pores lacking. Anal opercula together pyriform, with a longish, robust discal seta, and four small, slender, subapical ones, most of which were broken away in the specimen examined; two or three minute setae occur on the apex. Length of each operculum 300μ; combined width 275μ. Setae of the marginal fringe of different sizes, variously frayed or pointed at the apex; the larger setae are 60–75μ long; the small ones 30–45μ. On the margin of the body between the anterior and posterior stigmatic clefts there are 13 large and 22 small setae in one side; 15 and 21 respectively on the opposite side. Stigmatic spines three; median 40–50μ long; laterals 25–30μ. Multilocular pores rather few around the genital opening only. Quinquelocular pores set in irregular bands one pore wide. Tubular ducts arranged in a continuous submarginal band on the ventral side of the body, as normal in the genus. Antennae with eight segments, measuring together 380μ. Legs well developed with a small tibio-tarsal articulatory sclerosis; ungual digitules of the same size and shape; dimensions of legs (iii): trochanter plus femur 210μ; tibia plus tarsus 220μ. Owing to large distortions of the ano-genital area the setae of the fold of the anal invagination could not be properly detected.

Southern Nigeria: Near Ibadan, 9.iii.1918, host plant not recorded. (*C. A. Farquharson*).

In Newstead's original description the date of collection is December 1917. According to an additive note by E. B. Poulton, the species was collected on *Imbricaria maxima* Poit. (Sapotaceae).

VINSONIA Signoret, 1872

Vinsonia Signoret, 1872: 33.

Type-species: *Coccus stellifer* Westwood, 1871=*Vinsonia pulchella* Signoret, 1872.

The genus *Vinsonia* was introduced by Signoret (1872) for the inclusion of a single species, *V. pulchella*, which name he later (Signoret, 1877) synonymized with *Coccus stellifer* Westwood, 1871. Even nowadays the recognition of this genus merely rests on the stellate pattern of the wax test or on the sclerotization of the cephalic lobe. Lindinger (1913) retained *Vinsonia* identical with *Ceroplastes* with which it actually shows a very close morphological affinity. In view of our extremely poor knowledge of the identity of several species currently assigned to *Ceroplastes*, any discussion on the validity and composition of the genus *Vinsonia* is premature.

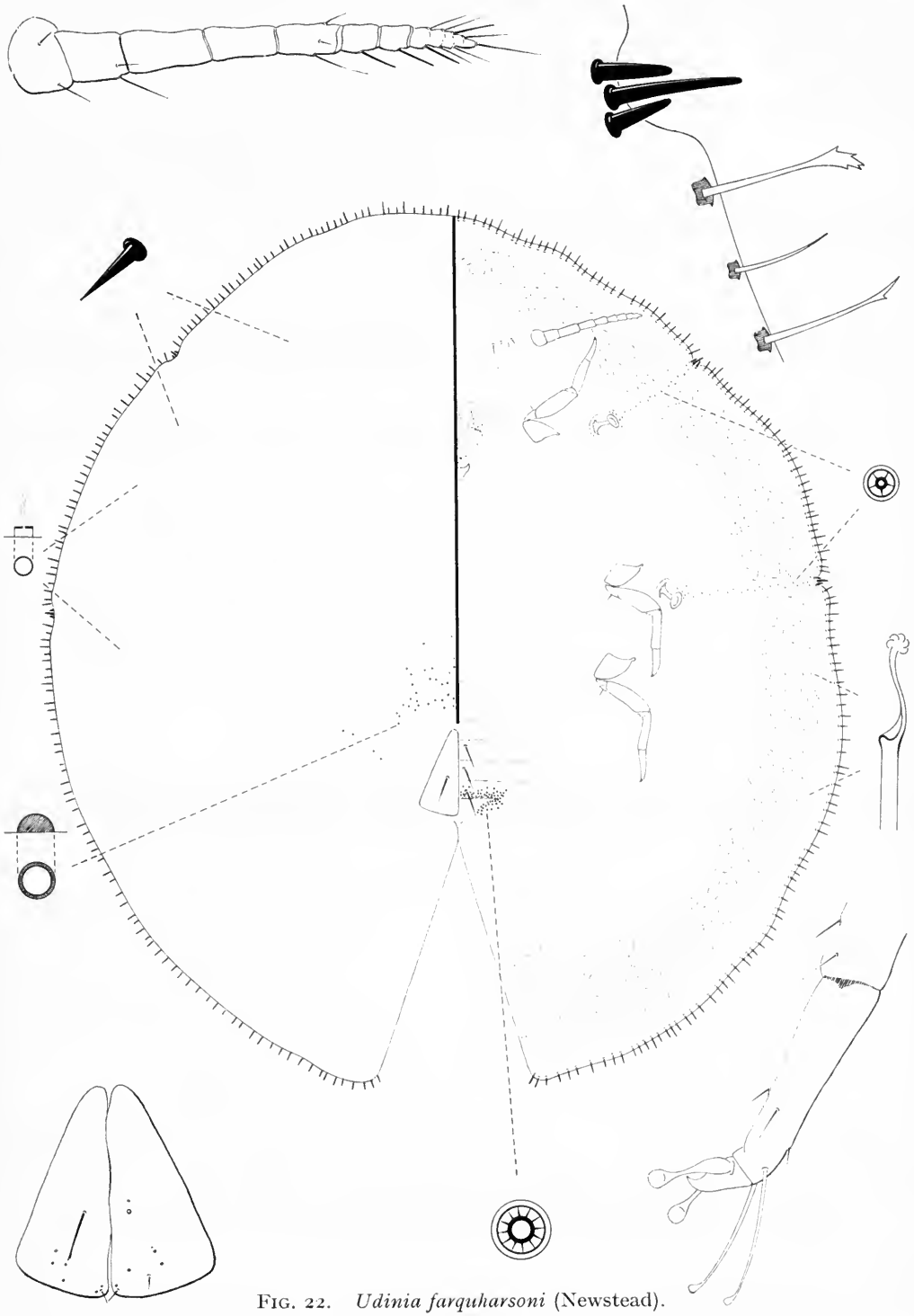

FIG. 22. *Udinia farquharsoni* (Newstead).

Vinsonia stellifera (Westwood, 1871)

(Text-fig. 23)

Ceroplastes stellifer (Westwood) Lindinger, 1913: 81.
Vinsonia stellifera Green [*sic*]; De Seabra & Vayssière, 1918: 163.
Vinsonia stellifera (Westwood); Laing, 1928: 215.

The first record of this species from Africa south of the Sahara was by Lindinger (1913) from Tanganyika on *Cocos nucifera* Linn. Later the insect was found on *Citrus* sp. in S. Thomé, a small island in the Gulf of Guinea (De Seabra & Vayssière, 1918; Laing, 1928).

The following detailed description of the external appearance of the living adult female is transcribed from Green's *The Coccidae of Ceylon* (1909).

"Adult female with a semitranslucent waxy test, the margins of which are flattened and produced into seven rays that give the insect the appearance of a miniature starfish. Median area strongly convex above, the apex with an oblong pad of opaque white wax. Colour of living examples pink darkening with age to purplish red. In dried examples this tint fades to reddish brown. Anal operculum dark brown. Margin colourless during life; yellowish in dried examples. Each ray is tipped by a longish conical process of opaque white wax. The median anterior ray carries a supplementary white point on each side of the terminal process. The following two rays on each side have a well-defined median ridge. A pair of small white waxy processes project from the posterior margin immediately behind the anal aperture. Under surface flat. After oviposition, the median area shrinks and forms a cavity for the reception of the eggs. From below, it can be seen that the median anterior ray corresponds with the cephalic lobe. The following two rays on each side are associated with the two pairs of stigmata, while the two remaining rays proceed from the abdominal lobes. At the extremity of each ray, below the base of the terminal process, is a fringe of minute glassy points—the remains of the earliest larval fringe. Diameter—across the rays—3·50 to 4·50 mm."

Young mounted adult females very broadly oval in outline; 1·2–1·4 mm. long. Dorsal setae minute, spiniform; very few. Dorsal pores of the simple type with two circular loculi of different diameter. Setae and pores are scattered without any pattern, except on a median, a cephalic and three lateral rounded or oval areas, where they are entirely lacking. Caudal process very short and very stout, strongly sclerotized. Anal opercula each with one discal, one subdiscal and one apical setae, all longish and robust; length of the opercula 85–95μ; combined width 55–65μ. Stigmatic spines set in groups of 4 to 8; all are stoutly conical, but variable in length; straight or slightly curved; the largest spine seen was 40μ long. Tubular ducts entirely absent. Multilocular pores few around the genital opening only. Quinquelocular pores few and arranged in bands two pores wide. Cruciform pores few. Legs very small, all having the tarsus and tibia fused together; ungual digitules not differentiated in shape and size; dimensions of legs (iii): trochanter plus femur 65–75μ; tibia-tarsus 58–75μ. Antennae short and rather stout, with six segments; total length 140–160μ. Between the antennae are inserted 14 to 20 long robust setae. Two to four setae of variable length occur at the posterior end of the body.

KENYA: Mombasa, 5.ii.1963, on *Mangifera indica* Linn. (Anacardiaceae) (*G. De Lotto*).

ZANZIBAR: 10.ii.1956, on *Cocos nucifera* Linn. (Palmae) (*R. H. Le Pelley*).

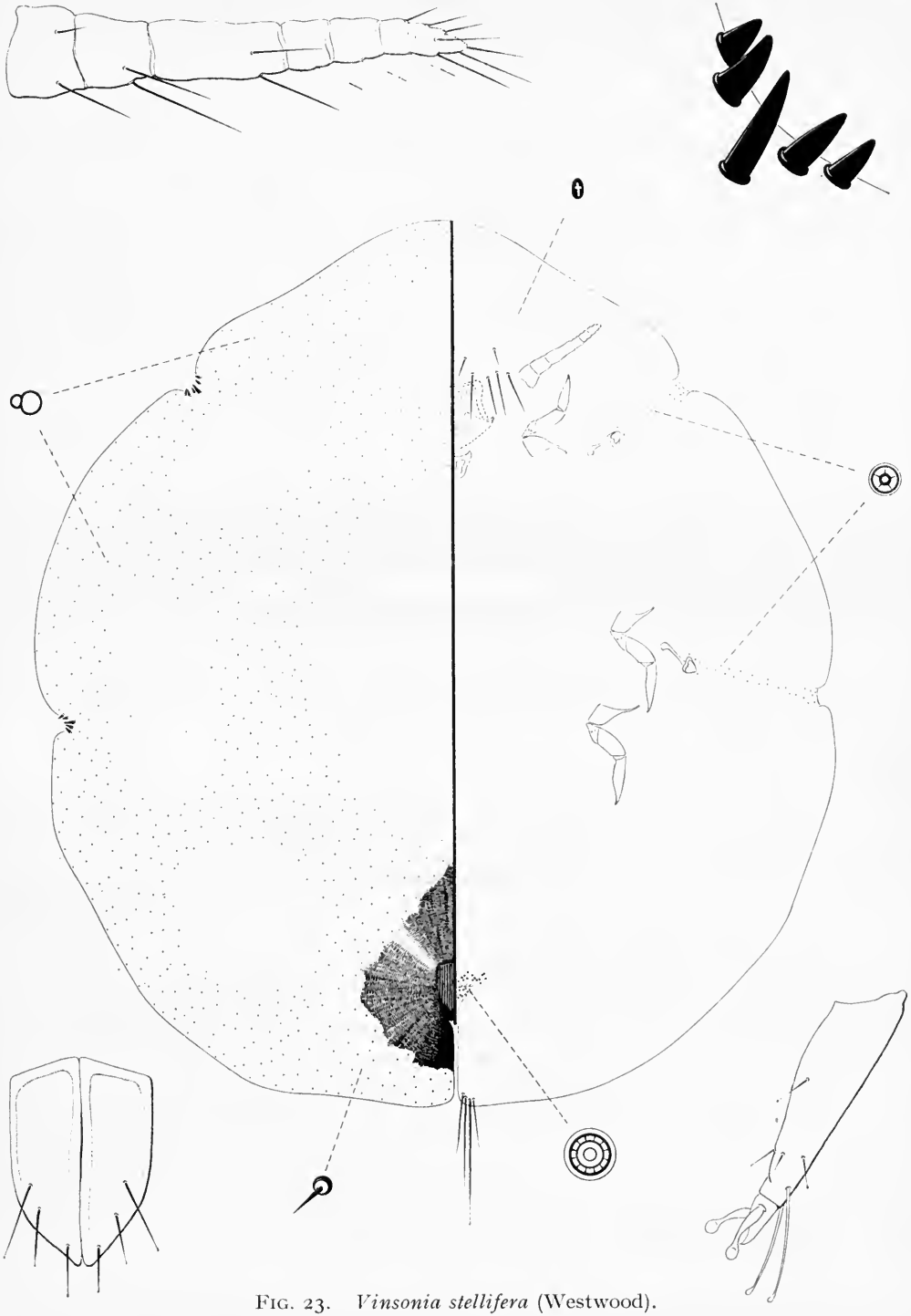

FIG. 23. *Vinsonia stellifera* (Westwood).

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INDEX

INDEX TO VOLUME

New taxonomic names are in bold type

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