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NOTES ON SOME ANTHOPHORINE BEES, MAINLY FROM THE OLD WORLD (APOIDEA)

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Abstract

An outline is given of the present state of our knowledge of the tribe Anthophorini. This is followed by a discussion of the status, interrelationship and distribution of some Old and New World components of the *Habropoda* association. The essential features of the type-species of *Anthophora, Emphoropsis, Habropoda* and *Elaphropoda* are enumerated and, to ensure generic and specific recognition, illustrations of the more important male characters are supplied for each of these. A review of the Old World members of *Habropoda* includes *Anthophora oraniensis* Lep., from Algeria, which is redescribed and figured. Species doubtfully referred to *Habropoda* are listed, but it is emphasized that this taxon can be split up in a number of distinct genera with broadly overlapping ranges. One of these is *Elaphropoda,* a new genus from Eurasia, which contains several already described and one new species, *E. bembidion* sp. n., from Borneo.

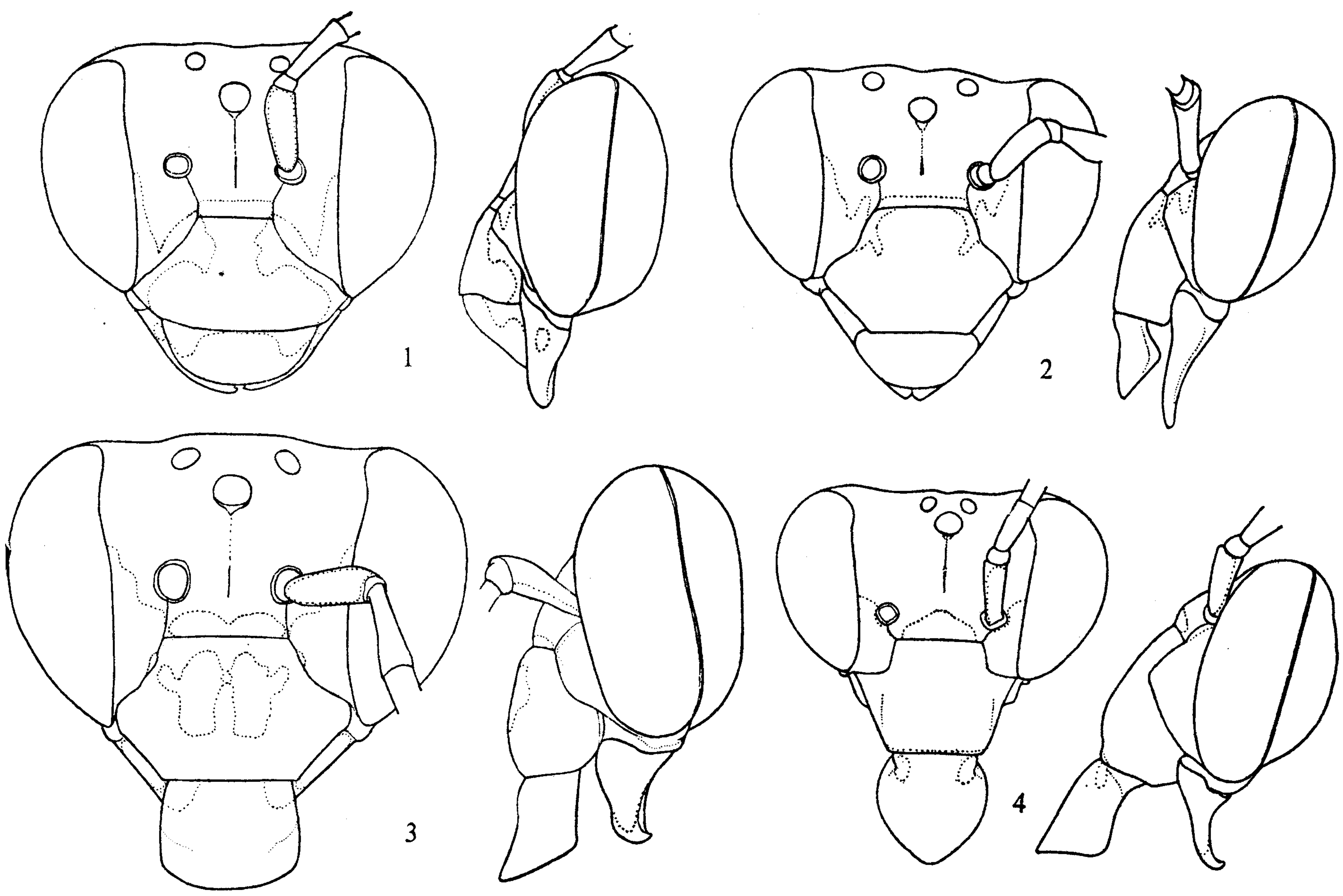

Fig. 1—4. Head in fronto-dorsal and lateral view. Fig. 1, *Anthophora acervorum* (L.), Holland; fig. 2, *Emphoropsis laboriosa* (F.), Florida; fig. 3, *Habropoda tarsata* (Spin.), Rome, Italy; fig. 4, *Elaphropoda impatiens* (Lieft.), Bukit Kutu, Malaya. Light coloured and dark areas enclosed in dotted lines. Males

Introduction

The Anthophoridae are a large group of solitary bees having an almost worldwide distribution, a great many of which also occur in the tropical parts of the Old World. As far as the elements of the tribe Anthophorini are concerned, those of the Ethiopian and Malagasy faunal regions are still imperfectly analysed and will not concern us here: in addition to some others also found elsewhere, two genera, *Pachymelus* F. Smith, 1879, and *Pachymelopsis* Ckll., 1905, are richly

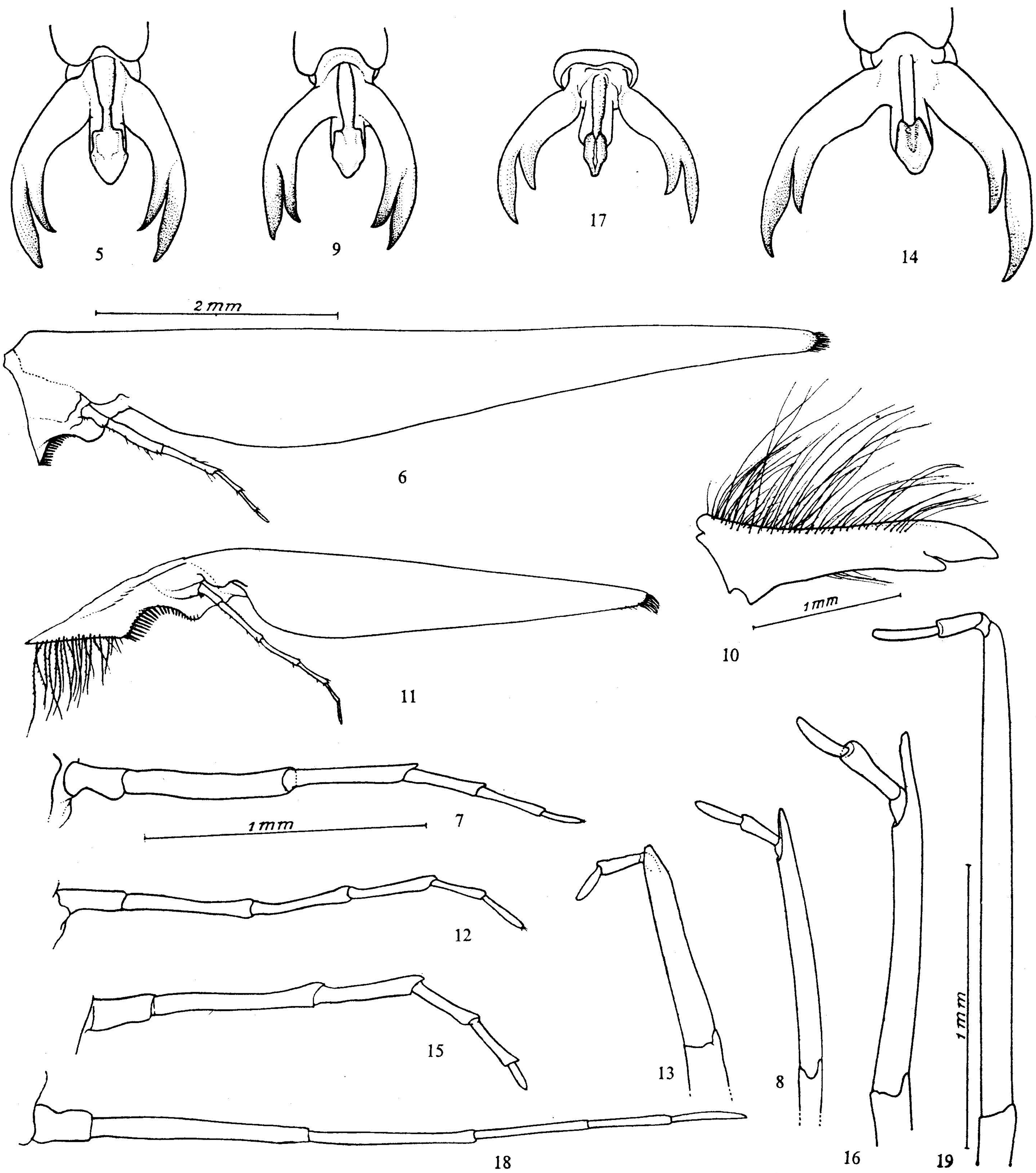

Fig. 5—19. Tarsal claws of hind leg, mandible, maxillae and maxillary palpi, and apical segments of labial palpi. Vestiture omitted. Fig. 5—8, *Anthophora acervorum* (L.), Holland; fig. 9—13, *Emphoropsis laboriosa* (F.), Florida; fig. 14—16, *Habropoda tarsata* (Spin.), Rome, Italy; fig. 17, *Elaphropoda impatiens* (Lieft.), Fraser's Hill, Malaya; fig. 18—19, *Elaphropoda percarinata* (Ckll.), Fukien, China. Corresponding figures drawn to the same scale. Males

represented in Madagascar and apparently peculiar to that island. In Eurasia and Australia, on the other hand, six non-parasitic genera of the tribe have so far been recognized. These are: *Anthophora* Latr., 1803 (including the poorly defined *Paramegilla* Friese), *Heliophila* Klug, 1807, *Habropoda* F. Smith, 1854, *Clisodon* Patton, 1879, *Amegilla* Friese, 1897, and *Asaropoda* Cockerell, 1926. In the present paper only *Habropoda* and a new taxon closely related to it will be discussed in somewhat greater detail.

The genera *Anthophora, Heliophila* and *Clisodon* [1]), having mainly a Palearctic and Mediterranean distribution in the Old World, are not or only poorly

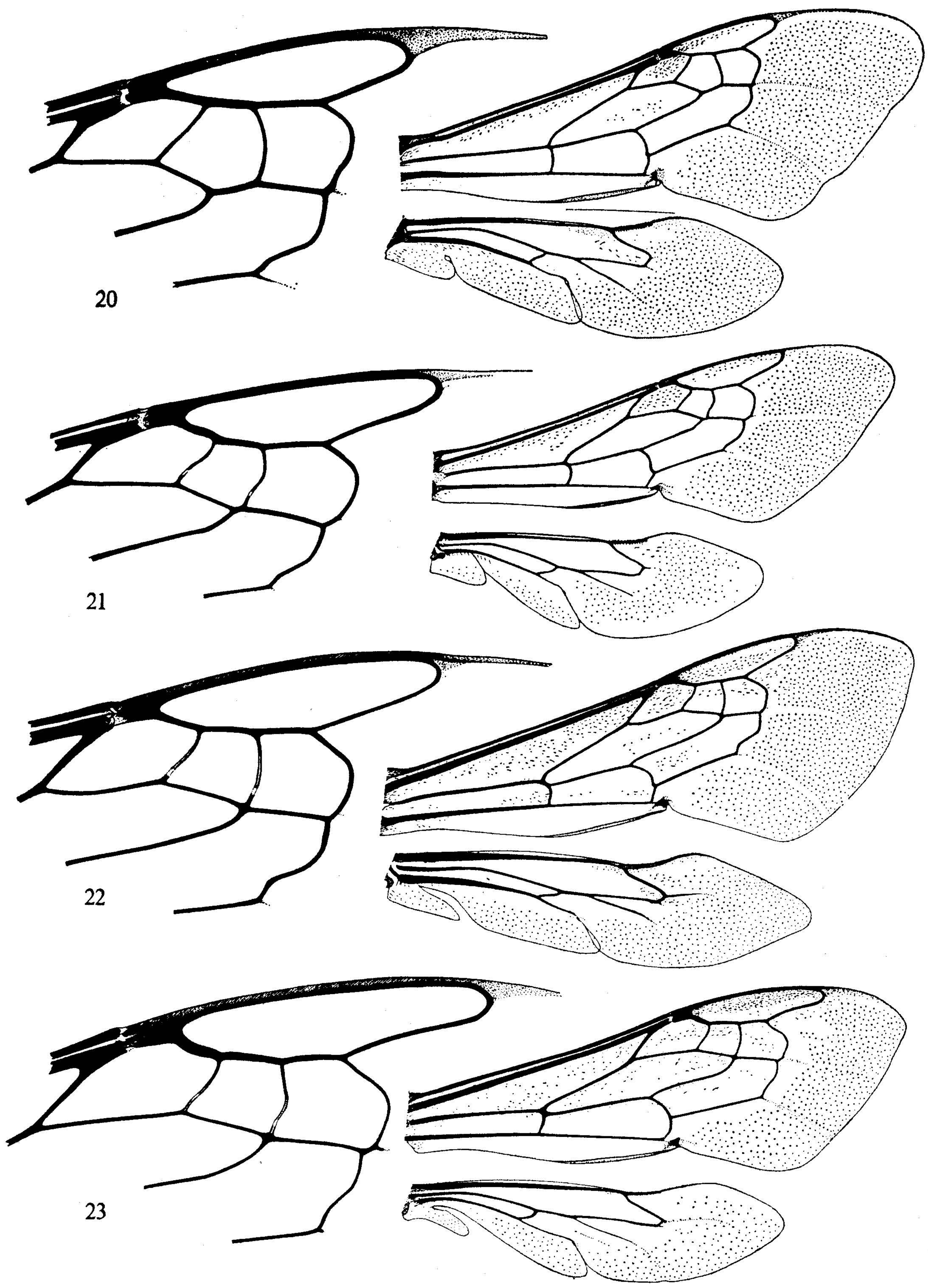

Fig. 20—23. Venation of right pair of wings (right) and portion of fore wings, more enlarged. Fig. 20, *Anthophora acervorum* (L.), Holland; fig. 21, *Emphoropsis laboriosa* (F.), Florida; fig. 22, *Habropoda tarsata* (Spin.), Rome, Italy; fig. 23, *Elaphropoda impatiens* (Lieft.), Bukit Kutu, Malaya. Corresponding figures drawn to the same scale. Males

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[1]) Revision: V. B. POPOV (1951).

represented in southeast Asia and are absent from Australia. *Amegilla,* with its numerous species throughout the warmer parts of the Eastern Hemisphere, is also the dominant genus in southeast Asia and the Australian region. It was briefly reviewed by POPOV (1950), who was the first to firmly establish its status within the family, supplying at the same time a list of the described species and lower categories compiled from the literature then available to him. Towards the eastern periphery of the Oriental region and on the mainland of Australia *Amegilla* mixes with species of the nearly related *Asaropoda,* which has its centre of distribution in Australia. A synopsis of the Australian forms was published by RAYMENT (1951), whose treatment is, however, superficial and does not include any of the taxa defined by earlier writers. Lastly, the origin and geographical distribution of the Eurasian genus *Habropoda* were discussed at some length by POPOV (1948), whose paper clearly demonstrates the complexity of this group. In this synoptic review the author outlined the supposed evolutionary history of these bees, referring simultaneously to some taxonomic features. It was necessarily based on a study of the genus in its broadest sense, as it comprised all described Old World forms previously assigned to it. Although many of the latter were known to him only from the literature, all recorded localities were treated alike and entered in a map showing the distribution regardless of group differentiations. POPOV's concept of *Habropoda* not only necessitated the inclusion of at least one African element of rather remote affinity but also of other units with which he was not personally acquainted. As a matter of fact, three Eurasian genera with overlapping ranges are involved in POPOV's account. Two of them are treated in the present paper, while a third (and probably more) still require careful analysis. Moreover, these taxa are morphologically as closely related among themselves as each of them can be linked with the dominant genus *Anthophora,* which is itself highly polymorphic and of widespread occurrence. For some unknown reason the last-mentioned genus was entirely left out of consideration in POPOV's account. We have at present obtained a somewhat better knowledge of the morphology of these bees and, though still far from complete, it indicates that POPOV's interpretation of the present-day distribution of the *Habropoda* group requires considerable alteration. I also think that the conclusions arrived at by him, though admittedly tentative, are rather premature and do not permit of a decisive answer to be given on the origin and evolution of these bees.

In a publication that appeared four years in advance of POPOV's review but which for obvious reasons had remained unknown to him, I have given characterizations of a number of old and new species of "*Anthophora*" and "*Habropoda*" occurring in the Malaysian subregion (LIEFTINCK, 1944). All regional species previously assigned by me to *Anthophora* were subsequently transferred to *Amegilla* (LIEFTINCK, 1956) but, in anticipation of a thorough analysis of the whole complex still amalgamated in *Anthophora,* I merely stated that a new genus would be necessary to accommodate the tropical oriental bees formerly included in *Habropoda.*

It is the object of the present paper to demonstrate the principal features of this compact little group, which is here introduced under the new name *Elaphropoda,* gen. nov. An attempt will be made to directly compare the type-species and allied forms of this taxon with others of more remote affinity and with the types of three other genera considered to be most nearly related. These representative species are: *Anthophora acervorum* (L., 1758), *Emphoropsis laboriosa* (F., 1804), and *Habropoda tarsata* (Spinola, 1838) with its immediate allies.

The principal generic characters of *Anthophora* are contained in the well-known publication of MICHENER (1944), while definitions of *Emphoropsis* have been supplied by a number of writers whose publications are cited under that genus.

The illustrations of morphological structures accompanying the text of the following account are intended to be self-explanatory. As far as the genera *Anthophora* and *Emphoropsis* are concerned, the figures are given solely for the purpose of comparison with corresponding structures found in *Habropoda* and *Elaphropoda,* more comprehensive notes and descriptions, where necessary, being supplied only for the latter.

Anthophora Latreille, 1803

As is well known, *Anthophora* contains an enormous number of very diverse species distributed all over the temperate and subtropical parts of the world, with radiations in more southerly directions. There is, in fact, a marked decrease in the number of species south of the Tropic of Cancer; and when leaving aside the Anthophorini of the African fauna and South America, whose components and affinities are still imperfectly studied, it can be said that in the Old World tropics no true *Anthophora* occur in the Malay Archipelago nor has any been found in the Australian Region or the Pacific islands.The greatest diversity in morphological features exists amongst those inhabiting the temperate regions of the Old World from which it may possibly be inferred that the Nearctic elements are derived from old stock centred in the Palearctic Region.

In the existing keys and descriptions of these Old World *Anthophora,* group characters that may express the probable relationships have only rarely been taken into account [1]). Of the great majority of Mediterranean and Asiatic species, for instance, practically no descriptions or figures exist of the head and leg structures or of the male copulatory organs, so that many remain unrecognizable. In several instances it is not even known whether such forms are true *Anthophora* or *Amegilla.* Some of the former are superficially much like *Amegilla* while others may easily be mistaken for *Heliophila*, which themselves are sometimes astoundingly similar to certain *Amegilla* with which they occur together. The highly specialized short-haired and banded groups of true *Anthophora* are thus frequently confused with similarly-looking sections of allied genera. With so many of them only known from descriptions, it is hardly surprising that generic identification can only be a matter of guess-work. A notable exception to the rule forms the beautifully

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[1]) A section still of doubtful generic (or subgeneric) status is the "subgenus" *Paramegilla* Friese, 1897. According to FRIESE, the only character by which it is said to differ from *Anthophora* is the presence of large, white pubescent spots at the sides of the abdominal segments. The type-species of *Paramegilla* is *Apis ireos* Pallas, 1773, from Russia; I have only seen a female of another included species, *A. (P.) christofi* F. Mor., 1880, from Turkestan.

illustrated work of MORAWITZ (1875) on the bees of Turkestan. In this outstanding publication a number of excellent drawings of male genitalia are found which are most helpful in segregating the regional genera and species groups.

The most comprehensive study of *Anthophora* is the one published by MICHENER (1944), who provided a profusely illustrated account of the general morphology and anatomy based on one of the commonest Nearctic species, viz. *A. edwardsii* Cresson. For comparison with other genera discussed in the present paper I have, for similar reasons, selected one of the best known European representatives,

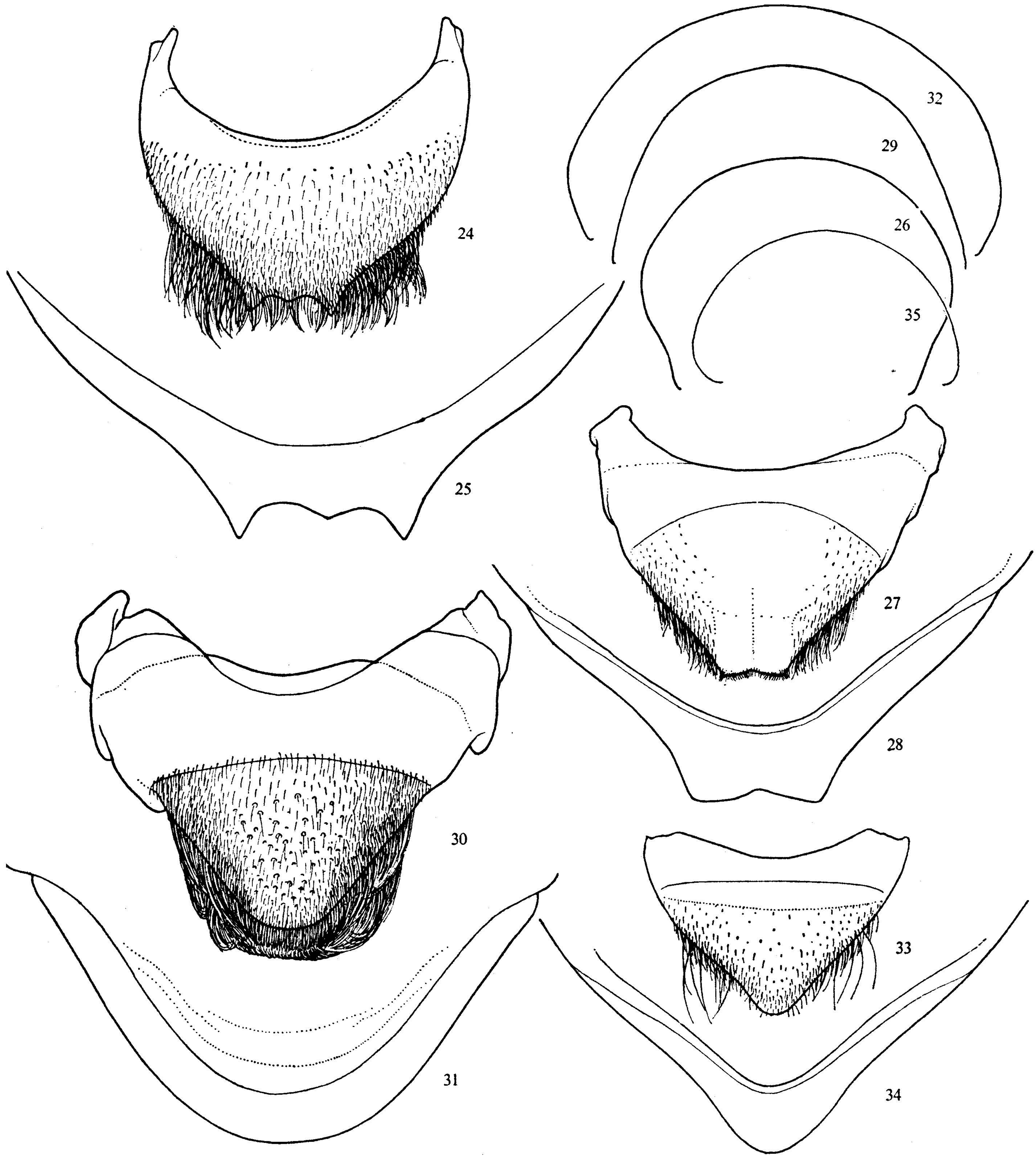


Fig. 24—35. Seventh gastral tergite of male, dorsal view (24, 27, 30 and 33), ventral view more enlarged (25, 28, 31 and 34), and cross-sections of same (26, 29, 32 and 35). Fig. 24—26, *Anthophora acervorum* (L.), Holland; fig. 27—29, *Emphoropsis laboriosa* (F.), Florida; fig. 30—32, *Habropoda tarsata* (Spin.), Rome, Italy; fig. 33—35, *Elaphropoda impatiens* (Lieft.), Fraser's Hill, Malaya. Corresponding figures drawn to the same scale

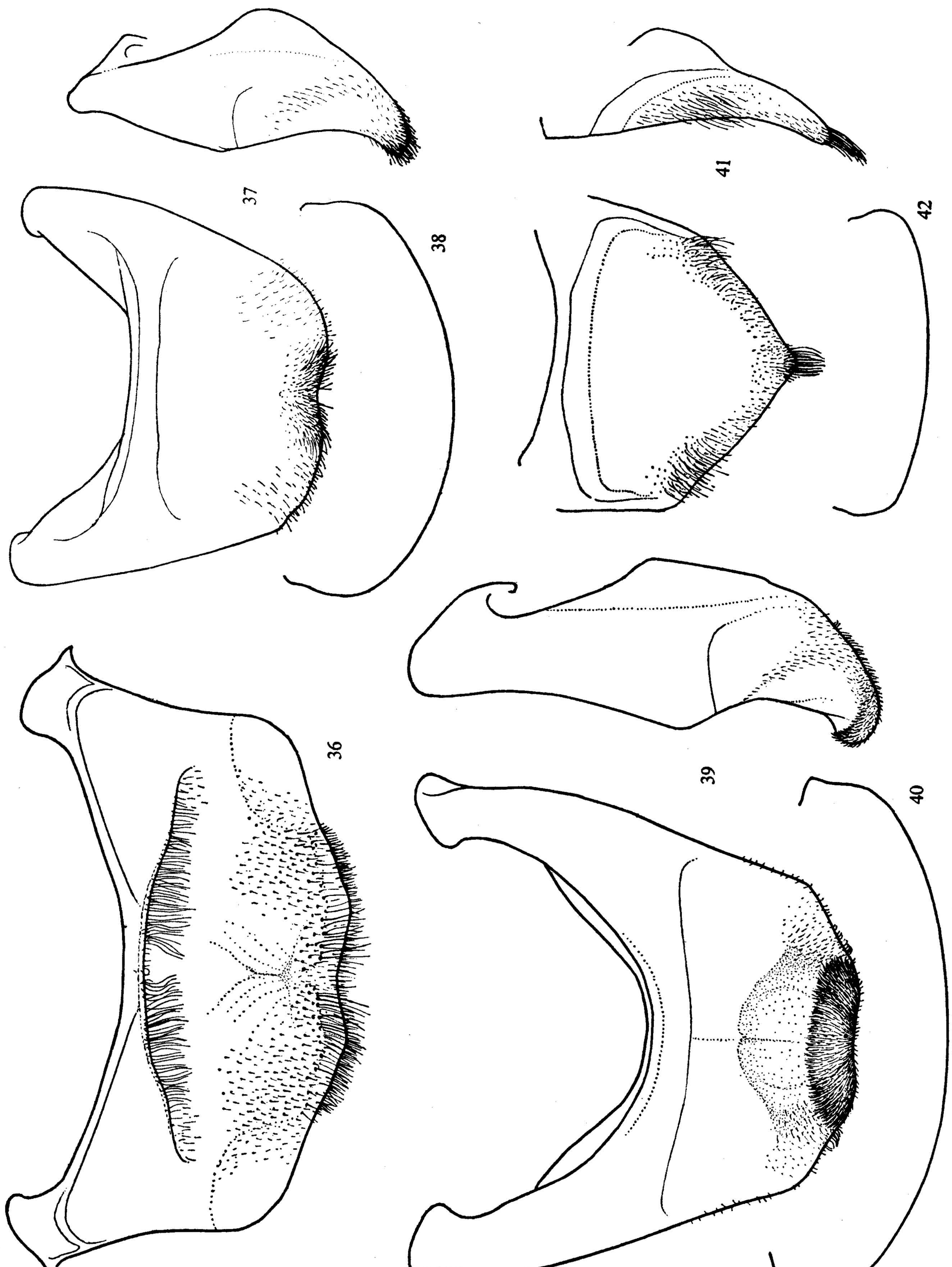
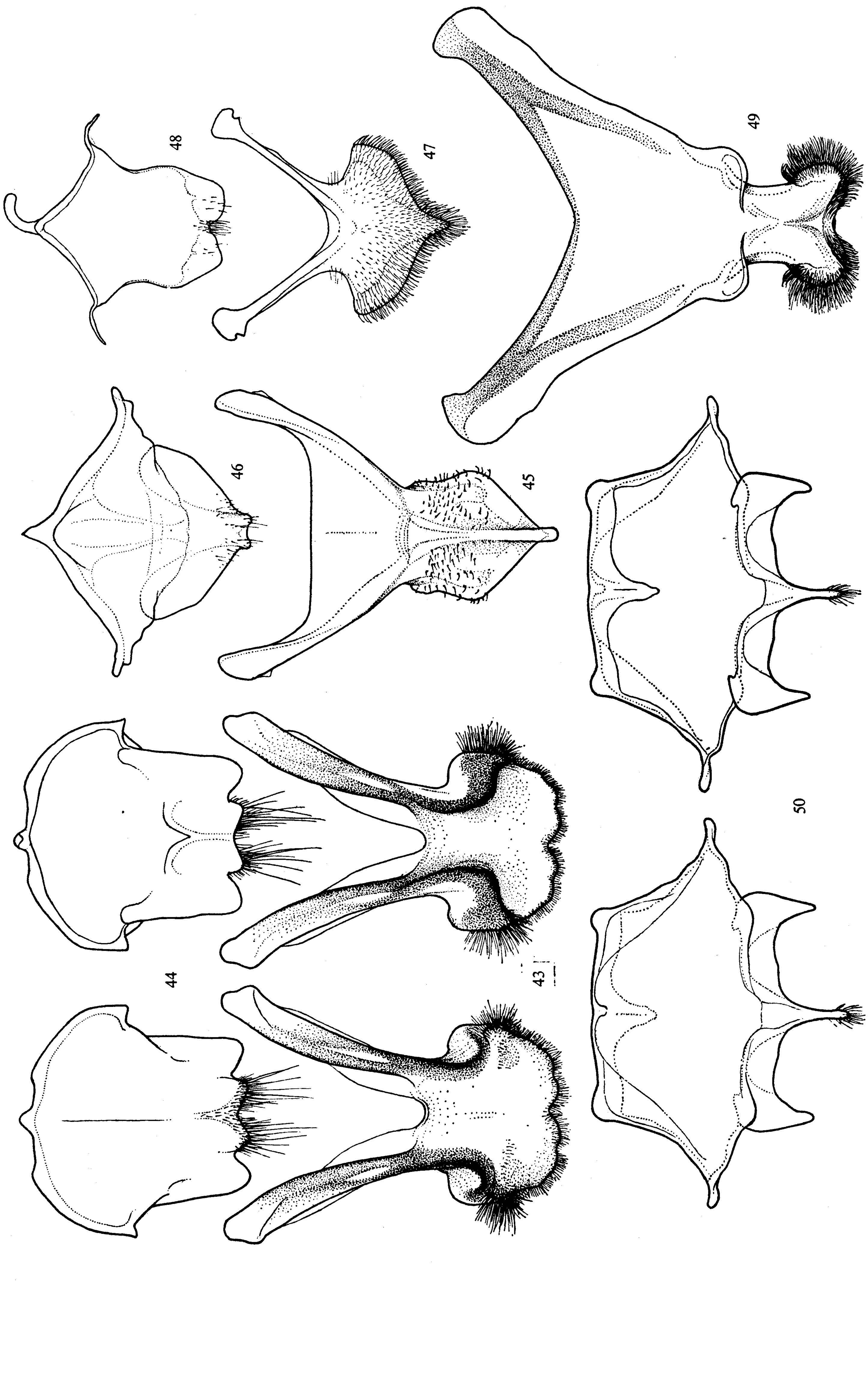


Fig. 36—42. Sixth gastral sternite of male, ventral and lateral view (36, 37, 39 and 41), and cross-sections of same (38, 40 and 42). Fig. 36, *Anthophora acervorum* (L.), Holland; fig. 37—38, *Emphoropsis laboriosa* (F.), Florida; fig. 39—40, *Habropoda tarsata* (Spin.), Rome, Italy; fig. 41—42, *Elaphropoda impatiens* (Lieft.), Bukit Kutu, Malaya. All figures on the same scale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the type-species *A. acervorum* (L.). The most important structural characters of the male are here illustrated; head, mouth-parts and tarsal claw (fig. 1, 5—8), wings (fig. 20), exposed apical tergites and sternites of abdomen (fig. 24—26 and 36), seventh and eighth sternal plates (fig. 43—44), and genital capsule (fig. 51).

Habropoda F. Smith, 1854

1854. SMITH, Cat. Hym. Brit. Mus. 2 : 318—319 (*Habrophora* F. Sm.), 320 (*Habropoda* nom. nov.), pl. 12 fig. 9—11.
1869. DOURS, Mon. Icon. Anthophora (Mém. Soc. linn. Nord France): 29—34, pl. 1 (partim), pl. 2 fig. 1—6 (col. plate).
1879. PATTON, Bull. U.S. Geol. Surv. 5 : 477—479 (partim, type-species *H. ezonata* F. Smith, 1854 = *Tetralonia tarsata* Spinola, 1838, designated).
1890. DE SAUSSURE, in GRANDIDIER, Hist. Madagascar 20 : 12 (diagnosis).
1897. BINGHAM, Fauna Brit. India, Hym. 1 : 414 (key), 521—523 (partim), fig. 177; not pl. IV fig. 6.
1897. FRIESE, Bienen Europa's 3 : 18, 24 (subgenus).
1899. ASHMEAD, Trans. Amer. Ent. Soc. 26 : 60 (key).
1909. VACHAL, Ann. Soc. ent. France 78 : 11 (key).
1923. FRIESE, Die europ. Bienen : 215—217 (notes).
1930. SCHMIEDEKNECHT, Hym. Nord- u. Mitteleuropas, 2. Aufl.: 780 (key, subgenus).
1943. SANDHOUSE, Proc. U.S. Nat. Mus. 92 : 557.
1948. POPOV, Doklady Akad. Nauk URSS, new ser. 59 : 1673—1676 (partim!), fig. 1 (map).
1958. IUGA, Subfam. Anthophorinae, in Faun. Rep. Pop. Rom. Ins. 9 : 94—97, fig. 40 (wing).

Always excepting the differences found in the wing venation, generic characters applicable to both sexes of *Habropoda* are not very well marked and (for the female) difficult to evaluate. The main characteristics are contained in the afore-cited references, but it should be remembered that in the diagnoses given by DOURS, PATTON, BINGHAM and also POPOV, members of the allied genera *Emphoropsis* and *Elaphropoda* were included. The best general definitions are those supplied by SMITH and DE SAUSSURE, insofar as these are based only upon the Mediterranean forms. I have failed to discover clear-cut characters for the female other than those found in the venation, for I have observed that some features of the mouth-parts, legs and pygidial area are hardly, if at all, different from those of certain large-sized species of *Anthophora*. In both sexes of the more typical species of *Habropoda* the interocellar distance is only little longer than the ocellocular distance, whereas in the type-species of *Emphoropsis* the lateral ocelli are more widely separated (ratio about 10 : 7); lastly, in two *Emphoropsis*-like bees (from Vietnam and Fukien, respectively), the reverse condition exists (ratio 8.5 : 10). These differences may be, however, of specific rather than generic

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Fig. 43—50. Seventh and eighth sternites, exterior view (43, 44 and 50, left and 45—49), and interior view (43, 44 and 50, right). Fig. 43—44, *Anthophora acervorum* (L.), Holland; fig. 45—46, *Emphoropsis laboriosa* (F.), Florida; fig. 47—48, *Elaphropoda impatiens* (Lieft.), Bukit Kutu, Malaya; fig. 49—50, *Habropoda tarsata* (Spin.), Rome, Italy. All figures on the same scale significance. Males are easily recognized by a combination of sexual characters, primary as well as secondary; most of these will be apparent from the accompanying figures. An additional feature worth mentioning is, perhaps, the attenuated and curiously flattened flagellar segments of the antennae, which in all males extend beyond the tegulae.

POPOV (1948) has already called attention to the remarkably elaborate form and texture of the invaginated seventh and eighth abdominal sternites in *Habropoda* males. Somewhat beyond half-way their length these plates are distended, bearing transverse and swollen ridges with angulate or tooth-like marginal projections which are heavily sclerotized; the apical portions often bear strong

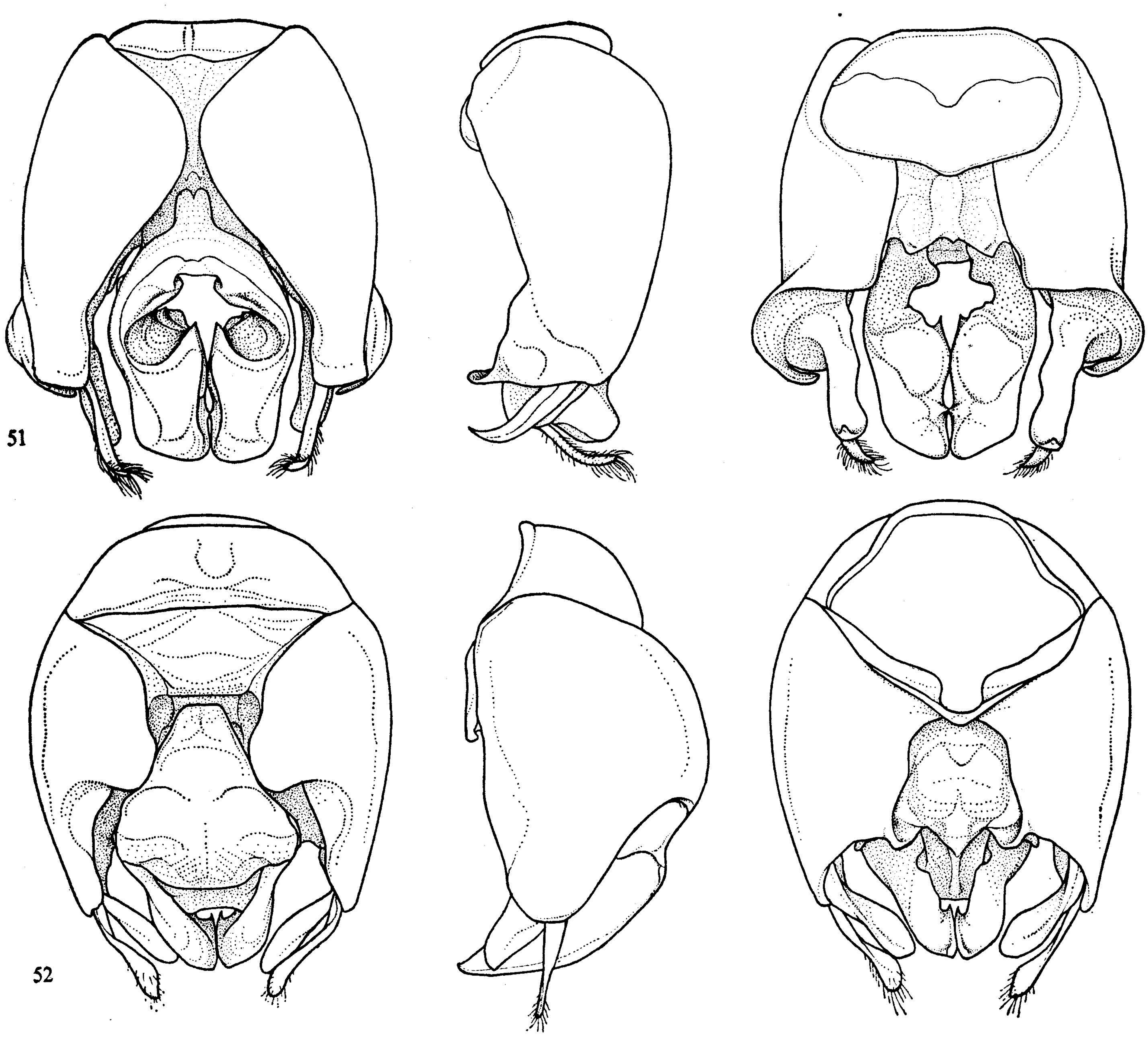

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Fig. 51. Genital armature of *Anthophora acervorum* (L.), Holland, dorsal, left lateral and ventral view. Fig. 52, the same of *Emphoropsis laboriosa* (F.), Florida. Enlarged on the same scale

papillae and bristle-like setae (see fig. 49, 57—58, 63—64, and 69—70). The long apodemes and spiculae of these plates are also present in some *Emphoropsis* and *Elaphropoda* but the ridges and processes in *Emphoropsis* are only poorly indicated while they have completely disappeared in the highly specialized *Elaphropoda*.

It will be seen from our illustrations that the resemblance between *Habropoda* and *Anthophora* is not quite as great as that between either of these and *Emphoropsis,* the latter taking rather an intermediate position in almost every respect.

Pending a characterization of the species reportedly known from the African continent (south of the Sahara), it seems best not to include these in *Habropoda* in the strict sence as applied here. I do not know which species from South and East Africa POPOV (1948) had in mind when recording these on a map (loc. cit.: 1674). He remarks upon four but, with the exception of *H. festiva* Dours (from

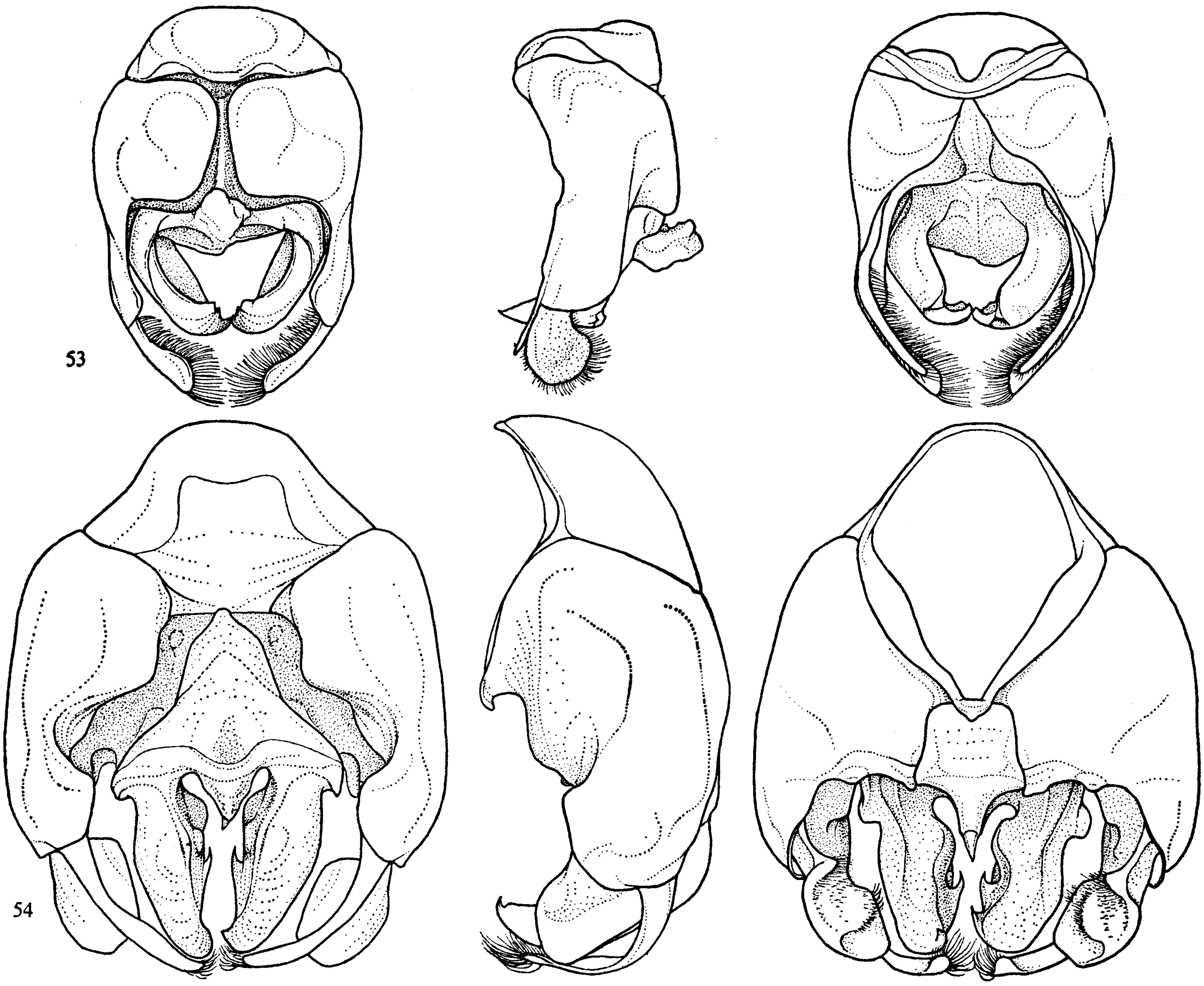

Fig. 53. Genital armature of *Elaphropoda impatiens* (Lieft.), Bukit Kutu, Malaya. Fig. 54, the same of *Habropoda tarsata* (Spin.), Rome, Italy. Enlarged on the same scale

"Cafrérie"), none of them was mentioned by name. I have examined and dissected a male of a species apparently closely allied to *festiva* from Tanganyika but, although this shows some approach towards *Habropoda,* it is surely not congeneric, differing also in the venation.

Following the specific accounts of *Habropoda* proper, I have appended a list of the Asiatic forms questionably referred to it by previous authors. This list may or may not include a remarkable species from China of which I have dissected a male from Fukien, which undoubtedly belongs to yet another genus; it resembles *Elaphropoda* but is wholly different structurally. I hope to deal with this and other forms in a future paper.

Lastly, mention should be made of *Anthophora gracilipes* F. Mor., 1873, from the Caucasus. This is one of a separate species-group of *Anthophora*, which in 1877 was erroneously transferred to *Habropoda* by RADOSZKOWSKI (Horae Soc. Ent. Ross. 12 : 334); I have seen both sexes of it.

Distribution. — From the Mediterranean region eastwards through central Asia to China (Peking).

Remarks. — The species of *Habropoda* are probably parasitized by the conspicuous velvet black-and-white pubescent bees of the melectine genus *Eupavlovskia* Popov, whose distribution corresponds very nearly with that of their probable hosts with which they were repeatedly found associated in the field. Nothing further seems to be known of their biology.

Habropoda tarsata (Spinola, 1838)

1838. SPINOLA, Ann. Soc. ent. France 7 : 541—542. — ♂ "environs de Civita Vecchia, dr. Leach don." (*Tetralonia*).
1854. SMITH, Cat. Hym. Brit. Mus. 2 : 320, pl. 7 fig. 6—6a (♂ ins. & leg). — ♀ ♂ Albania (*H. ezonata* sp. n.).
1856. SICHEL, Bull. Soc. ent. France (3) 4 : xix. — ♂ Florence; ♂ Sicilia (*Anthophora Passerini* sp. n.).
1869. DOURS, Mon. Icon. Anthophora : 31—33, pl. 2 fig. 3—4 (♀ ♂ colour plate, ♂ hind leg). — ♀ ♂ Greece.
1874. DOURS, Cat. syn. Hym. France, Mém. Soc. linn. Nord France 3 : 2 (first record in France : Hyères).
1876. MORAWITZ, Horae Soc. ent. Ross. 12 : 5, 31 (Caucasus).
1878. MORAWITZ, Ibid. 14 : 8 (Tauskaja, Caucasus).
1890. DE SAUSSURE, in GRANDIDIER, Hist. Madagascar 20 : 12 (key) (*H. ezonata* Smith).
1897. FRIESE, Bienen Europa's 3 : 24—25 (key), 51—53 (descr., distrib., ethol.) (*Podalirius tarsatus*, and as subgenus).
1913. ZAVATTARI, Boll. Mus. Zool. Anat. comp. Torino 28 : 1. — ♀ ♂ Rodi (= Rhodes) (*Anthophora*).
1921. FRIESE, Archiv f. Naturgesch. A. 87 : 166. — Amanus Mts.
1923. FRIESE, Die europ. Bienen : 215, 217, 226 (flower records, notes), fig. 55 (wings).
1930. SCHMIEDEKNECHT, Hym. Nord- u. Mitteleuropas : 780, 785 (key ♀ ♂) (subgenus).
1948. POPOV, Doklady Akad. Nauk URSS, new ser. 59 : 1675 (distrib.).
1958. IUGA, Subfam. Anthophorinae, in Faun. Rep. Pop. Rom. Ins. 9 : 97 (key) —99. — ♂ ♀ Romania : Tulcea.[1])
1964. COMBA, Mem. Soc. Ent. Ital. 43 : 44. — ♂ ♀ Lazio, Italy.

For good descriptions of this handsome bee reference can be made to the literature and also to the illustrations supplied in the present paper. The head is shown in fig. 3, the tarsal claw, mouth-parts and wings in fig. 14—16 and 22 respectively, the male gastral terminalia in fig. 30—31, 39—40 and 49—50, and the genital apparatus in fig. 54.

Distribution. — Originally described from Italy (Rome), the species is probably widely distributed in the Mediterranean basin and southwest Asia. The following localities can be recorded. F r a n c e : Le Trayas, Le Lavandou and Hyères (Var); Nice (Alpes maritimes). — I t a l y : Bolzano (Bozen, Tirol); environs of Bologna (Emilia); environs of Genova (Liguria); Firenze and Castiglioncello near Livorno (Toscana); environs of Rome and Acilia (Lazio); Portici and Castellammare (Campania); Calabria; Sicily. — R o m a n i a : Tulcea.[1]) — J u g o - s l a v i a : Pola (Istria); Split (Spalato); Treska valley, Urosevac, Skopje and Katlanovska Banja (Macedonia). — B u l g a r i a : Krupnik. — A l b a n i a. — G r e e c e : Corfu; Athens (Mt. Imitos); Attica (Limni Marathonos); Kalávrita (Peloponnesus); Samos; Tinos (Cyclades); Rodhos (Rhodes). — A s i a M i n o r (Turkey): Marmaris and Ula (Mugla Prov.); Finike (Antalya Prov.); Gözne (Mersin Prov.); Amanus Mts. (Gavur Daglari). — C a u c a s u s and T r a n s - c a u c a s u s : various localities.

Remarks. — *H. tarsata* is an early spring species, occurring from March to the first half of May in low country; it is often found in company of *H. zonatula.* Flower records are: *Coronilla emerus,* near Krupnik 300 m, leg. PITTIONI (VERHOEFF in litt.); *Coronilla emerus, Anchusa* and *Ajuga,* near Bolzano (FRIESE, 1897); *Echium altissimum* and *Salvia sclera,* at Broshom, 800 m, Caucasus (MORAWITZ, 1876); *Muscari comosum,* in southern France (BARENDRECHT in litt.); male also on *Prunus persica* (FRIESE, 1923) and *P. amygdalus* (IUGA, 1958).

Habropoda tadzhica Popov, 1948

1948. POPOV, Trans. Tadjik Br. Akad. Sci. URSS 8 : 31—34, fig. a—e (♂ struct.). — ♀ ♂ Tadzhikistan.

Material. — 1 ♂ 1 ♀ (paratypes), labelled (in Russian) "Village Kwak, 2000 m, 35 km N of Dushanbe, 10 & 20.VI.1937, V. Gussakovski" and "Habropoda tadzhica sp. nov. Popov", det. V. POPOV 1947, in Mus. Leningrad.

This species comes nearest *H. tarsata.* The original description is incomplete and does not do full justice to the nature of the pubescent body pattern and the peculiar structure of the legs and terminalia of the male. The abdomen is neither tricoloured (*tarsata*) nor banded (*zonatula*), but uniformly clothed with rather long and dense golden yellow hair. The bright yellow clypeus of the male is marked with black as in the species just mentioned, the size of the spots being intermediate between the two. Like *H. tarsata* the fore legs are of simple structure but the long spine-like coxal process is reduced to a short plate-shaped lamella. Femur and tibia III are greatly swollen, the inner carina of the tibia terminating in a short tooth-like subapical projection; the smooth and shiny inner surface of the greatly modified basitarsus (fig. 55) is deeply hollowed out, the whole structure smaller than in *tarsata* and shaped differently. The 7th and 8th sternal plates are shown (fig. 57—58), the 8th sternite bearing more likeness to that of *tarsata* (fig. 50) than to *zonatula* (fig. 64), and considering also the structure of the genital capsule with its appendages (fig. 56), *tadzhica* appears to be most closely related to *tarsata.* This resemblance applies also to the female pygidial plate, which in the latter is more narrowly triangular and pointed than it is in *zonatula* and allies.

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[1]) This Romanian record was taken from MORAWITZ and possibly confused with Tauskaja (Tauz in Azerbeidshan), as given by MORAWITZ.

Habropoda moesta Popov, 1952

1948. POPOV, Doklady Akad. Nauk. URSS, new ser. 59 : 1673 (Kopet Dagh, sine nomine).
1952. POPOV, Trav. Inst. Zool. Acad. Sci. URSS, Moscou 10 : 113—114. — ♀ Kopet Dagh.
1960. PONOMAREVA, Ibid. 27 : 161 (flower record).

Material. — 1 ♀ labelled (in Russian) Iiol. Dere/W. Kopet Dagh, 20.V.1953, Ponomareva, on *Lonicera floribunda,* in Mus. Leningrad.

Male unknown. The type is from Germab, Kopet Dagh, LEDER (collector?), in Mus. Leningrad. The present specimen, identified by A. PONOMAREVA, tallies with the description. General appearance similar to *H. zonatula* and *balassogloi*

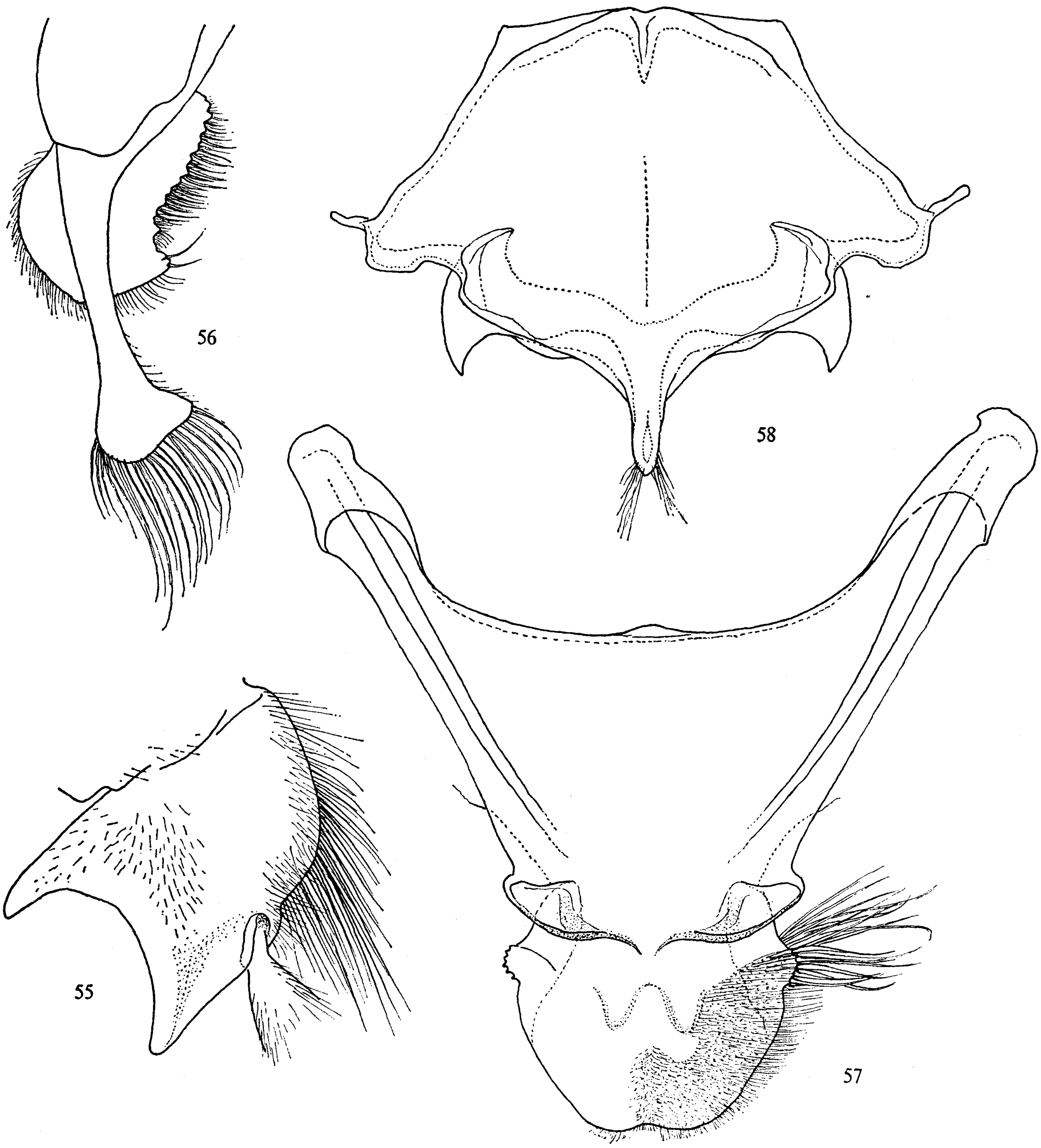

Fig. 55—58. *Habropoda tadzhica* Popov, paratype male, Tadzhikistan; fig. 55, left basitarsus of hind leg, exterior view; fig. 56, apex of gonoforceps, showing gonostyli; fig. 57 and 58, seventh (57) and eighth (58) sternal plates, exterior view

but the abdominal pubescence covers most of the exposed tergal surface and the anterior limit of the dense apical banding is effaced by the presence of much shorter and scantier pale hairs covering the basal portions of tergites 2—4. There is also a greater abundance of longish erect hair interspersed between the appressed pubescence and this has led POPOV to associate this species with *H. tarsata* rather than *ezonata* and immediate allies. His view is supported by the pygidial plate of *moesta* being more convex and more definitely pointed than in *ezonata.* It is, in fact, shaped similarly to that of *tadzhica* and *tarsata,* the last two being unquestionably intimately allied species.

Habropoda zonatula F. Smith, 1854

1854. SMITH, Cat. Hym. Brit. Mus. 2 : 319, pl. 7 fig. 7 (♂ leg). — ♀ ♂ Albania (*H. zonatula* sp. n.).
1869. DOURS, Mon. Icon. Anthophora : 30—31, pl. 2 fig. 1—2 (♀ ♂ colour plate). — ♀ ♂ Greece.
1874. MORAWITZ, Horae Soc. ent. Ross. 10 : 133—134 (addit. descr.). — ♂ Bacu, Daghestan.
1876. MORAWITZ, Ibid. 12 : 5 (Azchur, Caucasus).
1890. DE SAUSSURE, in GRANDIDIER, Hist. Madagascar 20 : 12 (key).
1897. FRIESE, Bienen Europa's 3 : 24—25 (key), 53—55 (descr., distrib., ethol.) (*Podalirius zonatulus*).
1923. FRIESE, Die europ. Bienen : 215, 217, 226 (flower records, distrib. etc.).
1930. SCHMIEDEKNECHT, Hym. Nord- u. Mitteleuropas : 780, 784 (key ♀ ♂) (subgenus).
1948. POPOV, Doklady Akad. Nauk URSS, new ser. 59 : 1675 (distrib.).
1954. IUGA, Bull. stiint. Acad. Rep. Pop. Rom. 6 : 792.
1957. MOCZAR, Fauna Hung. 19. Apidae : 22 (records in Hungary) (*Anthophora*).
1958. IUGA, Subfam. Anthophorinae, in Faun. Rep. Pop. Rom. Ins. 9 : 97 (key), 99—100, fig. 41—42 (♂ struct.). — ♂ ♀ Romania.
1958. MOCZAR, Rovart. Koslem (Fol. Ent. Hung.) 11 : 404 (records in Hungary & flower records) (*Anthophora*).
1964. COMBA, Mem. Soc. Ent. Ital. 43—44. — ♀ Lazio, Italy.

Superficially, the female of this conspicuous banded bee is more like *Anthophora* or some large-sized *Amegilla* than any of its congeners. From the former it can be distinguished, apart from the neural characters, by the narrow malar space and the widely distant lateral ocelli; from *Amegilla* it differs by the presence of pulvilli between the tarsal claws and other characters. The face-marks and morphological details of a male from Greece are here shown in fig. 59—64.

Distribution. — Like *H. tarsata* a spring species, first described from Albania. Widely spread and, though apparently very local, showing a distribution that broadly overlaps the range of *tarsata.* The localities known to the writer are as follows. France: Hyères (Var). — Italy: environs of Rome (Lazio); Brindisi (Apulia); Sicily: Mt. Etna (Mte. Rossi, 800 m) and Taormina (Mte. Ziretto, 200 m). — Malta. — Hungary: various localities, a.o. Cinkota and environs of Budapest. — Romania: "Tultscha" (? Tulcea); Techirghiol, and in Craiova. — Jugoslavia: environs of Prilep (Macedonia). — Albania. — Greece: Thessaloniki (Saloniki, Macedonia); Olympia and Messene (Peloponnesus); Ionian Islands. — Asia Minor (Turkey): Marmaris and Ula (Mugla Prov.); Cubuk (Ankara Prov.); Bozdogan (Aydin Prov.);

Amanus Mts. (Gavur Daglari). — Azerbeidshan (Caucasus): Bacu. — Transcaucasus: various localities. — According to Mr. E. STANEK (in litt.), the species has recently been discovered also in Czechoslovakia.

Remarks. — There is an old record by FRIESE (1897 : 55) who found the bees in Hungary, nesting in loamy soil on the roadside between Rákos-Kereshtur and Czinkota (east of Budapest). The same author mentions *Melecta funeraria* (= *Eupavlovskia funeraria* (F. Smith) as its parasite. Flower records for the female in Hungary are *Salvia* and *Vicia* (FRIESE, 1897 and MOCZAR, 1958); IUGA (1958) observed that in Romania males frequent the flowers of *Robinia pseudacacia.*

Habropoda oraniensis (Lepeletier, 1841) comb. nov.

1841. LEPELETIER, Hist. Nat. Ins. Hym. 2 : 39—40. — ♀ ♂ Oran (*Anthophora oraniensis* sp. n.).
?1849. LUCAS, Explor. Sci. Algérie, Zool. 3 : 143—144, Hym. pl. 1 fig. 1, 1a—f (♂ ♀ ins.col. & struct.) — ♀ ♂ Oran (*Anthophora*).

Material. — Type series, consisting of 2 ♀ and 3 ♂. Lectotype ♀ (by present designation), labelled "Oran" on blue disk, under drawer label "Anthophora Oraniensis ♀" (LEPELETIER's writing in red); lectoallotype ♂ (by present designation), dissected, bearing same labels as lectotype ♀; 1 ♂ 1 ♀, unlabelled. All in the Paris Museum. ♂ (incomplete), under drawer label "Anthophora oraniensis LePell. Oran/coll. Serville, M. de St. Fargeau", in Mus. Torino.

The above specimens quite unsuspectedly turn out to be true *Habropoda,* constituting a species that has always been looked upon as a member of *Anthophora.* It has been no easy matter to find out whether LEPELETIER's bee has anything to do with the *Anthophora oraniensis* of DOURS (1869), LUCAS (1849), FRIESE (1897) or PRIESNER (1957 : 79—80). FRIESE placed it in a separate group of his "Subgenus *Amegilla* Friese", together with *A. caroli* Pérez (which is an *Anthophora*) and *fulvodimidiatus* (Dours) (which is a *Heliophila*); what he thought to be a female of *oraniensis* in all probability is some species of *Amegilla.* The other authors referred to it as *Anthophora* but in no case did they supply enough details to enable its recognition. Even the beautifully executed colour pictures and line drawings in LUCAS's work give no clue to reveal its identity, so that it still remains possible that here also some similarly-looking species of *Anthophora* was mistaken for it.

H. oraniensis resembles *H. zonatula* Smith very closely in most respects. The following additional descriptions may be supplied of the two sexes, one each (out of only five) being still in perfect condition.

Female (lectotype, Oran). — Stature and pubescent pattern as in *H. zonatula.* Vestiture of head silvery white, very dense and decumbent on labrum, gradually acquiring a yellowish white tint on vertex and becoming fox red on temples, occipital region, thorax and first gastral segment; this bright colour changes to brown on the lower portions of the thoracic pleurae. Legs for the greater part black haired; tibiae I and II outwardly with a streak of depressed silvery white tomentum, the black covering inner faces of femora I and II interspersed with pale hairs; outer faces of basitarsi II whitish. Tibia III black, but outwardly with

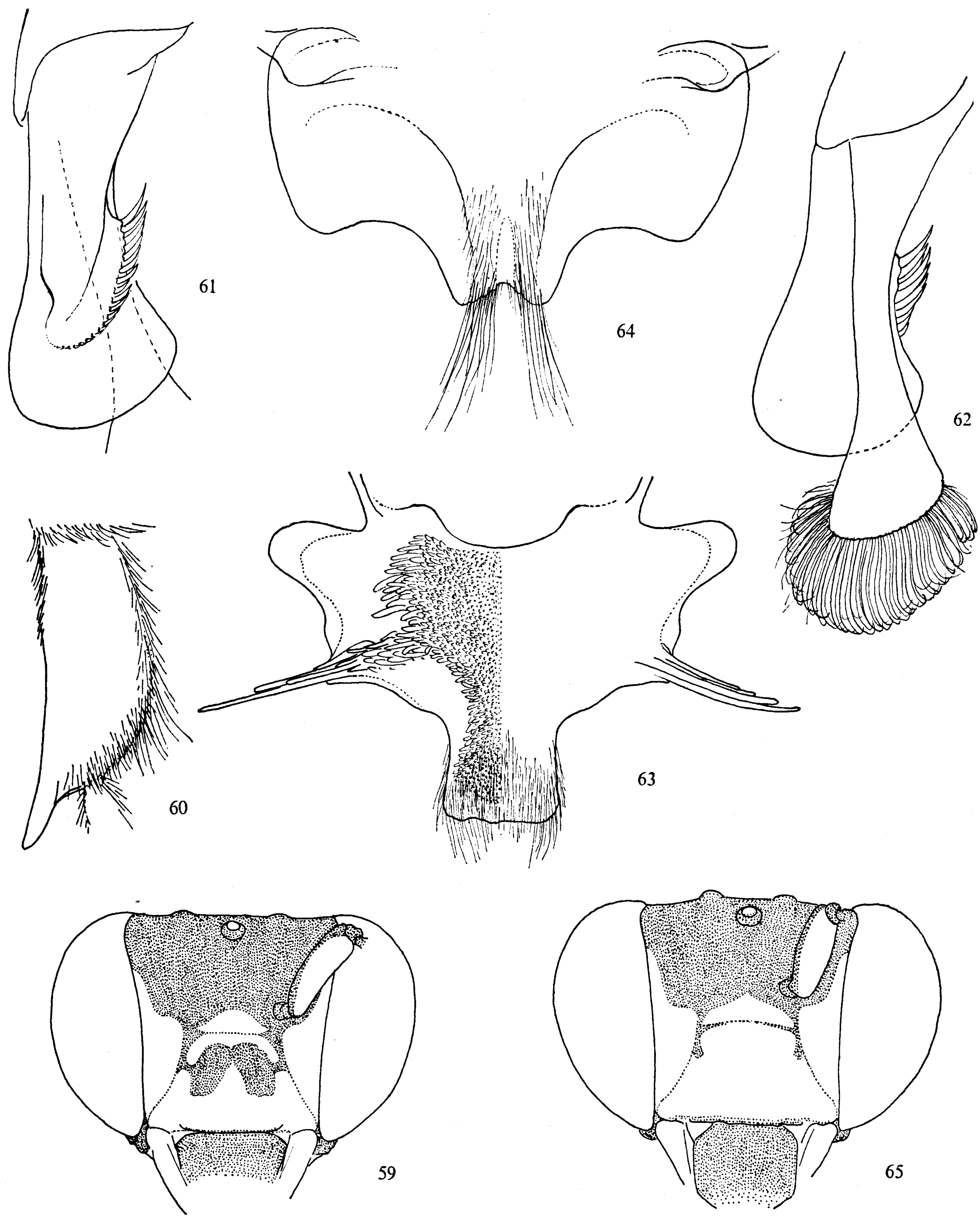

Fig. 59—64. *Habropoda zonatula* F. Smith, male, Peloponnesus; fig. 59, frontal view of head, showing face-marks; fig. 60, left basitarsus of hind leg, exterior view; fig. 61—62, apex of right (61, ventral view) and left (62, dorsal view) gonoforceps, showing gonostyli; fig. 63—64, apical portions of seventh (63) and eighth (64) sternites, exterior view. Fig. 65. *Habropoda oraniensis* (Lep.), lectoallotype male, Oran (Algeria), frontal view of head, showing face-marks

a broad, wedge-shaped area of silvery pubescence; outer face of basitarsus III black, inner face chestnut to dark ferruginous. Wings exactly as in *H. zonatula.* Pubescence of first gastral segment dense, erect, fox red; integument of tergites 2—4 shiny, pubescence short and scanty, deep black, each segment bordered apically with a narrow, sharply defined band of snow white hair leaving off abruptly at the sides; tergite 5 densely clothed with black hair entirely concealing

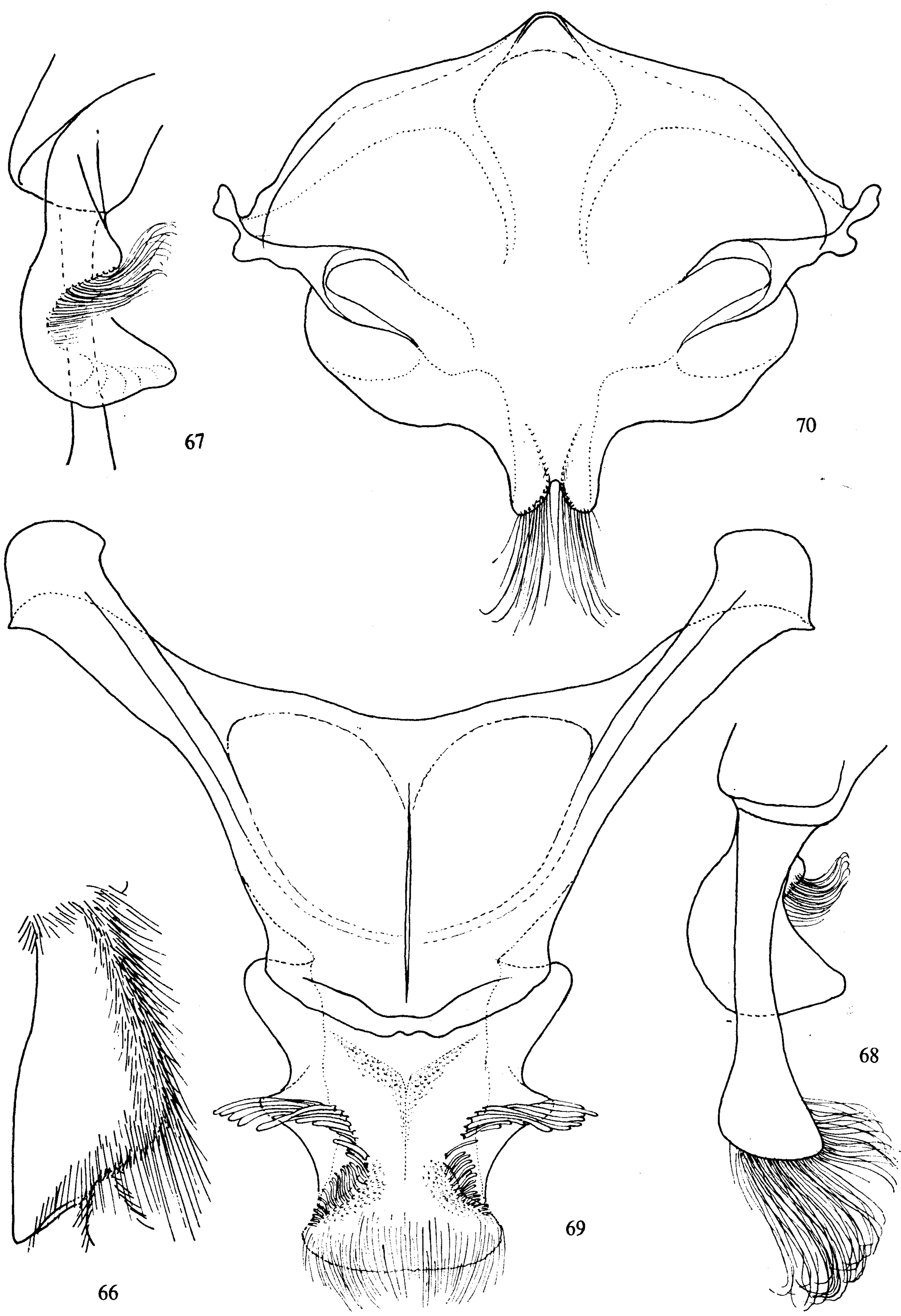

Fig. 66—70. *Habropoda oraniensis* (Lep.), lectoallotype, Oran (Algeria); fig. 66, left basitarsus of hind leg, exterior view; fig. 67—68, apex of right (67, ventral view) and left (68, dorsal view) gonoforceps, showing gonostyli; fig. 69—70, seventh (69) and eighth (70) sternites, exterior view

surface; pygidial segment black. Ventral surface of gaster mainly dark in the centre, densely fringed with whitish laterally; apical pubescent band of tergite 4 broadly continuous underneath so as to cover also the sternal surface, the next segments also clothed with long white hair.

Male (lectoallotype). — General aspect, size and texture almost as in *H. zonatula*; differs from it in the reduced face marks, more brightly coloured pubescence and in structural details of legs and terminalia.

Antennal segments 4—13 missing. Legs generally slightly more robust, procoxal process very similar but more evenly and less strongly downcurved; shape of basitarsus I similar to *zonatula,* but basitarsus III relatively shorter and more expanded distally, the apical process thicker and bluntly triangular, not lanceolate as in *zonatula* (cf. fig. 60 and 66). Clypeus yellow, with indication only of dark basal markings (cf. fig. 59 and 65). Pubescent pattern much as described for the female, brighter than in *zonatula*; decumbent and white on labrum, changing to yellowish white on clypeus and brightening to orange on vertex; vivid thoracic pubescence becoming lighter, almost white, laterally. Legs clothed with silvery white tomentum. Transverse apical bands of gastral tergites 2—5 distinct, but on 6 only the sides are white-haired; ventral surface of 3—5 clothed with white hair laterally.

The contour and sclerotization of the 6th gastral tergite and exposed sternal plates are very nearly identical in the two species compared, but contrasting characters are found in the shape of the apical portions of the seventh and eighth sternites, the surface and borders of which are more or less profusely adorned with papillae, thick sensory(?) setae and fine pubescence, variable in size, arrangement and density, as shown (cf. fig. 63—64 and 69—70). When comparing the genital armature of *oraniensis* with that of *zonatula,* it will be observed that slight but well-marked differences also exist in the shape and vestiture of the gonocoxite, whose two branches (gonostyli) are shown in outer and inner aspect (cf. fig. 61—62 and 67—68).

LEPELETIER's cotypes (♂ and ♀ in Mus. Paris and ♂ in Mus. Torino) are badly damaged and partly eaten away by insect pests, but all specimens are undoubtedly conspecific.

Distribution. — Algeria.

Habropoda balassogloi Radoszkowski, 1877

1877. RADOSZKOWSKI, Hor. Soc. ent. Ross. 12 : 334—335. — ♂ Etschmiadzin (Caucasus).
1948. POPOV, Doklady Akad. Nauk URSS, new ser. 59 : 1673—1675 (remarks, distrib.).

Material. — Transcaspia: 1 ♀, Kasakhstan, labelled "Nikolajewka/ zonatula Smith ♀/Habropoda balassogloi Rad. ♀, V. POPOV det.", in Mus. Leningrad.

The female of this bee is so much like *H. zonatula* in general appearance and vestiture that it can be easily mistaken for it. The description of the leg structure of the male [1]) also corresponds with *zonatula* but, since it belongs to a group of closely similar species even in respect of the male terminalia, I have no hesitation in following POPOV and considering it a distinct species. Males are not available for comparison but in the female of *balassogloi* the pubescent abdominal bands are distinctly broader than in *zonatula* and the marginal hair fringes at the apical sternites are longer, denser and white instead of yellow, the long pubescence at the temples, thoracic sides and on the scopa being also silvery. Apical hair band of gastral tergite 5 palest silvery yellow sparsely intermixed with light brown and hair on both sides of pygidial plate light brown (all bright ferruginous in *zonatula*). Pubescence on inner faces of middle and hind basitarsi and penicillus dark brown, not bright golden yellow as in *zonatula*. The best character I have found in the antennae, which in *balassogloi* are distinctly longer than in *zonatula*; the first flagellar in *balassogloi* is about 3.5 times as long as its apical width, in *zonatula* less than 3 times, the length of the first four flagellar segments in *balassogloi* being in the ratio 28.5 : 10 : 10 : 10, in *zonatula* 25 : 10 : 10 : 10. In both species the pygidial plate is flat, finely transversely striate, the sides only slightly converging towards the rounded and almost truncated apex.

Distribution. — Caucasus and Transcaspia.

Habropoda pekinensis Cockerell, 1911

1911. COCKERELL, Proc. U.S. Nat. Mus. 39 : 642—643. — ♂ ♀ Pekin, China.
1936. GUSSAKOWSKIJ, Trav. Inst. Zool. Acad. Sci. URSS, Moscou 2 (4): 735—736, fig. 1—2 (leg structures). — ♂ Prov. Ala-Shan, W. China (*H. alashanica* sp. n.).
1948. POPOV, Doklady Akad. Nauk URSS, new ser. 59 : 1674 and 1675, footnote (synonymy).

Although I have not seen specimens, it is evident from the description that this bee is a true *Habropoda*, most closely related to *H. zonatula* Smith, with which the species was compared by COCKERELL himself. The male is described as having the characteristic long backwardly directed spine at the anterior coxa and the greatly flattened lamina at the hind basitarsus, thus agreeing with the European species. I have adopted the synonymy as given by POPOV; yet it seems necessary to compare GUSSAKOWSKIJ's figures of the leg structure of *H. alashanica* with the type of *pekinensis* in the U.S. National Museum, Washington.

Distribution. — West and East China.

Asiatic species described in *Habropoda*, or doubtfully referred to *Emphoropsis* but requiring further investigation, are the following (arranged in chronological order):

H. radoszkowskii Dalla Torre, 1896 (Cat. Hym. 10 : 285, nom. nov. for *Habropoda montana* Radoszkowski, 1882 (Wiadom. nauk przyrodz. Warszowa 2 : 77, ♀ ♂ Himalaya, nec *Anthophora montana* Cresson, 1869).

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[1]) Of the legs RADOSZKOWSKI says: "à la base de chaque trochanter des pattes antérieures on voit une forte apophyse pyriforme d'un jaune pâle, avec l'extrémité émoussée; les jambes de cette paire sont renflées au milieu; les cuisses des pattes postérieures très renflées, creusées un peu en gouttière, les jambes assez renflées et le premier article des tarses dilaté, applati et extérieurement bordé de pils gris." (loc. cit.: 335).

I have not been able to locate the type of *H. montana* but FRIESE (1897 : 305—306) refers to the latter by quoting the latin diagnosis ("♀ sarothrum rufo, metatarso posteriori nigro-villosis; ♂ tibiis anterioribus fortiter albido-ciliatis, metatarso posteriori dente auriculato terminato."). A female in the British Museum from Sikkim, Darjeeling, 7000 ft., 4.94, identified by BINGHAM himself, conforms exactly with his description and figure (1897), as do two unnamed females from Kumaon, United Prov., W. Almora Div., Nov. 1919, H.G.C., in the same museum. However, the leg structure of a conspecific male (Shillong 10.03, TURNER coll. 1912-111) differs from that described by BINGHAM, who writes: "posterior femora very slightly swollen, each posterior tibia produced at its inferior apex into a compressed, thin, rounded plate." As it is not the unmodified tibia but the posterior basitarsus which is produced apically (thus conforming with RADOSZKOWSKI's statement), the sexes were probably wrongly associated by BINGHAM. Also in the British Museum collection is a good series (both sexes) of a closely similar species recently collected in the Taplejung District (East Nepal Exped. 1961—62). Though undoubtedly closely related, these Shillong and Nepalese bees differ from each other both in structure and body colour, despite the fact that all agree in having the posterior tibia unmodified and the basitarsus widened and provided interiorly with a smooth ridge ending in a blunt tooth. An examination of the hidden sternites reveals that all of them are unquestionable *Habropoda.* These plates, though less heavily sclerotized than in the more typical members of the genus, are of the same characteristic form, markedly constricted and transversely ridged about half-way their length and provided apically with the same minute papillae. The same applies to at least three more species from various high altitude localities in the Himalayas and Assam (Shillong), of which specimens are available for further study in the British Museum collection.

H. krishna Bingham, 1908 (Rec. Ind. Mus. 2 : 366—367, ♂ Sikkim, Darjeeling, 7000 ft.).

Status uncertain. The author says that it comes nearest to *H. radoszkowskii,* as determined by him. Whole body densely covered with long brownish yellow pubescence. Mandibles and clypeus white, only the sutures of the latter black. Orbits parallel. Ocelli in equilateral triangle, but description of their position obscure. Legs normal.

H. turneri Cockerell, 1909 (Entomologist 42 : 308, ♀ Shillong Assam).

Male unknown. A mounted female in perfect condition (British Museum coll.), now before me, bears TURNER's written label "Shillong 9.03" and a second printed one with "Assam R. E. Turner 1910—225". This is obviously a topotype, agreeing with the original description in every respect. A densely pubescent bee with a strongly contrasting *Bombus*-like colour pattern of black, canary yellow and orange-red. Contrary to COCKERELL's statement on the type, the present example is compactly built and of normal proportions. The face and mouthparts as well as the placement of the ocelli are as in *Habropoda*; the slender sickle-shaped mandibles bear a single subapical interior tooth and the tongue is of moderate length. Unusual features are (1) the greater length of the marginal cell of the fore wing and (2) the minute size of the pulvilli between the tarsal claws, characters which it shares alike with *H. mimetica* Ckll., from China, which appears to be closely allied.

H. tainanicola Strand, 1913 (Supplem. Entom. Berlin 2 : 51—52, ♀ Formosa).

Male unknown. Position of first recurrent vein of fore wing slightly variable: usually received slightly before end of second submarginal, more rarely interstitial with its distal side. Body pubescence of head, thorax and gastral segments 1 to 3—4 black, for the rest orange. Clypeus prominent, black. According to STRAND the species resembles *H. radoszkowskii* D.T. (sensu BINGHAM!)

H. rowlandi Meade-Waldo, 1914 (Ann. Mag. Nat. Hist. (8) 13 : 50—51, ♀ ♂ Shillong Assam).

Appears to be allied with *H. turneri* Ckll., the male of which is unknown. The male of *rowlandi* has the clypeus totally pale yellow without any indication of a keel; the antennae are wholly black, the scape not yellow, as is so prevalent in males of this genus. In the female the face is all black, the legs ferruginous and the pubescence golden brown. I noted that the type (no. 637), in the British Museum, is not a true *Habropoda,* but the terminalia of the male have not yet been examined.

H. hookeri Cockerell, 1920 (Ann. Mag. Nat. Hist. (9) 6 : 202—203, ♀ Simla, 7000 ft. and ♀ Mussoorie, 7000 ft.).

Male unknown. According to COCKERELL nearly agrees with *H. radoszkowskii* D.T. (= *montana* Rad.), as described by BINGHAM. It is held distinct from that species on account of the unmodified and not specially broadened hind tibia. These are, however, characters of the male, not of the female, and since COCKERELL had no male of *hookeri,* this distinguishing character does not hold good.

H. mimetica Cockerell, 1927 (Amer. Mus. Novit. 274 : 15, ♀ Yen Ping, China).

According to COCKERELL, this species is allied to *H. turneri* Ckll. The male has not so far been described but will, it is hoped, be made known soon. I have examined a series of both sexes from Fukien (SE China) and, as these do not fit the diagnosis of either *Habropoda* and *Elaphropoda,* a new genus (or subgenus) will be necessary to accommodate the species.

H. sutepensis Cockerell, 1929 (Ann. Mag. Nat. Hist. (10) 4 : 132—133, ♂ Siam).

A small, densely pubescent species with normally shaped legs and a non-protuberant yellow clypeus. I have examined the types of either sex in the British Museum collection (♂, no. 652), the female having also been described by COCKERELL. The species approaches *Elaphropoda* in several characters but probably requires a new generic (or subgeneric) name to hold it.

H. nubilipennis Cockerell, 1930 (Ann. Mag. Nat. Hist. (10) 6 : 52, ♀ Foochow, China).

I agree with COCKERELL that the type, which I examined in the British Museum collection (no. 645), is not the female of *H. percarinata*, the latter being now transferred to *Elaphropoda*. The two species are not even congeneric but the exact status of *nubilipennis* (male unknown) remains to be established. The head of *H. nubilipennis* is shaped differently, the clypeus being shorter, considerably less swollen than in *Elaphropoda*, while the brown face marks are more sharply defined and shaped otherwise, as compared with members of that genus. It approaches a Chinese species-group of which *H. mimetica* is one of the participants but, pending the discovery of the male, this is all that can be said.

H. sinensis Alfken, 1937 (Ent. & Phytopath. 5 : 404—405, ♀ ♂ Chekiang, China).

It is absolutely impossible from the description alone to obtain an impression of this bee, nearly all characters mentioned being insignificant.

Emphoropsis Ashmead, 1899

1879. PATTON, Bull. U.S. Geol. Survey 5 : 477—478 (partim, sub *Habropoda*).
1899. ASHMEAD, Trans. Amer. Ent. Soc. 26 : 60 (key, gen. nov.).
1901. COCKERELL & COCKERELL, Ann. Mag. Nat. Hist. (7) 7 : 48 (type-species *Anthophora floridana* F. Smith, 1854 = *Bombus laboriosus* F., 1804).
1905. COCKERELL, Bull. South. Calif. Acad. Sci. 4 : 99—100 (revision).
1909. COCKERELL, Proc. U.S. Nat. Mus. 36 : 414 (*Emphoropsis murihirta murina* Ckll. 1909, first taxon included in *Meliturgopsis* Ashmead, 1899 : 62 = *Emphoropsis* Ashmead, 1899 : 60, teste COCKERELL).
1943. SANDHOUSE, Proc. U.S. Nat. Mus. 92 : 547, 572.
1944. MICHENER, Bull. Amer. Mus. Nat. Hist. 82 : 285—286 (incl. key).
1951. MICHENER, in MUESEBECK et al., Agric. Mon. U.S. Dept. Agric. Wash. 2 : 1239—1240 (catalog).
1962. MITCHELL, Tech. Bul. N. Carol. Agric. Exp. St. 152 : 234 (key), 331—332 (diagn., references, etc.), fig. 67 (wings).

This New World genus is included here for comparison with related taxa in the Anthophorini. For descriptions of the type-species, *E. laboriosa* (F.) (= *floridana* Sm.) and other members of the genus, the reader may be referred to the existing literature, the fullest characterization having been published recently by MITCHELL (1962). In the same year, TIMBERLAKE (Ent. News 73 : 36—38) described *E. excellens* Timb., an aberrant species from California, the male of which differs remarkably from other members by the structure of its antennae and legs.

Of the described species I have been able to examine both sexes of *E. depressa* (Fowler), *dammersi* Timb., *interspersa* Ckll. and *miserabilis* (Cress.); also the males of *E. laboriosa* (F.) and *pallida* Timb.; and a female of *E. rugosissima* Ckll. In general appearance all these species are closely similar to members of *Anthophora* with which they occur together in parts of their range. The generic characters of the venation are those enumerated and illustrated by PATTON (1879) and MITCHELL (1962). In all species examined the first recurrent vein in the fore wing is received just before the second intercubitus and the transverse median is placed slightly postfurcal (fig. 21); in several *laboriosa* and a male of *E. miserabilis* these veins are interstitial or coincide in one point, as is also the case in the Chinese "*Habropoda*" and all *Elaphropoda* (fig. 23). It will be seen that the latter differs from *Emphoropsis* in the much longer marginal cell and numerous structural characters. MICHENER (1944) has suggested that some of the bees described in *Habropoda* from East Asia (e.g. China) are in reality *Emphoropsis*. This may be true, as the resemblance is quite striking. In the Chinese species group the venation is scarcely more like true *Habropoda* than *Emphoropsis*, but since not one of the East Asiatic forms has yet been studied in sufficient detail, a decisive answer to this question can not yet be given.

Emphoropsis laboriosa (Fabricius, 1804)

1804. FABRICIUS, Syst. Piez.: 352, no. 51. — ♀ Hab. in Carolina (*Bombus laboriosus* nov.).
1854. SMITH, Cat. Hym. Brit. Mus. 2 : 339—340. — ♀ ♂ East Florida (*Anthophora Floridana* sp. n.).
1962. MITCHELL, Tech. Bul. N. Carol. Agric. Exp. St. 152 : 332—333 (descr., distrib., ethol.), fig. 94 (head ♀ ♂), 95 (♂ terminalia).

Material. — F l o r i d a : ♂ (dissected), Florida, Dunedin, 30.I.1932, A. L. MELANDER, identified by P. A. TIMBERLAKE.

Good figures of the head (male and female), wings and male terminalia are to be found in MITCHELL's work (loc. cit.). These conform to the illustrations here given, except that the head of the male in fig. 2 was drawn from a slightly different angle of view. Other figures are those of the tarsal claw (fig. 9), mouthparts (fig. 11—13), wings (fig. 21), seventh tergite (fig. 27—28), transverse section of gaster (fig. 29), sixth sternite (fig. 37—38), seventh and eighth sternal plates (fig. 45—46), and genital capsule (fig. 52).

Elaphropoda gen. nov.

1897. BINGHAM, Fauna Brit. India, Hym. 1 : 414, 521—523 (partim), not fig. 177, but with pl. IV fig. 6 (*Habropoda magrettii* Bingh. ♂).
1944. LIEFTINCK, Treubia, hors sér.: 77—93, fig. 23—31, pl. 42 fig. 5—8 (phot. ♂ ♀ *Habropoda impatiens* sp. n.).
1965. MICHENER, Bull. Amer. Mus. Nat. Hist. 130 : 14, 17—18 and 20 (*Habropoda*).

Medium-sized Anthophorini with elongate body and sparsely pubescent abdomen. Integument dark brown or black, the face, legs and parts of abdomen often predominantly light coloured (ochraceous-orange). Pubescence throughout short and scanty, except on thorax, where it is long and dense; plumose hairs behind orbits, on thorax, and partly also on legs and gastral sternites. Disk of labrum and clypeus sparsely covered with long, erect, bristle-like hairs. Abdomen comparatively long and narrow, that of male even more slender with pointed apex, the intermediate and terminal segments cylindrical in cross-section (fig. 35). Integument well exposed under the short tomentum, tergites not distinctly banded but posterior margins usually with narrow fringe of dense appressed pubescence; hair fringes of sternites longer, erect and plumose.

Head. Labial palpus 4-segmented, longer than galea, first segment very long and attenuated, about three times as long as second, the two apical segments small (fig. 19, 87); galea of proboscis extending back to or slightly beyond base of hind coxa in repose and when extended much longer than abdomen; glossa very long, with appressed pubescence, distal one-third with longer erect hairs. Maxillary palpus subequal in length to stipes, very slender, 6-segmented, second segment longest, separate segments in the ratio of 6 : 23 : 16 : 11 : 7 : 5, about the same in either sex of all species (fig. 18). Structure of head, fig. 4 and 81. Face narrow, inner orbits subparallel, curvature slightly inwardly convex, shortest distance between eyes about midway their length in full frontal view. Ocellorbital distance about twice broader than interocellar distance, but only one-half of the clypeocellar distance. Clypeus longer than its distance from anterior ocellus (clypeocellar distance) and much longer than its width at base (about 5 : 3); strongly protuberant, usually with distinct median longitudinal keel, its greatest depth in side view about equal to diameter of eye. Frontal carina poorly developed, reduced to a short elongate, antero-median tubercle situated at level of antennal sockets. Ocelli placed in a triangle, closely approximated, the anterior one largest, its distance from either posterior ocellus about one-third of the interocellar distance. Malar space distinct, though short, one-seventh to almost one-tenth of its width. Labrum subcordate, only little wider than long, its anterior border entire, but apex distinctly produced. Mandibles with two well-developed interior subapical teeth, the proximal tooth shortest (fig. 82). Antenna slender, of normal length, flagellar segments longer than wide (10 : 8); first joint of flagellum much widened towards apex; ratios of length and breadth as 12 : 9 (♂) and 17 : 9 (♀); length ratios of first four flagellar segments as 12 : 6 : 10 : 10 (♂) and 17 : 6 : 10 : 10 (♂).

Wings as for tribe, with short narrow stigma. Marginal cell of fore wing much longer than distance from its rounded apex to wing tip, free part of marginal cell only little shorter than rest of cell; first submarginal cell shorter than second and third together but longer than third, the second much the shortest though rather high and squarish, with its costal side little shorter than the anal; costal side of third submarginal likewise shorter than anal side; first recurrent vein invariably interstitial with second intercubital vein; fork of basal vein coincident with transverse median, which is hardly curved. Hind wing with transverse median vein moderately oblique and outwardly convex, about half as long as its distance from the fork *M-Cu*, the second abscissa obsolete beyond half-way length of *M*; jugal lobe small, lanceolate (fig. 23).

Legs slender, coxae not modified, unarmed; trochanter of hind leg of male enlarged, angular and produced backward, its posterior (caudal) surface flattened, that of female simple and rounded. Hind femur of male conspicuously inflated, its inner surface flat and bounded by two longitudinal keels, the innermost acute, the outer blunt; hind tibia laterally compressed, the inner surface smooth, shiny, slightly hollowed out and bounded by longitudinal sharp keels, in side view the tibia is strongly widened towards apex, ending in a triquetrous lamella. Claws similar in both sexes, deeply cleft, inner ramus shorter and more robust than outer; orbicula and pulvillus (arolia) well developed (fig. 17).

Scopal hairs of female not plumose, rather short and sparse, not at all concealing surface. Basitibial plate of female distinct, subtriangular, apex narrowly rounded, that of male similar and of equal size but poorly defined and this only at extreme apex, which is subacute.

Abdomen slender, more cylindrical than in allied genera, often with integumental maculations; pubescence short and sparse, segments not or only narrowly banded. Seventh gastral tergite of male strongly tapered, sixth sternite usually more distinctly so, apex subacute. Seventh and eighth sternites unmodified, thin and delicate, disk of the former broader than long, finely pubescent with abruptly pointed apex, the latter subrectangular, apex emarginate. Gonostylus at apex of gonocoxite distinct and bipartite, consisting of a long, thin, plate-shaped exterior process, situated dorsad, and a slightly shorter, cylindrical or rod-like interior process, placed more ventrad; penis valves (sagittae) robust and thick, strongly incurved, the broad apices emarginate and/or toothed; membranous midlobe of penis short, transverse. Pygidial plate of female subtriangular, slightly longer than its width at base, apex very broadly rounded.

Type-species: *Habropoda impatiens* Lieftinck, 1944.

Though previous discoveries in Malaya, Borneo and China include bees closely comparable with *E. impatiens,* I have selected this form as the type-species as it is the only one of which both sexes were fully described and illustrated.

The species placed in this new genus recall *Apis* in stature and general appearance, especially the female. They can be easily distinguished from *Anthophora, Habropoda* and *Emphoropsis* by the tridentate mandibles, closely approximated ocelli, sparsely pubescent legs and abdomen, and the great length of the marginal cell of the fore wing. Additional features both sexes have in common are: extremely attenuated mouth-parts, strongly elevated narrow face and conspicuously light-coloured legs. Males have modified hind legs and a pointed abdomen, the tapered form of the last visible segments being noteworthy. The apical sternal plates and genitalia are altogether different in shape from those of the allied genera, the former being flat, delicately pubescent structures (fig. 33—34, 41—42, 47—48, 76—80, 84—86, and 88—92). The characters of the legs, venation and genitalia at once exclude relationship with certain species of the *Amegilla florea* (F. Smith) assemblage, which they resemble at a casual glance. Some of the latter are equally striking for their strongly protuberant facial parts, enormously lengthened glossa and short pubescence; they are, however, at once separated by the absence of pulvilli (arolia) between the tarsal claws.

It is of interest also to compare *Elaphropoda* with *Deltoptila* LaBerge & Michener (1963), recently proposed for a group of Anthophorini occurring in Middle America. The authors found it to resemble *Habropoda* more nearly than it does *Emphoropsis,* especially in regard to the slender form of the legs, the short and sparse scopal hairs and, especially, the equilateral ocellar triangle. *Deltoptila* includes several species doubtfully placed in *Habropoda* by early American writers and it will be clear that the authors of the new taxon were entirely justified to remove it therefrom and place it in a genus of its own. It should be borne in mind that *Deltoptila* was compared with *Habropoda* at a time when *Elaphropoda* had not yet been separated from it as a distinct genus. It is exactly with the last-mentioned group that *Deltoptila* was primarily compared, sharing with it the long proboscis, unusually protuberant face and the features already mentioned. This resemblance is rather surprising but on the other hand there are well marked differences between the two. Chief amongst these are: the longer malar space of *Deltoptila,* the single inner tooth at its mandibles, the much shorter 2nd and 3rd segments of maxillary palpi, the shorter submarginal cell of the fore wing, and the different male genitalia and apical sternal plates.

Significant specific characters appear to be slight and few in number. Nearly all species have been described from single individuals of either sex, thus making it quite impossible to form an opinion about the consistency of any given character. For instance in *E. impatiens,* the only species of which good series of both sexes are available, the extent of "red" colour on the gastral segments was found to vary considerably between individuals and thus proved of no help in the separation of species. In regard to body sculpturing and degree of hairiness all known species seem to be practically alike, even the male sexual organs hardly showing distinctive differences. Under the circumstances all that could be done was to profusely illustrate the few characters most likely to be constant, i.e. the shape of the hind tibia and the penis valves of the male genital apparatus. For details not mentioned under the species discussed hereafter, see the comprehensive specific descriptions of *E. impatiens* (Lieft.) in the writer's previous paper (1944).

Distribution. — Sumatra (terr. typ.); from the Himalayas to southeast China, and through Burma and Malaya to Java and Borneo.

Remarks. — Restricted to the humid rain forests of the lower mountain zone (1450—1700 m alt.). Owing to this peculiar habitat and the extremely swift flight of *Elaphropoda,* these bees are easily overlooked and very rare in collections. The two species known from Sumatra and Java were both caught on flowers of *Impatiens* (Balsaminaceae). The same species in Malaya, Sumatra and Java are presumably parasitized by their nearest melectine relatives of the genus *Callomelecta* Ckll. discussed also in my 1944 article.

Elaphropoda magrettii (Bingham, 1897) comb. nov.

1897. BINGHAM, Fauna Brit. India, Hym. 1 : 522 (key), 523, pl. 4 fig. 6 (♂ insect). — ♂ Kumaon (*Habropoda magrettii,* n. sp.).
1909. BINGHAM, Rec. Ind. Mus. 2 : 366 (locality only). — Ferozepore, Punjab (*Habropoda*).
1920. COCKERELL, Ann. Mag. Nat. Hist. (9) 6 : 201—202. — ♂ Kumaon (*Habropoda fletcheri,* sp. n.) Syn. nov.

Material. — The types of these two Himalayan species were examined by me in the British Museum collection (*magrettii,* no. 638). Both are from Kumaon (northern United Provinces, W of Nepal), COCKERELL's specimen of *fletcheri* bearing a label "Kumaon, Ramgarh, 6000′, viii.1918, Fletcher".

A third male, now before me and in the British Museum under *H. magrettii* Bingh., is labelled "Shillong 9.03" (written) and "Assam R. Turner 1905—125" (printed). It agrees with my notes on the type but was received too late for dissection, figuring and incorporation in this paper. It is a rather small specimen with light-coloured legs, only the bases of all femora being diffusely brown. The inner outline of the hind tibia when viewed from below is distinctly undulated, thus differing from the figures here presented for related species. This male probably is correctly identified.

Clypeus not carinate down the middle, lacking the longitudinal keel so well pronounced in most other species. In the original description of *fletcheri* this bee is said to be less robust than *magrettii,* with black femora and dark apex of abdomen. The first statement I am unable to confirm, while the only point of distinction between the two relates to body colour, which, as I have shown for *impatiens,* in this group varies greatly between individuals when good series can be compared. The gastral tergites in all males of either *magrettii* and *fletcheri* are dull black with faint blue and purplish reflections, lacking "red" areas, only the hind margins of the segments being broadly testaceous, as they are also in the Chinese *E. percarinata* (Ckll.), which has, however, a sharply defined clypeal keel. In general appearance and venation these bees are quite similar to *E. moelleri* and other members here united, but the male sternites and genital organs of the types could not be investigated; further material of the present species from the same country is therefore needed to decide on the relationship of these closely similar bees. I have no doubt that *magrettii* and *fletcheri* are conspecific.

Distribution. — Northern India and ? Assam.

Elaphropoda khasiana (Schulz, 1906) comb. nov.

1904. CAMERON, Ann. Mag. Nat. Hist. (7) 13 : 211—212 (pars: ♀ only!). — ♀ Khasia Hills (*Habropoda fulvipes* sp. n.).
1906. SCHULZ, Spolia hymenopt.: 253 (*Anthophora khasianus* nom. nov. for *Habropoda fulvipes* Cam., not *Anthophora fulvipes* Eversm.).
1920. COCKERELL, Ann. Mag. Nat. Hist. (9) 6 : 202 (descr.). — ♂ Khasia Hills (*Habropoda fulvipes* Cam.).
1922. COCKERELL, Ibid. (9) 9 : 248 (note) (*Habropoda fulvipes* Cam.).
1927. COCKERELL, Ibid. (9) 20 : 530—531 (add. notes on ♂) (*H. fulvipes* Cam.).

Material. — Assam: ♀ (holo ~~lecto~~type), labelled "Khasia", ROTHNEY coll., in the University Museum, Oxford.

This bee is a true *Elaphropoda,* conforming in every respect to the diagnosis of that genus. COCKERELL (1922) already pointed out that CAMERON's male of *fulvipes* does not belong here but is a halictine (*Thrinchostoma* spec., possibly *sladeni* Ckll., 1913), CAMERON having been led astray by comparing his specimen with BINGHAM's picture of the male of *E. magrettii* (Bingham), a totally different bee; and by wrongly associating the sexes he naturally considered his female to represent a new species. In an earlier paper COCKERELL (1920) refers to a (topotypical!) male from the Khasia Hills he received from Mr. SLADEN, which he characterizes as follows: "... the face below the antennae is entirely rich chrome-yellow and the clypeus is carinated. The scape is yellow in front. The abdomen has the first two segments red". I have not seen this specimen, but since the last-mentioned brief description applies to any other species of the group except *magrettii* (which has no clypeal keel), its identity must remain doubtful. It may be conspecific with *E. moelleri* (Bingham), described from a male, but as long as no direct comparisons can be made of the structural features of these bees, nothing definite can be said.

Distribution. — Assam and ? Siam.

Although SCHULZ wrongly considered *Anthophora fulvipes* Eversmann, 1846, and *Habropoda fulvipes* Cameron, 1904, to be congeneric, we have to accept the substitute name *khasiana* Schulz for this species, *fulvipes* Cameron being a junior secondary homonym of *fulvipes* Eversmann.

Elaphropoda moelleri (Bingham, 1897) comb. nov.

1897. BINGHAM, Fauna Brit. India, Hym. 1 : 522 (key), 523. — ♂ Native Sikkim (*Habropoda moelleri*, n. sp.).

Material. — ♂ (holotype, no. 636), bearing BINGHAM's locality label, in the British Museum collection. It may well have been taken in the Darjeeling district (eastern Himalayas), east of Nepal. A second ♂ (Münich museum), now before me, is labelled "Sikkim/Waagen/46" and "Habropoda moelleri Bingh. det. E. Clément".

The present ♂ agrees well with the type and original description, except that only the first gastral segment is entirely "red", the disk of the succeeding segments of the abdomen being obscured, exactly as in *magrettii* and dark individuals, males as well as females, among our series of *E. impatiens* from Sumatra and the Malay

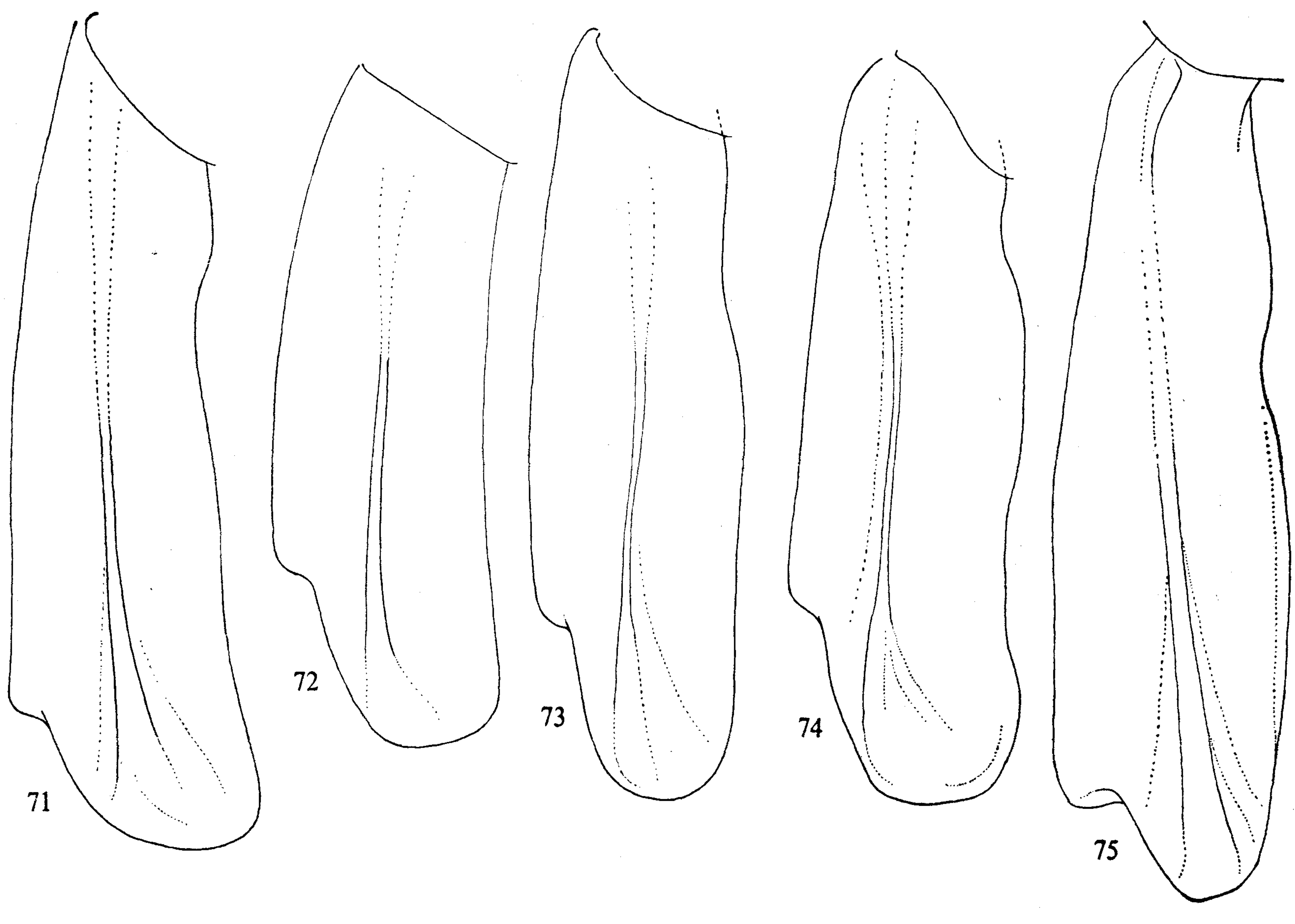

Fig. 71—75. *Elaphropoda* species, horizontal interior view of right hind tibia; fig. 71, *E. moelleri* (Bingham), Sikkim; fig. 72, *E.? impatiens* (Lieft.), Lower Burma; fig. 73, *E. impatiens* (Lieft.), Fraser's Hill, Malaya; fig. 74, *E. impatiens* (Lieft.), paratype, Mt. Tanggamus, S. Sumatra; fig. 75, *E. percarinata* (Ckll.), Tachulan, Fukien. All figures drawn to the same scale

Peninsula. Here again we meet with colour differences which are obviously of no use for specific discrimination.

Whole anterior surface of head, including labrum and most of the mandibles, honey yellow, except a pair of dark ferruginous hair-lines running from the transverse clypeal suture down along subantennal grooves to tentorial pits; yellow lateral face marks extending upward along eye-margin to upper margin of antennal sockets. Supraclypeal mark triangular, 2½ times broader than high, surface on top of this mark slightly raised, forming a low tubercle. Anterior face of antennal scape honey yellow, tawny behind; pedicel dark brown; flagellum ochraceous tawny, apical portion of first and basal part of second flagellar segments lighter. Hind leg (except coxa and trochanter) entirely pale, basitarsus not obscured.

Terminalia very similar to those of the allied species, as in fig. 76—77 (the 7th sternite was damaged and lost).

The following additional features, taken from the single male now before me, may or may not be of specific value as they would seem to apply to most, if not all, species examined.

Labrum widest about half-way its length, only little longer than wide (43 : 40). Length and basal width ratio of clypeus 50 : 32. Clypeocellar distance shorter than length of clypeus (40 : 55). Anterior length ratios of first four flagellar segments of antennae 13 : 5 : 10 : 10. Hind tibia about twice as long as its width at apex, measured along inner margin; inner aspect of hind tibia, see fig. 71.

Were it not for the strongly developed clypeal keel, *moelleri* would come very near *magrettii,* but on the strength of this important character, I prefer to keep the species apart.

Elaphropoda impatiens (Lieftinck, 1944) comb. nov.

1944. LIEFTINCK, Treubia, hors sér.: 80—91, pl. 42 fig. 5—7 (♂ ♀ ins. phot.) fig. 23—31 (♂ struct.). — ♂ ♀ Sumatra (*Habropoda*).
?1927. COCKERELL, Ann. Mag. Nat. Hist. (9) 20 : 531 (record only). — ♀ Peninsular Siam (*Habropoda fulvipes* Cam.).

Additional material. — S u m a t r a : series ♂ ♀, NE Sumatra, Deli, Berastagi, foot of Mt. Sinabung, 1400 m, 7—14.XI.1950, in dense forest, on flowers of *Impatiens* sp., M. A. LIEFTINCK; ♀, NE Sumatra, Deli, Sibolangit forest reserve, 450 m, 16.XI.1950, same collector; ♀, W Sumatra, Kerintji, Muara Sako, X.1915, EDW. JACOBSON. — M a l a y P e n i n s u l a : ♀, Negeri Sembilan, Gunong Angsi, 2000—2790 ft., IV.1918; ♂, Selangor, Bukit Kutu, 3300 ft., IX.1932; 3 ♀, Perak, Larut Hills, 4000—4500 ft., II.1932; 2 ♀, Pahang, Fraser's Hill, 4200—4600 ft., X.1933 & V.1936; ♀, Pahang, Cameron's Highlands, 5000 ft., VI.1935; all H. M. PENDLEBURY. — T h a i l a n d : ♂, Chiengmai, Doi Suthep, 900 m, 14.XI.1957, J. L. GRESSITT, Bishop Mus. — B u r m a : ♀, Lower Burma, S Shan States, Road 40 km E of Taunggyi, 25.IX—13.X.1934, R. MALAISE, Mus. Stockholm.

There is almost complete agreement between the type series and the additional examples from NE Sumatra and the Malay Peninsula, the latter exhibiting the same amount of variation in the abdominal colour pattern. This was described by me earlier and need not be repeated here. In fig. 23 of the original description the face marks of the male are incorrectly shown to extend inward behind the antennal sockets. This is due to the fact that the similarly coloured dense hair tufts on both sides of the frons were mistaken for integumental spots; in reality the paraclypeal area is coloured exactly as in *E. bembidion* sp. n., as shown in fig. 4 of the present paper. It will be seen, however, that the latter differs from

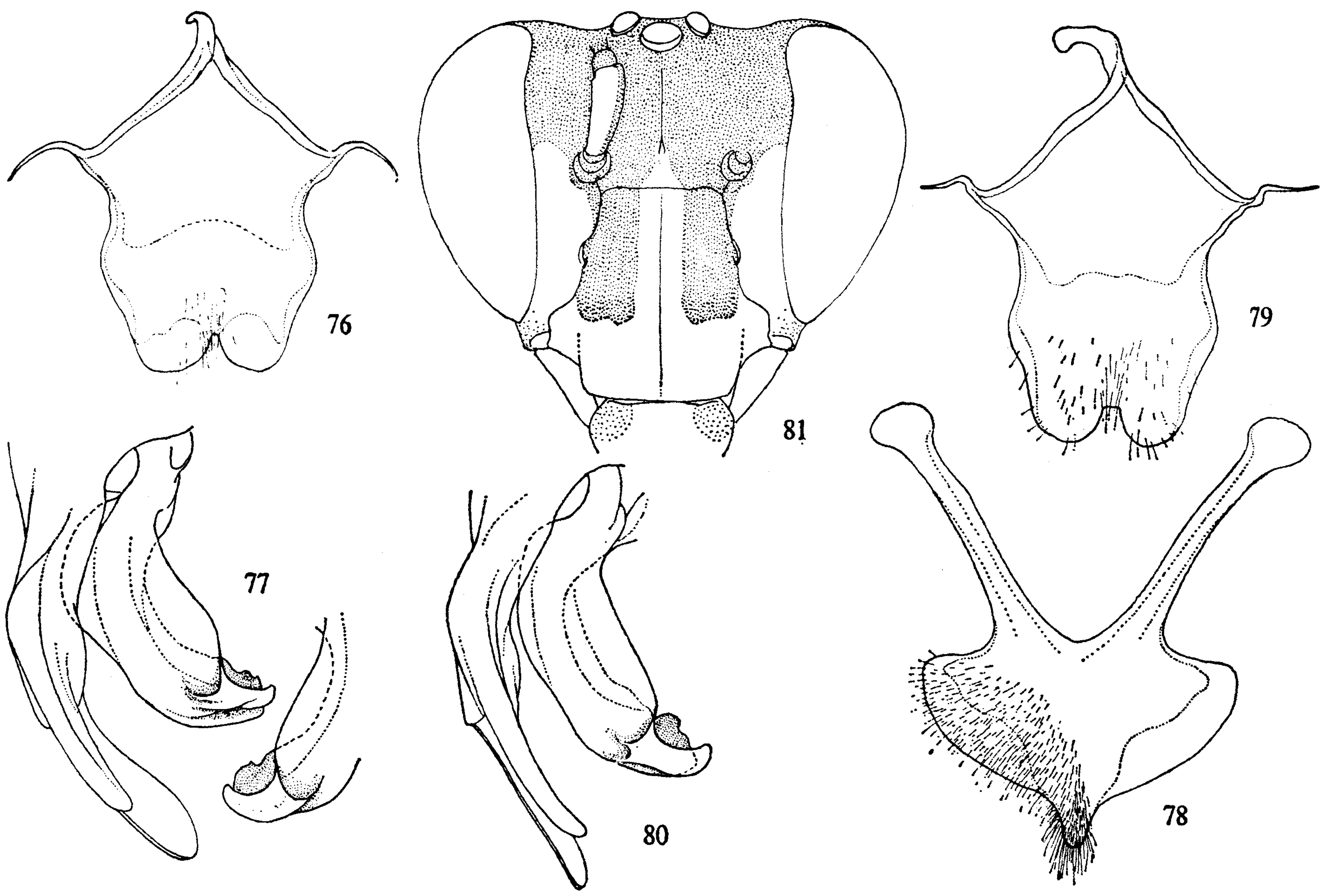

Fig. 76—81. Structural details of *Elaphropoda* males; fig. 76—77, *E. moelleri* (Bingham), eighth sternite (76), exterior view, and right gonoforceps and volsella (77), partial ventral view; fig. 78—80, *E. ? impatiens* (Lieft.), Lower Burma, seventh sternite (78), eighth sternite (79), exterior view, and right gonoforceps and volsella (80), partial ventral view; fig. 81, *E. bembidion* sp. n., holotype, Mt. Kinabalu, N Borneo, frontal view of head. Vestiture in fig. 77 and 80 omitted

impatiens by having a pair of conspicuous dark blotches on the clypeus (fig. 81). The supraclypeal mark in both sexes of *impatiens* is invariably shaped like a broad triangle, as correctly indicated in fig. 23 of the earlier paper. Despite the very close similarity in general appearance, colour and pubescent pattern, the specimens from Burma, Malaya and Sumatra are not quite alike with respect to certain structural proportions. The clypeocellar distance and length of clypeus are in the ratio of 40 : 50 (Burma and Malaya), as against 40 : 55.6 (Sumatra); the length and basal width of the clypeus and median interorbital width are in the ratios of 50 : 32 : 60 (Malaya and Sumatra) and 50 : 32 : 56 (Burma). Slight differences were also noted in the configuration of the hind tibiae as seen from beneath (fig. 72—74), but when viewed from the side the shapes and proportions were found to be nearly identical.

The Burmese male is a worn specimen whose coloured pubescence has lost much of its freshness. In this specimen the first gastral segment and a pair of transverse spots (one on either side) at the base of the second, are "red", the hind margins of 2—6 being broadly bordered with ochraceous, thus differing from the others in which these segments are only narrowly light-bordered. Now COCKERELL (1927) records *E. khasiana* (Schulz) from Peninsular Siam, so that the present male may belong to that species rather than *impatiens*? Its tibia is shown in fig. 72, the terminalia in fig. 78—80.

Distribution. — Sumatra and the Malay Peninsula (universal); ? Lower Burma.

Remarks. — I came across this elusive species again in northern Sumatra under circumstances almost identical to those during my collecting trip in 1939 and 1940 to south Sumatra. I wrote about these as follows: "On Mt. Tanggamoes *H. impatiens* was strictly confined in its visits to one particular kind of flower, viz. a wild Balsam, *Impatiens* cf. *oncidioides,* with large yellow flowers carrying long curved spurs. Patches of this hygrophilous plant were found in damp shady situations, chiefly in trenches and other gloomy places beside the long-abandoned track on the edge of the dense virgin forest. Once arrived there, we were soon struck by the shrill note of *impatiens* which flashed hither and thither among the low herbage. The males kept up a continual flight over the flowers which only the females searched for honey and pollen; the males greatly outnumbered the females and alighted only rarely in sunlit openings, on leaves and tiny branches; they were exceedingly alert and difficult to capture when ranging over the flowers in search of the females. Curiously enough, the insects were most abundant when the weather was dull and were active even when it was raining. Although common in this restricted habitat and possibly breeding gregariously, we have been unable to find the nests. *H. impatiens* is probably the host of *Callomelecta vulpecula,* which was captured in the same locality and on the same days." (LIEFTINCK, 1944 : 90—91).

Elaphropoda erratica (Lieftinck, 1944) comb. nov.

1944. LIEFTINCK, Treubia, hors sér.: 91—93, pl. 42 fig. 8 (♀ ins. phot.). — ♀ West Java (*Habropoda*).

Additional material. — Java: ♀, W Java, Mt. Pangrango, southern slope, 1200 m, 7.VIII.1949, on flower of *Impatiens platypetala* in humid forest, M. A. LIEFTINCK.

This is the second known example of a very rare species. It is exactly identical with the type. Unfortunately the male has remained unknown, but it should be easily distinguished from *impatiens* by its smaller size and different face marks.

Elaphropoda bembidion sp. n.

Material. — Borneo: ♂ (diss.), N Borneo (Sabah), Mt. Kinabalu, Kenokok, 3300 ft., 29.IV.1929, H. M. PENDLEBURY. Holotype ex F. M. S. Mus., in the British Museum (Nat. Hist.).

Characters as for genus. Closely resembling dark individuals of *E. impatiens*

(Lieft.), but differing in details of coloration, armature of legs and abdominal terminalia, as follows.

Male. — Mouth-parts, greater part of face and scape of antenna anteriorly, deep chrome, the malar space, teeth and apex of mandible, dark ferruginous. Face marks, frons and antennae dark brown, only the distal portion of first flagellar segment of antenna red brown; orange supraclypeal mark high and narrow (fig. 81). Legs rufous, the coxae and trochanters hazel; outer face of hind femur slightly darker towards apex, the basitibial area and hind basitarsus dark brown. Wings more strongly tinged with yellow than in *E. impatiens,* but the neuration as in that species. Integument of gaster coloured as in the darkest individuals of *E. impatiens,* i.e. no "red" areas on basal segments; instead, the hind margins of all tergites are more broadly pale coloured (cinnamon-buff) than in *impatiens,* the apical bands occupying only little less than half of the exposed surface of segm. 1—5, the sternites on the contrary being predominantly dark brown. Body pubescence as in *E. impatiens.*

Structure. — Clypeocellar distance and length of clypeus in the ratio of 40 : 54.5; length and basal width ratio of clypeus 50 : 30; length ratios of first four flagellar segments of antenna, 12 : 6 : 10 : 10. Clypeal keel well developed, similar to *E. impatiens.* Inferior keel of hind tibia more sharply pronounced than in *impatiens,* the apical lamella distinctly more drawn out in lateral view and narrower, the apex almost pointed when looked at from beneath (fig. 83). Length of body 15 mm approx., length of fore wing 11 mm.

Frontal view of head as in fig. 81; mandible, fig. 82. Terminalia very similar to those of the allied species (fig. 84—86).

Immediately distinguished from its allies by the well-developed dark brown clypeal marks, which in the males of all other described species are reduced to narrow dark stripes, often mere hair lines extending along the subantennal suture as far as the anterior tentorial pits, the clypeus itself remaining unmarked. The species is also remarkable for its darker wings, which are deeply stained with yellow. The female remains unknown.

Distribution. — Borneo.

Elaphropoda percarinata (Cockerell, 1930) comb. nov.

1930. COCKERELL, Ann. Mag. Nat. Hist. (10) 6 : 51—52. — ♂ Foochow, China (*Habropoda*).

Material. — China: ♂ (holotype, no. 644), SE China, Fukien, Foochow district, KELLOGG, in the British Museum (Nat. Hist.). — 2 ♂ (diss.) ♀, SE China, Fukien, Shaowu, Tachulan, 8—17.VIII, 8—14.IX.1943 and 27.VII.1947; ♂ (diss.) ♀, same area, Stat. 1, 1500 m, 3.VIII.1946; ♂ ♀, same area, Kuatun, Chungan, 1400 m, 4—6.VII.1945 and Sanchiang, Stat. 9, 14—1500 m, 11—12.VIII.1945; ♀, Fukien, Kienyang, Hwangkeng, Stat. 2, no date; all TSING-CHAO MAA.

The present specimens are referred here with some misgivings, the pubescence in all of them being rather paler than in the type and possibly discoloured. In general they agree with the type but differ by having the greater part of the anterior face of the antennal scape definitely yellow, though the yellow area is not sharply defined. In the original description no mention has been made of the consistency of the long hairs covering the clypeus on either side, the latter being

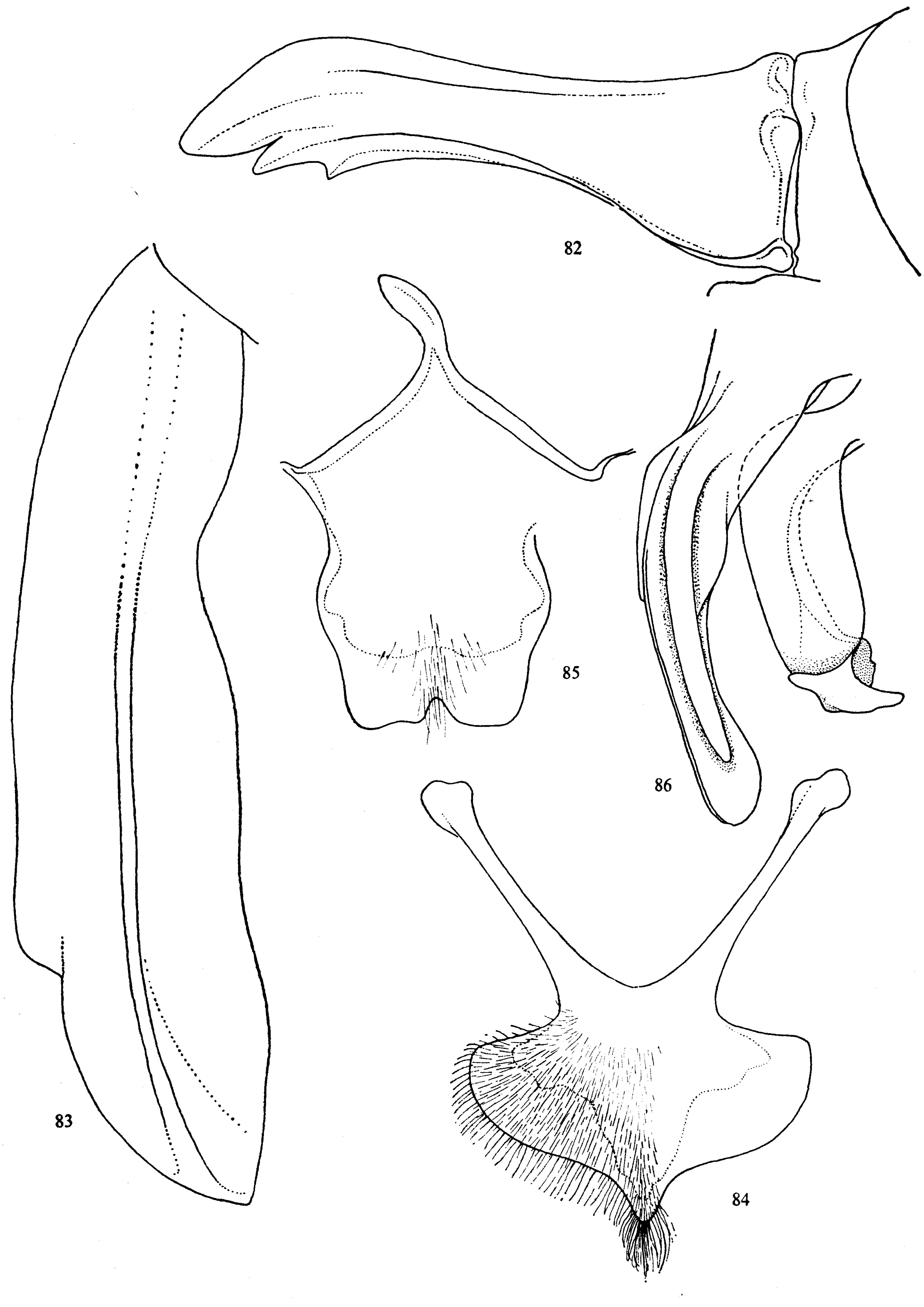

Fig. 82—86. *Elaphropoda bembidion* sp. n., holotype, Mt. Kinabalu, N Borneo; fig. 82, right mandible, exterior view (bristling omitted); fig. 83, right hind tibia, horizontal interior view; fig. 84 and 85, seventh (84) and eighth (85) sternites, exterior view; fig. 86, right gonoforceps and volsella, partial ventral view (vestiture omitted).

posterior margins of the first five gastral segments being pale brownish yellow, those of the tergites broadly, of the sternites more narrowly so. There are no "red" areas on the first two tergites in any of the present series, males and females, which thus differ from the type. The thin short pubescence on the disk of the gastral tergites is more dense than in any of the other species described, but the integument still remains well visible under the tomentum.

Male characters. — Clypeus relatively long, clypeocellar distance and length of clypeus in the ratio 40 : 56.5; length and basal width ratio of clypeus 50 : 30; length ratios of first four flagellar segments of antenna, 12 : 5 : 10 : 10. Details of structure, taken from two males collected at Shaowu (Tachulan) are illustrated (fig. 75 and 87—92).

COCKERELL compares his specimen with *H. fulvipes* Cam. (= *khasiana* Schulz) and *magrettii,* with which the species is, indeed, very nearly related.

Distribution. — East China (Fukien).

Acknowledgements

My sincere thanks are due to all entomologists who have assisted me in carrying out the present investigation, which is to be considered as a preliminary to further studies on a somewhat larger scale. It was started before I left Indonesia and is mainly based on material then received through the good offices of several correspondents abroad. Many of the illustrations were also prepared about that time, while others were supplemented only recently.

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bristly, not abundant, brown on upper portion and becoming golden yellow anteriorly. The wings are exactly as described for *magrettii* and *impatiens*; the marginal cell in the type is erroneously described as "not greatly produced", it being in fact of the same great length as in all other species of *Elaphropoda.* The tarsi of the type are described as "black or nearly so", but I failed to notice any difference between our specimens and the type, in which they are ochraceous orange, only the basitarsus III being conspicuously dark brown, and the claws are tipped with black.

The abdomen in both sexes is blackish brown or black, the integument of the

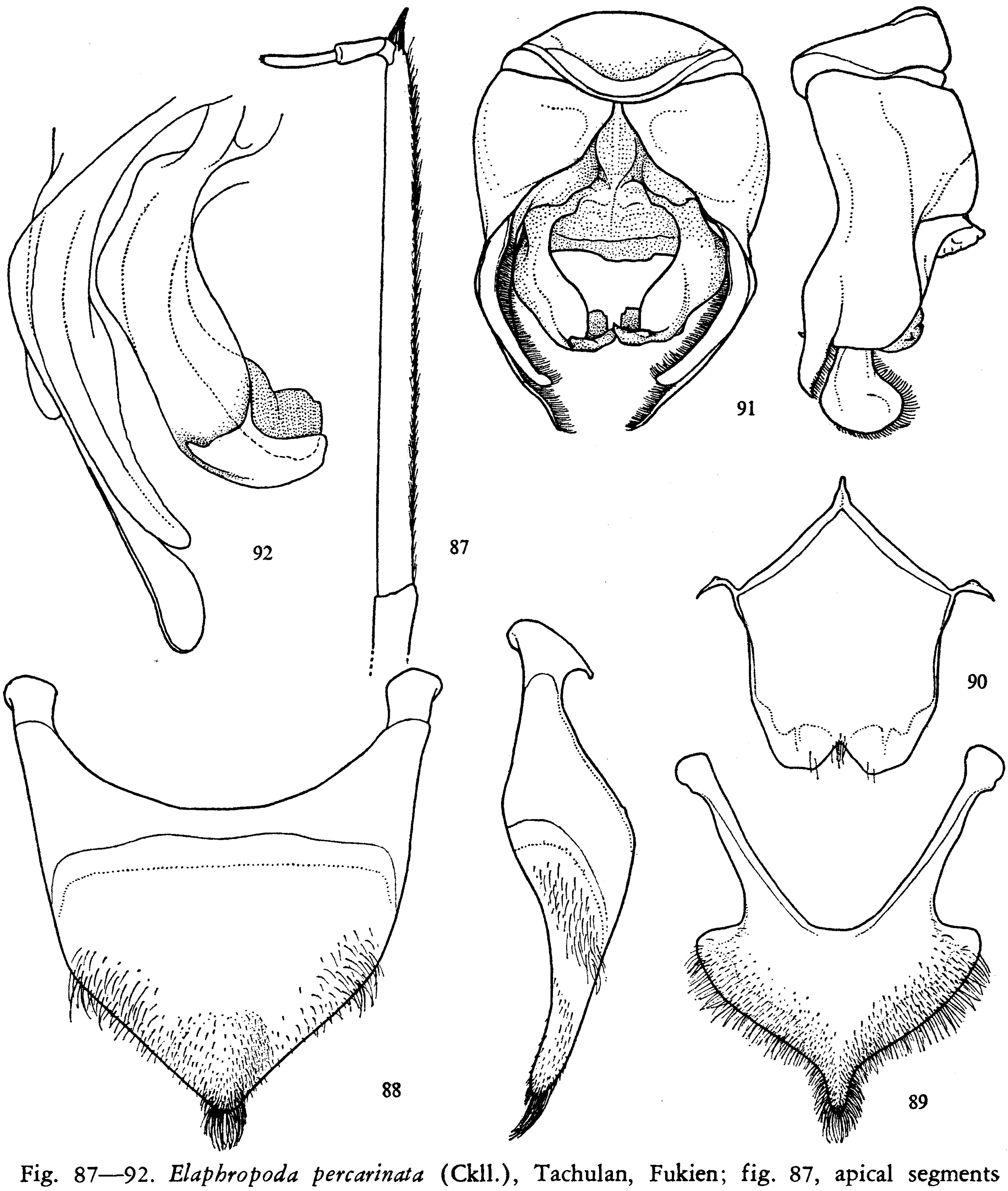

Fig. 87—92. *Elaphropoda percarinata* (Ckll.), Tachulan, Fukien; fig. 87, apical segments of labial palpus; fig. 88, sixth gastral sternite, exterior and profile view; fig. 89—90, seventh (89) and eighth (90) sternites, exterior view; fig. 91, genital capsule, ventral and left lateral view; fig. 92, right gonoforceps and volsella, partial ventral view (vestiture omitted).

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