

**CONTRIBUTION TO THE KNOWLEDGE OF THE
INDO-AUSTRALIAN PSENINAE
(HYMENOPTERA, SPHECIDAE)**

by

J. P. VAN LITH

Part I. *Psen* Latreille

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INTRODUCTION

In this paper an attempt is made to give a review of the Pseninae occurring in that part of the Malay Archipelago which is formed by the Indonesian Islands and the Philippines. In the first place it is based on the collections of the Rijksmuseum van Natuurlijke Historie at Leiden, Netherlands, and of the Zoological Museum at Bogor, Indonesia. This material has been collected mainly in Java and only a small number of specimens originate from Sumatra, Celebes and Bangka. In the second place I have been able to study two collections of Philippine Pseninae. From the United States National Museum at Washington I received the material brought together by Prof. C. F. Baker, amongst which a type and some paratypes of species described by Rohwer. Dr. Henry K. Townes, Ann Arbor, Michigan, kindly sent me the Pseninae collected by him in recent years. In addition I have examined the types of three species described by Smith from the material collected in the Archipelago by A. R. Wallace.

I gratefully acknowledge my indebtedness to the authorities of the following institutions and to the undermentioned entomologists who have kindly allowed me to study the Pseninae in their collections:

Zoölogisch Museum, Amsterdam (MA)
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Mr. H. T. Pagden, Penang, Malaya (HTP)
Natuurhistorisch Museum, Rotterdam (MR)
Dr. Henry K. Townes, Ann Arbor, Michigan (HT)
United States National Museum, Washington, D.C. (USNM)

I am especially indebted to Dr. J. van der Vecht, of the Leiden Museum, who encouraged me to study this subject, who has put at my disposal the results of his preliminary investigations and who has given me every possible assistance in the preparation of this paper. Many thanks are also due to Dr. K. V. Krombein for his information regarding the types of the Philippine Pseninae described by Rohwer, to the authorities of the University Museum at Oxford for the loan of three Smith types and to Dr. J. Leclercq, Liège, for his valuable intermediary and help. Dr. H. C. Blöte, Leiden, kindly identified the preys (Homoptera) which had been pinned under some of the female wasps.

Up to now little has been published about the Pseninae of the Indo-Australian Islands. Smith (1858, 1861, 1864, 1865) has named four species of *Psen* and *Psenulus* from Borneo, Celebes, Morotai and Misool. Ritsema (1876, 1880) has described two *Psenulus* from Java and Sumatra and Cameron (1907) two more *Psenulus* from Borneo. From the Philippines, however, Rohwer (1910, 1921 and 1923) described not less than four species of *Psen* and fifteen species plus one subspecies of *Psenulus*. Two of the Philippine *Psenulus* have also been recorded by Rohwer from Borneo and he has described two species and one subspecies of *Psenulus* exclusively from this island. Three of Rohwer's Philippine *Psenulus* also occur at Singapore and on Penang Island, whilst he has named two species (one from Penang Island and one from Singapore) which have not yet been found outside of Malaya. Pagden (1933) described a *Psenulus* from the Federated Malay States. New Guinea has supplied one *Psenulus* (Cameron, 1906, Etna Bay). From the continent of South East Asia and from Ceylon about 18 species of Pseninae have been described by Cameron, Turner, Nurse and Bing-

ham. These species have been dealt with at the end of this paper and in some cases supplementary descriptions and sketches have been given

As regards *Psen* s.l. the following numbers of species and subspecies now can be added to this genus:

| | <i>Indonesian Islands</i> | | <i>Philippine Islands</i> | |
|----------------------------------|---------------------------|------------|---------------------------|------------|
| | species | subspecies | species | subspecies |
| Subgenus <i>Pseneo</i> Malloch | — | — | 1 | — |
| Subgenus <i>Psen</i> s.str. | 11 | 1 | 2 | 1 |
| Subgenus <i>Mimumesa</i> Malloch | 2 | — | — | 2 |
| | 13 | 1 | 3 | 3 |

Adding these 16 species and 4 subspecies to the one Indonesian and 4 Philippine species which we knew already, we arrive at a total of 25 species and subspecies from the above islands.

As it was not possible to examine the types of all the continental species, some synonymy may be found later and a few species may have to be degraded to the subspecific rank, but the majority of the species described in this paper are certainly good new species. Especially the discovery of *Psen* (*Pseneo*) *townesi* is interesting, for the subgenus *Pseneo* Malloch was hitherto exclusively known from the Nearctic region. The question arises whether this species may have been imported by air from the New World. This appears unlikely, however, for the specimen from Luzon shows a character which easily separates it from the known Nearctic species, the clypeal margin not being tridentate, but bidentate, as in most species of *Psen* s.str.

The genus *Psenulus* Kohl will be discussed in the second part of this study.

SYSTEMATICS

Van der Vecht (1937) has already pointed out that the Hymenoptera occurring in the mountain regions of Java for the greater part belong to genera which have their region of distribution mostly outside the tropics. With regard to the Oriental representatives of the cosmopolitan genus *Psen* Latr. it can moreover be said that they generally show much agreement with the Palaearctic and Nearctic species which so far have been described, in their habitus as well as in their generic and subgeneric characters. There are a few Palaearctic species (*Psen exaratus* (Ev.), *Psen wuestneii* Faestner and *Psen sibiricus* Guss.) whose systematic place is not yet clear. It may be that the creation of new subgenera will prove to be desirable and I hope to discuss this problem later when dealing with Palaearctic Pseninae.

The subgenus *Mimesa* Shuckard has not yet been found in the Malayan

area. The genus *Pluto* Pate 1937 (synonym *Psenia* Malloch 1933, preocc.) has been included in the key to the genera although it is probably restricted to the Nearctic or Neotropical regions.

The genera *Deinomimesa* Perkins and *Nesomimesa* Perkins from the Hawaiian Islands (Perkins, 1899) seem to differ greatly from the Indo-Malayan *Psen* s.l. and have therefore been left out of consideration. Perhaps they will have to be classified as subgenera of *Psen*.

Caenopsen Cameron (1899) has been considered to be synonymous with *Psen* Latr. s.str. Cameron based *Caenopsen* on a single specimen which he believed to be a female. According to his definition it is distinguished from *Psen* s.l. by the extraordinary length of the second segment of the antennae. However, a study of the definition of the genus and of the description of *Caenopsen fuscinervis* reveals that what he had before him must have been a male. What he called the second segment of the antennae must in reality have been the third segment, the usually very small second segment or pedicel having been hidden in the scapus, as in *Psen ater* (F.). His description of the pygidium is very short and may also apply to the smooth last tergite of the male, the upper ridges of the last sternite sometimes giving the impression of keels belonging to the pygidial area. The other characters mentioned by him point to the subgenus *Psen*. I have seen a male from the BM, labelled "*Caenopsen fuscinervis* Cam. Khasia" (in an old handwriting). This may be a syntype and it has strengthened my opinion that the creation of the genus *Caenopsen* is based on a misinterpretation of the antennal segments and that the name should be stored as a synonym for the time being.

As regards the genus *Psenulus* Kohl I have followed de Beaumont (1937) in using this name and not *Diodontus* Curtis, as Malloch (1933) did and modern American authors still do. I must leave it to others to solve this problem definitely. Although there are great differences between the Palearctic species of *Psenulus* and some groups of the Oriental relatives, the creation of new subgenera, if actually necessary, has been deferred until more material is available.

Morphology

The morphological nomenclature in this paper has been adapted to that used by O. W. Richards (1956) in his Handbook. This means that in some cases I have had to depart from the terms which have been used during a long time by previous authors.

The antennal segments have been numbered from one to twelve (female) and from one to thirteen (male). As regards the parts of the thorax the old term of postscutellum has been replaced by *m e t a n o t u m*. The carinae

on the ventral side of the epicnemial areas are of great systematic value, as de Beaumont has already demonstrated when discussing the Palaearctic Pseninae (1937). In many species the epicnemial areas are also well-defined on the inner side, or at least there is a vague line. The *inter-epicnemial area*, which is often more or less depressed and striate or more coarsely sculptured than the lateral epicnemial areas, may be separated from the mesosternum by a transverse carina. In the subgenera *Mimumesa* Malloch and *Pseneo* Malloch this carina, which has been called *acetabular carina* by Richards, is continuous with the epicnemial carinae (fig. 1, 4). Many species of the subgenus *Pseneo* have a similar carina, which is usually very short, but in some Indo-Australian species, viz. *carbonarius* (female unknown), *nitidus* (both sexes) and *emarginatus* (in the male only) it extends to very near the lower ends of the epicnemial carinae so that these are almost connected (fig. 3).

In the subgenus *Pseneo* it looks as if the ends of the epicnemial carinae are curved backwards, but it is more likely that these ends form the anterior part of the precoxal suture (fig. 2). They sometimes reach the *subpleural signum* of Michener (1944), which Richards considers to be also a reduced part of the precoxal carina or suture. This subpleural signum (figs. 1-6) is usually not more than a small and oval suture which may be surrounded by a somewhat raised rim.

In the nearctic *Pseneo simplicicornis* Fox there is a very distinct carina running from the subpleural signum to the posterior margin of the mesosternum. Some species of the subgenus *Pseneo* have a less distinct line connecting the subpleural signum either with the anterior remains of the precoxal suture or with the posterior margin of the mesosternum. The term *mesosternum* has been maintained for the area between the precoxal sutures and the median sternal line.

The cells in the fore wings, in which the recurrent veins end (the cubital cells of others) have been termed *submarginal cells*, as proposed by Michener and Richards.

The posterior part of the thorax, the *propodeum*, is considered to form the first segment of the abdomen (tergite and sternite), the petiole being the second abdominal sternite (= first gastral sternite). This should be observed when comparing with old descriptions. I prefer the term *enclosed area* (of the propodeum) to dorsal area or area cordiformis. Sometimes this enclosed area does not cover the whole of the horizontal part of the propodeum and its shape varies from a mere transverse sulcus in some *Pseneo* species to a triangular area in the genus *Pseneo*.

The abdomen, excluding the propodeum, has been called *gaster*, in

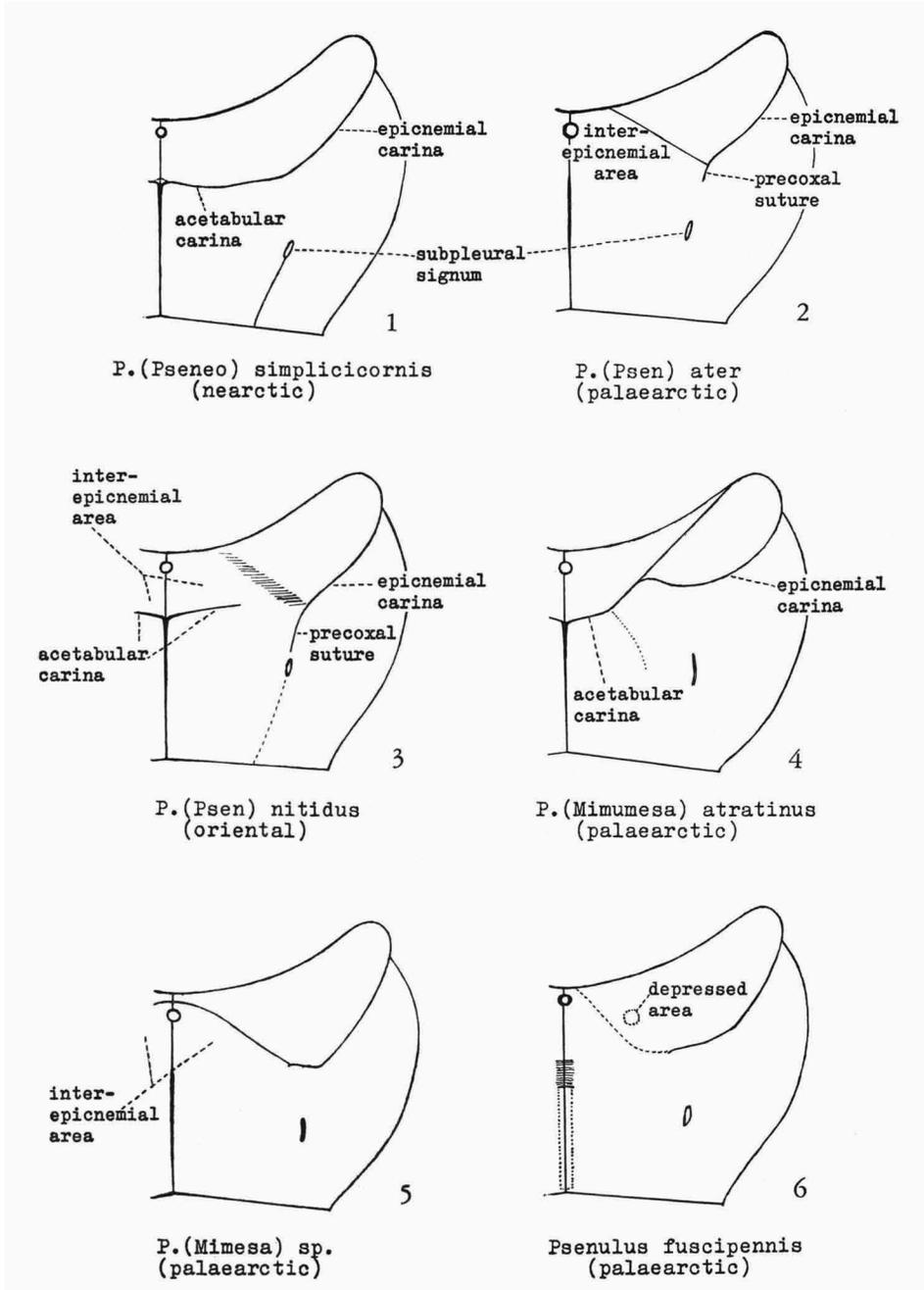


Fig. 1-6. Ventral view of mesosternum (left side) of some subgenera of *Psen* s.l. and of *Psenulus* Kohl.

accordance with Richards's proposal. The structure and sculpture of the pygidial area supply very useful characters for the identification of the females. Apart from a number of mostly large punctures the rest of the surface may be smooth and shining or dull and coriaceous or very finely reticulate. The sculpture is most distinct when magnified about 50 times. In the sketches of the pygidial areas I have tried to reproduce the differences I have found in the coriaceous sculpture.

Each series of figures in this paper gives the respective parts all approximately the same size, so that they do not correspond with the actual proportions in the sizes of the species. The figures have been made without the aid of drawing apparatus and should be considered as rough sketches only, but they are sufficient to illustrate the specific characters. Some details which are of no present or possible future importance for the identification of the species have been omitted in these drawings, such as the puncturation of the mesosternum and also the pubescence which, although characteristic on the propodeum in some species, would have concealed the more important characters.

Key to the genera

(The keys to genera and subgenera are based on a combination of the characters used by Malloch (1933) and de Beaumont (1937)).

1. Anal cell of hind wings ending beyond the origin of the cubital vein. Occipital carina connected with the carina surrounding mouth cavity (hypostomal carina) at considerable distance from median line of ventral side of head (fig. 7). *Psen* Latreille
- Anal cell of hind wings ending before the origin of the cubital vein. 2
2. Occipital carina connected with the hypostomal carina at considerable distance from median line of ventral side of head or ending below in a large tooth. Face with a prominent frontal line (carina) which in most cases is connected with a raised transverse line below bases. *Psenulus* Kohl
- Occipital carina carried around back of head and not connected with the hypostomal carina, sometimes rather widely separated from the latter on median line of ventral side of head. Frontal line (carina) simple; no transverse carinae. *Pluto* Pate

Psen Latreille

1796, Latreille, P. A., Précis des caractères génériques des insectes, p. 122 (type species: *Sphex atra* Fabricius 1794; designation by Latreille, 1802).

The principal characters are as follows: the anal cell of the hind wings ends beyond the origin of the cubital vein; occipital carina connected with the carina surrounding the proboscival fossa (mouth cavity) at a considerable distance from the median line of the ventral side of the head. The frontal line ends in a more or less protruding tooth between the antennae; this tooth is often connected with the lower part of the antennal sclerites by fine carinae. Pygidial area of female always well-defined.

A very fortunate agreement was found in the subgeneric characters which Malloch (1933) and de Beaumont (1937) have used. Malloch has drawn attention to the sculpture on the back of the posterior femora, whilst de Beaumont found valuable characters in the course of the epicnemial carinae and of the anterior transverse carina of the mesosternum (the acetabular carina of Richards). These characters are also of importance in the Indonesian and Philippine species which are discussed in this paper.

Mimesa Shuckard is not considered here to be a separate genus. The characters which *Psen* s.str. and *Mimumesa* Malloch have in common are many, and there are no important differences, both subgenera having a frontal line, no transverse carina on the disk of the clypeus, and a distinct scrobal suture. On the contrary the differences between *Mimesa* and *Mimumesa* are more striking than those between *Mimumesa* and *Psen* s.str. (frontal line, clypeal carina, scrobal suture, acetabular carina).

It is therefore not justifiable to treat *Mimesa* as a separate genus with *Mimumesa* as a subgenus. The relationship of *Mimesa* and *Mimumesa* is better expressed when they are both given subgeneric rank and placed in the genus *Psen* Latreille. The subgenus *Mimesa* does not seem to occur in the Indo-Australian region.

Amongst the material which the Townes family collected in the Philippine Islands was also one single female which I consider to belong in the subgenus *Pseneo* Malloch, so far Nearctic only.

Key to the subgenera of **Psen** Latr.

1. Hind femora with an elongate oval patch of soft pubescence near apex on posterior surface (fig. 13). Clypeus mostly tridentate, rarely bidentate. Mesopleura ruguloso-punctate or strongly punctate. Males without long fasciculate hairs at apex of fourth or fourth and fifth abdominal sternites. *Pseneo* Malloch
- No oval patch on hind femora. Clypeus rarely tridentate, mostly bidentate. 2
2. Ventral part of epicnemial carinae continuous with the longitudinal anterior part of the precoxal suture and not connected with the acetabular carina (fig. 2, 3). Hind femora usually bare on upper half of posterior surface (sometimes with a few microscopic hairs only) and with a longitudinal series of fine punctures, from which fine hairs arise, below the middle of the surface. The males have fasciculate hairs at the apex of the fourth and fifth abdominal sternites. *Psen* Latr.
- Epicnemial carinae not continuous with anterior precoxal suture (there are a few exceptions such as *P. (Mimumesa) wuestnei* Faester and *P. (Mimumesa) sibiricus* Guss.). Back of hind femora usually with at least a few hairs on upper half or bare part only narrow (about one third of the width); no longitudinal series of fine punctures. Males without fasciculate long hairs along the margin of the sternites. 3
3. Epicnemial carinae continuous with the acetabular carina so that the epicnemial are fully separated from the mesosternum (fig. 4). Petiole carinate or sulcate dorsally. Scrobal suture distinct, upper part of mesopleura (hypo-epimeral area) smooth, at most finely punctate (in the Indo-Australian species this upper part is covered with

- a dense appressed pubescence). Fine frontal line connecting the median ocellus with a transverse carina between the bases of the antennae. *Mimumesa* Malloch
- No acetabular carina (fig. 5). Petiole without V-shaped carinae. Scrobal suture not distinct, hypo-epimeral area not smooth, but striate or striato-punctate. Frontal line not wholly distinct. *Mimesa* Shuckard.

Subgenus **Pseneo** Malloch

1933, Malloch, J. R., Proc. U.S. Nat. Mus., vol. 82, p. 7 (subgenus, type species *Pseneo kohlii* Fox).

This subgenus was characterized by Malloch as follows:

"Similar in general habitus to *Pseneo*, differing essentially in having the clypeus in both sexes with two small rounded emarginations in center at apex, causing it to appear centrally tridentate; the petiole of the abdomen more or less rounded above, without dorsal sulci, the hind femur with an elongate oval patch of short pale hairs near apex on the posterior surface; both recurrent veins received by the second submarginal cell; abdomen of male without fasciculate hairs at apices of any of the sternites; and the pronotum in the males frequently with a sharp angle or tooth on each side above."

I have not seen the type species but could compare the Philippine specimen described in this paper with the allied Nearctic species *Pseneo simplicicornis* Fox. Although the Philippine species does not agree in all respects with the definition which Malloch has given of *Pseneo*, there is yet so much conformity with *P. simplicicornis* that I do not hesitate to assign it to this subgenus.

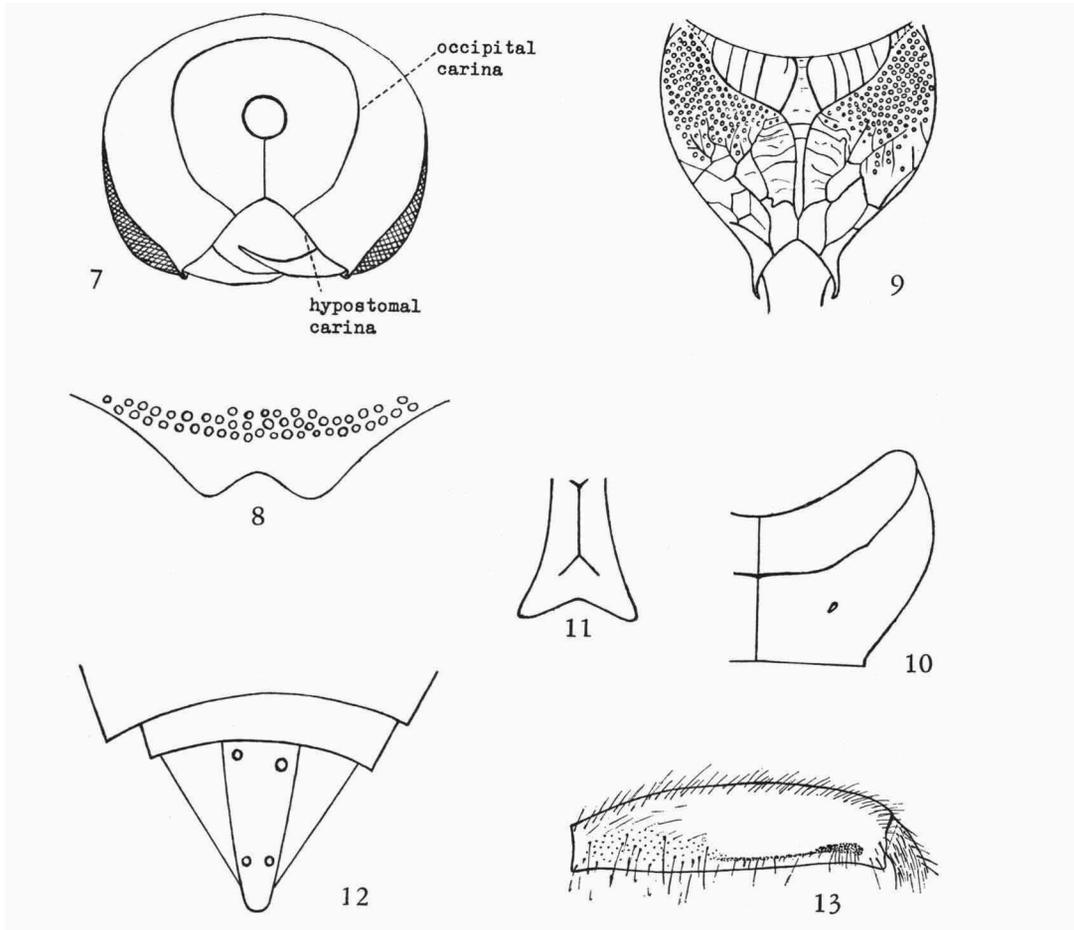
The clypeus of the Philippine species is bidentate, not tridentate as in the Nearctic relatives. Also in the subgenus *Mimumesa* the emargination of the clypeus can easily vary, so that not too much value should be attached to this character. Scutum, mesepisternum and mesosternum are coarsely punctate, contrasting with the smooth metapleura and the epicnemial areas.

In 1950 Krombein published a revision of the known species of this subgenus. In this study he drew attention to the emargination of the posterior margin of the metasternum, which is truncate or very slightly and broadly emarginate in *Pseneo*, but deeply, angularly or linearly notched in *Pseneo* s.str. In some Oriental *Pseneo* s.str. and *Mimumesa* Malloch which I have examined the incision is indeed very deep and linear. In the Philippine *Pseneo* the posterior margin is weakly emarginate (fig. 11).

According to Malloch all Nearctic species have a very prominent linear carina on the inner or opposed surfaces of the posterior coxae. In the Philippine species this carina is only distinct on the basal part. Both recurrent veins are received by the second submarginal cell in the Nearctic species, in *P. townesi* the second recurrent vein of the fore wings is interstitial. Pygidial area of female narrow and shining, with a few punctures along the margin and usually with a slight longitudinal median carina. In *P. townesi* the central part of the pygidial area is slightly convex only.

***Pseneo townesi* n.sp.**

Female. — Black, except brown palpi and reddish posterior calcaria. Wings, especially radial cell, slightly infuscated (wings rather worn). Clypeus densely, somewhat irregularly punctate; the broad impunctate margin



Figs. 7-13. *Pseneo townesi* n. sp., ♀; 7: ventral view of head, 8: anterior margin of protruding part of clypeus, 9: propodeum, 10: ventral view of mesosternum (left side), 11: metasternum, 12: pygidium, 13: back of right posterior femur.

is almost shining and deeply emarginate so that two distinct teeth are formed (fig. 8). The frontal line ends in a distinct interantennal tooth which, in ventral view, has a minute circular depression near the top. Tooth connected with antennal sclerites by fine carinae. Upper part of frontal line indistinct. Frons and vertex shining, with very coarse and dense puncturation, except

two low, almost impunctate tubercles on the frons. Postocellar area slightly raised. Antennae short, somewhat clavate, segments ten and eleven quadrate, the twelfth segment approximately one and a half times as long as it is broad at the base.

Scutum and scutellum shining, densely and coarsely punctate. Tegulae smooth. Metanotum finely punctate. Metapleura smooth and shining, almost completely impunctate. Hypo-epimeral area, mesepisternum and mesosternum coarsely punctate but shining between the punctures. Subpleural signum still visible in spite of coarse puncturation. Epicnemial carinae continuous with acetabular carina; lateral areas of epicnemium not distinctly marked off centrally (fig. 10). Inter-epicnemial area finely transversely striate. Enclosed area of propodeum somewhat concave, with longitudinal carinae. Upper part of propodeum on each side behind the enclosed area with a bare, distinctly punctate area, propodeal declivity with coarse reticulation (fig. 9) and indistinctly punctate between the carinae. Sides of propodeum finely punctate. Carinae on hind coxae only distinct at the base.

Femora and tibiae stoutly built. Upper two thirds of back of hind femora smooth and shining, only a few fine punctures on the basal part. The smooth area is separated from the lower part by a longitudinal series of very fine punctures. Near the apex the row of punctures ends in an oval depression which is completely dull, and approximately as long as the femora are broad at the end. Hind tibiae clavate, with short and blunt reddish spines on the upper side. First recurrent vein of fore wings ends near the middle of the second submarginal cell, second recurrent vein interstitial.

Petiole cylindrical, slightly depressed laterally. Gaster smooth, a few large punctures on the base of the third abdominal tergite (usually concealed in most species), also on the base of the third abdominal sternite and along the margin of this sternite and the following sternites. Pygidial area elongate triangular, apex slightly emarginate; surface smooth and shining with a few large punctures along the margin (fig. 12). Sides of last tergite with a few large punctures.

Face with appressed silvery pubescence, which is not dense, so that the sculpture is distinctly visible. Head, thorax and legs with pale, somewhat brownish pubescence. Oval depression on hind femora densely covered with fine whitish hairs.

Length about 10 mm.

This is the first *Pseno* I have seen from the Indo-Australian region. It is easily recognized by the very coarse puncturation of head and thorax, including the propodeum, and also by the dull, oval depression on the hind femora.

Luzon: 1 ♀ (holotype), Mt. S. Tomas, near Baguio, 6500 ft, 20 June 1953, H., M. and D. Townes (HT). The wings are rather worn and the fourth and following segments of the right antenna are missing.

Subgenus **Psen** Latr.

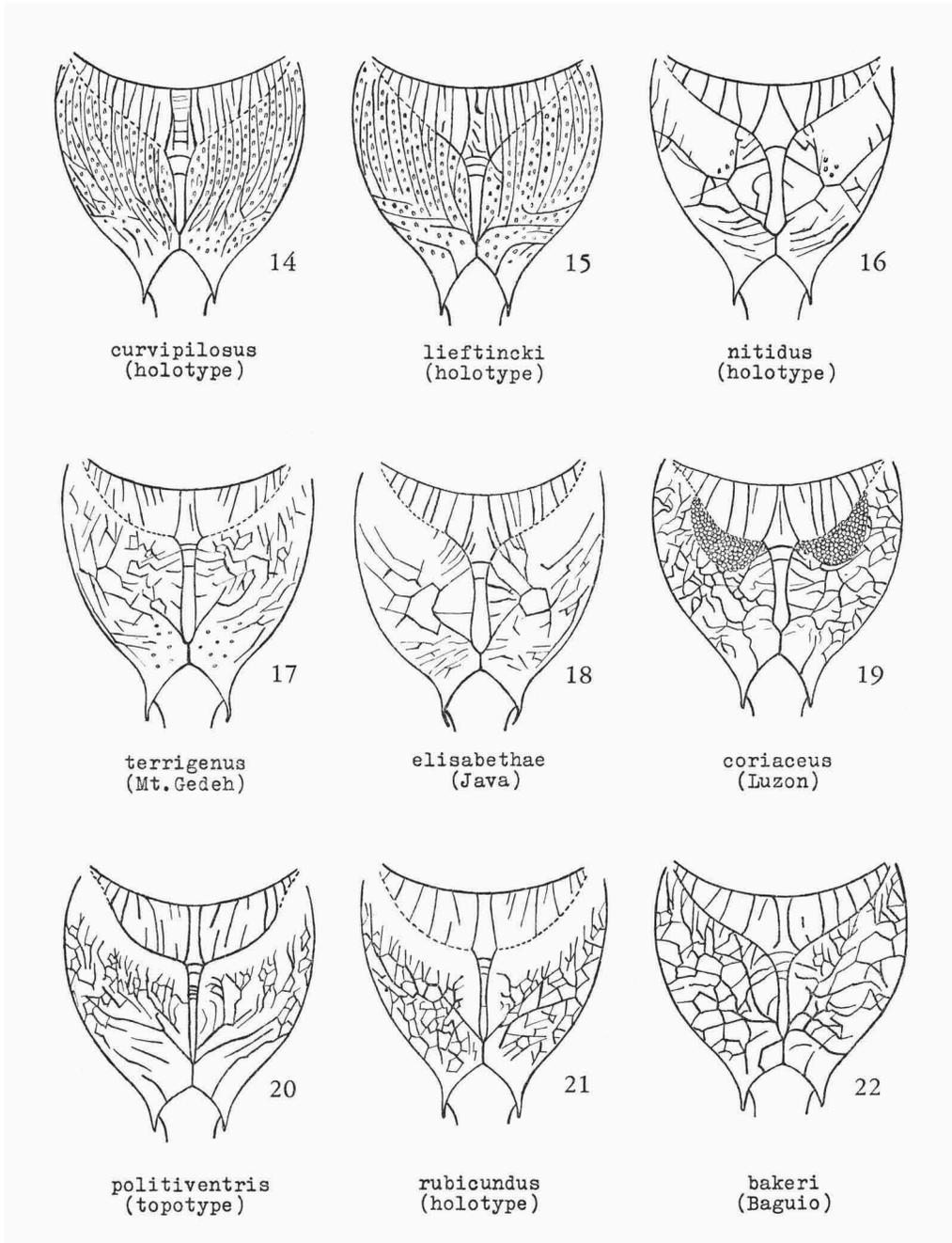
The frontal line is always a complete carina running downwards from the median ocellus, ending in a tooth which in dorsal view is often clearly projecting. Clypeus more or less emarginate, sometimes bidentate. The carinae bordering the ventral side of the epicnemial end in the anterior reduced part of the precoxal carinae, so that the epicnemial carinae seem to be curved backwards. Many species have an incomplete acetabular carina along the anterior border of the mesosternum (fig. 34). In some cases this acetabular carina almost reaches the lower ends of the epicnemial carinae, resembling the continuous carinae of *Mimumesa* Mall. Structure of mesopleura similar to that of *Mimumesa*, the upper part (hypo-epimeral area) being smooth and well-defined below by a deep scrobal suture. Enclosed area of propodeum bare, mostly somewhat concave and with more or less regular longitudinal striae. Lower section of declivous part of propodeum rugoso-reticulate, rarely with parallel longitudinal carinae.

Tarsi of mid legs sometimes dilated. Upper part of back of hind femora usually smooth and bare, or with a few fine hairs only in some species, often ventrally bordered by a dense row of punctures, in most species (not in *P. ater* F.) forming a distinct line on the outer half.

Petiole smooth and somewhat flattened above, very long and slender in the Indo-Australian species. A few palaeartic species have large punctures on the upper surface. The sides of the petiole may have two longitudinal carinae bordering a broad and shallow groove. Sides and ventral part of petiole with long hairs, directed sideways and obliquely downwards. Dorsum of petiole along the sides with a row of fine punctures, each with a fine hair which is mostly very short.

Males and females are very similar, but in a few species the sexes may differ in the sculpture of the declivous part of the propodeum and in the length of the acetabular carina. Pygidial area of female triangular, broad or sometimes very narrow, mostly coriaceous, rarely smooth, either with a few punctures along the margin or more or less densely punctate. Face of both sexes with dense and appressed silvery or golden pubescence, also a number of long and erect hairs. The males have a row of soft and long fasciculate hairs, which are directed obliquely backwards, or somewhat curved, along the margin of the fourth and fifth abdominal sternites.

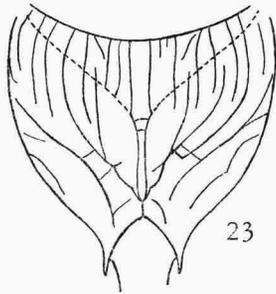
The structure of the male genitalia does not seem to be of practical value for the identification of the species.



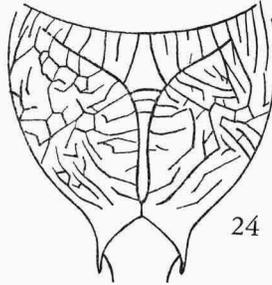
Figs. 14-22. Propodeum of various Oriental species of *Psen* s. str. (females).

Provisional key to the Indonesian and Philippine species of the subgenus **Psen** Latr.

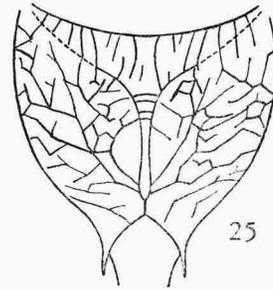
1. A conspicuous dense row of backward bent hairs along the posterior margin of the tergites. Propodeal declivity of female with regular and close longitudinal striae (fig. 14) and small tubercles between carinae. Anterior margin of clypeus irregularly punctate, with large interspaces and some very large punctures. Pygidial area of female broadly triangular, an irregular row of punctures along the margin. Large species. 2
 - Hairs along margin of tergites not conspicuously bent, often hardly visible. Propodeal declivity without close and regular longitudinal striae. 3
2. Face with pale golden pubescence (both sexes). Hairs along margin and pubescence on disk of tergites golden. (Java). *curvipilosus* n.sp.
 - Face with silvery pubescence. Bent hairs along margin almost black, pubescence on disk of fourth, fifth and sixth tergites greyish. Only one female known, length almost 18 mm. (Sumatra; ?Malaya). *lieftincki* n.sp.
3. Behind the enclosed area of the propodeum on both sides a smooth area or this part with very fine sculpture only; stronger carinae not extending to enclosed area (fig. 16). See also *opacus*. 4
 - No smooth areas there; carinae on propodeal declivity extending to enclosed area (fig. 22). 12
4. Base of third tergite of male with a triangular, microscopically reticulate and impunctate area (fig. 77). Scutum shining, with strong punctures in rows. Antennal segments 3-13 with tyloidea. Female unknown. (Java). *triangulatus* n.sp.
 - No triangular reticulate area on third tergite (some males unknown). 5
5. Mesosternum with acetabular carina which is almost as long as or longer than half the distance between the ends of the epicnemial carinae (fig. 32). 6
 - Acetabular carina shorter (males of *P. terrigenus* and *P. rubicundus* unknown) 7
6. Propodeum on both sides behind the enclosed area not smooth, but with some very fine carinae, declivity normal (fig. 83). Clypeus with broad but shallow triangular emargination. Antennal segments 6-12 of male with tyloidea. Female unknown. (Morotai). *carbonarius* Smith
 - Behind the enclosed area of propodeum on both sides a large and shining area (fig. 16). Emargination of clypeus deeper and rounded. Antennae of male without tyloidea. Pygidial area of female dull, with a row of punctures along the margin. (Java; Krakatau I.; Bangka; ?India) *nitidus* n.sp.
7. Emargination of clypeus deep, triangular; margin impunctate, with two pointed teeth. Pygidial area of female smooth and guttershaped. Face of female golden; male unknown. (Java) *terrigenus* n.sp.
 - Emargination of clypeus less deep, teeth rounded. Pygidial area of female not guttershaped. 8
8. Smooth areas behind the enclosed area broad, oblong, covering a large part of the propodeal declivity (fig. 18). 9
 - Smooth areas very narrow, mostly horizontal; propodeal declivity reticulate (fig. 20). 10
9. Smooth areas behind the enclosed area without any distinct sculpture, shining. Punctuation of scutum distinct. Pygidial area of female elongately triangular, smooth and shining, except apical part. Antennae of male without tyloidea. Face silvery in both sexes. (Java; ?India). *elisabethae* n.sp.
 - Smooth areas behind the enclosed area with regular coriaceous sculpture, but still somewhat shining (fig. 19). Punctuation of scutum coarse. Pygidial area of female as in *P. elisabethae*. Antennae of male without tyloidea. Face silvery in both sexes. (Philippines). *coriaceus* n.sp.



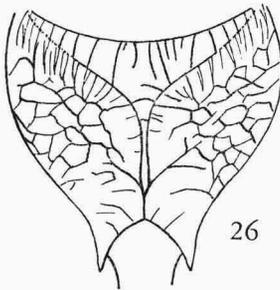
vechti
(holotype)



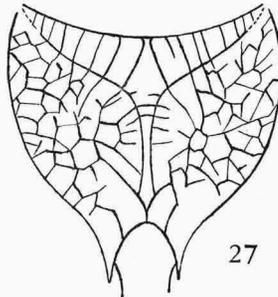
emarginatus
(Mt. Patuha)



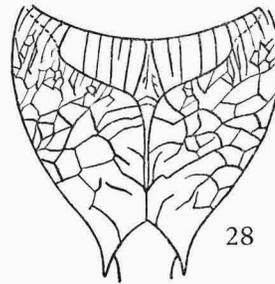
betremi
(Mt. Gedeh)



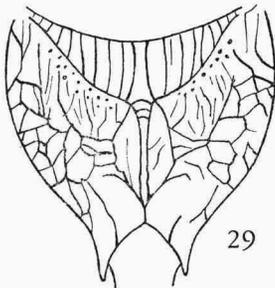
opacus
(holotype)



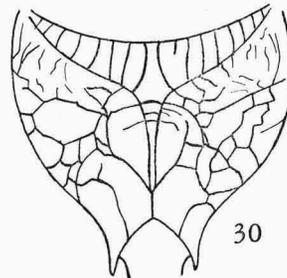
toxopeusi
(holotype)



aureohirtus
(topotype)

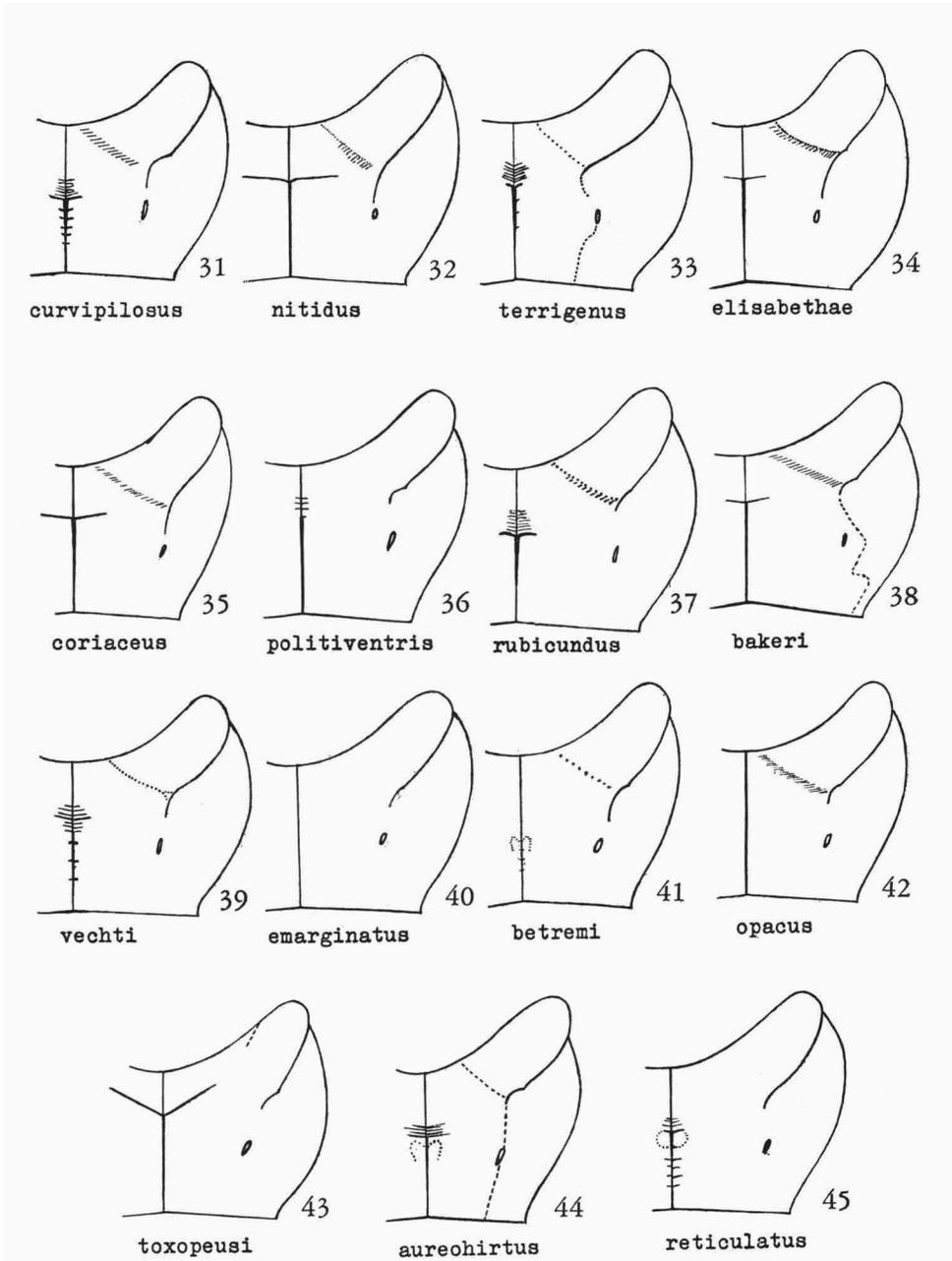


reticulatus
(Simla)

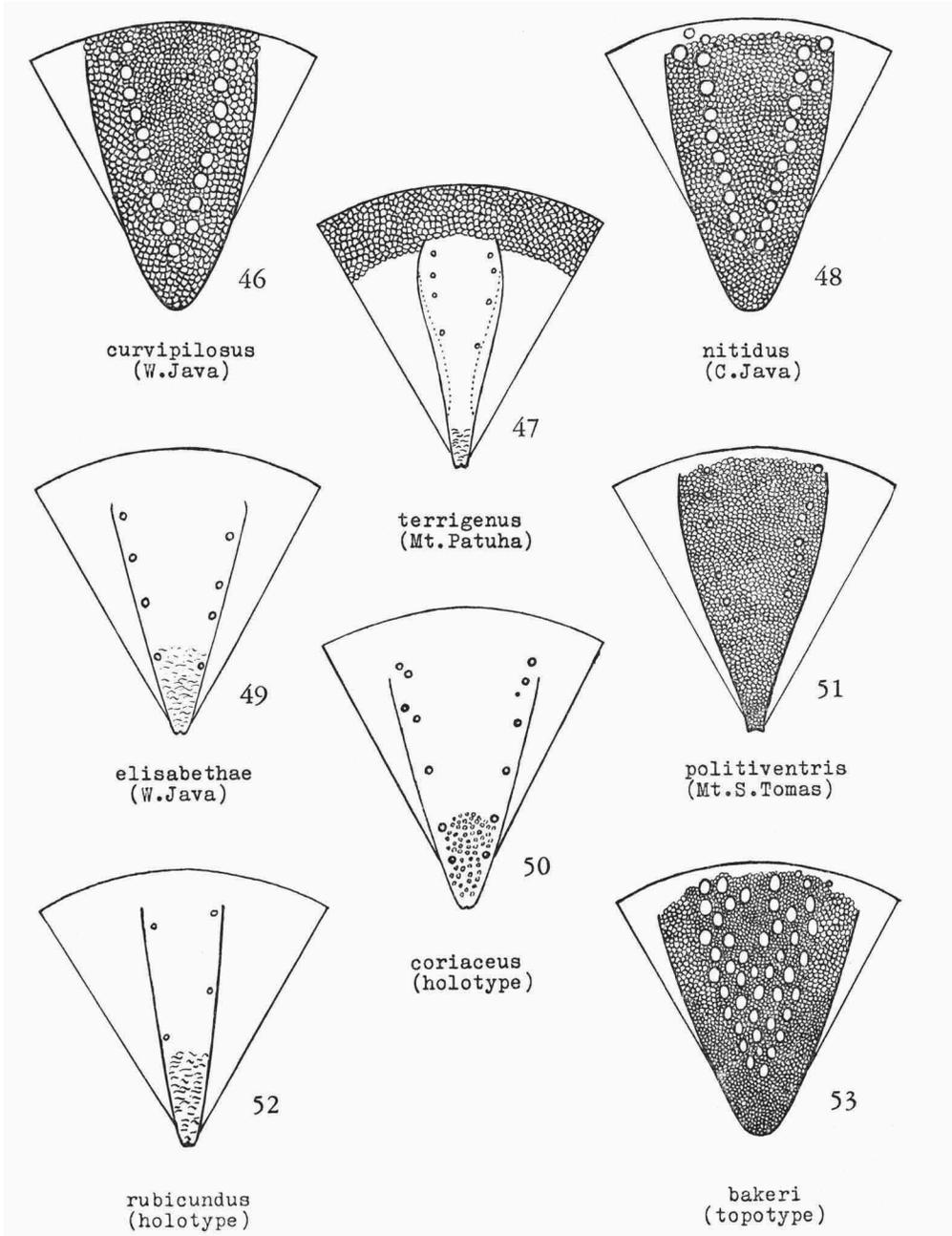


refractus
(Mt. Abu)

Figs. 23-30. Propodeum of various Oriental species of *Psen* s. str. (females).

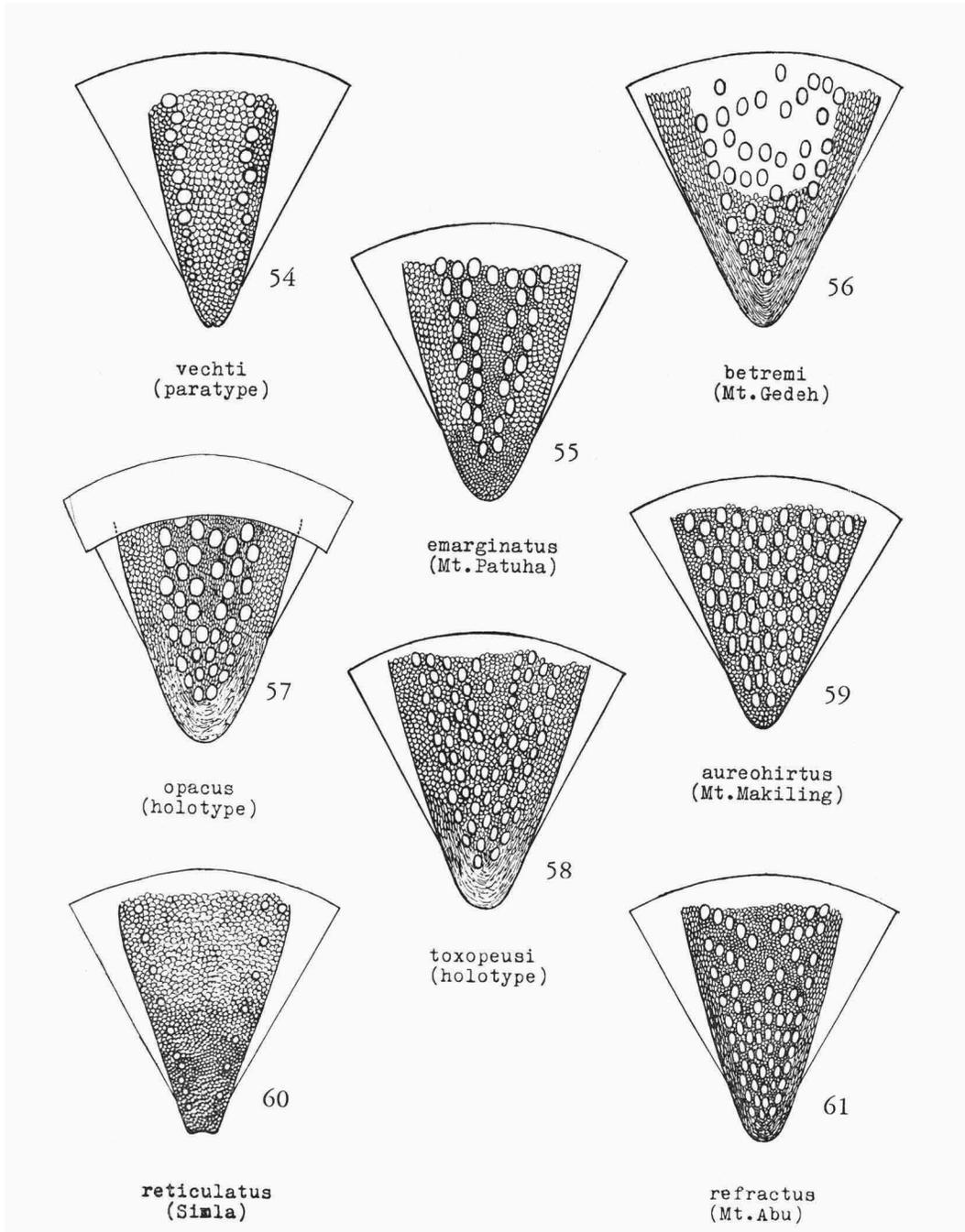


Figs. 31-45. Left part of mesosternum (ventral view) of various Oriental species of *Psen* s. str. (females).



Figs. 46-53. Pygidial area of various Oriental species of *Psen* s. str. (females).

10. Anterior margin of clypeus dull. Gaster including petiole black. Pygidial area of female dull, a few punctures along basal margin; apex slightly emarginate (fig. 51). Antennal segments of male very long, 4th-10th with longitudinal tyloidea, third and eleventh segments mostly indistinctly carinate. Face of female golden, of male silvery. (Philippines). *politiventris* Rohwer
- Anterior margin of clypeus shining. Petiole red, rest of gaster fully or partly red. Pygidial area of female narrow, base shining, apex slightly emarginate (fig. 52). Face of female silvery; male unknown. 11
11. Gaster almost wholly red, tergites slightly darkened. (W. Java). *rubicundus* n.sp.
- Gaster much darkened, of tergites 2-5 only the apical margin and the sides ferruginous. (E. Java). *rubicundus lawuensis* n.subsp.
12. Scutum striato-punctate. Margin of clypeus slightly emarginate, dull, impunctate. Interantennal tooth reduced to a flat round tubercle. Pygidial area of female triangular, with large punctures (fig. 53). Antennal segments 6-13 of the male with oval or circular tyloidea. Face of female golden, of male silvery. (Philippines). *bakeri* Rohwer
- Scutum shining, punctate. 13
13. Frontal line ends in a horizontally flattened protuberance. Clypeus deeply emarginate. Propodeal declivity with a few, almost parallel but rather far apart, longitudinal carinae (fig. 23). Pygidial area of female dull, with a row of punctures along the margin (fig. 54). Face of female golden, male unknown. (Java). *vechti* n.sp.
- Frontal line ends in a normal tooth. Propodeal declivity irregularly rugoso-reticulate 14
14. Gaster including petiole black. 15
- Petiole sometimes red, following segments at least partly red. 18
15. Interocellar and postocellar areas much raised. Antennal segments 6-13 of the male with tyloidea. No acetabular carina. Face of male silvery, female unknown. (Philippines). *melanosoma* Rohwer
- Interocellar and postocellar areas not or slightly raised. Antennal segments 6-12 or 7-12 of the male with tyloidea (male of *P. opacus* unknown). 16
16. A regular row of long stiff hairs along the margins of the tergites. Margin of clypeus impunctate, deeply emarginate, so as to form two distinct teeth. Male with very long acetabular carina; this carina absent in female. Legs dark; mid tibiae dilated. Pygidial area of female with large punctures in four irregular rows (fig. 55). Antennal segments 6-12 of male with tyloidea. Face silvery in both sexes. (Java). *emarginatus* n.sp.
- Hairs along the margins of the tergites, if any, not arising from a regular line of distinct punctures. 17
17. Face of female golden, of male silvery. Pygidial area of female broadly triangular, with many large punctures, but the margin impunctate (fig. 56). Antennal segments 7-12 of the male with oval tyloidea. Legs partly rufous. (Java). *betremi* n.sp.
- Face of female silvery (male unknown). Propodeal declivity behind the enclosed area with fine, more or less parallel carinae. Pygidial area of female broadly triangular, with four or six longitudinal rows of punctures (fig. 57). Legs dark. No stiff hairs along margin of tergites. (Philippines). *opacus* n.sp.
18. Large species. Petiole and following three segments fully red. Pygidial area of female striato-punctate, margin dull and impunctate (fig. 58). Face of female golden; male unknown. (Celebes). *toxopeusi* n.sp.
- Smaller species. Petiole black or red. Following segments at least partly darkened. 19
19. Petiole black. Second tergite of female with red apical margin, third tergite with two lateral red spots; male with more red on these and also on the following seg-



Figs. 54-61. Pygidial area of various Oriental species of *Psen* s. str. (females).

ments. Anterior margin of clypeus with shallow emargination, disk densely punctate. Pygidial area of female densely and almost completely striato-punctate (fig. 59). Antennal segments 6-13 of the male with tyloidea. Face golden in both sexes. (Philippines: Luzon). *aureohirtus* Rohwer

— Petiole red. (Female unknown). (Philippines: Negros).

aureohirtus rufopetiolatus n.subsp.

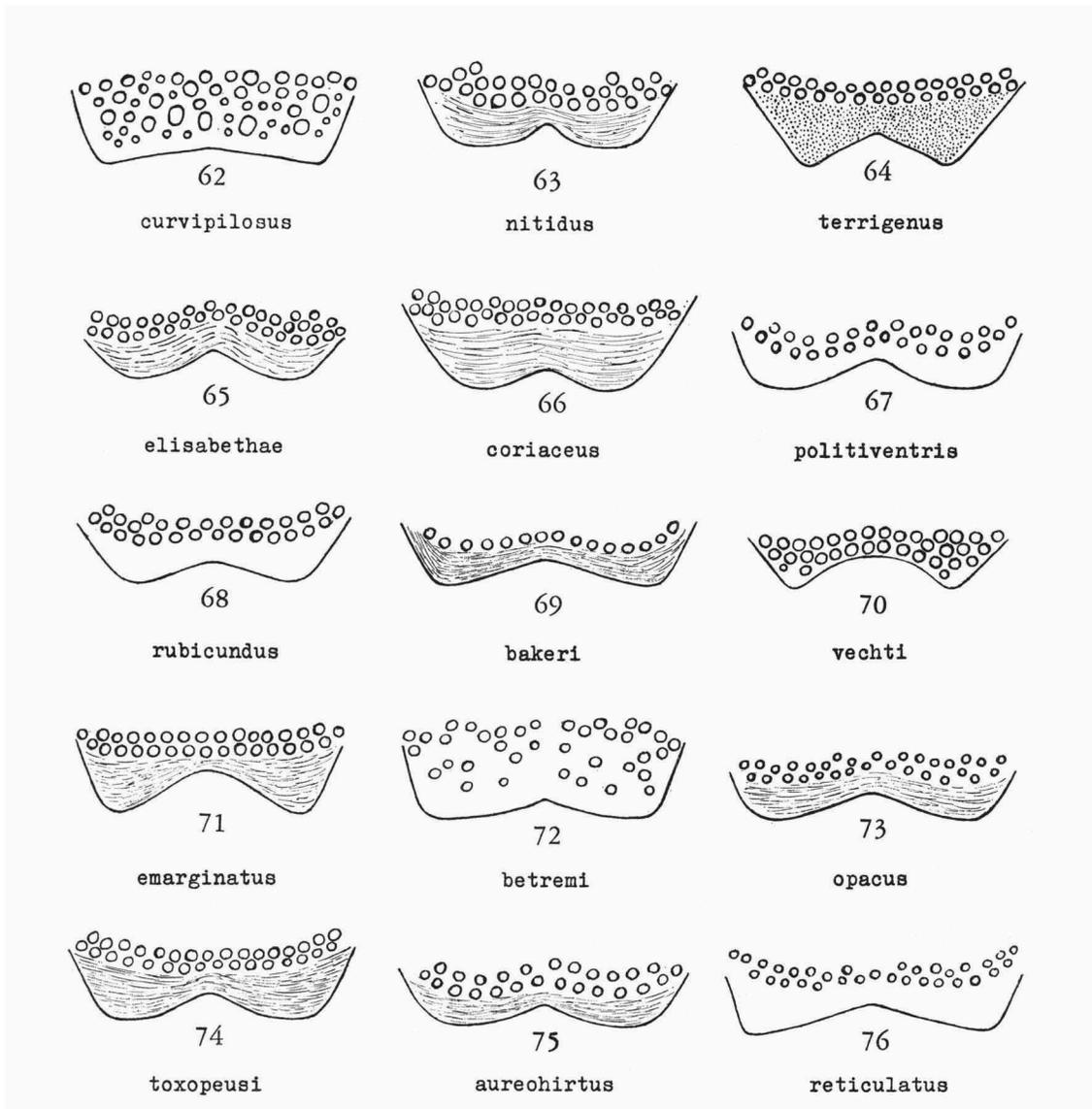
Psen (Psen) curvipilosus n.sp.

Female. — Black; tips of mandibles red, underside of antennae brown or reddish brown, tegulae reddish, tarsi and apices of tibiae reddish, posterior margin of tergites and sternites reddish transparent. Wings yellowish, veins pale brown.

Clypeus densely punctate, protruding margin very slightly emarginate and smooth, with a few large and some small punctures, some of the latter nearly reaching the end (fig. 62). A fine frontal line from the median ocellus ends in a large and laterally flattened tooth between the antennae; in lateral view this tooth looks like an equilateral triangle with a rounded top. From the bases of the antennae a fine carina runs obliquely upwards to this tooth. Vertex and frons shining, sparsely punctate, interstices larger than punctures, on the frons the punctures are deeper and more numerous. A distinct curved groove behind the lateral ocelli is connected with the median ocellus by an indistinct median longitudinal groove. Antennae somewhat clavate, apex of each segment somewhat thickened.

Scutum densely and coarsely punctate, often many punctures in rows with a tendency to striation. Scutellum and metanotum more sparsely but still coarsely punctate and shining. Mesosternum with a short transverse acetabular carina. Median groove of mesosternum with a longitudinal carina and a few very short transverse carinae (fig. 31). Mesopleura finely punctate, on the lower part intermixed with a few larger punctures. Enclosed area of propodeum smooth and shining, with a number of partly incomplete, longitudinal carinae; no sharp carina separating the enclosed area from the rest of the propodeum. Propodeal declivity somewhat irregularly and closely longitudinally striate; between the carinae with irregular and ill-defined tubercles (fig. 14). Sides of propodeum with shallow punctures.

Hind femora with the usual smooth upper part and with only a few short hairs beneath the longitudinal row of fine punctures so that this part too is almost smooth. Upper side of hind tibiae with short and blunt spines, on the inner side of the basis a patch of dense pale brown pubescence. First four tarsal segments of fore and mid legs somewhat dilated at the apex, with spines on the outer side, a stronger one at the end. Calcaria reddish, the inner one slightly longer than half the length of the first tarsal



Figs. 62-76. Anterior margin of protruding part of clypeus of various Oriental species of *Psen* s. str. (females).

segment, bent near the tip. In the fore-wings both recurrent veins end in the second submarginal cell, or the second recurrent is interstitial.

Petiole long and smooth, somewhat flattened above, slightly depressed at the apex, the sides with a distinct and large groove. Underside of the petiole

at the apex with an indistinct median keel and also with a number of indistinct longitudinal carinae laterally; along the margin of the underside a few large but shallow punctures. Gaster finely punctate, in front of the very narrow and smooth posterior margin of the tergites a few rows of strong punctures, from which the long bent hairs arise. Pygidial area triangular with rounded apex, coriaceous; the sculpture of the margin distinctly coarser than that of the central part, which is slightly raised; margin and central part separated by a row of punctures (fig. 46). Sides of apical segment with very large punctures. Sternites a little raised before the shining margin, the raised part with many sharp punctures, rest of sternites sparsely punctate only.

Face with pale golden appressed pubescence, with a few long and erect hairs. Scutellum, metanotum and propodeum (the latter with the exception of the enclosed area, which is bare) with long and dense, erect, pale golden pubescence, rest of the body with shorter hairs. The long hairs on both sides of the median groove of the propodeum are directed radially. Margin of upper side of petiole with long hairs arising from minute punctures; lateral grooves of petiole with a row of long hairs pointing obliquely upwards, ventral side also with long and erect hairs. Tergites bordered with a dense row of long golden hairs which are bent backwards, on the disk of abdominal tergites four, five and six a pubescence of short, fine hairs intermixed with long and erect hairs. Third and following sternites with long and erect pale hairs along the margin. Pygidium with long bristles arising from the punctures.

Length 12-14 mm.

Male. — Similar to the female, legs somewhat darker. Margin of clypeus with fewer punctures, between the punctures almost smooth, rest of clypeus shining with few punctures. Antennae clavate, without tyloidea. Propodeum as in the female, also the enclosed area, but the declivous part is irregularly striate, with only a few parallel carinae; on the sides it is coarsely reticulate. Upper side of hind tibiae without spines. Petiole ventrally with a distinct longitudinal carina, which is not sharp, on both sides of this carina a few irregular carinae. Second recurrent vein of fore wings interstitial. Posterior margin of fourth and fifth abdominal sternites with fringes of fasciculate, long, dark hairs.

Length 11 mm.

The female of this species is readily distinguished by the parallel striation of the propodeum; both sexes are characterized by the golden pubescence of the face, the bent, golden hairs along the margin of the tergites and the puncturation of the clypeus.

Holotype: ♀, E. Java, Mt. Idjen, Kali Sengon, 900 m, 28 June 1939, E. van der Vecht-Bourguignon (ML).

W. Java: 1 ♂ (allotype), Mt. Panggerango, Tjisarua South, 1000 m, 18 Jan. 1942, M. A. Lieftinck (ML); Mt. Gedeh, 1 ♀, Puntjak, 1400 m, 10 Jan. 1953, J. van der Vecht (MR), 1 ♀, Puntjak Pass, 7 Febr. 1941, M. A. Lieftinck (ML), 2 ♀, Puntjak, Telaga Warna, 1450 m, 18 June 1939 and 27 June 1942, the former with prey: *Considia* n.sp. (Homoptera, Cercopidae, identification Dr. H. C. Blöte), M. A. Lieftinck (ML, MR).

E. Java: 1 ♀, Mt. Semeru, R. Darungan, 6-13 June 1941, M. A. Lieftinck (ML).

All females, except the holotype, are paratypes.

Psen (Psen) lieftincki n.sp.

Female. — Closely allied to *P. curvipilosus*, but the only specimen which I have seen is considerably larger.

Underside of antennae reddish brown, the apical segments being somewhat darker. Mandibles dark, tibiae and tarsi reddish brown. Radial cell fuscous, wings yellowish.

Shape and puncturation of clypeus, interantennal tooth, thorax and gaster similar to *P. curvipilosus*. Propodeum with the characteristic longitudinal striae and small tubercles, from which hairs arise, but striae less close; on the lower part there are some transverse carinae (fig. 15). Sides of propodeum without distinct punctures. Second recurrent vein of fore wings interstitial.

Apex of petiole dorsally with a longitudinal, shallow depression, ventrally with some longitudinal, short carinae, which are more regular than in the preceding species. Sternites with fine reticulation. Pygidial area very similar to that of *P. curvipilosus* but the punctures are more irregularly placed and approach the lateral carinae more closely.

Face with silvery pubescence and some long and erect silvery hairs. Posterior margin of tergites with almost black long hairs which are bent backwards as in *P. curvipilosus*; these hairs are short on the second tergite, and paler on the sixth. Disk of tergites four, five and six with dense pubescence of short grey hairs and also with a number of long and pale hairs. Along the margin of the sternites long and stiff pale hairs, directed backwards. Pubescence on the scutum yellowish brown, on the rest of the body greyish.

Length 17 mm.

This species is easily distinguished from *P. curvipilosus* by the silvery pubescence of the face, the black instead of golden brown hairs along the margin of the tergites and the grey pubescence on the disk of the tergites.

S. Sumatra: 1 ♀ (holotype), Mt. Tanggamus, S. W. Lampong district, Gisting, 6-700 m, ult. Dec. 1939, M. A. Lieftinck (ML).

A male from the Malay Peninsula most likely belongs to this species. It agrees with the female in the reddish colour of the tegulae, the brown hind tibiae, the black, curved hairs on the posterior margin of the tergites and the greyish pubescence on the disk of these tergites. The fasciculate hairs on the fourth and fifth abdominal sternites are dark brown. Antennae without tyloidea.

However, there is an important difference in the structure of the upper side of the petiole, the apical third part having a deep, wide groove, which widens towards the apex. On both sides of this groove there is a somewhat irregular row of distinct punctures reaching as far as the sharp curve of the petiole near the propodeum.

On the underside the petiole shows a long median carina; on each side of this keel a shorter keel half the length of the petiole and then a very short keel. The lateral keels are not distinct in ventral view. The rest of the underside of the petiole is coarsely striato-punctate. Sides with a deep, punctate groove.

The difference in the structure of the ventral side of the petiole will undoubtedly prove to be a sexual difference only, but because of the much deeper groove on the upper side it is not yet quite certain that this male is really the other sex of *P. lieftincki*. A female from the same locality would be highly desirable to solve this problem.

The mesosternum is vaguely marked off; the subpleural signum is a small, indistinct, oval suture. The lower part of the propodeal declivity is coarsely reticulate.

Length 13 mm.

Malaya: 1 ♂, Bukit Kutu, 3485 ft., 30 Jan. 1930, H. T. Pagden (HTP).

***Psen (Psen) lieftincki* subsp.?**

Another male from Malaya, which is somewhat smaller, differs in the following details.

Tegulae dark brown. The subpleural signum is a shining, weak carina, about six times as long as it is broad. The groove on the upper part of the petiole is only distinct just in front of the second tergite, the rest of the apical third part of the petiole is slightly concave. On the underside there is only one long median keel and on each side of it about three short ones. On both sides of the median keel the underside is concave, so that the lateral keels are more prominent. The puncturation there has less tendency

to striation. Gaster more distinctly but still finely and not densely punctate. Pilosity on disk of tergites pale reddish brown.

Length: 11 mm.

Malaya: 1 ♂, Bukit Fraser, 15 July 1928, H. T. Pagden (HTP).

I prefer not to name this specimen so long as the identity of the preceding male has not been ascertained.

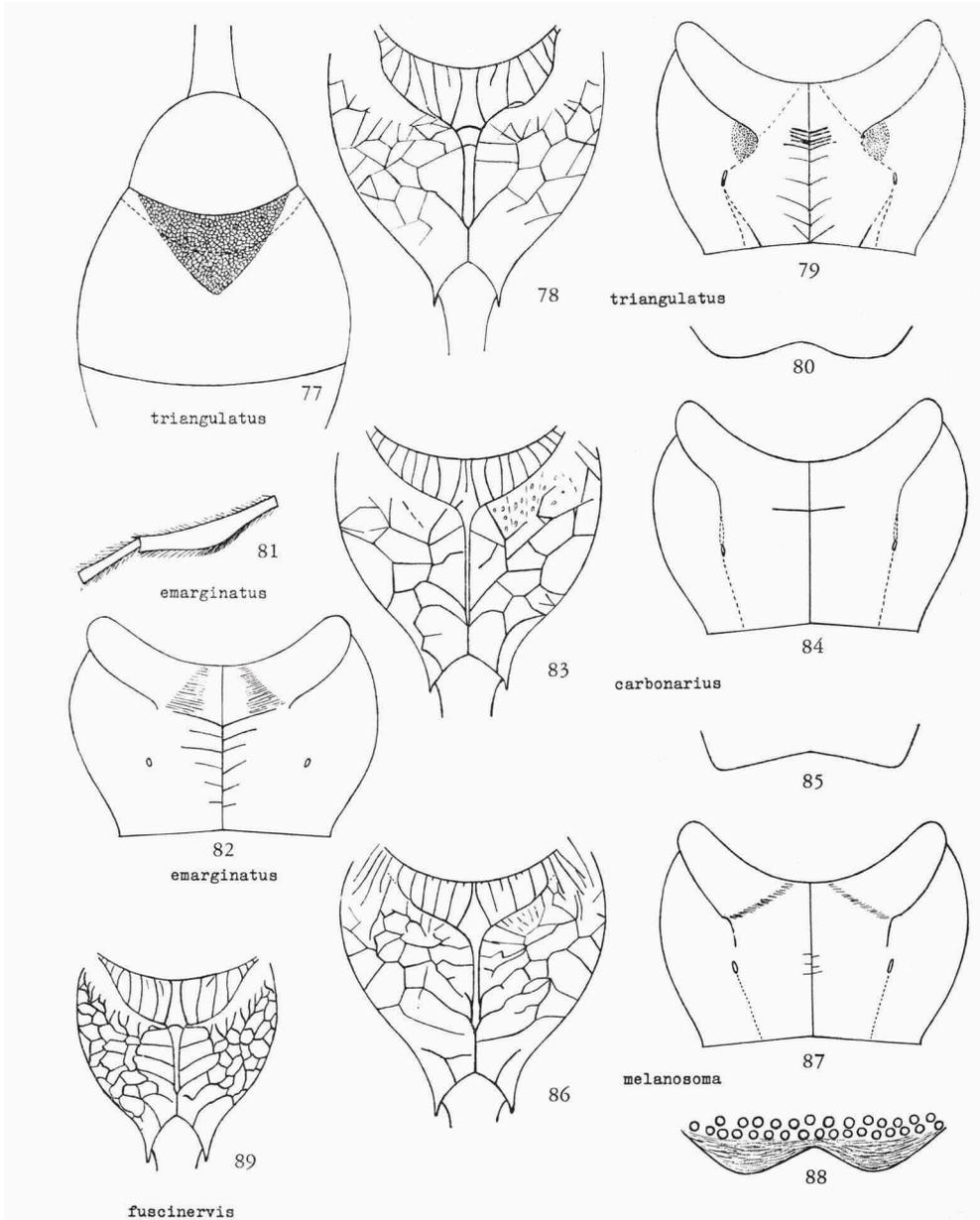
Psen (Psen) triangulatus n.sp.

Male. — Black; ends of tibiae, including calcaria, and tarsi ferruginous. Wing-veins dark brown.

Clypeus shining, interspaces between the punctures larger than the punctures, margin slightly emarginate (fig. 80). Frontal carina just below the median ocellus very fine, almost indistinct. It ends in a small tooth which is connected with the antennal sclerites by fine carinae. On the outer side of the lateral ocelli a small oblique groove. Frons and the area between and behind the ocelli densely punctate; rest of vertex shining, with a few punctures. Antennae slender, last segment less than twice as long as it is broad at the base. Segments 3-13 with tyloidea, on segment 3-6 broad and shining, extending from base to apex; on the following segments the tyloidea gradually become shorter and rounded at the ends, also duller; on the twelfth segment, which is slightly longer than it is broad, the tyloides measures about three quarters of the length of the segment and on the last segment it is not more than a short carina, about one third of the length of the segment.

Scutum shining, strongly but not densely punctate, punctures often in rows, scutellum sparsely punctate. Metanotum short, declivous. Mesopleura finely and sparsely punctate. Mesosternum finely punctate, precoxal carina completely developed, subpleural signum oval. Oblique, and partly sharp carinae end in the median mesosternal line (fig. 79). Acetabular carina not distinct, inter-epicnemial area with transverse striae. Propodeal enclosure shining, concave and with a few sharp longitudinal carinae. On both sides behind this enclosure a narrow smooth area. Declivity and sides of propodeum rugoso-reticulate (fig. 78). Back of hind femora basally with a few punctures, from each of which a hair arises. Base of hind tibiae slender and somewhat bent, no spines on the upper side. Both recurrent veins end in the second submarginal cell.

Petiole longer than the rest of the gaster, cylindrical, but sides slightly flattened and with a few punctures, dorsum smooth. Gaster shining, finely punctate. Third abdominal tergite with a narrow somewhat depressed base and a large, finely reticulate triangle, which is well-defined and bare (fig.



Five Oriental species of *Pseneura* s. str. (all males). Figs. 77-80: *triangulatus* n. sp. (paratype), second and third tergite, propodeum, mesosternum and anterior margin of protruding part of clypeus. Figs. 81-82: *emarginatus* n. sp. (allotype), mid tibia and mesosternum. Figs. 83-85: *carbonarius* Smith (holotype), propodeum, mesosternum and clypeus. Figs. 86-88: *melanosoma* Rohwer, propodeum, mesosternum and clypeus. Fig. 89: *fuscinervis* Cameron (syntype?), propodeum.

77). Tergites laterally, and also the fourth and following sternites, slightly reticulate.

Face with silvery appressed pubescence and a few long erect hairs. Hind femora with long greyish hairs below the row of punctures. Base of tibiae on the inner side with dense pale pubescence. Fourth and fifth abdominal sternites with long brown fasciculate hairs along the central part of the margin. Rest of the body with inconspicuous greyish pubescence.

Length approximately 8 mm.

Female unknown.

Distinguished by the remarkable reticulate triangle on the third tergite and the tyloidea on the antennae.

E. Java: 1 ♂ (holotype), Res. Semarang, Kopeng, Mt. Telego, 2000 m, July 1941, J. G. Betrem (ML); 1 ♂ (paratype), Res. Semarang, Kopeng, July 1941, J. G. Betrem (MR). The antennae of the paratype are missing.

Psen (Psen) carbonarius (Smith)

1865, Smith, F., Jl. Proc. Linn. Soc. Lond. Zool. Vol. 8, pp. 86-87, ♂ (*Mimesa carbonaria*; Morty Island).

Redescription

Black; mandibles yellowish, tips reddish; underside of antennae reddish; tegulae and legs testaceous, femora and tibiae partly darkened; scutum and gaster with bluish shine.

Anterior margin of clypeus with shallow triangular emargination (fig. 85), puncturation of disk invisible owing to the pubescence. Frons very finely punctate. A very thin frontal line which ends in a small tooth between the antennae, not clearly distinct in dorsal view. Postocellar area of vertex somewhat raised, with a few fine punctures. Right antenna (the segments 5-13 of the left antenna of the type are missing) with tyloidea on segments 6-12. The tyloidea on segments 9-12 are oval and slightly concave, on the preceding two segments they are smaller, distinctly raised, and smallest on segment six. The last segment of the antenna is slightly more than twice as long as the basal width. The pedicel is almost concealed in the first segment.

Scutum and gaster with fine and widespread punctures. Scutellum sparsely, metanotum densely punctate. Mesopleura almost impunctate. Scrobal suture distinct. Mesosternum with distinct acetabular carina. The epicnemial carinae end in the anterior precoxal carinae, which are partly broad and shining and extend as far back as the subpleural signum (fig. 84). Posterior part of precoxal carina represented by an indistinct ridge. Propodeum coarsely reticulate. Lateral areas adjacent to the enclosed part of the propodeum

with indistinct carinae and irregular tubercles (fig. 83). Sides of propodeum almost impunctate. Legs normal, hind tibiae with a few blunt spines on the upper basal part. Second recurrent vein interstitial. Petiole cylindrical, dorsally slightly flattened and smooth.

Besides the appressed silvery pubescence also some long and erect hairs on the face. Pubescence of temples with silvery reflection. Posterior half of hypo-epimeral area pubescent. Rest of thorax with greyish pubescence, which is dense and long on the propodeum. Abdominal sternites four and five with long golden brown fasciculate hairs along the margin.

The structure of the epicnemial, of the mesosternum and of the mesopleura, the bare upper half of the hind femora (which have no longitudinal series of punctures), the frontal line, the petiole and the fringes on the fourth and fifth sternites justify the placing of this wasp into the subgenus *Psen*.

It is readily distinguished from other *Psen* s.str. by the following combination of characters: the structure and sculpture of the mesosternum and of the propodeum, the emargination of the clypeus and the tyloidea of the antennae.

Morotai (Morty Island): 1 ♂ (holotype) (OUM).

***Psen (Psen) nitidus* n.sp.**

Female. — Black, often with bluish or bronze-violet tinge on head and thorax. Outer part of mandibles ferruginous. End of first antennal segment and underside of following segments brown. Propodeum and femora often with blue metallic tinge. Tegulae and ends of tibiae brown; tarsi pale yellowish-brown, the first segment lightest. Calcaria whitish. Nervures of wings brown.

Clypeus densely punctate; protruding margin dull, impunctate and emarginate so that two blunt teeth are formed (fig. 63). A thin frontal line runs from the median ocellus downwards and ends in a small interantennal tooth, which is connected with the bases of the antennae by fine carinae. Between the lateral ocelli a fine longitudinal groove, ending in median ocellus. Frons finely punctate, vertex with a few widespread punctures. Distal part of antennae somewhat clavate, segments 9-11 only slightly longer than they are broad.

Scutum with fine and sparse puncturation. Scutellum and metanotum sparsely punctate. Enclosed area of propodeum shining and well-defined; the lateral parts of this enclosed area are more concave than in *P. elisabethae*, with sharp and complete carinae. On both sides behind this enclosed part a smooth and shining area with at most a few microscopic punctures. Mesopleura finely punctate. Inter-epicnemial area and mesosternum partly sepa-

rated by a sharp acetabular carina, which is longer than half the distance between the ends of the lower epicnemial carinae. Surface of epicnemial smooth. Mesosternum with usual median carina, but no distinct small transverse carinae (fig. 32). Declivous part of propodeum coarsely rugoso-reticulate (fig. 16) but with only a few stronger carinae. Sides of propodeum smooth, with fine points from which hairs arise.

Hind tibiae with short, blunt spines on the upper side. Both recurrent veins of fore wings end in the second submarginal cell.

Petiole smooth, rounded above, along the lateral margin with a line of minute punctures. Petiole on each side with a broad but shallow groove; in this groove a few punctures from which long hairs arise. Rest of gaster shining with a tendency to reticulation, finely punctate, stronger on the last four tergites. Pygidial area with rounded apex, finely coriaceous, central part somewhat raised and bordered by a line of large punctures, each with a long backwardly directed bristle hair (fig. 48). Third abdominal sternite with a few large punctures on the base. Third sternite partly and following sternites almost completely with very fine reticulation, last sternite dull. All sternites except the last one with sparse puncturation on the disk, more densely punctate near the posterior margin.

Face with silvery appressed pubescence and a few long erect hairs. Temples with somewhat appressed silvery pubescence. Scutellum and metanotum with long pale hairs. Petiole with sideways directed long and pale hairs. Disk of third sternite and margin of this and following sternites with some long, backwardly directed hairs, rest of body with inconspicuous whitish pubescence.

Length about 7,5-9 mm.

Male. — Resembles the female. Antennae without tyloidea, last segment twice as long as it is broad at the base. Tarsi somewhat darker than in the female. Smooth areas of propodeum smaller, less distinctly defined. Acetabular carina slightly longer than in the female and inter-epicnemial area with more transverse striae. Mesosternum with a tendency to oblique striation. Hind tibiae without spines on the upper side. Ventral side of petiole concave (convex in the female). Fourth and fifth abdominal sternites slightly emarginate, fringes of golden brown fasciculate hairs along the apical margin.

Length about 7,5-9 mm.

This species is easily distinguished by the shining enclosed area of the propodeum, the two smooth and shining areas on both sides of the upper declivous part of the propodeum, the long acetabular carina in both sexes and the sculpture of the pygidial area of the female.

Holotype: ♀, E. Java, Malang, May 1933, J. G. Betrem (ML).

All other specimens mentioned below, except the allotype, the male from Bangka and the female from Ceylon, are paratypes.

E. Java: 2 ♀ and 9 ♂, Malang, April-May 1933, J. G. Betrem (including allotype, April 1933) (1 ♀ 7 ♂ ML, 1 ♀ 2 ♂ MR).

C. Java: 1 ♀, Wangun, March 1938, J. van der Vecht (ML).

W. Java: 1 ♀, Tjiguha, Djampang Wetan, Jan. 1938, J. van der Vecht (ML); 4 ♂ and 4 ♀, Bandung, 700 m, 2 June-30 Nov. 1940-1941, J. Olthof (1 ♀ 1 ♂ MZB, 2 ♀ 1 ♂ ML, 1 ♂ USNM, 1 ♀ 1 ♂ MR); Mt. Gedeh, 1 ♂, Situgunung, 16-20 Sept. 1940, J. van der Vecht (ML), 1 ♂, Tjibodas, 1400 m, 21 May 1935, J. van der Vecht (ML); 1 ♂ Mt. Tjangkudang, Djampang Wetan, Nov. 1938, J. van der Vecht (ML); 1 ♂ Mt. Tjisuru, Djampang Tengah, 6-800 m, March 1935, M. E. Walsh (ML); 1 ♀ Djampang Bibidjilan, July 1936, M. E. Walsh (ML).

Sunda Straits: 1 ♂, Krakatau I., 22 June 1955, A. M. R. Wegner (ML).

Bangka: 1 ♂, Pangkalpinang, Aer Item, 17 March 1935, J. van der Vecht (ML).

I have seen a female belonging to the British Museum (Natural History) labelled "Pundaloya, Col. C. T. Bingham, 96-30, *Psen orientalis* Cam. ♀". The name-label, which like the other labels has been repinned a few times, is in an old handwriting (cf. Bingham 1897, p. 264).

This specimen does not agree with the description of *Psen orientalis* by Cameron (1890) but corresponds in all respects with *Psen (Psen) nitidus* from Java. The bluish shine on thorax and femora, the relatively long acetabular carina, the sculpture of the propodeum, the nervation of the fore wings and the puncturation of the pygidial area exclude any doubt.

It would be interesting to see fresh material which could confirm the occurrence of *P. nitidus* in this region.

***Psen (Psen) terrigenus* n. sp.**

Female. — Black; ends of mandibles reddish, tegulae blackish brown, ends of tibiae and tarsi completely ferruginous. Wings somewhat smoky, nervures brown.

Clypeus with shining, narrow interspaces between the punctures; anterior margin deeply triangularly emarginate; teeth coriaceous, with a few punctures (fig. 64). Upper part of frontal line thin, hardly visible, lower part stronger, ending in a laterally somewhat flattened, small triangular tooth, which is distinct in dorsal view. This tooth is somewhat concave ventrally and connected with the antennal sclerites by fine carinae. Frons densely punctate, vertex sparsely punctate, on the outer side of the lateral ocelli a short oblique suture, behind the median ocellus a short longitudinal groove.

Tenth and eleventh antennal segments almost quadrate; the last segment $1\frac{3}{4}$ times as long as it is broad at the base.

Scutum with strong puncturation, interspaces mostly about as large as the punctures. Scutellum finely and sparsely punctate. Metanotum almost smooth. Inter-epicnemial area weakly defined, acetabular carina very short, median keel of mesosternum with a few indistinct transverse carinae (fig. 33). Enclosed area of propodeum with partly incomplete carinae, and adjacent narrow, smooth, lateral areas. Propodeal declivity irregularly rugoso-reticulate, strongest in the central part (fig. 17). Upper side of hind tibiae with some short and blunt spines. First recurrent vein of fore wings ends in the third part of the second submarginal cell, the second recurrent vein is interstitial.

Petiole cylindrical, base laterally somewhat flattened, upper side smooth; rest of gaster smooth, with hardly visible punctures. Pygidial area shining, with only a few fine punctures along the margin, before the apex finely transversely striate; towards the end the pygidial area is somewhat narrowed, which is accentuated by a longitudinal depression in the posterior half; apex emarginate (fig. 47). In front of the pygidial area the last tergite is finely reticulate; sides with a few large punctures.

Face with golden appressed pubescence and some long erect hairs. Vertex, scutum, scutellum and metanotum with brown hairs, rest of thorax and propodeum with inconspicuous grey pubescence. Gaster with normal pubescence, dorsally almost bare, posterior margin of sternites with a few long hairs as usual.

Length approximately 9-10,5 mm.

Male unknown.

Psen terrigenus is easily distinguished by the relatively strong puncturation of the scutum, the structure of the propodeum, the sculpture of the pygidial area, and the golden face.

W. Java: 2 ♀, Mt. Patuha, Rantja Bolang, 220 m, April 1937, E. Jacobson (holotype, ML, paratype, MR). These two females are labelled "nesten in grond in hollen berm van weg" (translation: nests in soil in hollow bank of road).

A third female from W. Java, Mt. Gedeh, Tjibodas, 1450 m, 20 Nov. 1938, J. van der Vecht (ML), has a more densely punctate clypeus and no punctures on the clypeal teeth. The gaster is somewhat reddish ventrally, also on the sides of the tergites.

***Psen (Psen) elisabethae* n.sp.**

Female. — Black; face between transverse interantennal carina and

clypeus, and thorax and femora with bluish shine. Ferruginous are: central part of mandibles, apex of first and underside of second antennal segment, tegulae, femora apically, tibiae, tarsi, and apex of pygidium. Veins of wings dark brown.

Clypeus densely punctate, the broad protruding margin without punctures but finely transversely striate, slightly and broadly emarginate (fig. 65). The frontal line ends in a large, laterally flattened tooth which is connected with the underside of the antennal sclerites by carinae. Central part of frons densely punctate, vertex with fine and widespread punctures. Post-ocellar area slightly raised, but puncturation not different from that on the sides of the vertex. Each lateral ocellus on a low tubercle.

Scutum shining, with deep punctures, sometimes in rows, but interspaces mostly a few times larger than the punctures. Tegulae smooth, scutellum with a few strong punctures, metanotum with a few finer punctures. Mesopleura shining, with a few fine punctures. Epicnemial carinae continuous with the anterior part of the precoxal carinae, reaching the subpleural signum; acetabular carina indistinct (fig. 34). Lateral epicnemial areas distinctly defined. Enclosed area of propodeum concave, with longitudinal carinae; median sulcus of declivous part of propodeum rather broad; upper part of propodeum on both sides with a large, smooth, and shining area; rest of propodeum irregularly, but not very strongly, reticulate (fig. 18); sides of propodeum shining, with a few fine punctures.

Upper side of hind tibiae with a row of short, blunt spines. Second and third segments of fore tarsi shorter than they are broad, tarsal segments of mid legs dilated towards the apex. Both recurrent veins of the fore wings end in the second submarginal cell.

Petiole slender, rounded ventrally, sides somewhat depressed, upper side slightly flattened as usual. Tergites with fine punctures. Pygidial area with small apical emargination, shining, the ferruginous end is finely coriaceous, and has on each side along the margin about five small punctures, each with a long bristle (fig. 49). Sides of last tergite with a few large punctures. Third abdominal sternite shining, following sternites very finely reticulate, base with a few larger punctures, each with a long bristle. Last sternite dull, apex irregularly punctate and with a short longitudinal keel.

Face, temples and pronotum with appressed silvery pubescence, mesopleura and base of mandibles with erect silvery pubescence. Rest of head and thorax with long whitish hairs. Gaster with sparse pubescence, on last segments longer and denser. Each puncture of pygidial area with a short bristle.

Length about 10 mm.

Male similar to female. Antennae not long, last segment approximately

1¾ times as long as it is broad, preceding three segments almost quadrate; tyloidea absent. Tarsi normal, hind tibiae without spines on the upper side. Petiole with two carinae on each side, no ventral carina. Margin of fourth and fifth abdominal sternites with a row of long and dark brown fasciculate hairs.

Length about 8-9 mm.

Holotype: ♀, W. Java, Mt. Patuha, Rantjabali, 1700 m, Sept 1941, J. van der Vecht (ML).

This species, which is dedicated to Mrs. Elisabeth van der Vecht-Bourguignon, is easily distinguished by the bluish shine on face, thorax and legs, the large, smooth areas of the propodeum, the shining pygidial area of the female and the ferruginous colour of the legs. It is closely related to *P. coriaceus*.

A female from Sukabumi, Java (IRSNB, I. G. 18388) differs in having the first two antennal segments reddish and the underside of the following segments brownish. Moreover the fore and mid femora are brownish, the hind femora ferruginous. The lower part of the smooth propodeal areas has a tendency to coriaceous sculpture, which, to a lesser extent, also applies to the allotype.

A female from Mt. Halimun, W. Java, May 1936, M. E. Walsh (ML), has also pale first antennal segments and brownish hind femora.

The following specimens from Java are labelled as paratypes.

W. Java: Mt. Gedeh, 8 ♀ and 27 ♂ (including allotype), Tjibodas, 1400-1450 m, 31 March-Dec. 1935/1950, M. A. Lieftinck, L. J. Toxopeus, J. van der Vecht, E. van der Vecht-Bourguignon (1 ♂ MZB, 5 ♀ 19 ♂ ML, 2 ♂ BM, 1 ♀ 1 ♂ USNM, 2 ♀ 4 ♂ MR), 1 ♀ and 4 ♂, Puntjak, 1400-1450 m, 11 Jan.-5 June 1948/1953, J. van der Vecht (ML), 1 ♀, Puntjak, Telegawarna, 1450 m, 18 June 1939, M. A. Lieftinck (MZB); 1 ♀ Mt. Panggerango, Tjibeureum, 1700 m, 20 Aug. 1952, M. A. Lieftinck (ML); 3 ♀ and 4 ♂ Mt. Patuha, Rantjabali, 1700 m, Sept. 1941, J. van der Vecht (2 ♀ 3 ♂ ML, 1 ♀ 1 ♂ MR); 1 ♀ Bandung, 700 m, 10-13 July 1941, J. Olthof (MZB); 1 ♂ Djampang Tengah, 1800 ft, 7 April 1939, J. van der Vecht (ML); 2 ♂ Mt. Salak, Pasir Leutik, 800 m, 3 Dec. 1939, J. van der Vecht (ML).

C. Java: 1 ♂, Mt. Lawu, Sarangan, June 1938 (ML).

E. Java: 1 ♂ Mt. Idjen, Blawan, 900 m, 10 Oct. 1939, H. Lucht (ML); 3 ♂ Mt. Pantjang, Nongkodjadjar, 1200-1500 m, Aug. 1934-1935, J. G. Betrem (2 ♂ ML, 1 ♂ MR).

Sumatra: A male from S. W. Lampongs, Mt. Tanggamus, 2 Jan. 1935, M. A. Lieftinck and L. J. Toxopeus (ML) belongs to this species but as

in the females from Sukabumi and Mt. Halimun in Java and the female from India the hind legs are darker than in the typical form.

India: 1 ♀, Bombay Presidency, Khandala, Oct. 1910, E. Comber, 1910-255 (BM). This specimen resembles the female from Sukabumi but the hind femora and tibiae are slightly darker, almost as brown as the fore and mid femora. Fresh captures to confirm the occurrence of the species in this region are highly desirable.

***Psen (Psen) coriaceus* n.sp.**

Female. — Black; thorax and legs, particularly propodeum and femora, with bluish shine. Anterior side of fore tibiae and mostly all tarsi testaceous. Apex of pygidium reddish. Veins of wings dark brown.

Clypeus with broad margin, which is emarginate as in *P. elisabethae* and dull, but impunctate (fig. 66). Frontal line ends in a tooth which is connected with the underside of the antennal sclerites by fine carinae. Central part of frons irregularly, partly coarsely, punctate, rest of frons and also the vertex with sparse, rather large but shallow punctures; lateral ocelli on a low tubercle, postocellar area somewhat raised, slightly more than in *P. elisabethae*. Against the eyes, below the level of the median ocellus, a rounded, somewhat raised, impunctate area. These areas are not distinct in all paratypes. Scutum shining, with coarse punctures, sometimes arranged in rows, interspaces generally smaller than the punctures. Posterior two thirds of tegulae shining. Scutellum more scarcely punctate than scutum, metanotum almost impunctate. Epicnemial carinae continuous with fore part of precoxal carinae, reaching the subpleural signum. Acetabular carina short. Epicnemial areas distinctly separated from the inter-epicnemial area (fig. 35). Enclosed area of propodeum somewhat concave, with slightly coriaceous sculpture and longitudinal carinae; median sulcus on declivous part of propodeum rather broad; upper part of propodeum on both sides with a large area which is not shining as in *P. elisabethae*, but finely coriaceous. Rest of propodeal declivity reticulate (fig. 19). Sides of propodeum shining, posteriorly with fine sculpture. Fore and mid tarsi as in *P. elisabethae*. Upper side of hind tibiae with a row of short blunt reddish spines. Both recurrent veins end in the second submarginal cell, or second recurrent vein interstitial.

Petiole slightly shorter than in *P. elisabethae*, cylindrical, dorsally slightly flattened. Tergites finely punctate, the sixth tergite with a few stronger punctures in front of the margin, which is smooth. Pygidial area almost as in *P. elisabethae* (fig. 50). Sides of apical tergite with a few large punctures. Third abdominal sternite shining; following sternites finely reticulate with

a few fine punctures. Apex of last sternite densely irregularly punctate and with a smooth median keel.

Face, temples and pronotum with appressed, mesopleura and base of mandibles with erect silvery pubescence. Gaster with sparse pubescence, which is longer and denser on last segments. Each puncture on pygidial area with a short bristle.

Length: about 10,5 mm.

Male similar to female, but underside of antennae testaceous; fore femora wholly and mid femora partly testaceous; back of hind femora brownish. Clypeus somewhat more shining. Antennae rather short, apical segment about twice as long as it is broad basally, no tyloidea.

Petiole on each side with two carinae and ventrally with a median keel. Hind tibiae without spines on the upper side. Margin of fourth and fifth abdominal sternites with a row of long brown fasciculate hairs.

Length: about 8 mm.

This species is easily distinguished from other *Psen* (*Psen*) by the coriaceous sculpture of the two bare areas on the propodeum. It is undoubtedly closely related to *P. elisabethae*, which occurs mainly in Java. *Psen coriaceus* agrees with the latter in the bluish shine, the margin of the clypeus, the extension of the bare areas on the propodeum and the structure of the pygidium.

Important differences are to be found in the colour of the legs, the puncturation of the scutum, the sculpture of the propodeum and the ventral median keel of the petiole. For the time being I would therefore prefer to regard *P. coriaceus* as a separate species.

It is remarkable that in a female from Negros the scutum is much more finely punctate than in the other specimens, whereas the male from the more southern Mindanao Island is as coarsely punctate as the allotype from Mindoro. The thorax of the Negros specimen is slightly more blue.

Prey records: one female from Luzon (Baguio, collected by Chapman) bears a label „storing nest with *Clovia lineolata*” (Homoptera, Cercopidae).

Psen coriaceus is apparently restricted to the Philippine Islands.

Mindoro: 1 ♀ (holotype), Ilong Mt. Halcon, 3000 ft, 10 May 1954, M. & D. Townes (HT); 1 ♂ (allotype), Alcate Vict., 6 April 1954, Townes family (HT).

Luzon: 1 ♀ (paratype), Baguio, Chapman, coll. C. F. Baker, 1927 (USNM); 1 ♀ (paratype), Mt. S. Tomas, 7200 ft, nr. Baguio, 27 Dec. 1952, H. M. & D. Townes (HT); 1 ♀, Benaue, Mt. Prov., 1955, W. Beyer (MR); 1 ♂, Mt. Makiling, labelled “paratype *melanosoma* Roh., 22882” (USNM).

Negros: 1 ♀, Mt. Canlaon, 3600 ft, 30 April 1953, H., M. & D. Townes (HT).

Mindanao: 1 ♂, Zamboanga, Baker (USNM). In this specimen the puncturation of the scutum is coarser and the hind legs are darker than in the allotype.

Psen (Psen) politiventris Rohwer

1921, Rohwer, S. A., Phil. Jl. Sc., vol. 18, No. 3, pp. 321-322, ♀ (*Psen (Mimesa) politiventris*; Baguio, Luzon, Philippines).

Female. — Additions to original description: margin of clypeus dull, without punctures (fig. 67). Interantennal tooth ends in an angulate carina which does not reach the antennal sclerites. Frons and vertex sparsely but distinctly punctate. Mesosternum without acetabular carina, finely punctate (fig. 36). Behind the enclosed area of the propodeum a horizontal narrow smooth and shining area, largest on the sides (fig. 20). Hind tibiae slender, with reddish spines on the upper side. Pygidial area coriaceous, slightly narrowed towards the end, apex emarginate, a few punctures along the margin of the basal two thirds (fig. 51). Some of the hairs along the margin of the upper side of the petiole are almost as long as the lower hairs.

Length about 10.5 mm.

Male. — Similar to the female, but differs as follows: Puncturation of clypeus less distinct. Antennae long and slender, last segment slightly more than three times as long as it is broad, segments 4-10 with longitudinal narrow tyloidea, on the eleventh segment sometimes an indistinct carina. Smooth areas behind the enclosed area often finely transversely striate, especially near the propodeal sulcus. The irregular transverse carinae ending in the median line of the mesosternum are somewhat longer. Petiole laterally with a weak longitudinal depression. Apical tergite brownish.

Face with silvery pubescence. Fasciculate hairs along the margin of the fourth sternite inconspicuous, on fifth sternite more distinct, although short.

Length about 9-10 mm.

This is a true *Psen* s. str., as is evident from the sculpture of the hind femora, the course of the epicnemial carinae and the presence of fasciculate hairs on the margin of the fourth and fifth abdominal sternites.

Psen politiventris is easily distinguished from the other species by the sculpture of the propodeum, in the female moreover by the pygidial area and in the male by the antennal carinae. As in *P. bakeri* the legs are red in both sexes, including the trochanters, the hind tarsi being somewhat darkened. It is closely allied to the Indian species *Psen (Psen) fuscinervis* (Cam.) and

Psen (Psen) reticulatus Cam., which apart from some other small differences, have darker legs.

Besides a female topotype, which according to Krombein agrees in all details with the holotype, and a male, identified by Baker, I have seen an interesting series collected by the Townes family.

Material examined: Luzon, 1 ♂ and 1 ♀, Baguio, Benguet, Baker (ML); 5 ♀ and 31 ♂, Mt. S. Tomas, 6500-7300 ft, nr. Baguio, April-December 1952-1953, Townes family (3 ♀ 24 ♂ HT, 2 ♀ 7 ♂ MR); 1 ♂, Mt. Data, 7800 ft, 1 Jan. 1953, Townes family (HT).

One of the males from Mt. S. Tomas is a dwarf measuring not more than 7 mm; it has a distinct carina on the eleventh antennal segment.

***Psen (Psen) rubicundus* n. sp.**

Female. — Head and thorax black; protruding margin of clypeus and the gaster ferruginous; first segment of antennae and underside of following segments, mandibles, legs and petiole paler red, more yellowish. Tegulae and pronotal tubercles brownish. Ends of hind femora and tibiae brown; hind tarsi completely brown. Veins dark brown.

Clypeus densely punctate, except the broad shining margin, which is slightly emarginate (fig. 68). Fine frontal line, which ends in a small but distinct truncate tooth, connected with the antennal sclerites by fine transverse carinae. Frons densely but finely punctate, vertex shining, with a few punctures. Behind the posterior ocelli a deep transverse suture; between the ocelli a short longitudinal groove. Postocellar area somewhat raised, the raised part well-defined laterally. Antennae long, most segments twice as long as they are broad, the eleventh segment is about 1½ times as long as it is broad at the base. Scutum shining, with strong punctures, sometimes arranged in rows, the interspaces generally larger than the punctures. Scutellum and metanotum only finely punctate. Mesopleura almost impunctate. Inter-epicnemial area somewhat depressed, so that the epicnemial are well-defined on the inner side. Acetabular carina short (fig. 37). Fore part of mesosternum finely and densely punctate. Dorsal enclosed area of propodeum with longitudinal carinae which do not all reach the posterior margin. The rest of the horizontal part of the propodeum is smooth and shining. Propodeal declivity rugoso-reticulate, but only few of the carinae are stout, including the V-shaped carina just above the petiole (fig. 21). Sides of propodeum smooth, posterior part punctate. Legs slender, basal two thirds of the hind tibiae on the upper side with a row of short and blunt spines. The second recurrent vein ends in the third submarginal cell.

Petiole cylindrical. Gaster shining, finely and sparsely punctate. Pygidial area narrow, apex emarginate so that two small teeth are formed; the basal two thirds are shining, the end is very finely transversely striate (fig. 52). Base of fourth and following abdominal sternites finely reticulate. Last sternite with a few punctures, its apex keeled.

Face with silvery appressed pubescence and a few long erect hairs, temples somewhat silvery, rest of the body with scarce greyish pubescence.

Length about 8,5-9,5 mm.

Male unknown.

P. rubicundus is easily distinguished by the structure of the propodeum and the red colour of legs and gaster.

W. Java: 1 ♀ (holotype), Mt. Patuha, Rantjabali, 1700 m, Sept. 1941, J. van der Vecht (ML); 1 ♀ (paratype), Mt. Gedeh, Tjibodas, 1450 m, 20 April 1940, E. van der Vecht-Bourguignon (MR); 1 ♀, Mt. Tangkuban-Prahu, 29 March 1934, L. J. Toxopeus (ML). This latter female has slightly darker legs, the second tergite is darkened in the middle and also the base of the fourth tergite is darkened.

***Psen (Psen) rubicundus lawuensis* n. subsp.**

In three females from East Java the legs are almost as pale as in the type of *P. rubicundus* from W. Java, but the clypeus, pronotal tubercles and tegulae are darker; tergites 2-5 black, except the apical margin and the sides, which are ferruginous. Sternites 4 and 5 also somewhat darkened.

E. Java: 3 ♀ (holotype and 2 paratypes), Mt. Lawu, Sarangan, June 1933, J. G. Betrem (ML, 1 ♀ paratype MR).

***Psen (Psen) bakeri* Rohwer**

1923, Rohwer, S. A., Phil. Jl. Sc., vol. 22, No. 6, p. 601, ♂ (*Psen (Mimesa) bakeri*; Luzon, Philippines).

Female. — Black; clypeus with indistinct reddish band behind the protruding margin; underside of antennae, except first two segments, yellowish brown, also tip of last segment; mandibles reddish with darker tips; legs ferruginous, including the trochanters. Wing veins brown.

Anterior margin of clypeus with broad triangular emargination (fig. 69). Frons and vertex with distinct puncturation, widespread on the vertex, between the punctures slightly coriaceous. Behind each of the lateral ocelli a deep semicircular groove. Postocellar area only slightly raised. Interantennal tooth hardly protruding. Antennae very long, third segment more than four times as long as it is broad at the apex, ends somewhat clavate, last segment more than twice as long as it is broad at the base. Scutum closely

striato-punctate. Scutellum with coarse punctures, not distinctly striate. Mesosternum with acetabular carina (fig. 38), finely punctate and with a tendency to oblique striation. Between the epicnemial areas, which also on the inner side are distinctly marked off, some irregular transverse striation. Enclosed area of propodeum concave, posteriorly well-defined (fig. 22). Declivous part of propodeum coarsely reticulate. Upper two thirds of hind femora bare, bounded below by a series of fine punctures. Upper side of hind tibiae with a row of short and blunt spines. Second recurrent vein just ending in third submarginal cell.

Petiole with tendency to coriaceous sculpture; sides with a lateral groove, the latter bordered by carinae of which the upper one is the most distinct. Tergites with only a few distinct punctures, mainly on the posterior half. Pygidial area broadly triangular, margin more distinctly coriaceous than the central part, which is coarsely punctate (fig. 53). Sides of apical tergite with irregular punctures, some of which are very large.

Face golden, rest of the body with greyish pubescence, scutum somewhat darker. The long bristles arising from the punctures on the pygidium are brown.

Length about 10,5 mm.

Male. — Resembles the female. Ventral side of antennae more or less brown or reddish. Seventh and eighth tergites ferruginous. Tyloidea of the antennae paler than the rest of the segments.

Emargination of clypeus slightly shallower than in the female, but still distinct (original description: "produced part of clypeus without a median emargination"). Antennae somewhat clavate, segments 6-13 with roundly oval tyloidea, last segment over $2\frac{3}{4}$ times as long as it is broad at the base. Upper side of hind tibiae with short and blunt spines.

Pubescence of face silvery and appressed, the erect pubescence on vertex, scutum, scutellum and metanotum is greyish brown, on the rest of the thorax more greyish. Apical tergite, and hind margin of sternites with long hairs; margin of fourth and fifth abdominal sternites moreover with a row of fasciculate, long, dark hairs.

Length about 8,5-10,5 mm.

This species is easily distinguished from the other Indo-Australian *Psen* s.str. by the very coarse, punctato-striate sculpture of the scutum.

Luzon. Material examined: 1 ♂, Baguio, Benguet, Baker (ML). (This specimen has been compared by Krombein with the holotype and according to him agrees very well with same); 1 ♀ from the same locality (USNM) and labelled by Krombein "*? Psen bakeri* Rohwer"; Mt. S. Tomas, 6500 ft, nr. Baguio, 1 ♂, 4 April 1953, 1 ♀, 20 June 1953, Townes family (HT).

Psen (Psen) vechti n. sp.

Female. — Black, partly with metallic-blue tinge. Ferruginous are: antennae (upper side somewhat darkened), tegulae and legs, including fore and mid coxae. Greater part of hind coxae bluish black. Tubercles partly brownish. Upper part of propodeum with brassy shine. Wing veins brown. Margin of gastral segments somewhat reddish-transparent, apex of ultimate segment reddish transparent.

Clypeus densely punctate, protruding margin emarginate with two distinct teeth, which are smooth at the extreme apex (fig. 70). Fine frontal line, ending in a horizontally flattened protuberance, which in dorsal view is bluntly rounded anteriorly and almost as broad as two-thirds of the distance between the antennal sockets. A fine suture beside and behind the lateral ocelli, a short longitudinal one in front of the median ocellus and one behind it. Vertex with a few widespread punctures. Antennae slender, all segments at least twice as long as they are broad at the base. Scutum finely and sparsely punctate; parapsidal sutures extending to scutellum; scutellum with somewhat larger punctures; metanotum sparsely and finely punctate. Mesopleura very finely and sparsely punctate. Inter-epicnemial area distinctly marked off (fig. 39). No acetabular carina. Enclosed area of propodeum triangular, with longitudinal carinae, which for the greater part are continued on the propodeal declivity, reaching the lower central part of the propodeum where the striation is less regular. Areas between the carinae of the propodeal declivity irregularly and superficially sculptured (fig. 23). Sides of propodeum very shining, posterior half with a few fine punctures. Fore tarsi broader than they are long, mid tarsi dilated at the apex, base of mid tibiae slightly bent. First recurrent vein of fore wings ends in second submarginal cell, second recurrent vein interstitial. Petiole cylindrical, posterior part somewhat flattened above, smooth. Gaster finely and sparsely punctate. Pygidial area elongate triangular, emarginate, coriaceous, margin somewhat finer and separated from the central part by an irregular line of large but shallow punctures (fig. 54). Sides of last tergite with a few strong punctures. Sternites shining on the posterior part, bases somewhat reticulate and sparsely punctate, punctures strongest on base of third sternite. Last sternite dull, closely and finely punctate with a short and shining longitudinal keel at the apex.

Face with beautiful golden appressed pubescence and some long and erect golden hairs; temples pale golden; thorax with brownish pubescence; propodeum with longer and greyish hairs; gaster with sparse brownish pubescence; sternites with a few long backwardly directed hairs. Punctures of

pygidial area each with a long backwardly directed bristle.

Length about 10 mm.

Male unknown.

Psen vechti is the only species I know in this subgenus with a horizontal protuberance between the antennae. It is further readily distinguished by the carination of the propodeal declivity, the sculpture of the pygidial area and the golden pubescence of the face.

W. Java: Mt. Gedeh, 1 ♀ (holotype), Tjibodas, 1500 m, 19 May 1935, J. van der Vecht (ML), with prey: *Aphrophora* n.sp. (Homoptera, Cercopidae; identification Dr. H. C. Blöte); 1 ♀, (paratype), Tjibeureum, 1600 m, 29 June 1937, J. van der Vecht (MR).

Psen (Psen) melanosoma Rohwer

1921, Rohwer, S. A., Phil. Jl. Sc., vol. 18, p. 322, ♂ (*Psen (Mimesa) melanosoma*; Luzon, Philippines).

Original description

“Male. Length, 9 mm. Clypeus convex, with close small punctures, the apical margin slightly rounded and with two rounded median teeth; face sculptured with transverse carina; frontal carina complete from anterior ocellus to between bases of antennae where it is more prominent; frons with distinct, small, close punctures; vertex (more broadly laterally) and posterior orbits shining; ocelli in a low triangle; the postocellar and ocellular lines subequal; scape rather short, the outer margin nearly straight; flagellum rather long, slightly thickening apically, first joint one-third longer than second, the fifth and sixth joints irregularly rounded beneath; pronotum feebly carinate anteriorly, rounded laterally; parapsidal furrows completely wanting; scutum shining, with close, well-defined punctures; scutellum convex, more sparsely punctured than the scutum; mesopleura and metapleura shining, impunctate; episternauli complete; inclosed area of propodeum broadly triangular in outline, closely rugose, medially with a diamond-shaped area; sides and posterior surface of propodeum coarsely reticulate, the posterior surface with a median carina; legs slender; abdomen shining impunctate; petiole cylindrical, as long as posterior leg to apex of femur; last tergite with sparse punctures; second cubital cell large, trapezoidal in outline, third transverse cubitus strongly bent at middle. Black; anterior legs below femora piceous; clypeus, face, frons below middle, and pronotum dorsally with appressed silvery pubescence; thorax with sparse silvery pubescence except on the scutum where it is blackish. Wings hyaline, iridescent; venation black.

Type locality. Mount Maquiling, Laguna, Luzon. Described from two males (one type) received from C. F. Baker.

Type. Catalogue No. 22882, United States National Museum".

According to Rohwer's key (p. 321), the propodeal enclosure has no distinct median sulcus.

Dr. K. V. Krombein had the kindness to examine the type in the USNM and reported in his letter of 6th Sept. 1957 as follows:

"Frontal line not ending in a tooth but in a minute tubercle; anterior margin of clypeus emarginate in middle to such an extent that a broad rounded lobe is formed on each side of the emargination, the clypeal margin narrowly impunctate; hairs of face silvery; flagellar segments 6-13 with tyloides, that on 6 emarginate in profile and narrow at base and gradually widening toward apex, 7 rounded in profile, 8 tuberculate in middle in profile, 8-12 broadly oval in outline and slightly hollowed out, 13 smaller and narrower and confined to basal half of segment; epicnemial carina formed as in your lower right sketch (*Psen elisabethae*), terminating posteriorly on mesosternum in a low, blunt tooth; acetabular carina absent; propodeal enclosure with longitudinal carinae and a central narrow, elongate area; rugoso-reticulate sculpture of declivity extending to enclosure, no intervening smooth area".

The epicnemial carinae indicate that also this species belongs into the subgenus *Psen* s.str. It is characterized by the tyloidea on the antennal segments 6-13, and by the narrow sulcus of the propodeal declivity.

The second male, which was designated as a paratype, represents a new species (vide *P. coriaceus*).

The material recently collected by the Townes family in Negros contains a male which is probably also a *P. melanosoma*.

In this specimen the interocellar area is sparsely but coarsely punctate; this area and the postocellar area are much raised, as in *P. aureohirtus*. The raised part of the vertex is especially distinct when viewed from behind. The vertex is very shining between ocelli and oculi and very sparsely and finely punctate. The puncturation of the scutum has a tendency to striation. There are traces of prescutal sutures (Rohwer uses the term parapsidal sutures and says that they are completely wanting in *P. melanosoma*). The median scutal line is very vague. The true parapsidal lines are not sutures but distinct carinae about as long as the tegulae are broad. There is no distinct acetabular carina (fig. 87). The median sulcus of the propodeal declivity is narrow (fig. 86). Petiole almost cylindrical, dorsally somewhat flattened.

Vertex and scutum with dark brown pubescence contrasting with the silvery and greyish pubescence on the rest of head and thorax. The fascicu-

late hairs along the margin of the fourth and fifth abdominal sternites are dark brown and long.

Negros: 1 ♂, Mt. Canlaon, 3600 ft, 8 May 1953, H., M., and D. Townes (HT).

***Psen (Psen) emarginatus* n.sp.**

Female. — Black; brownish are: antennae ventrally, tegulae and legs; the ends of the tibiae and the whole tarsi are somewhat paler. Veins of wings brown.

Clypeus densely punctate, deeply emarginate, so that two triangular teeth are formed which are very finely striate (fig. 71). Frontal line distinct, ending in a vertically flattened triangular tooth. Frons not densely punctate, a long shallow depression against the oculi; vertex with sparse and fine puncturation. Postocellar area somewhat raised. Scutum shining, with strong punctures, sometimes in rows, otherwise interspaces often three or four times larger than the punctures. Distinct parapsidal carinae, not sutures. Scutellum sparsely punctate; metanotum with a few very fine punctures, from which long pale hairs arise. Epicnemial areas smooth, towards the median line finely coriaceous; also mesosternum finely coriaceous. No distinct acetabular carina (fig. 40). Enclosed area of propodeum well-defined, not all longitudinal carinae complete; propodeal declivity reticulate (fig. 24). Mid tibiae short, dilated in the middle and there about 1.5 times as broad as they are at the base. The dilated part seems to be still broader than it really is owing to the dense short pubescence there. Fore and mid tarsi also dilated and with dense yellowish pubescence. Upper side of hind tibiae with short blunt spines. The second recurrent vein of fore wings ends in the third submarginal cell, almost interstitial.

Petiole cylindrical, flattened dorsally, laterally with an indistinct groove, in which a few punctures. Base of third abdominal tergite depressed, this and the following tergites finely punctate. Pygidial area broadly triangular, coriaceous, with 4-6 rows of irregular and very coarse punctures, which leave a more or less distinct narrow median longitudinal impunctate area. The margin of the pygidial area is somewhat depressed and slightly coarser coriaceous (fig. 55). Sides of last tergite very coarsely punctate. Disk of third sternite with a few large punctures, sides more densely and finely punctate, two flat shining tubercles on both sides in front of the margin. Following sternites finely reticulate. Last sternite indistinctly keeled.

Face with silvery appressed pubescence and a few long, erect hairs. Mesosternum, inter-epicnemial area, underside of coxae and trochanters and femora with conspicuous silvery pubescence, femora also with a few long hairs.

Margin of tergites with a dense row of short stiff hairs, which are somewhat bent backwards. From each of the punctures on the pygidial area a backwardly directed long reddish bristle arises. Margin of sternites with a few long hairs.

Length about 10 mm.

Male. — Teeth of clypeal margin slightly more rounded than in the female. Antennae long and slender, last segment slightly more than twice as long as it is broad at the base. Segments 6-12 with irregular oval tyloidea, which are concave on the sixth segment. A very long acetabular carina which almost reaches the epicnemial carinae. Inter-epicnemial area finely striate. Mesosternum shining, finely punctate, with a few irregular transverse carinae which end in the median carina (fig. 82). Mid tibiae less dilated than in the female. Hind tibiae with a few rudimentary blunt spines. Second recurrent vein interstitial.

Dense and appressed silvery pubescence on the face. Margin of fourth and fifth abdominal sternites with fringes of fasciculate pale golden hairs, the other sternites with a few long and erect thin hairs.

Length about 8,5 mm.

Easily distinguished by the emargination of the clypeus, the dilated mid tibiae and the short bent hairs on the tergites in both sexes. It is extremely peculiar that the acetabular carina, which is indistinct in the female, is well developed in the male; nevertheless these specimens agree so well in all other characters that I do not hesitate to regard them as conspecific.

C. Java: 2 ♀ (holotype and paratype) and 1 ♂ (allotype), Res. Kedu, Mt. Telamojo, 1900 m (top), 28 Oct. 1939, M. A. Lieftinck (ML, paratype MR). One of these ♀ has been taken carrying the prey: *Hemisphaerius* sp. (Homoptera, Fulgoridae, det. Dr. H. C. Blöte); 1 ♀ (paratype), Res. Semarang, Kopeng, Oct. 1939, J. G. Betrem (ML).

W. Java: 1 ♀, (paratype) Mt. Patuha, Rantjabali, about 1700 m, 23 Sept. 1941, J. van der Vecht (ML).

***Psen (Psen) betremi* n.sp.**

Female. — Black; labrum ferruginous, mandibles yellowish with red tips, legs ferruginous, fore femora darkened for the greater part, the other femora and the ends of the hind tibiae darkened dorsally, tergites laterally somewhat reddish brown. Wing veins dark brown.

Clypeus indistinctly punctate; margin depressed, almost impunctate, with shallow triangular emargination (fig. 72). The frontal line ends in a pyramid-shaped tooth which is connected by fine carinae with the underside of the antennal sclerites. Frons with broad and shallow depressions along the

inner margin of the oculi, the rest is finely punctate; vertex shining, almost impunctate. Scutum smooth, with distinct punctures, often in rows. Scutellum and metanotum almost impunctate. Parapsidal sutures reaching from scutellum to as far as the fore side of the tegulae, the posterior half is broad and shallow, the fore part narrow and deep. Mesosternum almost dull, with fine punctures and a few weak and short oblique striae originating from the median line, no acetabular carina, subpleural signum oval (fig. 41). Mesopleura shining, very finely punctate. Enclosed area of propodeum with partly irregular, longitudinal striae; declivity coarsely reticulate (fig. 25). Sides of propodeum shining, with indistinct punctures and a few short carinae originating from the posterior ridge. On the back of the hind femora the series of punctures nearly reaches from end to end, a few hairs only below this line. Fore and mid tarsi slightly dilated towards the end. Upper side of hind tibiae with short and blunt spines. The first recurrent vein of the fore wings ends in the second submarginal cell, second recurrent vein interstitial or just ending in the third submarginal cell.

Petiole cylindrical, somewhat flattened dorsally, laterally with an indistinct groove. Base of third abdominal tergite depressed and impunctate; rest of this tergite, as well as all other tergites slightly reticulate with fine punctures. Pygidial area broadly triangular, finely coriaceous, sometimes almost smooth on the central part and with a tendency to striation towards the apex; coarsely punctate, punctures not deep and with a tendency to form short grooves, leaving a narrow margin only and sometimes also an irregular longitudinal median area (fig. 56). Base of third sternite dull, with widespread large punctures; posterior part smooth and shining, including two distinct lateral tubercles, almost impunctate. The following sternites finely reticulate, with sparse fine puncturation, which is denser in front of the posterior margin. Last sternite with a faint short longitudinal keel at the apex.

Face with appressed golden pubescence and a few erect hairs; pubescence of temples, pronotum and mesosternum with silvery reflection. Vertex, scutum, scutellum and metanotum with long brownish hairs. Propodeal declivity with long greyish hairs, which are palest on the lower part. Mesosternum besides the appressed pubescence also with long erect hairs. Mesopleura, including the posterior half of the hypo-epimeral area, with sparse long hairs. Outer side of legs with long hairs. Posterior margin and to a lesser extent also the disk of tergites 2-6 with erect hairs; along the posterior margin they are not placed as regularly as in *P. emarginatus*. Along the posterior margin of the sternites softer long hairs. Pygidial area with backwardly directed brown bristles. Rest of gastral pubescence not conspicuous.

Length about 10-11 mm.

Male. — Differs from female in the following details. Last tergite rufous apically. Disk of clypeus still more indistinctly punctate, almost smooth. Antennae long and slender, last segment more than twice as long as it is broad at the base. Segments 8-11 thickened apically. Segments 7-12 with oblong oval tyloidea which are dark brown like the rest of the antennae. The subpleural signum is a narrow carina, the rest of the precoxal carina completely but faintly indicated. Upper side of hind tibiae without spines. Petiole without lateral grooves.

Face with silvery appressed pubescence. Margin of fourth and fifth abdominal sternites with fringes of golden brown hairs.

Length about 8-9 mm.

Psen betremi is distinguishable from allied species in the female by the golden face and the sculpture of the pygidial area, in the male by the tyloidea of the antennae and the sculpture of the clypeus.

E. Java: 1 ♀ (holotype) and 6 ♂ (allotype and paratypes), Res. Semarang, environs of Kopeng, Oct. 1939, J. G. Betrem (holotype and 4 ♂ ML, 2 ♂ MR).

W. Java: 6 ♀, Mt. Gedeh, Tjibodas, 1450 m, April-Nov. 1932/1940, H. R. A. Muller, J. van der Vecht and E. van der Vecht-Bourguignon (4 ♀ ML, 2 ♀ MR).

The specimens from W. Java have not been designated as paratypes as they have paler legs and the lower part of the clypeus is somewhat less densely pubescent.

One of the females from Tjibodas (Nov. 1938) has been taken together with the prey, a *Coelidia* sp. (Homoptera, Jassidae, identification Dr. H. C. Blöte).

***Psen (Psen) opacus* n.sp.**

Female. — Black; ends of mandibles reddish, anterior side of fore tibiae brown, mid and hind tarsi dark brown, calcaria whitish. Wing veins dark brown.

Clypeus densely punctate, but the interspaces shining; margin impunctate and finely transversely striate, with a broad triangular emargination (fig. 73). The frontal line ends in a low triangular tooth, which is connected with the lower side of the antennal sclerites. On the sides of the frons a shallow groove, parallel with the inner orbits. Interocellar and postocellar region somewhat raised. Frons and vertex finely and sparsely punctate. Scutum with widespread but distinct punctures, posteriorly with a tendency to striation; the puncturation within the parapsidal lines is much coarser than between these lines and the tegulae. The central part of the scutum is

somewhat lower than the lateral parts so that the parapsidal line forms a distinct, raised carina in dorsal view. Scutellum sparsely but distinctly punctate; metanotum with a few fine punctures. Mesosternum smooth and shining with exceedingly fine punctures. Inter-epicnemial area dull and densely punctate, somewhat depressed, so that the epicnemial areas are distinctly marked off (fig. 42). Enclosed area of propodeum with irregular longitudinal striae; the areas on both sides just behind the enclosed area with fine and almost regular striation; propodeal declivity with coarse reticulation (fig. 26). Hind femora smooth and shining on the posterior side, the upper two thirds separated from the lower part by a series of fine punctures from which short and fine hairs arise. Upper side of hind tibiae with a row of blunt, short spines. The first recurrent vein of the fore wings ends in the second submarginal cell, the third recurrent vein in the third cell, both at a distance of about one third of the height of the second submarginal cell.

Petiole cylindrical, an indistinct groove on the sides and posteriorly with a small triangular depression against the second tergite. Tergites smooth and shining, with fine puncturation; in front of the almost impunctate margin of the sixth tergite a few large punctures. Pygidial area broadly triangular, with rounded apex; the central part is finely coriaceous, and densely, coarsely punctate, except an irregular central line; the margin is somewhat more coarsely coriaceous than the central part (fig. 57). Sternites almost smooth, sparsely and finely punctate with a few coarse punctures. Base of last sternite coriaceous, rest irregularly punctate, apex keeled.

Face with silvery appressed pubescence and a few long hairs. Rest of the body with sparse greyish brown pubescence. From each puncture of the pygidial area a golden brown, backwardly directed bristle arises.

Length 9 mm.

Male unknown.

Psen opacus is distinguished from the other *Psen* s.str. of the Malay Archipelago by the structure of the upper part of the propodeum together with the puncturation of the pygidial area and the silvery pubescence of the face. It may be allied to *P. carbonarius* Smith from Morotai, but more material of both sexes will be needed to ascertain the relationship of these apparently rare representatives of the subgenus *Psen*.

Luzon: 1 ♀ (holotype), Mt. S. Tomas nr. Baguio, 6500 ft, 20 June 1953, H. M. & D. Townes (HT).

***Psen (Psen) toxopeusi* n.sp.**

Female. — Black; ferruginous are: first antennal segment and underside of following segments, mandibles, palpi, pronotal tubercles, tegulae,

legs and the first three gastral segments, including the petiole. Wing veins brown.

Clypeus dull, densely punctate, the protruding margin finely transversely striate, deeply emarginate, so that two large rounded teeth are formed (fig. 74). Distinct frontal line, ending in a large, pyramidshaped, but laterally somewhat flattened, inter-antennal tooth, which is connected with the antennal sclerites by fine carinae. Central part of frons and the raised inter-ocellar area striato-punctate. This inter-ocellar area has a median depressed line which ends in the median ocellus. The post-ocellar area is also raised. Frons laterally and also vertex shining, sparsely and finely punctate. Occipital carina very much raised, in lateral view projecting downwards like a tooth. Antennae gradually thickening apically.

Scutum shining, distinctly punctate, parapsidal sutures extending to scutellum. Base of scutellum with longitudinally carinate transverse sulcus. Puncturation of scutellum and of metanotum like that of scutum. Mesopleura with very fine punctures. Acetabular carina more forwardly placed than in the other species (fig. 43). Enclosed area of propodeum shining, but with traces of coriaceous sculpture, regular longitudinal carinae, declivity rugoso-reticulate (fig. 27). Basal two thirds of hind tibiae with a partly double row of blunt spines. The second recurrent vein ends in the third submarginal cell.

Petiole cylindrical, flattened dorsally, slightly shorter than the following two gastral segments together. Gaster shining, finely punctate, fifth and following tergites faintly coriaceous. Pygidial area broadly triangular, with rounded apex, finely coriaceous and with deep punctures in short grooves, which are partly continuous; base partly impunctate, margin of pygidial area wholly impunctate (fig. 58). Sternites with only a few, distinct punctures, finely reticulate, margin and tubercles of third abdominal sternite smooth, last sternite keeled apically.

Face with golden appressed pubescence and a few long and erect hairs, also the base of the mandibles, the temples and the pronotum with appressed golden pubescence. Scutum with dark brown pubescence, mesosternum with long golden, somewhat appressed pubescence, paler on posterior half. Rest of the thorax with golden pubescence, which is longest on base and sides of propodeum. Legs and gaster with short golden pubescence, punctures of pygidial area with the usual bristles; margin of sternites with a few long and stiff, obliquely backwardly directed hairs.

Length about 12-13 mm.

Male unknown.

This beautiful species is easily distinguished by its large size, the situation

of the acetabular carina, the golden pubescence and the ferruginous colour of antennae, petiole and gaster. It seems to be related to *P. aureohirtus* Rohwer, but the pygidial area is more densely punctate and duller.

S. W. Celebes: 1 ♀ (holotype), Malino, 1000 m, June 1936, L. J. Toxopeus (ML); 2 ♀ (paratypes), Mt. Lompobatang, 1600 m, July 1936, L. J. Toxopeus (ML, MR).

***Psen (Psen) aureohirtus* Rohwer**

1921, Rohwer, S. A., Phil. Jl. Sc., vol. 18, no. 3, pp. 322-323, ♀♂ (*Psen (Mimesa) aureohirta*; Luzon, Philippines).

Female. — Black; mandibles, first antennal segment and underside of following segments, tegulae, legs including trochanters, apical margin of second and two spots on third abdominal tergite ferruginous. Margin of following tergites yellowish transparent. Wings somewhat yellowish, veins brown.

Clypeus except apical margin densely punctate, the reddish transparent margin with broad shallow emargination (fig. 75). The distinct frontal margin ends in a small tooth, connected with antennal sclerites by fine carinae. Frons densely punctate, vertex shining, with a few punctures. Postocellar area raised.

Scutum densely punctate, scutellum and metanotum sparsely punctate. Anterior margin of mesosternum without distinct acetabular carina, but with some fine striae, on each side of the median line a slight depression (fig. 44); precoxal carinae complete, but only the anterior part and the subpleural signum distinct, rest of the carinae vague. Enclosed area of propodeum with a tendency to coriaceous sculpture and with longitudinal carinae. Propodeal declivity coarsely reticulate (fig. 28), the rugae as distinct as in most other *Psen* s.str. (not feebly reticulate, as Rohwer says). Back of hind femora with a distinct series of fine punctures on lower half, smooth and shining above this line. Upper side of hind tibiae with blunt spines, inner spur longer than half the length of the metatarsus. Second recurrent vein just ending in third submarginal cell, almost interstitial.

Petiole cylindrical. Gaster finely punctate. Pygidial area coriaceous, coarsely punctate, with tendency to striation, the narrow margin is impunctate (fig. 59).

Face, posterior orbits and pronotum dorsally with appressed golden pubescence. Thorax with sparse, erect, golden pubescence, pygidial area with backwardly directed golden bristles.

Length about 10,5 mm.

Male. — Similar to female. Ferruginous colour on second and third tergites more extended than in the female.

Antennae slender, apical segment about 2,5 times as long as it is broad; segments 6-13 with tyloidea, on the sixth segment these are narrow basally, widening towards apex, on the following segments gradually larger, broadly oval on segments 11 and 12, on the last segment very small and circular, that on the sixth segment is emarginate in profile, on the seventh segment it is convex and on the eighth segment it is more distinctly tuberculate.

Anterior part of precoxal carina continuous with subpleural signum. Acetabular carina short. Upper side of hind tibiae with very short and blunt spines only.

Apical margin of fourth and fifth abdominal sternites with golden fringes of fasciculate hairs (not spines as said in the original description).

Length about 7,5 mm.

P. aureohirtus is distinguishable from the other *Psen* s.str. studied in this paper by the tyloidea on the antennae of the male, the dense puncturation of the pygidial area of the female, the red markings of the second and third sternites and the golden face in both sexes. The inter-ocellar area is raised as in *P. toxopeusi*.

I have examined the following specimens from Luzon: 1 ♀ (topotype) and 1 ♀ (paratype), Mt. Makiling, coll. Baker (USNM); 1 ♂ (paratype), Los Banos, coll. Baker (USNM); furthermore I saw 1 ♂ from Sibuyan Island, coll. Baker (USNM).

***Psen (Psen) aureohirtus rufopetiolatus* n.subsp.**

Easily distinguished from the typical form by the red petiole. Red colour of gaster slightly darker. Red band along anterior margin of clypeus more distinct. No important differences in structure or sculpture could be found.

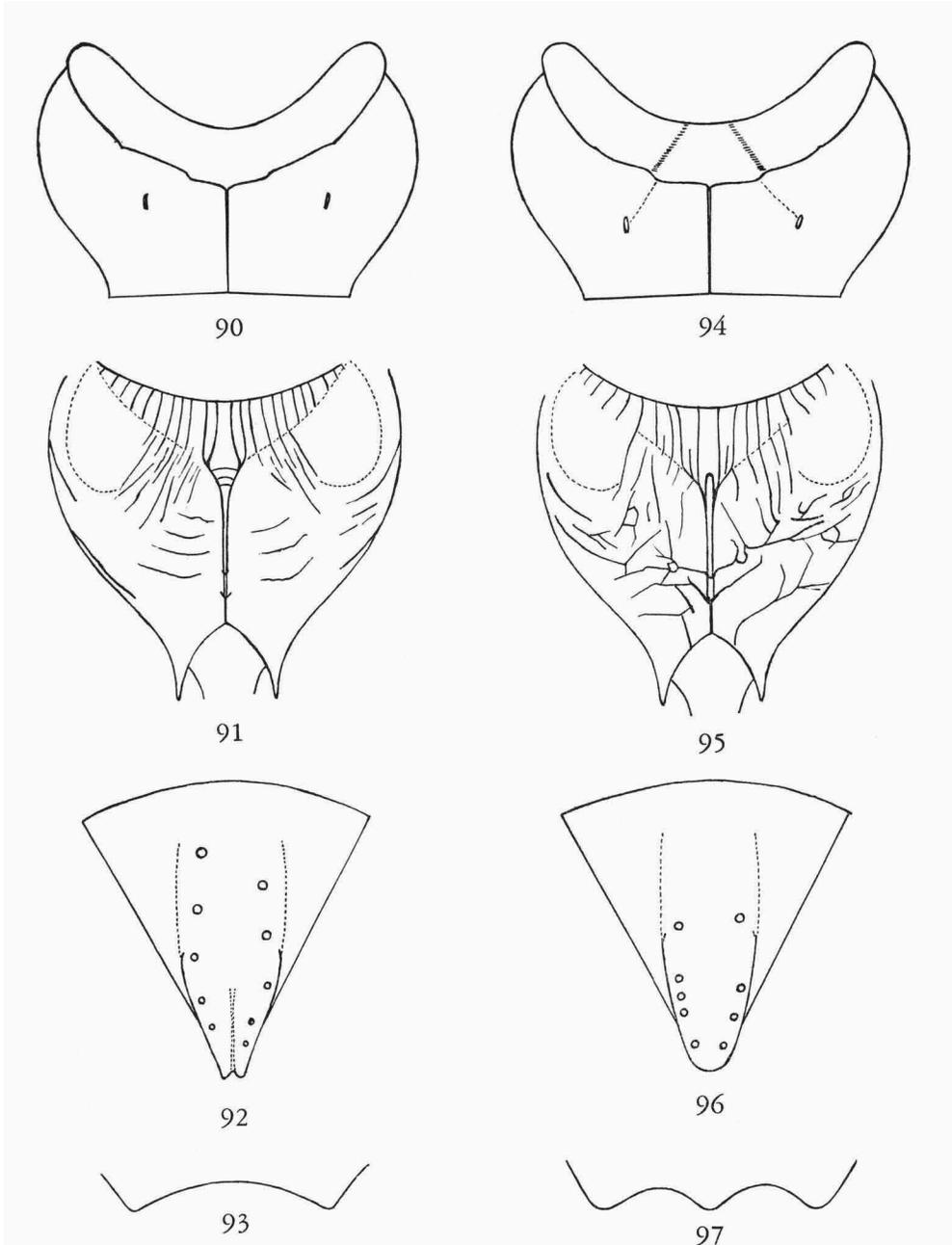
Length about 9 mm.

Negros: 1 ♂ (holotype), Mt. Canlaon, 3600 ft, 8 May 1953, H., M. and D. Townes (HT).

Subgenus ***Mimumesa*** Malloch

1933, Malloch, J. R., Proc. U.S. Nat. Mus., vol. 82, p. 16 (type species *Psen niger* Packard).

Clypeus emarginate or bidentate, rarely tridentate. The fine frontal line ends in a small tooth which is connected with the antennal sclerites by transverse carinae. Acetabular carina continuous with lower part of epicnemial carinae (fig. 4, 90, 94). *P. sibiricus* Guss. and *P. wuestnei* Faester which hitherto have been placed in this subgenus, do not show this character and



Two species of the subgenus *Mimumesa* from the Malay Archipelago, mesosternum, propodeum, pygidial area and anterior margin of protruding part of clypeus. Figs. 90-93: *auratus auratus* n. sp. ♀ (Java). Figs. 94-97: *tridentatus* n. sp. ♀ (holotype).

their systematic place should be reconsidered. Scrobal suture like that of *Psen* s.str. Hypo-epimeral area smooth or finely punctate only. Structure of propodeum resembling that of *Psen* s.str.

In the Palaearctic and Nearctic *Mimumesa* the petiole is relatively short, but it is very long in the Indo-Australian species discussed in this paper. In the Palaearctic and Nearctic species the petiole has dorsal carinae, in the Indo-Australian species a short groove on the posterior third part, also a number of strong punctures. Sides of petiole with carinae. Pygidial area of female smooth or coriaceous, with sparse or dense puncturation. In the Palaearctic species (no Oriental male specimens examined) the male genitalia offer good characters for identification.

Face with dense appressed pubescence, in the Palaearctic *P. (M.) dahlbomi* Wesm. and perhaps other *Mimumesa* the pubescence of the face is very sparse and erect. In one Indo-Australian species the appressed pubescence also covers the frons, mesopleura and mesosternum and the lower part of the propodeum. Hind femora on the upper part of the posterior surface with at least a few hairs, or the bare part much narrower, not bordered below by a series of fine punctures. Pubescence of petiole similar to that of *Psen* s.str., but the hairs arising from the fine punctures along the margin of the dorsum are much longer. Male without a row of fasciculate hairs along the margin of the fourth and fifth abdominal sternites.

Key to the species of the subgenus *Mimumesa* Malloch

1. Clypeus tridentate. Face silvery, no golden pubescence on the rest of thorax or gaster. Puncturation of vertex more distinct. Underside of petiole with two longitudinal carinae and a short median apical carina. Pygidial area with slightly rounded sides, apex not emarginate. Legs darker. (Male unknown). (Sumatra) *tridentatus* n.sp.
- Clypeus emarginate. Face golden, rest of head, thorax and gaster with partly dense, golden pubescence. Underside of petiole convex. Pygidial area somewhat narrowed towards the end, apex distinctly emarginate. (Males unknown). *auratus* n.sp., 2
2. Bare areas behind the propodeal enclosure smooth. Face golden. Puncturation of gaster fine. (Sumatra, Java, Bali) *auratus auratus* m.
- Bare areas behind the propodeal enclosure almost entirely longitudinally striate. Face somewhat darker golden. (Philippine Islands) 3
3. Puncturation of gaster similar to that of *auratus auratus*. (Mindoro). *auratus mindoroensis* n.subsp.
- Puncturation of gaster much deeper and denser; gaster more pubescent. (Negros). *auratus multipunctatus* n.subsp.

***Psen (Mimumesa) auratus* n.sp.**

Female. — Black; central part of mandibles reddish, underside of the antennae basally and the last segment entirely ferruginous, the first two segments yellowish red. Yellowish red are also: tegulae, ends of femora,

tibiae and tarsi of fore and mid legs and the last tarsi of the hind legs. The rest of the legs is brown. Second and following tergites laterally somewhat reddish. Wing-veins testaceous.

Clypeus densely punctate, the protruding margin smooth and shining, with a broad but shallow emargination (fig. 93). Frons with sparse puncturation. The distinct frontal line ends in an inconspicuous tooth which is shining on the ventral side and has a circular depression there. This tooth is distinctly connected with the underside of the antennal sclerites by lateral carinae. Ocelli surrounded by a pentagonal groove and the area thus enclosed divided into two parts by a median longitudinal line. Each lateral ocellus connected with the oculi by an oblique groove. On each side of the frons, against the oculi and on the level of the median ocellus, there is an oval raised area which is darker than the rest of the frons and is very slightly coriaceous. Vertex shining with very fine and sparse puncturation. Antennae somewhat clavate, segments ten and eleven shorter than they are broad.

Scutum shining, with fine puncturation, punctures often in rows, interspaces between the rows larger than the punctures. Deep parapsidal sutures run from the posterior margin of the scutum until nearly as far as the fore side of the tegulae. Scutellum with a few punctures and a series of short irregular longitudinal carinae along the posterior margin. Mesopleura with fine punctures only, from which the hairs arise. Scrobal suture distinct, hypo-epimeral area convex. Epicnemial carinae continuous with the acetabular carinae; epicnemial areas finely reticulate, almost smooth (fig. 90). Mesosternum with very fine puncturation, and a few stronger punctures. Subpleural signum dull and slightly raised. Enclosed area of propodeum almost triangular, with regular longitudinal carinae which are continued into the hairy declivous part. On each side of the upper part of the propodeal declivity, behind the enclosure, an almost circular area, which is bare and shining, the rest of the declivous part with an irregular carinate sculpture, almost concealed by the dense golden pubescence (fig. 91). Declivous part of propodeum with a narrow longitudinal sulcus. Sides of propodeum dull, posteriorly with vertical carinae. Upper side of hind tibiae with a row of thick spines. Both recurrent veins of fore wings end in the second submarginal cell.

Petiole about as long as the rest of the gaster; posterior third part dorsally flat or with a shallow groove, on each side a few irregular large punctures. Sides of petiole with a narrow deep groove and a row of large punctures under this line; under side rounded. Gaster with very fine punctures, the sixth abdominal tergite and the sternites also with a few larger punctures. Pygidial area shining, somewhat narrowed; apex emarginate, the pygidium thus ending in two rounded small teeth; sides of pygidial area with sharp

carinae, which are only little longer than the depressed posterior part of the pygidial area. Along the margin of the pygidial area a row of large punctures, about 10-16 in total (fig. 92). Sides of the last tergite with large punctures.

Face with beautiful golden appressed pubescence, reaching as far as the median ocellus; clypeus with also a number of long and erect golden hairs, the anterior margin is bare. A similar pubescence on temples and pronotum, pronotal tubercles, mesopleura, and on the declivous part of the propodeum. All these parts have also a number of long and erect hairs. Vertex behind and between the ocelli with sparse long and erect hairs, between ocelli and oculi a few shorter hairs. Scutum and scutellum with golden pubescence which leaves the puncturation distinctly visible. Dense and erect golden pubescence on the posterior margin of the scutum, in the depressions on each side of the scutellum and on the metanotum; on each half of metanotum the hairs are directed obliquely sideways, a triangular area in the middle is almost bare. On the lower part of the mesopleura and on the mesosternum the pubescence is much paler, almost grey. Legs with pale pubescence, mostly somewhat appressed. Upper third part of hind femora almost bare, the rest with a dense and short pubescence; a few long hairs with bent tips along the underside of the hind femora.

Petiole with long and erect, sparse, golden hairs arising from the punctures on the sides and also along the margin of the upper part of the petiole, where they are not much shorter. Tergites with golden pubescence, especially along the margin, but not on the central part of the margin. Punctures of pygidial area each with a long backwardly directed bristle. Sternites with long and erect hairs and some appressed pubescence; the base of the last sternite is almost bare.

Length about 12-13 mm.

Male unknown.

The very conspicuous golden pubescence and the emargination of the clypeus make it easy to distinguish this species from *P. tridentatus*.

Holotype: ♀, W. Java, Mt. Gedeh, Tapos, 700 m, May 1933, J. van der Vecht (ML).

W. Java: Mt. Gedeh, 1 ♀, Tapos, 800 m, 1-16 Aug. 1936, J. van der Vecht (MR), 1 ♀, Tapos, 700 m, April 1935, Kalshoven (ML); 1 ♀, Mt. Panggerango, Tjisarua South, 23 Nov. 1941, M. A. Lieftinck (MZB). All these specimens are paratypes.

E. Java: 1 ♀, Djerukundjur, 26 Nov. 1941, H. Lucht (ML).

Bali: 1 ♀, Baturiti, August 1941, Kalis (ML).

N. E. Sumatra: 1 ♀, Habinsaran, Simanimbo, 1 Aug. 1923, J. C. van der Meer Mohr (ML).

In the female from N. E. Sumatra the puncturation of the scutum and of the posterior half of the scutellum is coarser. This specimen and those from E. Java and Bali have not been designated as paratypes, in view of the possibility that they belong to a different subspecies; this can only be decided when more material becomes available.

***Psen (Mimumesa) auratus mindoroensis* n.subsp.**

Differs from the Indonesian form in the sculpture of the bare areas behind the propodeal enclosure, these being for the greater part longitudinally striate, more densely so than the enclosed area. This striation is much more extensive than in the Indonesian specimens and more distinct, because the pubescence on the declivous part of the propodeum extends less far. The remaining smooth areas on the sides are only small.

Further differences are: scutum laterally with coarser puncturation than in any of the Indonesian specimens. Hind legs almost black. Pygidial area less narrowed towards the apex. Pubescence somewhat darker golden.

Philippines: 1 ♀ (holotype), Mindoro Or., Ilong Mt. Halcon, 4500 ft, 10 May 1954, M. & D. Townes (HT).

***Psen (Mimumesa) auratus multipunctatus* n.subsp.**

Very similar to the preceding subspecies from Mindoro. Almost the whole surface of the bare areas on the propodeum with longitudinal carinae, although these are mostly indistinct on the sides.

The puncturation of the gaster is much denser and deeper, but still finer than the finest punctures on the posterior part of the scutum. Puncturation on base of third and following tergites dense, the interspaces being about as large as the punctures, on the posterior half the interspaces are larger. In the two preceding subspecies the punctures are extremely fine and the interspaces many times larger than the punctures. Apex of pygidial area as in the Indonesian form but the carinae along the margin sometimes longer, no trace of a median keel. Gaster more pubescent.

Philippines: Negros, Mt. Canlaon, 3600 ft, 1 ♀ (holotype) 30 April 1953, 9 ♀ (paratypes) 29 April-8 May 1953, H., M. and D. Townes (holotype and 6 ♀ HT, 3 ♀ MR).

***Psen (Mimumesa) tridentatus* n.sp.**

Female. — Black; antennae, tegulae and tarsi brown, spines on the upper side of the hind tibiae testaceous. Wing-veins pale brown.

Protruding anterior margin of the clypeus tridentate (fig. 97). Structure

and sculpture of frons and vertex similar to those of *P. auratus* but the punctures on the vertex more distinct and the depression of the underside of the inter-antennal tooth not circular but lozenge-shaped. The groove round the ocelli is only distinct beside and behind the lateral ocelli. Antennae slightly clavate as in *P. auratus*.

Epicnemial carinae continuous with acetabular carina (fig. 94). The subpleural signum is a distinct oblong little groove. Mesosternum smooth with a few distinct punctures only. Sculpture of propodeum as in *P. auratus*. Hind tibiae with a row of blunt spines along the upper side. Both recurrent veins of fore wings end in the second submarginal cell.

Petiole about as long as the rest of the gaster, posterior third part dorsally with a shallow groove, somewhat deeper than in *P. auratus*, along the margin of the petiole a partly double row of large, oblong, punctures, each with a hair which is as long as the hairs on the sides. Lateral grooves as in *P. auratus*. Ventrally there are two carinae and a short median apical carina. Gaster with widespread but distinct punctures. Base of third abdominal tergite bare, anteriorly very finely reticulate. Last tergite, including pygidial area, shining, lateral keels of pygidial area somewhat bent outwards, apex rounded. A few punctures along the margin of the pygidial area (fig. 96). Sides of last tergite with a few large punctures. Sternites before the margin with a number of deep punctures.

Appressed pubescence of face silvery, not reaching as high as in *P. auratus*. On the upper side of the thorax and on the propodeum the pubescence is brown, rest of the body with inconspicuous greyish pubescence. Hypoepimeral area with a few hairs only. Propodeal declivity without appressed golden pubescence. Punctures of pygidial area each with a backwardly directed long bristle. Before the margin of the sternites a few long hairs.

Length about 12 mm.

The structure of the propodeum and the course of the carinae of the epicnemial area point to a near relationship with *P. auratus*, although the silvery face, the tridentate margin of the clypeus and the shape of the pygidial area make it a distinctly different species.

Sumatra: 1 ♀ (holotype), Muara Sako, Oct. 1915, Edw. Jacobson (ML).

Doubtful species of *Psen*

***Psen?* petiolatus** Smith

1863, Smith, F., Jl. Proc. Linn. Soc. Zool., vol. 7, p. 37, ♀ (*Psen petiolatus*; Misool).

"P. capite thoraceque nigris, nitidis; abdomine pedibusque ferrugineis; alis hyalinis.

Female. Length 3 lines. Head and thorax smooth, shining and impunctate, the antennae, palpi and mandibles ferruginous; the clypeus covered with silvery pubescence. Thorax: the tegulae and legs pale ferruginous; the margin of the collar and sides of the thorax with glittering silvery-white pubescence; the mesothorax with two central impressed lines anteriorly and a slight scratch over the tegulae; the wings hyaline and beautifully iridescent, the nervures testaceous. Abdomen: the petiole as long as the first segment and curved downwards; all the segments smooth, shining and impunctate.

Hab. Mysol."

Unfortunately I have not been able to examine the type, which should be in the Oxford University Museum. According to Mr. E. Taylor in his letter of 6th March 1957: "...although there is a name label in the collection there is no specimen, nor is there even a pin-hole in the space!"

Judging from the original description (see above) *P. petiolatus* differs from the only *Psen* with fully red gaster known to me (*P. rubicundus*) in the veins of the wings being testaceous and not dark.

The short petiole could point to a *Psenulus*, but the available data do not allow exact identification.

SOME PSENINAE FROM THE ASIATIC CONTINENT AND CEYLON

Psen (Psen) fuscinervis (Cam.)

1899, Cameron, P., Ann. Mag. Nat. Hist., ser. 7, vol. 4, pp. 55-56, ♀ (*Caenopsen fuscinervis*, Khasia Hills, Assam).

Through the kind intermediary of Dr. J. Leclercq I have seen a specimen, labelled "*Caenopsen fuscinervis* Cam. Khasia/Cameron Coll. 1914-1110" (BM).

This wasp, which is a male and lacks the right antenna, agrees with the description of Cameron and it might be the holotype but for the fact that the fringe on the margin of the fifth abdominal sternite is missing or at least not visible. Cameron says that he found fringes on both the third and fourth sternites (gastral sternites, not abdominal sternites) so that his specimen must have been a male and therefore I am wondering whether this is the same specimen as the one I have examined. The second antennal segment is almost completely retracted in the first segment and there is no doubt that it is a true *Psen* s.str.

It is closely related to *P. politiventris* Rohwer, as is evident from the tyloidea of the antennae and the sculpture of the upper part of the propodeum (fig. 89). As in *P. politiventris* the lateral ocelli are placed on low tubercles, separated posteriorly by a T-shaped groove. The emargination of the clypeus is broadly triangular, the narrow margin is almost smooth. The disk of the clypeus is not densely punctate, with smooth interspaces. The second recurrent vein of the fore wings is interstitial.

The differences with *P. politiventris* are: legs dark, veins of wings yellowish brown (in *P. politiventris* dark brown), scutum somewhat more strongly punctate, petiole cylindrical (in *P. politiventris* with a weak lateral groove).

The back of the hind femora with a few scattered hairs on the upper half and no distinct series of punctures separating this smooth part from the pubescent lower half.

A female from Assam, Shillong, Sept. 1903, R. Turner (BM) is most likely the other sex of *fuscinervis* Cam. It agrees in many respects with the male specimen of Cameron. The clypeus has a broadly triangular emargination, its margin is rather broad and shining. Antennae broken off. No acetabular carina. Petiole almost cylindrical with a small, almost circular depression posteriorly as in the other members of the *politiventris* group. Pygidial area as in *P. politiventris* from Luzon. Face silvery (golden in *P. politiventris*).

***Psen* (*Psen?*) *matalensis* Turner**

1912, Turner, R., Ann. Mag. Nat. Hist., ser. 8, vol. 10, pp. 362-363, ♀ (*Psen matalensis*; Matale, Ceylon).

According to the original description this species is characterized by the red colour of the second and third tergites, the elongate triangular and very coarsely punctate pygidial area and the silvery face.

Psen (*Psen*) *refractus* Nurse from Mt. Abu, India, also has an elongate-triangular and coarsely punctate pygidial area and a completely red second tergite, the third tergite is red except the black posterior margin. It is easily distinguished from *P. matalensis* by the finely reticulate propodeum, which is said to be coarsely rugose in *P. matalensis*. The petiole is longitudinally grooved laterally.

An undescribed subspecies of *P. refractus* from Kodaikanal, 6500 ft, Pulney Hills, S. India, collected by P. S. Nathan (KVK) has a completely red second tergite but the third tergite has only red spots laterally. Furthermore it differs from *P. matalensis* in the richer pubescence of the gaster.

The only species from the Malay Archipelago which comes near to *P. matalensis* as regards the coloration, is *P. aureohirtus aureohirtus* Rohwer from Luzon, but this latter form has a dense golden pubescence, apart from other differences.

***Psen?* *nigrinervis* Cameron**

1902, Cameron, P., Ann. Mag. Nat. Hist., ser. 7, vol. 10, pp. 63-64, ♀ (*Psen nigrinervis*; Khasia Hills, Assam).

According to Cameron this species is allied to *P. orientalis* and *P. reticulatus*. He says that the pygidial area is: "closely aciculated, the sides with a few punctures margined by a distinct keel". This would indeed agree with *P. reticulatus*, not with the description of *P. orientalis* Cam. The front and vertex are stated to be covered with long black hairs. The "basal area on the median segment is strongly longitudinally irregularly striated" but at the end of his description Cameron states: "There is no clearly defined area on the base of the median segment".

Psen (Psen) orientalis Cameron

1890, Cameron, P., Mem. Proc. Manch. Lit. Phil. Soc., ser. 4, vol. 3, p. 269, ♀ (*Psen orientalis*; Madras, India).

I have not been able to examine material of this species. According to Cameron's description the principal characters are: black; ocellar regions raised, ocelli not in pits; thorax shining, impunctate; pygidial area flat above, base impunctate, rest finely and closely punctate; pubescence of face silvery.

A female in the collection of the British Museum (Natural History), labelled "Pundaloya, Col. C. T. Bingham, 96-30, *Psen orientalis* Cam. ♀" is a *Psen (Psen) nitidus* or a subspecies of it. The pygidial area is coriaceous and has a row of punctures along the margin like the Javanese specimens, the face is silvery pubescent.

Gussakovskij (1933) described a new species *Mimesa orientalis* (♂), collected by Dr. Malaise near the river Ussuri. The authorities of the Museum at Stockholm kindly sent me one of the two males for examination. It is labelled: "15.VII.30 / Vladivostok Suchan Malaise / typus / *Mimesa orientalis* sp. n. ♂ V. Gussakovskij". De Beaumont (1937) rightly assigned this species to the subgenus *Psen* s.str. In 1942 Yasumatsu published a description of the female of *P. orientalis* Guss. in which he mentions that the face has a golden pubescence. From his drawing it appears that the pygidial area, which is finely coriaceous, has an irregular row of punctures along the margin but that the central part of the pygidial area is impunctate.

It is clear that the species of Cameron and that of Gussakovskij both belong to the genus *Psen* and in view of their homonymy I propose to call the species of Gussakovskij: **Psen (Psen) ussuriensis** nov. nom.

Psen (Psen) refractus Nurse

1903, Nurse, C. G., Jl. Bombay Nat. Hist. Soc., vol. 15, pp. 11-12, ♀ (*Psen refractus*; Mount Abu, India).

A female from Mount Abu (BM) kindly sent to me, by Dr. J. Leclercq, for examination, is undoubtedly one of the three syntypes. It is evident that this species has also to be assigned to the subgenus *Psen* s.str. If my identification is correct, I do not understand the remark of Nurse that this species belongs to Cameron's "*annulipes*" group. According to Kohl (1896) in *P. annulipes* the anal cell of the hind wings ends before the origin of the cubital vein, as in *Psenulus*.

P. refractus is to be recognized by the following characters: second abdominal tergite completely, third tergite almost completely red, propodeal declivity dull, with fine reticulate sculpture, which is almost imperceptible on the two bare areas behind the propodeal enclosure. Only a few coarse carinae on the declivous part of the propodeum. No acetabular carina. Petiole with a broad groove on the sides. Pygidial area coarsely irregularly punctate, margin narrow and slightly more coarsely coriaceous than the central part of the pygidial area (fig. 61).

From the Malay Archipelago we know two species with indistinct sculpture behind the enclosed area of the propodeum, viz. *P. opacus* from Luzon and *P. carbonarius* from Morotai. In the former species, however, the sculpture on the upper part of the propodeum is more distinct and more striate and moreover the petiole is cylindrical.

P. carbonarius Smith is perhaps more closely allied, but the type is a male (OUM) and moreover the second recurrent vein is interstitial. In *P. refractus* this vein ends distinctly beyond the second submarginal cell.

I have seen a few specimens from Kodaikanal, 6500 ft, Pulney Hills, S. India (KVK) with the same sculpture of the propodeum and pygidial area, but in which the third tergite has only red spots laterally. This is a subspecies of *P. refractus*; it will be described in a separate paper.

***Psen* (*Psen*) *reticulatus* Cameron**

1902, Cameron, P., Jl. Bombay Nat. Hist. Soc., vol. 14, p. 289, ♂ and ♀ (*Psen reticulatus*; Deesa, India).

In the material of the British Museum (Natural History) a series of undetermined wasps was found, collected by Col. C. G. Nurse at Simla, India, Aug./Sept. 1898. They all have a peculiar plumbeous hue on head and thorax, which gives the smooth parts a dull appearance. In this respect they agree with the description of Cameron's *P. reticulatus*. The epicnemial carinae (fig. 45), the very short acetabular carina and the smooth and shining upper half of the hind femora (there is no distinct series of punctures which separates the smooth upper part and the punctate lower half) do not leave any doubt that this belongs to the subgenus *Psen*. It is related to

P. politiventris from the Philippine Islands, judging from the structure of the propodeum (fig. 29) and the pygidial area (fig. 60), but in view of the far smaller number of tyloidea on the antennae of the male it has been considered a separate species.

In *P. reticulatus* the male has tyloidea on the fifth and sixth antennal segments only. These tyloidea consist of short, black and shining carinae, the first one is shorter than its base is broad, the second one is about as long as the widest part of the segment. The antennae are long, the last segment is almost three times as long as it is broad at the base. In both sexes there is behind the enclosed area of the propodeum a smooth region without sculpture, at most with a few fine punctures.

The pygidial area of the female resembles that of *P. politiventris* but it is somewhat broader and the base is slightly more convex. The apex has a reddish spot as in *P. politiventris*.

The female has a length of about 9-13,5 mm, the male measures about 9-10 mm.

Psen (Psen?) rufiventris Cameron

1890, Cameron, P., Mem. Proc. Manch. Litt. Phil. Soc., vol. 3, pp. 267-268, ♀ (*Psen rufiventris*; Madras, India).

Judging from the rather extensive original description this species seems to resemble somewhat the Javanese *P. rubicundus*. According to Cameron the abdomen is piceo-ferruginous, the mesonotum is opaque, the propodeal declivity irregularly reticulate, the pygidial area shining and convex, keeled laterally, pubescence of face golden.

It differs from *P. rubicundus* in the colour of the face, furthermore in *P. rubicundus* the scutum is shining and the pygidial area is flat. *Psen erraticus* Smith from Celebes, to which Cameron refers, belongs to the genus *Psenulus*.

Psen (Psen?) rufoannulatus Cameron

1907, Cameron, P., Ann. Mag. Nat. Hist., ser. 7, vol. 20, p. 90, ♀ (*Psen rufoannulatus*; Simla, India).

This species may be allied to *Psen refractus* or *Psen matalensis*. The second and third abdominal segments are bright red according to Cameron, but owing to the very incomplete description and having no types available, I cannot yet ascertain its systematic position.

Psen (Mimumesa) kashmirensis Nurse

1903, Nurse, C. G., Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 520, ♀ ♂ (*Psen kashmirensis*; Kashmir, India).

This species is a *Mimumesa*, closely related to the Palearctic *P. (M.) unicolor* v. d. Lind. The mesopleura are more finely punctate than in *P. (M.) unicolor*; the antennal segments 4-10 are carinated, the last antennal segment is slightly more than twice as long as it is broad, only the extreme tip of this segment is pale brown.

I have examined two males, one labelled "type", both from an altitude of 5000-6000 ft.

Another form which is very closely allied to *P. unicolor* has been taken at Quetta (Pakistan). In the male also the eleventh antennal segment is carinated, but very indistinctly so; the under side of the last two or three segments is pale brown. In the female the pygidial area is triangular and densely punctate; the upper part of the hind femora is smooth and there is no distinct series of punctures. As in *P. kashmirensis* the epicnemial areas are similar to those of *P. unicolor*.

Material examined: 2 ♀♀ and 1 ♂ from Quetta, Aug. 1903, C. G. Nurse (BM).

The following Oriental species have been assigned by the respective authors to the genus *Psen*, but probably should be all placed into *Psenulus*:

Malay Peninsula and Malay Archipelago

- Psen erraticus* Smith (1861) (Celebes)
- Psen ornatus* Ritsema (1876) (Java)
- Psen sumatranus* Ritsema (1880) (Sumatra)

India and Assam

- Psen clavatus* Cameron (1890) (Poona, India)
- Psen carinifrons* Cameron (1902a) (Deesa, India)
- Psen rufobalteata* Cameron (1904) (Khasia Hills, Assam)
- Psen montanus* Cameron (1907a) (Simla, India)
- Psen puncticeps* Cameron (1907a) (Simla, India)

Psen pulcherrimus Bingham (Jl. Proc. Linn. Soc. Zool., 1896, p. 443; Tenerassim) and *Psen marginicollis* Cameron (Entomologist, 1908, vol. 41, p. 242; Kuching) are no *Pseninae* but a *Diodontus* (sensu Kohl) and a *Stigmus* (according to Turner), respectively.

DISTRIBUTION AND RELATIONSHIPS

Relatively much material has been collected in Java, especially in West Java and also on some Philippine islands, but records from the other islands

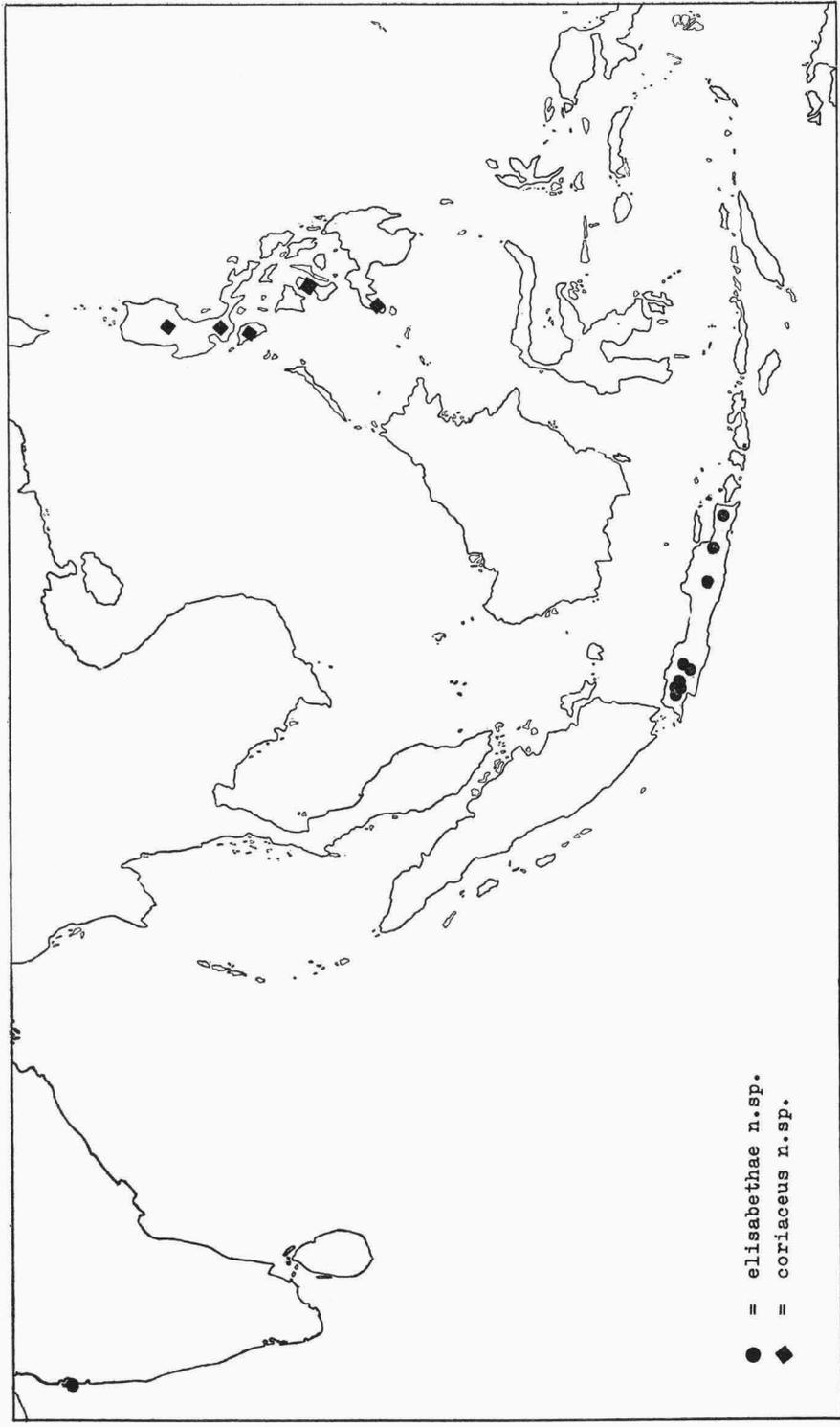


Fig. 98. Map showing distribution of *Psen (Psen) elisabethae* n. sp. and *Psen (Psen) coriaceus* n. sp. in Java, India, and the Philippine Islands.

in the Malay Archipelago are scarce or lacking, so that it is not yet possible to obtain a complete picture of the distribution of the Pseninae in this region.

As regards *Psen* s.l. it may be concluded from the available data that there exists a close relationship between some Philippine and Indian species or between some Javanese and Indian species on the one hand and between some Philippine and Indonesian species on the other hand.

P. (Psen) politiventris from Luzon, for instance, has two important characters which show great similarity with those of some species from the south-eastern Asiatic continent, amongst which *P. reticulatus* Cam. from India and *P. fuscinervis* Cam. from Assam. This similarity concerns the sculpture of the pygidial area of the female, the number of tyloidea on the antennae of the male and the structure of the propodeum in both sexes.

Two Indonesian species of *Psen* s.str. have a distribution range extending as far westward as Ceylon (*P. nitidus*) or Bombay (*P. elisabethae*), if the labels on two old specimens in the collection of the British Museum (Natural History) are correct. I have not yet been able to find any difference of specific or subspecific value, but it would be very interesting to examine fresh material from Ceylon and India.

In north-eastward direction *P. elisabethae* is closely related to the Philippine species *P. coriaceus*. The distribution of these species is shown in fig. 98.

From the Malay Peninsula only two specimens have been studied, both belonging to the *curvipilosus* group of *Psen* s.str. As might be expected, they proved to be near relatives of the Sumatran and Javanese representatives of this group, *P. lieftincki* and *P. curvipilosus* (fig. 99).

In the present state of our knowledge of the Oriental Pseninae it would be premature to give a subdivision of the subgenus *Psen*. It may be helpful, however, to mention briefly some groups of obviously closely related species:

1. group of *P. curvipilosus*

This group consists of *P. curvipilosus* n. sp. (Java; male unknown) and *P. lieftincki* n. sp. (Sumatra and Malaya). It is characterized by the long curved hairs in front of the posterior margin of the tergites. The sculpture of the pygidial area shows little variation.

2. group of *P. elisabethae*

Represented by *P. elisabethae* n. sp. (Java, also India) and *P. coriaceus* n. sp. (Philippine Islands). Characterized by the large bare upper propodeal areas, though these parts vary in sculpture. The structure and sculpture of the pygidial area are almost identical in the two species.

3. group of *P. fuscinervis*

Consists of *P. fuscinervis* (Cam.) (Assam), *P. reticulatus* Cam. (India) and *P. politiventris* Roh. (Luzon). Characterized by the structure and sculpture of the pygidial area of the female. There is also much similarity in the tyloidea of the males of *P. fuscinervis* and *P. politiventris*.

4. group of *P. aureohirtus*

In this group I have provisionally combined *P. aureohirtus* Roh. (Luzon, Negros and Sibuyan), *P. melanosoma* Roh. (Negros and Luzon; female unknown) and *P. toxopeusi* n. sp. (S.W. Celebes; male unknown). They all have in both sexes a more or less raised postocellar area. Further characterized by the tyloidea of the males of *P. aureohirtus* and *P. melanosoma* and the dense puncturation of the pygidial area of the females of *P. aureohirtus* and *P. toxopeusi*.

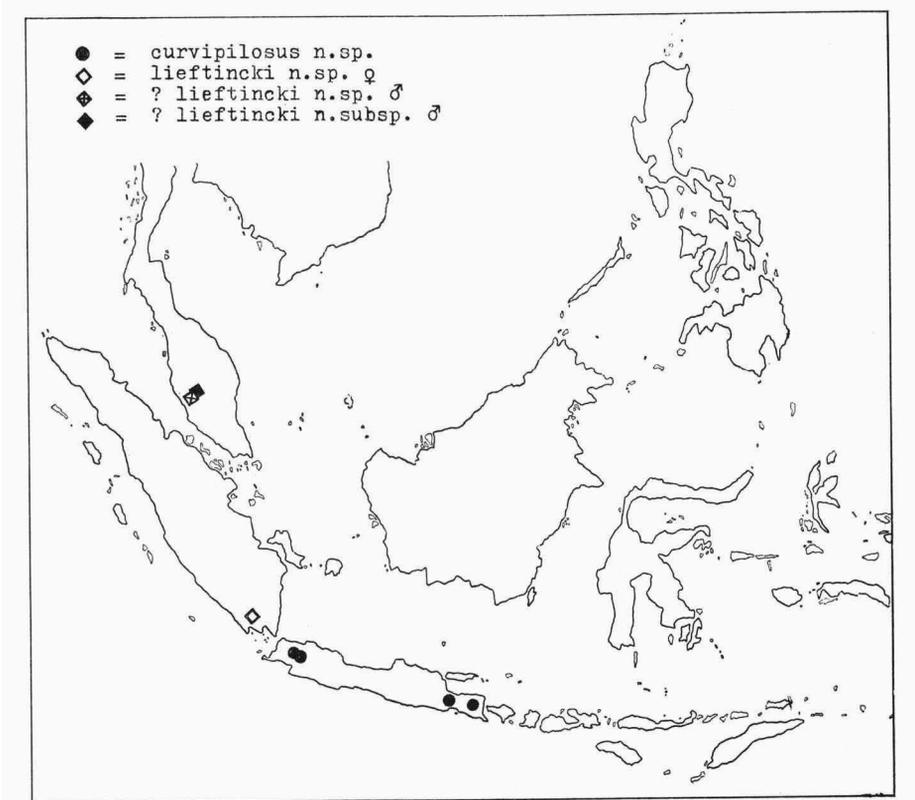


Fig. 99. Map showing distribution of *Psen (Psen) curvipilosus* n. sp. and *Psen (Psen) lieftincki* n. sp. in Malaya, Sumatra, and Java.

As regards the subgenus *Mimumesa* it was interesting to find that *P. (M.) auratus* from the Sunda Islands is almost identical with two forms from the Philippine Islands Mindoro and Negros (fig. 100). The differences are of a small degree only and I have thought it advisable to consider these forms as subspecies of the Indonesian form. A specimen from Bali agrees with those from Java, which is in conformity with the statement of other authors that the fauna of the former island shows more similarity with the Greater Sunda Islands than with the Lesser Sunda Islands.

Of the subgenus *Pseneo* no more than one species has been found in Luzon, so that little can be observed as yet about this subgenus which previously was thought to be Nearctic only. The fact that no more than one specimen was collected near Baguio, where two assiduous collectors have been working, need not give rise to any doubt of this being an endemic species, as also in some Palaearctic species of *Psen* a very sporadic occurrence has been ascertained.

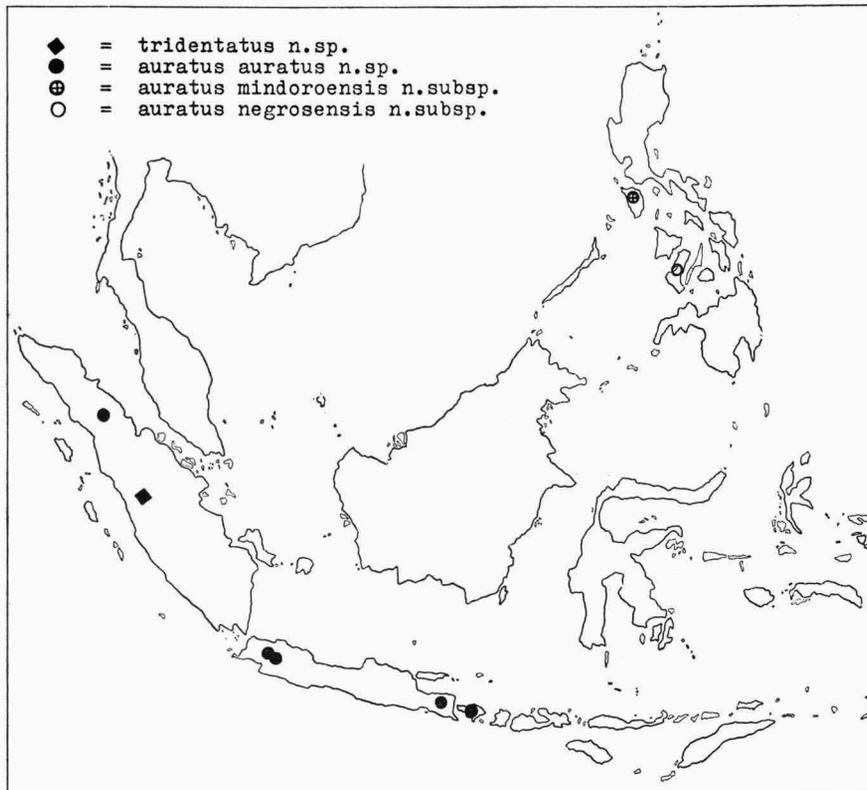


Fig. 100. Map showing distribution of *Psen (Mimumesa) tridentatus* n. sp. and *Psen (Mimumesa) auratus* n. sp. in Sumatra, Java, and the Philippine Islands.

From these provisional observations may be concluded that the study of more material — good series especially from Borneo and Celebes are greatly needed — could reveal many other interesting facts about the distribution of the Pseninae in the Malay Archipelago.

BIOLOGICAL NOTES

In the Malay Archipelago the genus *Psen* s.l. seems to occur mainly or exclusively in the mountain regions. Most of the specimens which have been collected recently bear labels indicating the altitudes at which they have been found. From the available data it appears that they occur at heights varying from 220 m to 2400 m, but mostly between 900 and 1500 m. Also the wasps from India, Assam etc. have been captured in mountainous areas (Mt. Abu, Khasia Hills). Dr. J. van der Vecht often observed the wasps in Java in open places in the forests, sunning on the leaves of various plants.

In the material studied the only *Psen* which has been found on a flower is a male of *Psen curvipilosus*. This wasp was collected from the small white flowers of a *Borreria* species, a weed which locally is very common along the edges of the forests.

Very little is known about the nesting habits of the Indo-Australian *Psen*. The only record in this respect concerns two females of *P. (Psen) terrigenus* n. sp. which were nesting in the hollow bank of the road.

Five females belonging to five different species have been taken carrying their prey, which consisted of larger forms of Homoptera Auchenorrhyncha, namely:

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| <i>P. (Psen) curvipilosus</i> n. sp. | — | <i>Considia</i> n. sp. (Cercopidae) |
| <i>P. (Psen) emarginatus</i> n. sp. | — | <i>Hemisphaerius</i> sp. (Fulgoridae) |
| <i>P. (Psen) betremi</i> n. sp. | — | <i>Coelidia</i> sp. (Jassidae) |
| <i>P. (Psen) vechti</i> n. sp. | — | <i>Aphrophora</i> n. sp. (Cercopidae) |
| <i>P. (Psen) coriaceus</i> n. sp. | — | <i>Clovia lineata</i> (Cercopidae) |

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The names of new species and new subspecies, and new names, are marked with an asterisk.

Synonyms and homonyms are printed in italics.