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

Part III. New species of the subgenera *Psen* Latreille and *Mimumesa* Malloch and a review of East-Asiatic and Indo-Australian *Psen* Latreille, s.l.

by

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CONTENTS

INTRODUCTION

Shortly after my first contribution to the knowledge of the Indo-Australian Psenini (May, 1959) two interesting studies on Psenini were published, namely one by Carl M. Yoshimoto (August, 1959) on the Hawaiian genera *Deinomimesa* Perkins and *Nesomimesa* Perkins and an extensive paper by K. Tsuneki (September, 1959) on the genera *Psen* Latreille and *Psenulus* Kohl from Japan and Korea.

A new comparative study of Indo-Australian and East-Asiatic material has revealed many interesting close relationships within the subgenus *Psen*

Latreille. Furthermore I have had the opportunity to examine the *Psen* types of Cameron, Nurse and Turner in the collections of the British Museum (Natural History) and of the Oxford University Museum, together with a few types of Gussakovskij in the Stockholm Museum. From various institutions I also received for identification a number of undetermined specimens mainly collected in East and South Asia. Special mention should be made of the material collected during recent years for the Bernice P. Bishop Museum, Honolulu. This material, kindly entrusted to me for study, includes also a few specimens from N.E. New Guinea and New Ireland. A few nomenclatorial problems could be solved and a number of new species and subspecies could be described. New keys are presented here, including all East-Asiatic and Oriental species of the subgenera *Psen* Latreille, *Mimumesa* Malloch and *Mimesa* Shuckard. The remarks made by Leclercq (1963) in his study on the Asiatic and Philippine Crabronids also apply to the Psenini of Asia and Indo-Australia: the material is very limited and many forms have been described from one specimen only. Therefore the keys should still be considered as preliminary ones. That to the species of the subgenus *Psen,* however, clearly demonstrates the affinities between the Indo-Australian and the East-Asiatic species. Many of these could be brought into well-separated groups which are distributed over both the Indo-Australian and the East-Asiatic areas. I have made an attempt to base this division into groups also on the male genitalia. For obvious reasons a thorough comparative study of the male genitalia could not yet be effected. However, the first results seem to confirm the conclusions which were based on other characters.

I am very much indebted to the institutions and the entomologists who allowed me to study their material and who are mentioned below together with the abbreviations used in this paper.

BISH — Bernice P. Bishop Museum, Honolulu (Dr. J. L. Gressitt and Dr. C. M. Yoshimoto)
BM — British Museum (Natural History), London (Dr. I. H. H. Yarrow)
BPIM — Bureau of Plant Industry, Entomology Research Section, Manila (Dr. C. R. Baltazar)
FMS — Federated Malay States Museums, Malaya
HTP — Mr. H. T. Pagden, Penang, Malaya
KTS — Prof. K. Tsuneki, Fukui, Japan
ML — Rijksmuseum van Natuurlijke Historie, Leiden (Prof. J. van der Vecht)

MR — Natuurhistorisch Museum, Rotterdam (Mr. H. Landsman)
NMW — Naturhistorisches Museum, Wien (Dr. M. Fischer)
NRS — Naturhistoriska Riksmuseum, Stockholm (Dr. E. Kjellander)
OUM — Oxford University Museum, Hope Department of Entomology, Oxford (Prof. G. C. Varley and Mr. E. Taylor)
USNM — United States National Museum, Washington D.C. (Dr. K. V. Krombein)
PMFV — Mr. P. M. F. Verhoeff, Den Dolder, The Netherlands.

Special thanks are due to the authorities of the Rijksmuseum van Natuurlijke Historie at Leiden for their constant help and for their kindness in publishing this study in the Zoologische Verhandelingen. I am also very grateful to the Uyttenboogaart—Eliasen Stichting for the grant which made the publication of this paper possible.

In this study, contrary to the morphological nomenclature adhered to in my first paper on *Psen* (Van Lith, 1959), the term gastral segments is used only, the petiole being considered here as the first gastral sternite. Because of the confusion created by calling these segments abdominal segments and by considering the propodeum as the first abdominal segment and so on, as some authors do, I had already changed to the more usual nomenclature in my second publication on the Pseninae (Van Lith, 1962).

As regards the peculiar transverse groove at the base of the second gastral sternite I noticed, when re-reading the original description of *Caenopsen fuscinervis,* that Cameron (1899) had already mentioned that "the second ventral segment has a deep furrow at the base, this furrow occupying the entire base, and at the sides is covered with white hair". Apparently he did not pay further attention to this structure.

The drawings in this paper were made with the aid of a Leitz drawing apparatus (mirror) and after reduction they show the various details with magnifications of 45 times (pygidial areas) or 25 times (other parts). To avoid repetition only very few figures are given of species which have already been described in my first paper (1959). As a rule hairs have been omitted, except in the drawings of the genitalia and the pygidial areas; these latter figures also show the sculpturation, but only on the left half.

The male genitalia of the subgenus Psen Latreille

The shape of the outer parts of the male genitalia has proved to be a useful character to distinguish between the species belonging to the subgenus *Mimumesa* Malloch (de Beaumont, 1937). A profound study of the male genitalia of the subgenus *Psen* is not yet possible. Of many important species the males have not yet been collected. Many of the described males

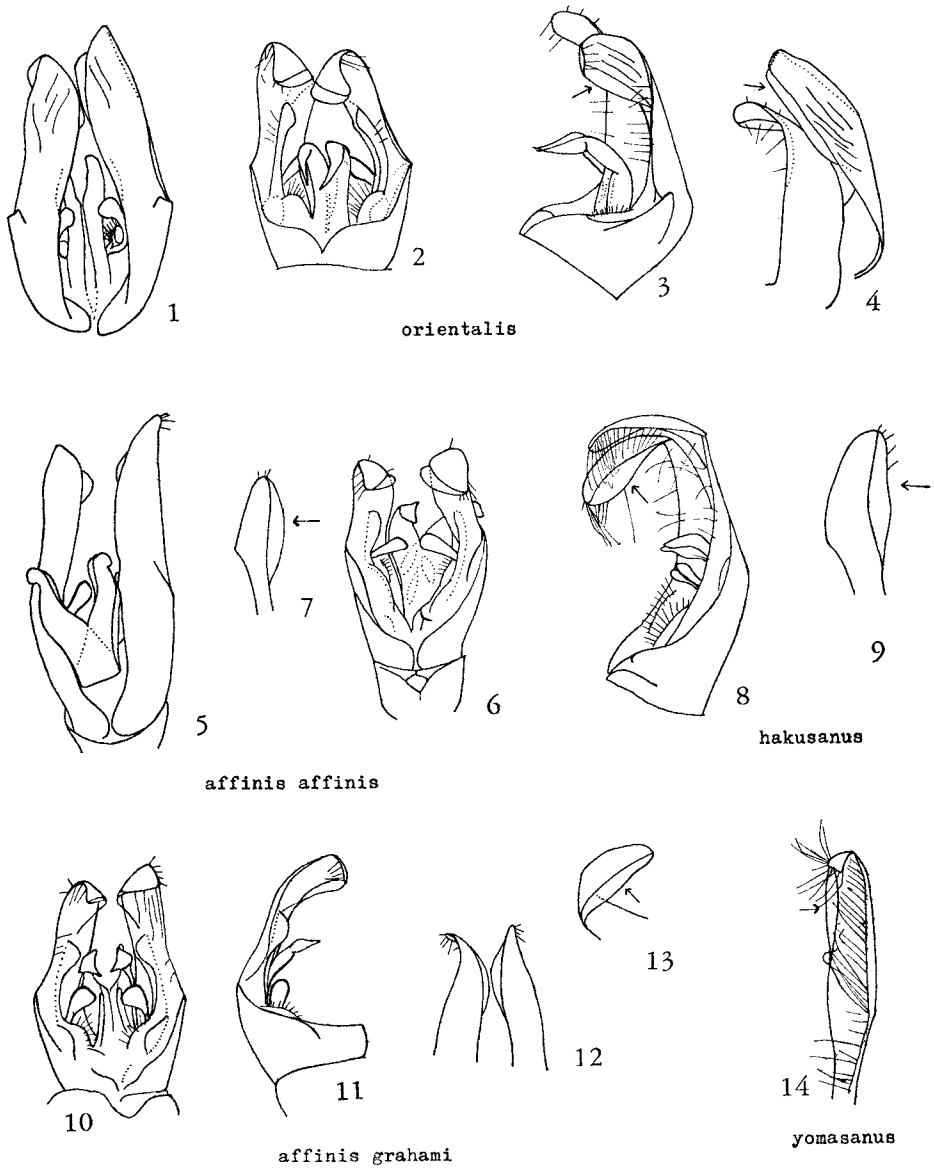

Fig. 1-14, male genitalia of various East-Asiatic and Indo-Australian *Psen* s. str. 1-4, *P. orientalis* Cameron, Simla, dorsal, ventral, lateral view, and end of stipes in latero-dorsal view; 5-7, *P. affinis affinis* Gussakovskij, Japan, dorsal, ventral view, and end of right stipes in dorsal view; 8-9, *P. hakusanus* Tsuneki, lateral view and end of right stipes in dorsal view; 10-13, *P. affinis grahami* n. subsp., ventral, lateral (left stipes) view, end of stipites in dorsal view, and right stipes in dorso-apical view; 14, *P. yomasanus* n. sp., right stipes in ventral view.

are unique specimens sofar and could not be dissected. Another great inconvenience is the fact that the available material of many large areas in South and East Asia is inadequate, or completely lacking. In total 23 males belonging to 19 species or subspecies could be studied.

Notwithstanding these unfavourable circumstances the first results of the study of the genitalia are encouraging and they are strengthening my opinion that the subgenus *Psen* can be subdivided in a number of distinct groups of species. The differences in the genitalia seem to confirm the creation of groups which were based on other structural characters, amongst which the shape of the propodeum and the puncturation of the pygidial area of the female are the most important.

As regards the nomenclature of the genitalia a few remarks should be made. For the parts of the outer valves I have chosen the terms stipites and squamae (Snodgrass, 1941, basiparameres and parameres; Michener, 1944, gonocoxites and gonostyli). It is likely that in the subgenus *Psen* the whole sclerotized outer valvae form the stipites and that the apical inner lobes which are membraneous are to be considered as the squamae, parameres or gonostyli of other Hymenoptera. The shape of these membraneous lobes is a very important character to distinguish between the groups of species. Ventrally they are often fused with the stipites to such an extent that only the part which projects beyond the inner margin of the stipes is well visible. In the figures the end of the stipes has always been drawn at least once in such a position that the free part of the membraneous lobe is visible in its greatest extension. The lobe is then indicated by a small arrow. Sometimes also the outer margin of the stipes is more or less transparent (indicated by a dotted line) but this transparent part is not distinctly separated from the darker part. In some species there are membraneous tubercles or inflated bags on the ventral side of the stipites.

The projections visible between the stipites and the aedeagus are called volsellae as they seem to be the same parts as figured by Yoshimoto (1959) in his paper on the Hawaiian Pemphredoninae.

The group which is best represented here is that of *P. orientalis*. The genitalia of six species could be compared, viz. *P. orientalis* (fig. 1-4), *P. affinis affinis* (fig. 5-7), *P. affinis grahami* (fig. 10-13), *P. hakusanus* (fig. 8-9), *P. yomasanus* (fig. 14), *P. politiventris* (fig. 15-18), *P. triangulatus* (fig. 19-20). The propodeum of the latter species was not immediately recognized as being characteristic of the group of *P. orientalis* and the reticulate triangle on the second gastral tergite is a unique character sofar. The shape of the genitalia, however, leads to the conclusion that they must be very closely related. The genitalia of the group of *P. orientalis* are

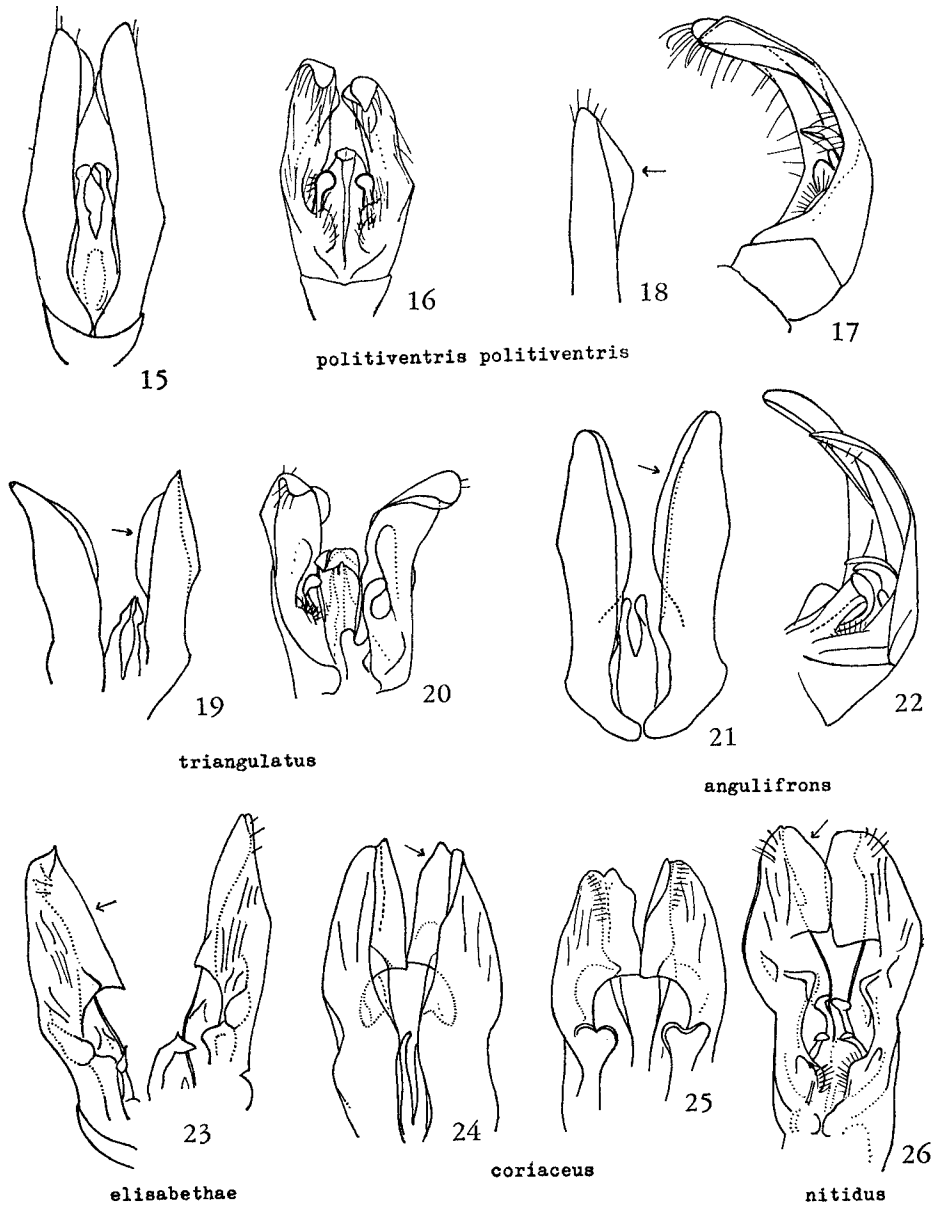

Fig. 15-26, male genitalia of various Indo-Australian *Psen* s. str. 15-18, *P. politiventris politiventris* Rohwer, dorsal, ventral, lateral view, and end of right stipes in dorsal view; 19-20, *P. triangulatus* Van Lith, dorsal and ventral view; 21-22, *P. angulifrons* n. sp., dorsal and lateral view; 23, *P. elisabethae elisabethae* Van Lith, ventral view; 24-25, *P. coriaceus* Van Lith, dorsal and ventral view; 26, *P. nitidus* Van Lith, ventral view.

all dark brown. The transparent part of the squamae which is visible in dorsal view is narrow. The hairs on the ventral outer side of the stipes may be long and placed along the whole margin, as in *P. hakusanus* and *P. yomasanus.*

The only male of the group of *P. rufiventris* I have seen is that of *P. angulifrons* from Mindanao and as could be expected it is of the *orientalis* type. The colour of the sclerotized parts is somewhat paler (fig. 21-22). The male of *P. richardsi* Tsuneki has just been described by Tsuneki (1964), who also gives a drawing of the genitalia. Apparently the squamae do not differ very much from those of *P. angulifrons.*

The genitalia of the group of *P. elisabethae* (*P. elisabethae,* fig. 23; *P. coriaceus,* fig. 24-25; *P. novahibernicus,* fig. 27-28) are quite different. The colour of the apparatus is much paler, yellowish and it is largely transparent. The squamae are very broad and connected with the ventral side of the stipites. Although there is much similarity in the shape of the membraneous lobes the differences are sufficient to distinguish the species easily. They have all conspicuous membraneous lobes or tubercles at the ventral base of the stipites. The genitalia of *P. elisabethae auricomus* which could not be drawn are quite similar to those of the nominate form. After comparison of the genital apparatus there is little doubt that *P. nitidus* (fig. 26) should be placed into this group or at least very close to it, although the sculpturation of the pygidial area of the female is different.

Of the group of *P. tsunekii* only one male was available, which differs from the other males in the squamae reaching beyond the apices of the stipites (*P. tsunekii,* fig. 29-30). The stipites are yellowish brown.

The group of *P. aureohirtus* is represented here by *P. aureohirtus* (fig. 31) and *P. melanosoma* (fig. 32-34). The shape of the membraneous parts differs somewhat and I am not quite sure that *P. melanosoma* is rightly placed here. In both species the apparatus is dark brown. I think that the genitalia of *P. refractus meridianus* (fig. 35-38) are more like those of *P. aureohirtus.* Unfortunately the stipites of the available male of *P. aureohirtus* have been mutilated but I have tried to sketch a reconstruction.

Of two males which could not yet be satisfactorily classified the genitalia have also been examined, viz. of *P. betremi* and of *P. ruficrus.* The long elongate squama of *P. ruficrus* is not as much fused with the underside of the stipes as for instance in the group of *P. orientalis.* Anteriorly the squamae are bordered by a row of long hairs (fig. 39-40). I had two males of *P. betremi* at my disposal, but in both specimens the squamae are not distinctly separated from the stipites. The stipites are pale coloured and being very thin they are easily rolled up when dry (fig. 41-43).

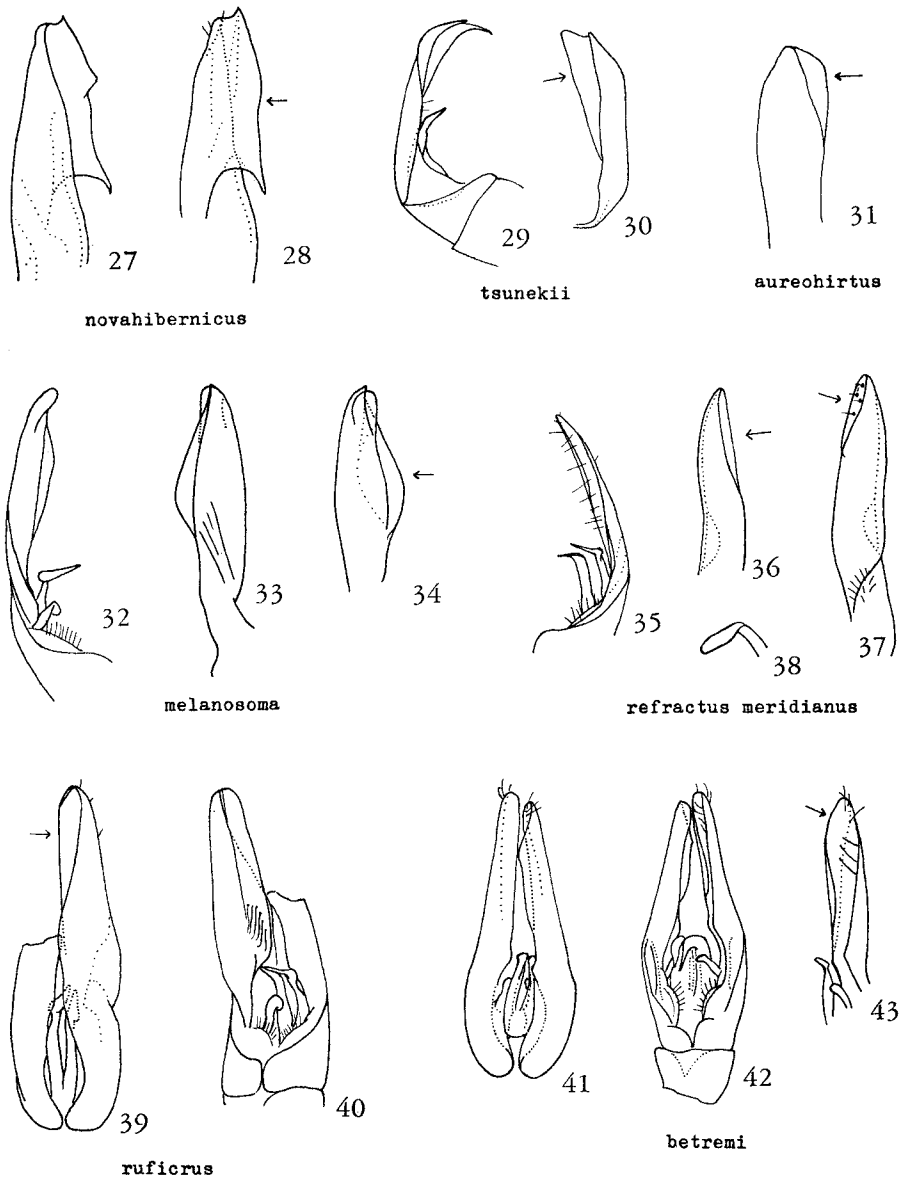

Fig. 27-43, male genitalia of various East-Asiatic and Indo-Australian *Psen* s. str. 27-28, *P. novahibernicus* n. sp., end of right stipes in dorsal view, and end of left stipes in ventral view; 29-30, *P. tsunekii* nom. nov., lateral view, and end of left stipes in dorsal view; 31, *P. aureohirtus* Rohwer, end of left stipes in ventral view; 32-34, *P. melanosoma* Rohwer, lateral view, and end of left stipes in dorsal and ventral view; 35-38, *P. refractus meridianus* n. subsp., lateral view, right stipes in dorsal and ventral view, and end of volsella; 39-40, *P. ruficrus* n. sp., dorsal and ventral view; 41-43, *P. betremi* Van Lith, dorsal, ventral view, and end of right stipes in ventral view.

KEY TO THE INDO-AUSTRALIAN AND EAST-ASIATIC SPECIES OF THE SUBGENUS PSEN LATREILLE

1. Petiole dorsally coarsely punctate. Margin of third and fourth gastral sternites of male without tuft of long fasciculate hairs 2
— Petiole dorsally not coarsely punctate. Male with tuft of long hairs on margin of third or third and fourth gastral sternites 3
2. Metatarsus of mid legs of male with one long tooth (fig. 45). Mandibles of male with long tooth. Female with narrow and shining pygidial area. Temples in both sexes about as long as eyes in lateral view. (Europe, Caucasus, Siberia, Korea, Japan) . . . . . *exaratus* (Eversmann) (p. 18)
— Metatarsus of mid legs of male with two distinct teeth (fig. 46). Mandibles of male without tooth. Eyes twice as long as temples in lateral view. Female unknown. (Japan) . . . . . *santoro* Yasumatsu (p. 18)
3. Female with long and pointed interantennal tooth (lateral view); pygidial area broadly triangular, densely punctate. Mid metatarsus of male broadened . . 4
— Interantennal tooth less strong. Metatarsus of mid legs of male normal . . 6
4. All tarsal segments of mid legs of male of abnormal shape (fig. 44). Face of female silvery; third antennal segment at most three times as long as it is broad at apex. Antennal segments 6-13 of male with tyloidea. (Europe, Siberia, China, Mongolia, Korea and Japan) . . . . . *ater* (Fabricius) (p. 17)
— Only metatarsus of mid legs of male with hook-shaped protuberance (fig. 47) 5
5. Antennal segments 6-13 of male with tyloidea. Face of female golden; third antennal segment more than three times as long as it is broad at apex. (Japan) . . . *aurifrons* Tsuneki (p. 18)
— Antennae of male without tyloidea. Female unknown. (Japan) . . . . . *yasumatsui* Gussakovskij (p. 18)
6. Posterior margin of gastral tergites with fringe of long hairs 7
— No distinct fringe of long hairs 12
7. Back of propodeum in both sexes with irregular carination. Scape of antennae thick, further antennal segments normally slender. Pygidial area of female densely punctate. Antennae of male with tyloidea. Underside of petiole smooth in both sexes. Group of *P. emarginatus* 8
— Back of propodeum, especially of females, with parallel striation. Antennae thick, flagellum almost as broad as scape. Pygidial area of female broadly triangular, dull, an irregular row of punctures along the margin. Antennae of male without tyloidea. Underside of petiole irregular. Group of *P. curvipilosus* 10
8. Posterior margin of tergites with fringe of black hairs. Gaster black with bluish shine. Female unknown. (Malaya) . . . . . *pilosus* n. sp. (p. 20)
— Fringe of hairs on posterior margin of tergites paler 9
9. First gastral tergite with large reddish spot on each side. Posterior margin of tergites with fringe of long and stiff, fuscous-golden hairs. (Japan) . . . . . *dzimm* Tsuneki (p. 20)
— Gaster black. Posterior margin of tergites with fringe of inconspicuous yellowish stiff hairs. (Java) . . . . . *emarginatus* Van Lith (p. 20)
10. Curved long hairs along margin of gastral tergites and pubescence on disk of tergites golden-brown. Pubescence of face pale golden in both sexes. (Java) . . . *curvipilosus* Van Lith (p. 21)
— Curved hairs almost black, pubescence on disk of fourth, fifth and sixth gastral tergites greyish. Pubescence of face silvery 11
11. Hind tibiae brown. Larger. Punctures on second gastral tergite indistinct. In female end of petiole coarsely punctate ventrally, but punctures not deep. In male underside of petiole not or slightly concave on either side of median carina, very coarsely

striato-punctate there. Carinae on either side of median ventral carina usually of irregular length. (Sumatra, Malaya) . . . *lieftincki lieftincki* Van Lith (p. 21)

— Hind tibiae darker, nearly black. Smaller. Punctures on second gastral tergite more distinct but still fine. In female end of petiole below much finer punctate. In male underside of petiole concave on either side of median carina, few punctures only. Carinae on either side of median ventral carina usually of about equal length. (Malaya) . . . . . *lieftincki minor n.* subsp. (p. 23)

12. Mandibles extremely broad. Interantennal carina often ending in a transverse, much protruding carina. Pygidial area of female triangular, dull, an irregular row of punctures along the margin. In female, sometimes also in male, part of the longitudinal carinae of the enclosed area of the propodeum distinctly continued on back of propodeum. Antennae of male probably always without tyloidea. Group of *P. tsunekii* 13

— Mandibles normal 17

13. Petiole more or less quadrate in cross section; sides depressed, consequently with distinct longitudinal edges above and below. Median ventral carina 14

— Petiole rounded below and only upper lateral edges distinct or petiole almost cylindrical 15

14. Posterior end of petiole about 1 2/3 times as broad as base of petiole. Reticulate carination on back of propodeum rather coarse. Ventral median carina sharper. Puncturation of frons very fine but distinct, sparser on vertex. Female unknown. (Siberia) . . . . . *ussuriensis* Van Lith (p. 24)

— Petiole more slender, sides almost parallel. Carination on back of propodeum less coarse. Frons and vertex almost impunctate. Ventral median carina of petiole of male weaker. Face of female silvery. (Japan) . . . . . *tsunekii* nom. nov. (p. 26)

15. Legs dark, tibiae brown. Frons and vertex extremely finely punctate. Back of propodeum with very coarse and irregular carination; a few of the longitudinal carinae of the enclosed area distinctly continued on the back. Female unknown. (Assam) . . . . . *assamensis* n. sp. (p. 28)

— Legs, at least tibiae, partly red 16

16. Legs completely red. Antennae brown, scape and underside of flagellum reddish. Underside of petiole finely punctate. Frons and vertex finely punctate. Face of female golden, male unknown. (Java) . . . *vechti vechti* Van Lith (p. 28)

— Only tibiae and tarsi red. Underside of hind femora brown. Antennae darker. Face of female golden, male unknown. (Burma) . . *vechti birmanicus* n. subsp. (p. 28)

17. Behind enclosed area of propodeum on both sides of median sulcus a smooth area. In case the smooth area is narrow and indistinct (cf. *P. politiventris*) dorsal side and back of propodeum are forming an obtuse angle. (If propodeum only dorsolaterally behind enclosed area more or less smooth and second recurrent vein ending in third submarginal cell, cf. *P. refractus*). Pygidial area of female (as far as known) with one row of punctures along margin 18

— No smooth area behind enclosed area of propodeum, carinae on back of propodeum extending to enclosed area. Dorsal side and back of propodeum always curved in lateral view. Pygidial area of female densely punctate 43

18. Smooth (or coriaceous) areas behind enclosed area of propodeum broad, oblong, covering a large part of back of propodeum. Propodeum in lateral view gently curved, in *P. coriaceus* and *P. amboinensis* somewhat angular. Second recurrent vein of fore wings never ending in third submarginal cell. Antennae of male without tyloidea 19

— Smooth areas narrower and for the greater part situated on the horizontal part of the propodeum. Propodeum in lateral view more angular, distinctly divided into an almost horizontal dorsal part and an almost perpendicular back part. Enclosed area

of propodeum more depressed. Second recurrent vein of fore wings in some species ending in third submarginal cell 25

19. Pygidial area of female broadly triangular, surface coriaceous, one row of punctures along margin. Mesosternum with acetabular carina about as long as half the distance between the epicnemial carinae. (Java, Krakatau I., Bangka I.) . . . *nitidus* Van Lith (p. 30)

— Pygidial area of female elongate triangular, smooth and shining. Acetabular carina shorter. Group of *P. elisabethae* 20

20. Smooth area behind enclosed area of propodeum with very fine coriaceous sculpture but still somewhat shining. Puncturation of scutum coarse. Vertex raised. Face silvery in both sexes. (Philippines) . . . . . *coriaceus* Van Lith (p. 32)

— Smooth areas without coriaceous sculpture, at most with a few obscure irregular carinae. Puncturation of scutum normal 21

21. Petiole very long, reaching beyond hind femora when stretched. Femora dark, tibiae and tarsi reddish brown. Scape of antennae dark. Petiole of female with traces of broad lateral groove, petiole of male nearly quadrate. Face silvery in both sexes. (Java, Sumatra) . . . . . *elisabethae elisabethae* Van Lith (p. 31)

— Petiole much shorter, not reaching as far as hind femora 22

22. Petiole with broad lateral groove, sometimes only distinct anteriorly, lower carina not sharp. Males unknown. Tibiae brown or reddish-brown 23

— Petiole of female with one lateral edge only, no distinct groove, in male somewhat quadrate. Tibiae brown or black 24

23. Pygidial area of female as narrow as in *P. elisabethae elisabethae* Van Lith. Vertex not distinctly raised. Tibiae and tarsi reddish brown, mid and hind tibiae darkened at apex. Scape of antennae reddish brown. Male unknown. (South India) . . . *elisabethae* subsp. (p. 31)

— Pygidial area somewhat broader. Vertex distinctly raised. Tibiae brown, tarsi paler. Heavily built species. Male unknown. (Amboina) . . *amboinensis* n. sp. (p. 32)

24. Hind femora, sometimes also fore and mid femora, reddish or dark reddish-brown, scape of antennae reddish. Face and temples of female with pale golden, almost silvery pubescence. (Malaya, Pulau Tioman) *elisabethae auricomus* n. subsp. (p. 31)

— Hind femora and tibiae black, ends of tibiae paler, tarsi pale white. Female unknown. (New Ireland) . . . . . *novahibernicus* n. sp. (p. 33)

25. Second recurrent vein of fore wings ending well in third submarginal cell. Mandibles reddish except dark tips. Pygidial area narrow, smooth and shining, a few punctures along the margin (fig. 88). Petiole almost cylindrical. Group of *P. rufiventris* 26

— Second recurrent vein of fore wings interstitial or ending just in third submarginal cell. Mandibles mostly dark. Pygidial area of female triangular, surface finely reticulate, a few punctures along the margin (fig. 94); if the pygidial area is narrow (fig. 90, 92) the surface is smooth or almost smooth. Petiole cylindrical or with lateral groove and ventral carina 31

26. Basal half of clypeus much raised, gaster red but petiole and first and third gastral tergites for the greater part brown-black. Face pale golden. Back of propodeum with whitish hairs. Male unknown. (South India) . *rufiventris* Cameron (p. 34)

— Basal half of clypeus not much raised 27

27. Petiole red, remainder of gaster red or partly dark brown. Face of female silvery 28

— Petiole black, gaster completely black or first tergites somewhat reddish on the sides. Face of female golden 29

28. Gaster almost completely red, tergites only slightly darkened. Red band before anterior margin of clypeus. Male unknown. (South Java) . . . . . *rubicundus rubicundus* Van Lith (p. 37)

— Gaster much darkened, only apical margin and sides of second, third, fourth and

fifth tergites ferruginous. Clypeus almost completely dark. Male unknown. (East Java) . . . . . *rubicundus lawuensis* Van Lith (p. 37)

29. Back of propodeum not only carinate but also punctate. Gaster completely black. Antennal segments 8-9 about twice as long as broad. Face including frons with dense golden pubescence. Back of propodeum with whitish hairs. Male unknown. (Luzon) . . . . . *nigriventris* n. sp. (p. 38)

— Back of propodeum not punctate 30

30. Back of propodeum with whitish hairs. Face of female golden, of male silvery. Sides of gaster reddish. Antennae of female short, segments 8-9 about half as long again as they are broad. Antennae of male without tyloidea. (Japan) . . . . *richardsi* Tsuneki (p. 38)

— Back of propodeum with golden brown hairs. Face golden. Gaster completely black. Lower half of clypeus red. Frons angularly protruding, horizontal side of head very long. Antennae long, no tyloidea. Smooth area behind enclosed area of propodeum indistinct. Female unknown. (Mindanao) . . . . . *angulifrons* n. sp. (p. 37)

31. Pygidial area very narrow, almost guttershaped, shining. No distinct smooth area behind enclosed area of propodeum. Petiole cylindrical. Median part of clypeus distinctly raised with deep triangular emargination. Face of female golden. Tarsi red. Male unknown. (Java) . . . . . *terrigenus* Van Lith (p. 39)

— Pygidial area much broader, if only slightly broader (fig. 91-92) the petiole is quadrate (*P. seminitidus* and *P. hakusanus*). Median part of clypeus not distinctly separated from the sides. Group of *P. orientalis* 32

32. Base of second gastral tergite of male with triangular, minutely reticulate area. Scutum shining, with strong punctures in rows. Antennal segments 3-13 with tyloidea. Female unknown. (Java, Sumatra) . . . *triangulatus* Van Lith (p. 49)

— No reticulate area on gaster (some males unknown) 33

33. Pygidial area of female very narrow, basal half somewhat convex and almost shining; apex emarginate, bilobed, lobes not much raised (fig. 92). Third and fourth gastral sternites of male with fasciculate hairs. Petiole in both sexes almost quadrate in cross section (to be confirmed for male of *P. seminitidus* which is still unknown), with two lateral keels and ventral median keel. Face of female silvery. Closely related forms 34

— Pygidial area broader, more flat and dull, apex almost straight (always?) and ends of lateral keels distinctly raised into a blunt tooth (fig. 94). Third and fourth gastral sternites of male or fourth sternite only with fasciculate hairs. Petiole quadrate or cylindrical 35

34. Smooth area behind enclosed area of propodeum narrow. Smaller species. Male unknown. (China, Tibet) . . . . . *seminitidus* nom. nov. (p. 40)

— Smooth area broader. Larger species. Petiole of female dorsally with trace of broad keel. Antennal segments 4-11 of male with tyloidea. Third and fourth gastral sternites of male with fasciculate hairs. (Japan). (see also *P. koreanus* Tsuneki (p. 41)) . . . . . *hakusanus* Tsuneki (p. 41)

35. Scutum with plumbeous hue, extremely finely punctate. Outer half of vertex almost impunctate. Petiole in both sexes rounded above, in female with traces of lateral depression and lower longitudinal edge, ventral keel not sharp. Frons of female very finely punctate. Antennal segments 5-6 of male with tyloidea. Third and fourth gastral sternites of male with fasciculate hairs. (India) . . . . . *orientalis* Cameron (p. 42)

— Scutum with much stronger punctures 36

36. Petiole distinctly quadrate in cross section with sharp ventral keel and normally punctate scutum. Antennal segments 5-6 of male with tyloidea. Face silvery in both sexes 37

— Petiole almost cylindrical with one more or less distinct lateral longitudinal edge;

no distinct ventral keel. Antennae of male without tyloidea or segments 4-10 or 4-12 with narrow carina (not all males known) 38

37. Frons below ocelli with punctato-striate sculpture. Vertex and scutum finely but distinctly punctate. Pygidial area of female fig. 95. (Ussuri region, Japan, Korea) *affinis affinis* Gussakovskij (p. 44)

— Frons below ocelli stronger striate. Vertex and scutum slightly stronger punctate. Pygidial area of female slightly broader (fig. 96). Smooth area behind enclosed area of propodeum of female slightly broader. In female carination of propodeum stronger. (China) . . . . . *affinis grahami* n. subsp. (p. 44)

38. Legs dark, at most tarsi reddish or reddish-brown 39

— Femora and tibiae or tibiae and tarsi red 41

39. Petiole short, less than twice as long as first gastral tergite, sides depressed. Pygidial area of female rather broad, with irregular, basally double row of punctures. Face silvery. Fore and mid tarsi reddish. Male unknown. (South China) . . . . *kulingensis* n. sp. (p. 41)

— Petiole longer, cylindrical 40

40. Face of female silvery. Antennal segments 4-12 of male with distinct tyloidea. Third and fourth gastral sternites of male with fasciculate hairs. (India) . . . . . *fuscinervis* (Cameron) (p. 46)

— Face of female golden. Antennae of male without distinct tyloidea. Only fourth gastral sternite with fasciculate hairs. (Burma) . . . *yomasanus* n. sp. (p. 45)

41. Legs including trochanters pale red, tarsi somewhat darkened as also lower outer side of fore femora. Face of female golden, of male silvery. Temples and sides and back of thorax with whitish hairs. Frons below ocelli striato-punctate. Petiole reaching beyond hind femora. Antennal segments 4-10, rarely 4-11, of male with narrow tyloidea. (Luzon) . . . . *.politiventris politiventris* Rohwer (p. 48)

— Outer side of fore femora completely darkened or all femora darkened . . 42

42. Legs red, only outer side of fore femora darkened. Face golden, rest of head, and thorax and gaster golden-brown. Frons below ocelli strongly striato-punctate. Petiole reaching beyond hind femora. Male unknown. (Mindanao) . . . . . *politiventris bellus* n. subsp. (p. 49)

— Femora brown, tibiae and tarsi pale red. Antennae below reddish. Face of female golden, sides and back of thorax with whitish hairs. Frons below ocelli finer punctate than in nominate form, interspaces somewhat opaque. Petiole not reaching as far as hind femora. Punctures of pygidial area somewhat larger than in nominate form. Male unknown. (Malaya) . . *politiventris pahangensis* n. subsp. (p. 48)

43. 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. Antennal segments 6-13 of male with broad tyloidea. Face of female golden, of male silvery. (Philippines) . . *bakeri* Rohwer (p. 58)

— Scutum shining, with normal puncturation 44

44. Second recurrent vein of fore wings ending well in third submarginal cell. Median anterior part of female clypeus strongly raised and separated from the depressed lateral parts by a sharp edge. Antennae of male with broad tyloidea. Group of *P. refractus* 45

— Second recurrent vein of fore wings either interstitial or ending in third submarginal cell. Median part of clypeus of female not separated from the lateral parts by a sharp edge 48

45. Petiole of female without distinct lateral carinae or groove. Raised part of clypeus short (fig. 72). Only hind margin and sides of first tergite and sides of second and third tergite reddish, in both sexes. Face of female silvery. No smooth area on propodeal declivity. (Ceylon) . . . . . *.matalensis* Turner (p. 55)

— Petiole of female with distinct lateral groove. Raised part of clypeus long (fig. 68).

In *P. refractus* (both sexes) propodeum with a nearly smooth dorso-lateral area behind enclosed area 46

46. Face of female golden. Only sides of first gastral tergite somewhat reddish. Pygidial area of female broader, less densely punctate (fig. 101). Fifth and sixth antennal segments of male about twice as long as broad. (South India) . . . . . *krombeini* n. sp. (p. 52)

— Face of female silvery. First or first and second gastral tergites red. Pygidial area of female narrower, more densely punctate (fig. 100) 47

47. First and second gastral tergites red. Male unknown. (North India) . . . . . *refractus refractus* Nurse (p. 50)

— First gastral tergite red, second tergite with lateral red spots. Fifth and sixth antennal segments of male about as long as broad. (South India) . . . . . *refractus meridianus* n. subsp. (p. 51)

48. Gaster including petiole black 49

— Petiole red; if black, following segments at least partly red 52

49. Interocellar and postocellar areas distinctly raised. Antennal segments 6-13 of male with broad tyloidea. No acetabular carina. Second recurrent vein of fore wings interstitial. Face of male silvery, female unknown. Legs dark. (Philippines) . . . *melanosoma* Rohwer (p. 57)

— Interocellar and postocellar areas not or only slightly raised. Antennal segments 6-12 or 7-12 of male with tyloidea (male of *P. opacus* unknown) 50

50. Legs dark. First recurrent vein of fore wings ends well in third submarginal cell. Propodeum behind enclosed area with fine, more or less parallel carinae. Pygidial area of female broadly triangular, with four or six longitudinal rows of punctures. Face of female silvery, male unknown. (Philippines) . . *opacus* Van Lith (p. 58)

— Legs partly rufous. First recurrent vein of fore wings interstitial 51

51. Propodeum on both sides behind enclosed area not smooth but with some indistinct carinae and irregular tubercles. Antennal segments 6-12 of male with tyloidea. Female unknown. (Morotai) . . . . . *carbonarius* (Smith) (p. 57)

— Propodeum behind enclosed area in male with normal carination, in female much finer. Pygidial area of female broad with many large punctures, margin impunctate. Antennal segments 7-12 of male with oval tyloidea. Face of female golden, of male silvery. (Java) . . . . . *betremi* Van Lith (p. 58)

52. Large species. Petiole and following three tergites fully red. Legs red. Interocellar and postocellar areas much raised. Pygidial area of female striato-punctate, margin dull and impunctate. Face of female golden, rest of body with golden-brown pubescence. Male unknown. (Celebes) . . . . . *toxopeusi* Van Lith (p. 57)

— Petiole red but no tergites fully red or petiole black and at least second tergite completely or almost completely red. Smaller species 53

53. Petiole black, gastral tergites 1-4 for the greater part red. Second recurrent vein of fore wings ending well in third submarginal cell. Interocellar and postocellar areas not much raised 54

— Petiole black or red, at most two gastral tergites completely or partly red. Second recurrent vein mostly interstitial 55

54. Face of female silvery. Mesosternum, coxae and femora conspicuously silvery pubescent. Red: gastral tergites 1-4 completely, fifth tergite partly and sternites 2-3 completely; legs reddish brown but femora partly darkened. Pygidial area of female broadly triangular, densely coarsely punctate, also medially, margin reticulate (fig. 104). Male unknown. (Malaya) . . . . *brinchangensis* n. sp. (p. 60)

— Face of female golden. Red: gastral tergites 1-4, first, third and fourth tergites partly darkened, and sternites 2-4. Legs also red, fore and mid femora darkened posteriorly. Pygidial area broadly triangular, coarsely punctate with narrow median

impunctate line (fig. 103). Male unknown. (North India) . . . . . *eurypygus* n. sp. (p. 61)

55. First and second gastral tergites red. Petiole black. Second and following gastral tergites with conspicuous short white pubescence, longer and somewhat curved backwards at hind margins. Face of female silvery. Pygidial area of female rather broadly triangular, densely punctate, margin impunctate. Male unknown. (North India) . . . . . *rufoannulatus* Cameron (p. 58)

— Gaster darker, petiole black or red 56

56. Petiole black. First gastral tergite of female with red apical margin, second gastral tergite with two lateral spots; male with more red on these tergites and on following segments. Interocellar and postocellar areas much raised. Second recurrent vein of fore wings about interstitial. Pygidial area of female densely and almost fully striato-punctate. Antennal segments 6-13 of male with broad tyloidea. Face golden in both sexes, remainder of body goldenbrown. (Luzon) . . . . . *aureohirtus aureohirtus* Rohwer p. 56)

— Petiole red 57

57. Gaster slightly darker but otherwise as in preceding form. Female unknown. (Negros) . . . . . *aureohirtus rufopetiolatus* Van Lith (p. 56)

— Gastral tergites black. Interocellar and postocellar areas not much raised. Second recurrent vein of fore wings ending in third submarginal cell. Antennal segments 6-13 of male with tyloidea. Legs pale red. Face silvery. Female unknown. (N. E. New Guinea) . . . . . *ruficrus* n. sp. (p. 62)

GROUPS OF SPECIES OF THE SUBGENUS PSEN LATREILLE WITH NEW SPECIES AND NEW RECORDS

Group of *Psen ater*

The males of the three species belonging to this group have broadened tarsi of the mid legs, as in the following group, but the third and the fourth gastral sternites have the usual tufts of long hairs on their margin. Of only two species the females are known; these have a broadly triangular, densely punctate pygidial area.

The placing of *P. yasumatsui* into this group is provisional only, as the female has not yet been recognized and as the antennae of the male are differing from those of *P. ater* and *P. aurifrons* in having no tyloidea.

Psen (Psen) ater (Fabricius) (fig. 44)

1794, FABRICIUS, Entom. Syst. **4**: 457 (*Sphex atra*).
1937, DE BEAUMONT, Mitt. Schweiz. Ent. Ges. **17**: 42-43.
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 649-651.
1942, YASUMATSU, Mushi **14**: 93.
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 62-63.

Distribution: Europe, Siberia, Mongolia, Korea and Japan.

I have also seen a female from Manchuria: Harbin, 23 July 1950, leg. Alin (PMFV).

Psen (Psen) aurifrons Tsuneki (fig. 47)

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 63-65.

Distribution: Japan.

Psen (Psen) yasumatsui Gussakovskij

1934, GUSSAKOVSKIJ, Mushi **7**: 80-82, ♂.
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 651-652.
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 74.

Distribution: Japan.

Group of *Psen exaratus*

Into this group two species, which differ considerably from the other species belonging to the subgenus *Psen* have been brought together. In the first place the petiole is coarsely punctate on the upper side and secondly the fasciculate hairs, which in all other males of the subgenus *Psen* are to be found on the posterior margin of the third and fourth gastral sternites, are lacking. The female of *P. exaratus* has a narrow and shining pygidial area with a few punctures along the margin (fig. 81). The female of *P. santoro* is still unknown.

Psen (Psen) exaratus (Eversmann) (fig. 45, 48-49, 81)

1849, EVERSMANN, Bull. Soc. Imp. Nat. Moscou **22**: 361, ♀ (*Mimesa exarata*).
1937, DE BEAUMONT, Mitt. Schweiz. Ent. Ges. **17**: 44-45.
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 654-656.
1942, YASUMATSU, Mushi **14**: 94.
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 69-70.

Distribution: Europe, Caucasus, Siberia, Korea and Japan.

Prof. de Beaumont kindly allowed me to examine a male of *P. exaratus* from Switzerland and I could ascertain that it possesses the same remarkable long tooth on the mandibles (fig. 48) as the Japanese male which was described by Tsuneki and which he most willingly sent to me for comparison.

Psen (Psen) santoro Yasumatsu (fig. 46)

1942, YASUMATSU, Mushi **14**: 94-95, ♂.
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 74-77.
1962, TSUNEKI, The Life Study (Fukui) **6**: 40.

Distribution: Japan.

Although Tsuneki confirmed that *P. santoro* has no tooth on the mandibles, he supposed (1962) that *P. santoro* may be not more than a form or a subspecies of *P. exaratus*. The figures (fig. 45-46) show a marked difference in the teeth of the mid legs, however, and as long as there is no proof to the contrary we can better regard *P. santoro* as a different species.

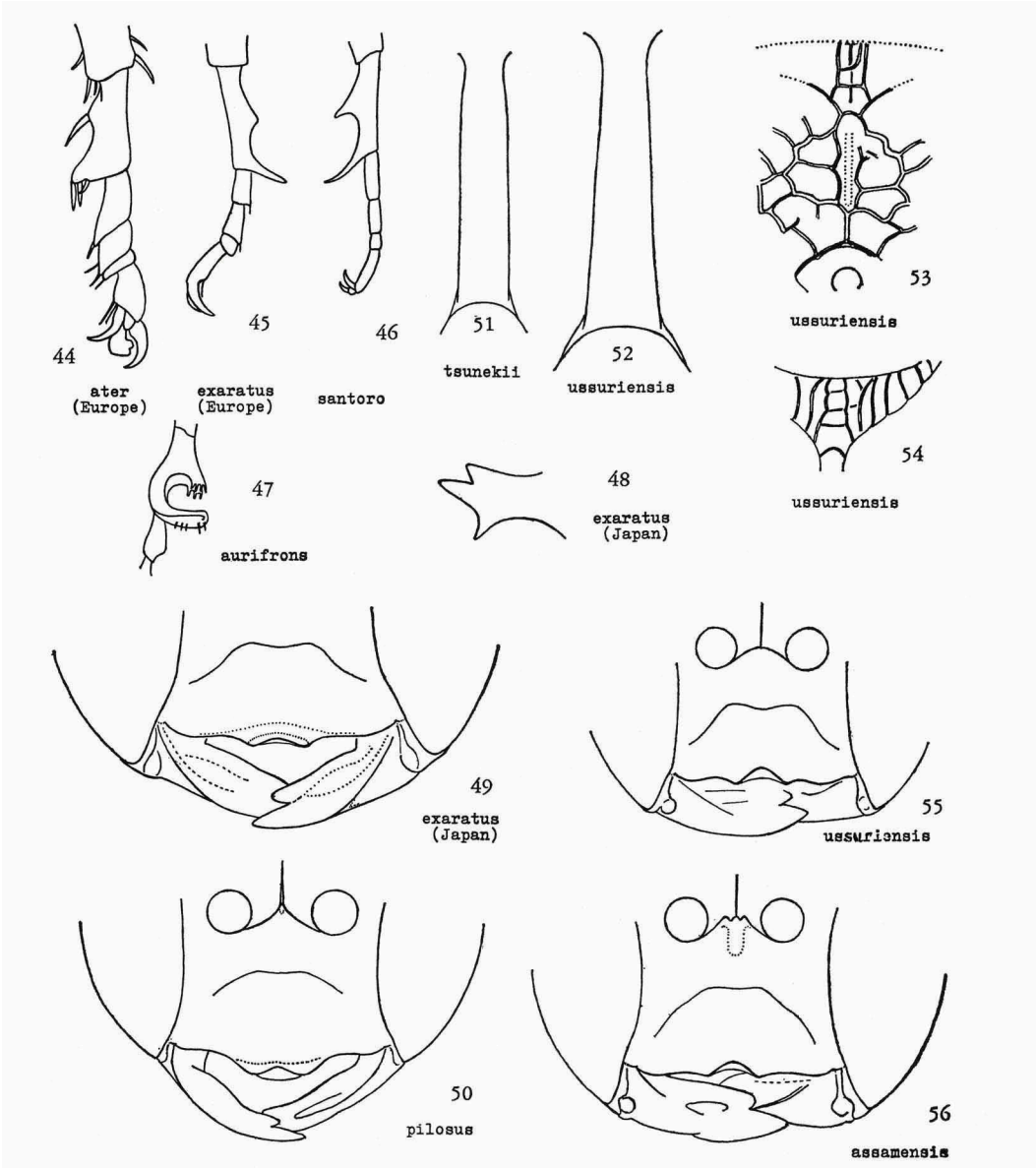

Fig. 44-56, various East-Asiatic and Indo-Australian *Psen* s. str. 44-46, male mid tarsi of *P. ater* (Fabricius), Europe, *P. exaratus* (Eversmann), Europe, and *P. santoro* Yasumatsu; 47, mid metatarsus of *P. aurifrons* Tsuneki, ♂; 48-49, *P. exaratus* (Eversmann), Japan, mandible (♂), lower part of face (♀); 50, *P. pilosus* n. sp., ♂, lower part of face; 51, *P. tsunekii* nom. nov., ♂, petiole; 52-55, *P. ussuriensis* Van Lith, ♂, petiole, back of propodeum, enclosed area of propodeum, and lower part of face; 56, *P. assamensis* n. sp., ♂, lower part of face.

Group of *Psen emarginatus*

The following three species which have been considered here as forming a separate group are resembling *P. curvipilosus* because of the fringes of long hairs on the posterior margin of the tergites. They are easily distinguished, however, from that group by the densely punctate pygidial area of the females, the tyloidea of the males and the narrow mandibles in both sexes. In the group of *P. curvipilosus* the mandibles are very broad.

P. emarginatus Van Lith was described from Java in 1959, the Japanese *P. dzimm* was shortly thereafter published by Tsuneki (1959) and of the third form, *P. pilosus,* a description is given here, based on a single male from Malaya.

Psen (Psen) emarginatus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 43-44.

Distribution: Java.

Psen (Psen) dzimm Tsuneki

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 68-69.

Distribution: Japan.

Psen (Psen) pilosus n. sp. (fig. 50)

Male. — Black; legs, especially tibiae somewhat brownish, gaster with bluish shine. Labrum red. Palpi brown. Underside of flagellum of antennae brown. Veins of wings dark brown.

Clypeus convex, disk shining, finely, not densely punctate, anterior margin triangularly emarginate (fig. 50). The interantennal carina ends in a small tooth which is connected with the antennal sclerites by a fine carina. Frons below ocelli with coarse and close puncturation, besides the anterior ocellus the interspaces are about as large as the punctures; a broad margin along the oculi is impunctate. Vertex on either side of the ocelli almost impunctate, behind the ocelli sparsely punctate. Mandibles normally bidentate. Scape of antennae inflated, nearly twice as broad as the third antennal segment at apex. Antennal segments 6-13 with tyloidea which consist of a circular depression, indistinct on the last segment.

Scutum coarsely and densely punctate, on the anterior half punctures in a few transverse rows, on the posterior half more widespread, interspaces there twice or more as large as the punctures. Scutellum finer and more sparsely punctate. Metanotum still finer, densely punctate. Propodeum behind enclosed area with very coarse and irregular reticulate carination. On

the mesosternum the precoxal sutures are completely visible. Legs normal. In the fore wings the second recurrent vein ends just in the third submarginal cell.

Petiole nearly quadrate in cross section, sides depressed with distinct ridge above and below, ventral side rounded. Gaster shining, finely punctate.

Face with silvery and appressed pubescence, vertex with brown hairs, temples and dorsal side of pronotum silvery. Scutum, scutellum and metanotum with long dark brown hairs, back of propodeum and petiole with yellowish-brown hairs. Mesosternum with dense, short, pale pubescence. Gaster with reddish-brown long pubescence, along the posterior margin of the tergites a row of long and stiff, black hairs which are directed towards the axis. Third and fourth gastral sternites with long dark brown fasciculate hairs on posterior margin. Rest of sternites with pale and long pubescence.

Length about 10 mm.

Female unknown.

Malaya: 1 ♂ (holotype), Pahang, Fraser's Hill, 4200 ft., 21 July 1936, H.M. Pendlebury (BM 1955-354, ex FMS Museums).

Group of *Psen curvipilosus*

The group of *P. curvipilosus* is characterized by the conspicuous long curved hairs along the posterior margin of the gastral tergites, the parallel longitudinal carinae on the back of the propodeum (these carinae continue on the enclosed area) and the structure of the pygidial area. The latter is rather broad, with finely reticulate surface and a row of punctures along the margin.

The median part of the clypeus is much raised and sharply separated from the depressed lateral parts (fig. 67). The mandibles are very broad in both sexes. The males have no tyloidea. The combination of these characters easily distinguishes the three forms belonging to this group from the other Indo-Australian *Psen*. Sofar only two species are known, occurring in Java and Sumatra and in Malaya.

Psen (Psen) curvipilosus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 20-23.

Distribution: Java.

Psen (Psen) lieftincki lieftincki Van Lith (fig. 67)

1959, VAN LITH, Zool. Verh. Leiden **39**: 23-24.

Distribution: Malaya, Sumatra.

Besides the male from Selangor which was described in 1959 and which

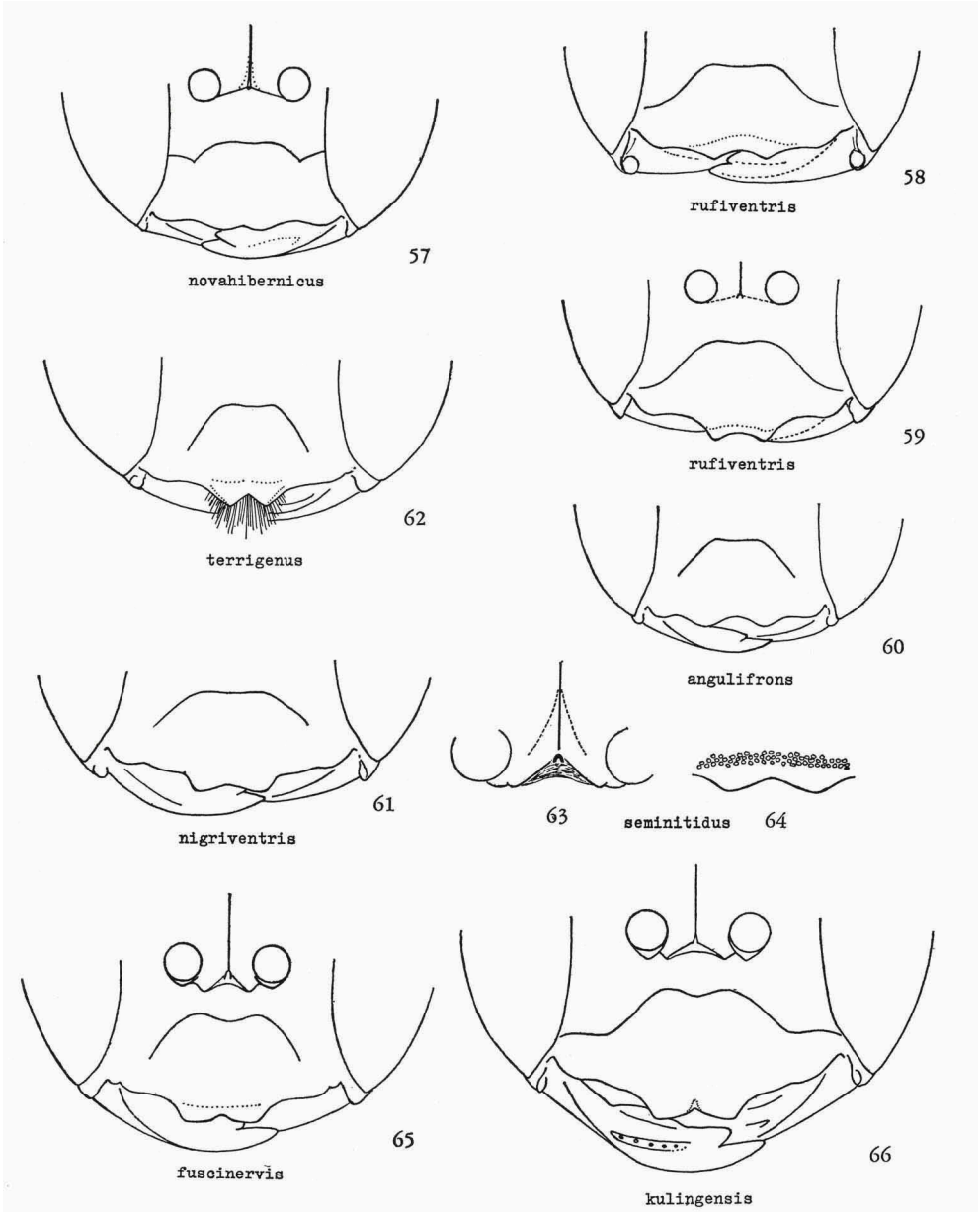

Fig. 57-66, lower part of face of various East-Asiatic and Indo-Australian *Psen* s. str. 57, *P. novahibernicus* n. sp., ♂ ; 58-59, *P. rufiventris* Cameron, ♀, frontal and dorso-frontal view; 60, *P. angulifrons* n. sp., ♂ ; 61, *P. nigriventris* n. sp., ♀ ; 62, *P. terrigenus* Van Lith, ♀ ; 63-64, *P. seminitidus* nom. nov., ♀, interantennal carina and anterior margin of clypeus; 65, *P. fuscinervis* (Cameron), ♂ (holotype); 66, *P. kulingensis* n. sp., ♀.

I still consider as belonging to the nominate subspecies, a few more males can now be recorded from western Malaya: 3 ♂, Selangor, Bukit Kutu, 3500 ft., 19 April 1926, H. M. Pendlebury (BM 1955-354, ex FMS Museum); 1 ♂, Kedah Peak, 3300-3950 ft., 11 March 1928, H.M. Pendlebury (BM 1955-354, ex FMS Museums).

Only one female has been collected up till now, not in Malaya but in southern Sumatra.

Psen (Psen) lieftincki minor n. subsp.

1959, VAN LITH, Zool. Verh. Leiden **39**: 24-25, ♂ (*Psen (Psen) lieftincki* subsp. ?).

This wasp differs from the nominate subspecies in the following details.

Darker, especially the hind tibiae which are nearly black. The puncturation of the gaster, notably on the second tergite, is slightly more distinct, although still very fine.

On the underside of the petiole the male has a long median carina and posteriorly a number of short keels, which are usually of about the same length. On either side of the median carina the petiole is distinctly concave, whilst in the nominate subspecies this area is flat or hardly concave. The puncturation is less dense and weaker. In the female there are a few short carinae posteriorly but no longer median keel, sothat the greater part of the underside of the petiole is rounded, as in the nominate subspecies. The puncturation of the posterior half of the petiole is much finer.

Smaller, length of male about 11-12,5 mm, female about 12,5 mm.

Malaya: 1 ♂ (holotype), Pahang, Bukit Fraser, 15 July 1928, H. T. Pagden (HTP); 1 ♂ (paratype), Pahang, Fraser's Hill, 4200 ft., 15 July 1936, H. M. Pendlebury (BM 1955-354, ex FMS Museum); 1 ♀ (allotype), Pahang, Cameron Highlands, 5000 ft., 11 June 1935, H. M. Pendlebury (BM 1955-354, ex FMS Museums).

It seems that this subspecies is restricted to eastern Malaya, whilst the nominate subspecies has been found in western Malaya and Sumatra.

Group of *Psen tsunekii*

A number of *Psen* from East Asia and Java have extraordinarily broad mandibles. They have this character in common with the group of *P. curvipilosus* with which they seem to be closely allied. The structure of the clypeus and the pubescence of the gaster are normal, however, so there can be no confusion.

The pygidial area of the females is elongate triangular, dull, with a row of punctures along the margin. The antennae of the males are probably always without tyloidea. In the female of *P. vechti* the longitudinal carinae

on the back of the propodeum are partly parallel, often continued on the enclosed area. In the males the carination is much more irregular.

The group covers the area from Siberia (*P. ussuriensis*), over Japan (*P. tsunekii*), India (*P. assamensis*) and Burma (*P. vechti birmanicus*) to Java (*P. vechti vechti*).

Psen (Psen) ussuriensis Van Lith (fig. 52-55)

1932, Gussakovskij, Ark. f. Zool. **24**: 5-6, ♂ (*Mimesa orientalis*; Ussuri region).
1937, De Beaumont, Mitt. Schweiz. Ent. Ges. **17**: 43 *(Psen (Psen) orientalis)*.
1937, Gussakovskij, Trav. Inst. Zool. Acad. Sc. URSS **4**: 656-657 *(Psen (Psen) orientalis)*.
1959, Van Lith, Zool. Verh. Leiden **39**: 59 *(Psen (Psen) ussuriensis* nom. n. for *Psen (Psen) orientalis* Gussakovskij).
1959, Tsuneki, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 78.

In the collections of the Stockholm Museum are two males labelled *Mimesa orientalis* Gussakovskij, both captured by Dr. Malaise in the Ussuri province (Siberia). One of these specimens has been designated as the type by the author. They are very similar to *P. tsunekii* Van Lith, having the same structure of the clypeus and of the mandibles. Yet there are some slight differences. The posterior end of the petiole is much broader than in *P. tsunekii* from Japan, being about 1 2/3 times as broad as the base of the petiole (fig. 52). In *P. tsunekii* the sides of the petiole are almost parallel (fig. 51). In the Ussuri male the carination on the back of the propodeum is coarse, somewhat coarser than in the Japanese form. The back of the propodeum has a few carinae only and this part is distinctly separated from the rounded sides of the propodeum by a high carina, higher than in *P. tsunekii*. Frons and vertex are finely but distinctly punctate whilst in *P. tsunekii* these parts are almost impunctate. The ventral median carina of the petiole is sharper than in *P. tsunekii*.

There is no doubt that *P. ussuriensis* and *P. tsunekii* are very closely related, if not conspecific. Before reducing the Japanese form to subspecific rank it would be highly desirable, however, to compare the females of both forms. Unfortunately there are in the collections I have studied no females of *P. ussuriensis*. A further study of the female that Yasumatsu described in 1942 is necessary to ascertain whether this is really the female of *P. orientalis* Gussakovskij or is identical with *P. tsunekii* Van Lith.

Redescription based on the paratype from Vladivostok (NRS):

Male. — Brownish (discoloured). Underside of flagellum, tibiae and tarsi yellowish-brown. Outer half of mandibles reddish. Wings yellowish, veins yellowish-brown.

Median part of clypeus raised but not separated from lateral parts of clypeus; anterior margin emarginate (fig. 55). The broad underside of the

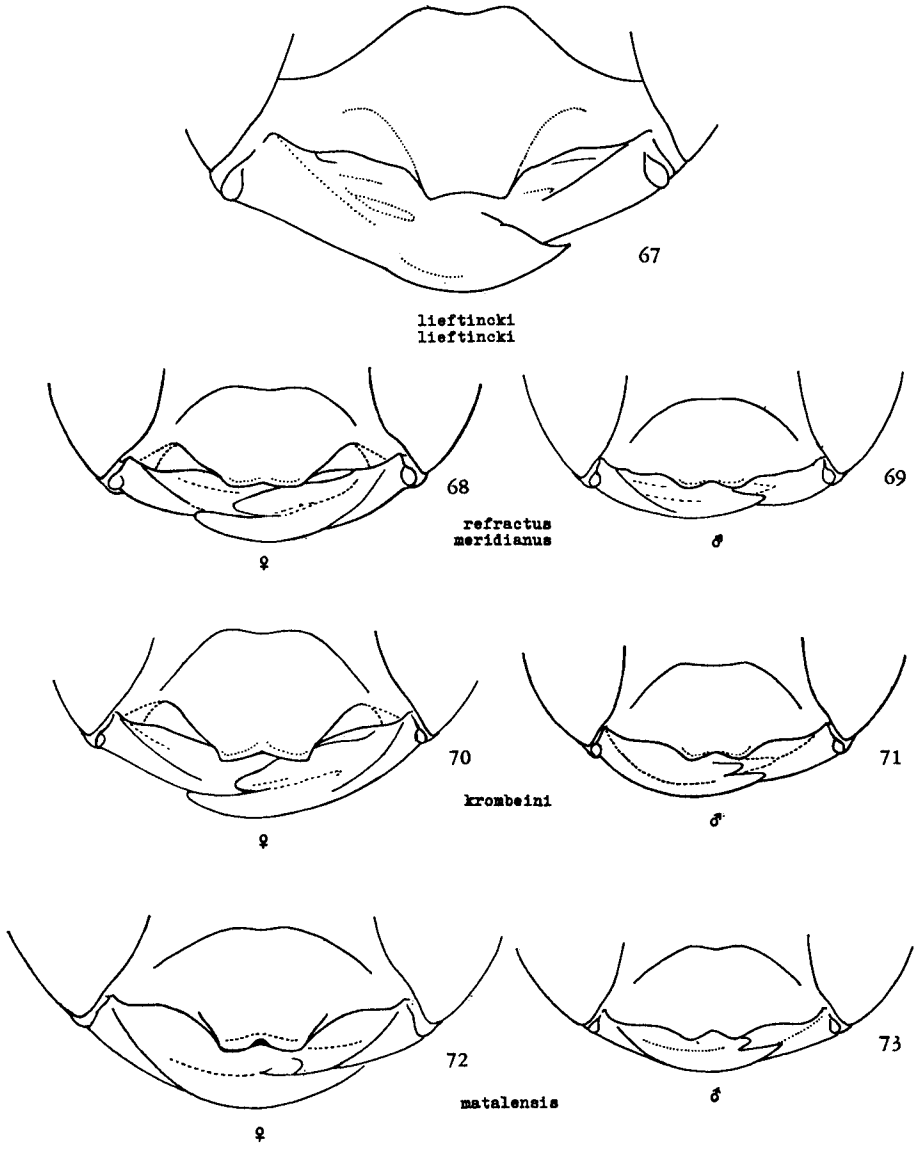

Fig. 67-73, lower part of face of various Indo-Australian *Psen* s. str. 67, *P. lieftincki lieftincki* Van Lith, ♀ (holotype); 68-69, *P. refractus meridianus* n. subsp., ♀ and ♂; 70-71, *P. krombeini* n. sp., ♀ and ♂; 72-73, *P. matalensis* Turner, ♀ and ♂.

clypeus is, in frontal view, visible as a lunar segment (fig. 55). The frontal carina ends below the antennae in a transverse carina, or rather a plate with rounded anterior margin (when seen from below). Mandibles very broad, distinctly bidentate. Antennae long, third segment slightly longer than the fourth segment, following segments about twice as long as broad, without tyloidea. Frons finely, densely punctate. Vertex slightly more strongly, but more sparsely punctate. Vertex behind ocelli slightly raised. Scutum and scutellum finely, not densely punctate. Enclosed area of propodeum rather irregularly carinate, between the median longitudinal carinae a few irregular transverse carinae (fig. 54). Immediately behind the enclosed area the propodeum is coarsely reticulate, a few stronger carinae on the perpendicular part (fig. 53). Some of the carinae of the enclosed area are continued on the rest of the propodeum. Second recurrent vein of the fore wings interstitial.

Petiole with broad lateral grooves, which have sharp edges above and below, ventrally with distinct longitudinal carina. Dorsal side of petiole much flattened, posterior end broadened, one and two-third times as broad as base of petiole, which is also somewhat broader than usual. Gaster except petiole very finely punctate, margin of last tergites almost impunctate. The tooth at the base of the second gastral sternite is blunt.

Face silvery. Pronotum dorsally with appressed silvery pubescence. Rest of head and thorax whitish pubescent, gaster more brownish pubescent. Eyes with a few minute hairs.

Length about 8,5 mm.

Siberia: Ussuri region, 2 ♂ (holotype and paratype), Vladivostok, Suchan, 15 July 1930, R. Malaise (NRS); 1 ♂, Tigrovaja, 3 June 1930 (coll. Gussakovskij).

Psen (Psen) tsunekii nom. nov. for *Psen (Psen) mandibularis* Tsuneki not *Psen (Mimumesa) mandibularis* (H. Smith, 1906) (fig. 29-30, 51, 82)

1942, YASUMATSU, Mushi **14**: 93 *(Psen (Psen) orientalis).*
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 66-68, 78 *(Psen (Psen) mandibularis* nom. n. for *Psen (Psen) orientalis* Gussakovskij, sensu Yasumatsu and Tsuneki).

Fortunately both sexes of this interesting form are known. I am very much obliged to Prof. Tsuneki to donate me not only a female but also one of the few males which have been collected. As it has been said under *P. ussuriensis* it is likely that *P. tsunekii* is a subspecies of the former.

A comparison of the female which was described by Yasumatsu in 1942 with Tsuneki's material is needed to ascertain whether they represent the same form.

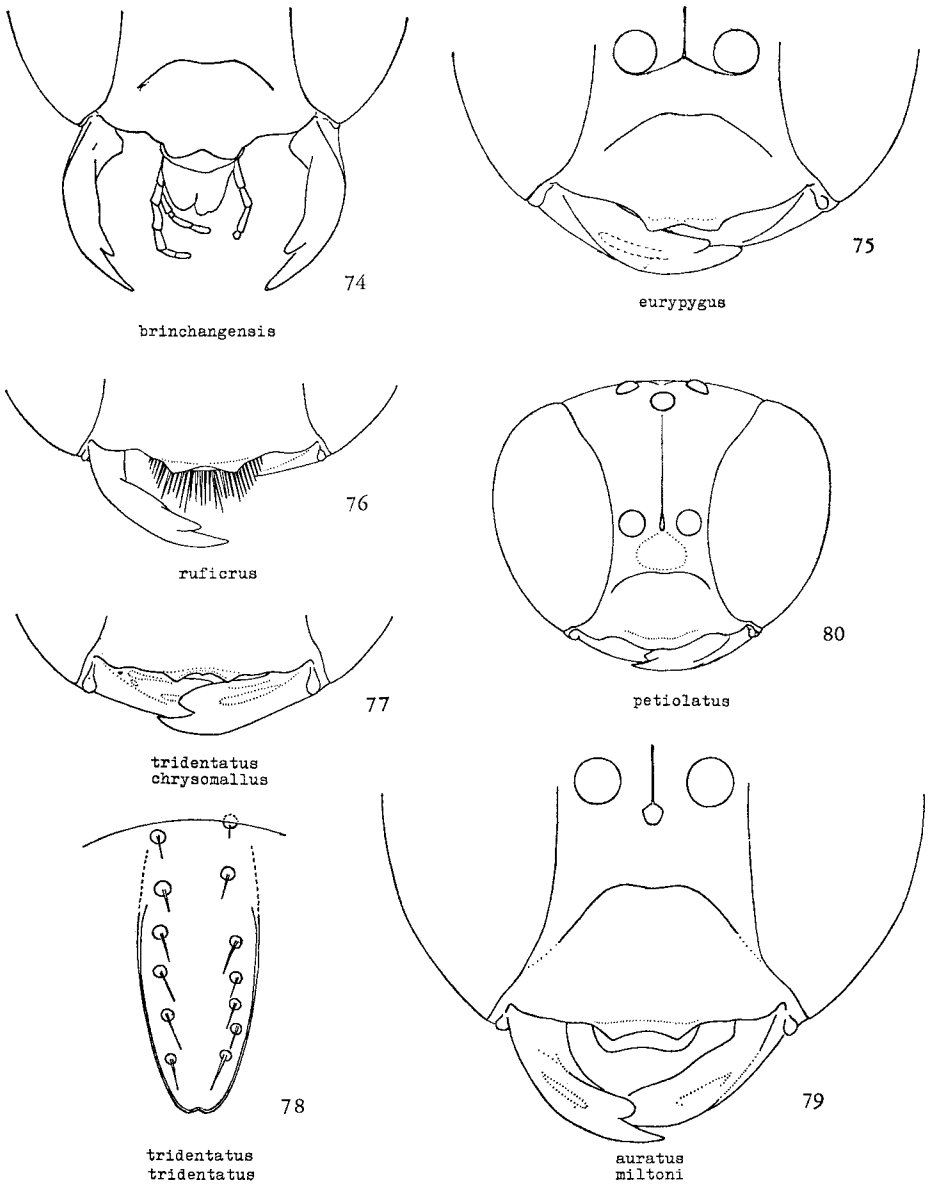

Fig. 74-76, lower part of head of various Indo-Australian *Psen* s. str. 74, *P. brinchangensis* n. sp., ♀ ; 75, *P. eurypygus* n. sp., ♀ ; 76, *P. ruficrus* n. sp., ♂.
Fig. 77-80, various Indo-Australian *Psen* subgenus *Mimumesa*. 77, *P. tridentatus chrysomallus* n. subsp., ♂, lower part of face; 78, *P. tridentatus tridentatus* Van Lith, ♀, pygidial area; 79, *P. auratus miltoni* n. subsp., ♀, lower part of face; 80, *P. petiolatus* Smith, ♀, face.

Mimumesa Malloch being regarded now as a subgenus of *Psen* Latreille, the name *mandibularis* is preoccupied by the Nearctic species *Psen (Mimumesa) mandibularis* (H. Smith, 1906). Prof. Tsuneki left it to me to give the Japanese form a new name. It is with great pleasure that I dedicate it to him. He is the first taxonomist, as far as I know, who has drawn attention to the broadened mandibles.

Psen (Psen) vechti vechti Van Lith (fig. 83)

1959, VAN LITH, Zool. Verh. Leiden **39**: 40-41, ♀.

Distribution: Java; male still unknown.

Psen (Psen) vechti birmanicus n. subsp. (fig. 84)

Differs from the nominate subspecies in the darker colour and in the slightly shorter petiole.

Antennae darker, upper side of flagellum dark brown, underside paler brown. Outer half of mandibles brown, in *P. vechti vechti* they are reddish. Femora nearly black, tibiae and tarsi pale brown.

Petiole somewhat shorter than in nominate subspecies. The transverse carina in which the interantennal carina ends is less distinct; in one of the three females the transverse carina is protruding into a triangular tooth. The pygidial area is distinctly broader (fig. 84).

Larger, length about 11-12 mm. Male unknown.

Burma: 3 ♀ (one holotype, two paratypes), Chan Yoma, coll. Gribodo (NMW, one paratype ML).

Psen (Psen) assamensis n. sp. (fig. 56)

Male. — Black; basal half of underside of flagellum, outer half of mandibles, fore side of fore and mid femora, tibiae and tarsi brown, also the tegulae. Palpi yellowish-brown. Veins of wings brown.

Clypeus slightly convex, emargination and crescent as in *P. ussuriensis*. The interantennal carina ends in a protruding plate or transverse carina which is tridentate when seen from above or below (fig. 56). Frons very finely and sparsely punctate, below the anterior ocellus almost impunctate. Vertex very sparsely and finely punctate. The posterior ocelli connected by a fine carina from which another carina runs to the anterior ocellus. Antennae long, most segments twice as long as they are broad. Mandibles very broad, distinctly bidentate. Occipital carina normal.

Scutum and scutellum distinctly but finely and regularly, not densely punctate. Metanotum almost impunctate. Enclosed area of propodeum with somewhat undulating longitudinal carinae which continue into the very coarse

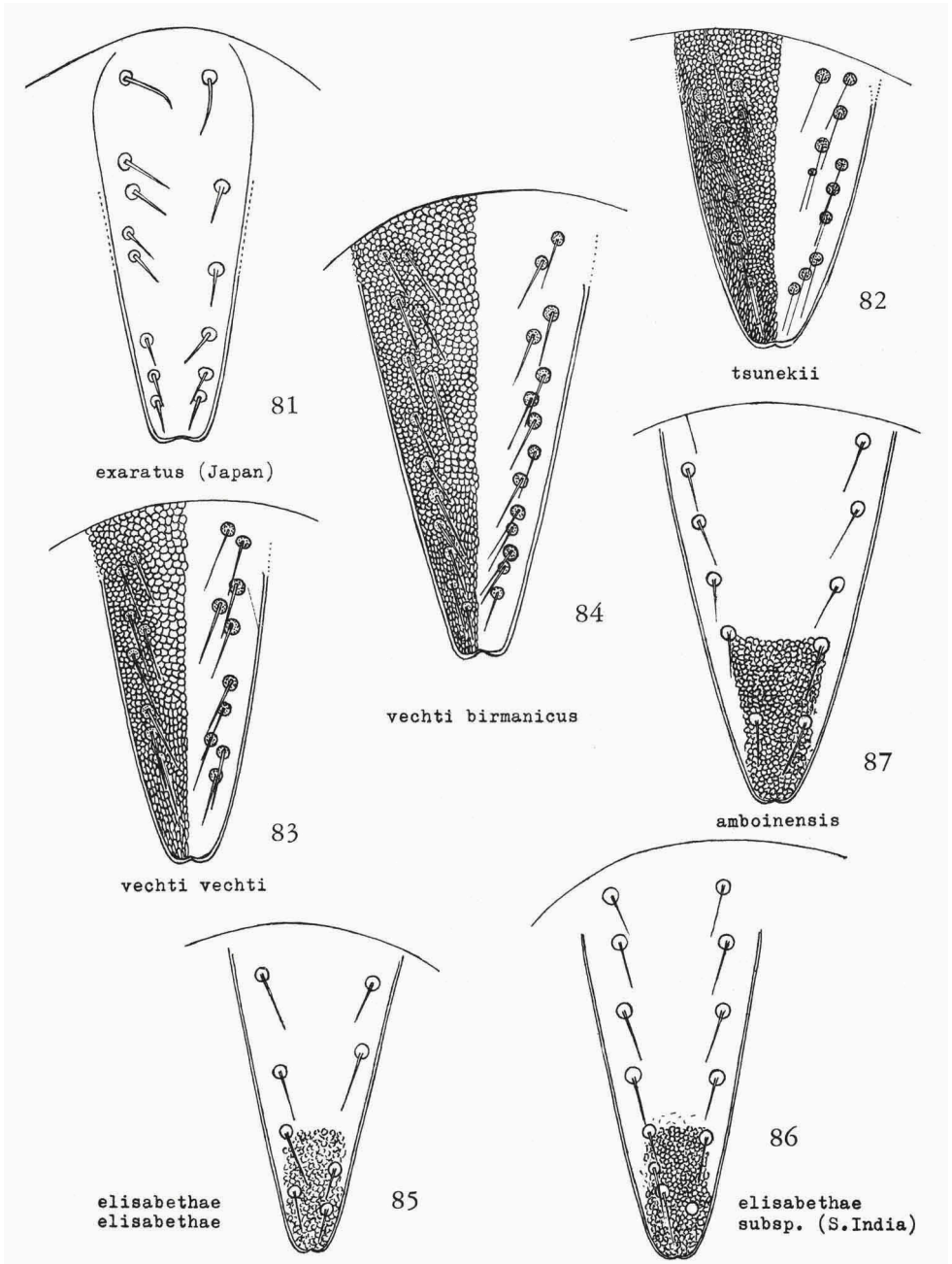

Fig. 81-87, pygidial area of female of various East-Asiatic and Indo-Australian *Psen* s. str. 81, *P. exaratus* (Eversmann), Japan; 82, *P. tsunekii* nom. nov.; 83, *P. vechti vechti* Van Lith; 84, *P. vechti birmanicus* n. subsp.; 85, *P. elisabethae elisabethae* Van Lith; 86, *P. elisabethae* subsp., S. India; 87, *P. amboinensis* n. sp.

and irregular carination of the back and sides of the propodeum. The median two longitudinal carinae of the enclosed area of the propodeum are connected by three transverse carinae. Legs slender. Upper half of back of hind femora smooth and shining, separated from the sparsely haired lower back surface by a dense broad row of hairs. These hairs are about as long as the width of the femora whilst in *P. tsunekii* they are very short. First recurrent vein of fore wings interstitial.

Petiole long but not reaching as far as hind femora, almost cylindrical, dorsally flattened and smooth. Sides of petiole with upper edge only, ventrally rounded, ventrolaterally with rather coarse puncturation. Rest of gaster very finely punctate.

Face with silvery and appressed pubescence, also dorsal side of pronotum. Head and upper side of thorax brownish haired, back of propodeum paler. Gaster with brown hairs, on the posterior half somewhat bristly. Margin of third and fourth gastral sternites with fringe of golden fasciculate long hairs.

Length about 11 mm.

Female unknown.

India: 1 ♂ (holotype), Khasia (OUM). This specimen was labelled: "*Caenopsen fuscinervis* Cam. Khasia", in Cameron's handwriting. The left antenna is broken off.

This wasp very much resembles *P. vechti* and its subspecies, of which only females are known. It is easily distinguished by the darker legs. Very probably this wasp will prove to be another subspecies of *P. vechti.*

Group of *Psen nitidus*

P. nitidus has the same gradually curved propodeum with large smooth upper areas as we find in the wasps of the group of *P. elisabethae.* I would have placed it without hesitation into the latter group if there would not have been a difference in the sculpture of the pygidial area, that of *P. nitidus* resembling the pygidial area of *P. curvipilosus.* Anyhow the structure of the genitalia (fig. 26) points to a very close relationship with *P. elisabethae.* I prefer, however, to postpone a combination of the two groups until more species closely related to *P. nitidus* have become available.

Psen (Psen) nitidus Van Lith (fig. 26)

1959, VAN LITH, Zool. Verh. Leiden **39**: 28-30.

Distribution: Java, Krakatau, Bangka, ? Ceylon.

Group of *Psen elisabethae*

Two closely related species have been described in 1959, namely *P. elisabethae* from Java and *P. coriaceus* from the Philippine Islands. The back

of the propodeum is gently curved (in lateral view) and behind the enclosed area of the propodeum is a large smooth area on either side. The pygidial area of the female is elongate triangular, shining, with a few punctures along the margin (fig. 85).

A new subspecies of *P. elisabethae* from Malaya and the Isle of Pulau Tioman and another one from South India, a new species from Amboina and also a new one from New Ireland are described here.

Psen (Psen) elisabethae elisabethae Van Lith (fig. 23, 85)

1959, VAN LITH, Zool. Verh. Leiden **39**: 31-34.

Distribution: Java, Sumatra. There is also a record from India, but this is probably another subspecies.

Psen (Psen) elisabethae auricomus n. subsp.

In the female the differences with the nominate subspecies are as follows. Scape of antennae and to some extent also the first segments of the flagellum reddish. Legs paler, hind femora, sometimes also fore and mid femora, reddish or reddish-brown. Petiole much shorter, not reaching as far as the end of the hind femora. Legs, especially hind femora, thicker. Pubescence of face pale golden, tending to be silvery.

A male from Selangor, though the colour of the legs is darker than in the three females, is believed to be conspecific. Its hind femora are dark brown. The petiole and the legs are slightly longer than in the female, but still shorter than in the male of *P. elisabethae elisabethae*. Face silvery. There is very little difference in the structure of the genitalia but they are somewhat darker.

Malaya: 1 ♀ (holotype), Kuala Lumpur gardens, coll. H. M. Pendlebury, 2 Oct. 1938; 1 ♂ (allotype), Selangor, Bukit Kutu, 3500 ft., 7 Sept. 1929, H. M. Pendlebury; 1 ♀ (paratype), Johore, Kota Tinggi, August 1917 (all BM 1955-354, ex FMS Museums).

South China Sea: 1 ♀ (paratype), Pulau Tioman, Ayer Prabang, May 1927, N. Smedly, Selangor Museum (BM 1955-354).

I have not made drawings of the pygidial areas of the females, but according to my notes they were slightly broader than in the nominate subspecies from Java. A further study of the species of this group occurring in S.E. Asia is certainly needed.

Psen (Psen) elisabethae subsp. (fig. 86)

A female from South India, Nilgiri Hills, 3500 ft., coll. H. L. Andrews (OUM), differs from *P. elisabethae auricomus* in having a silvery face whilst the lateral groove of the petiole is more distinct. Tibiae and tarsi are

reddish-brown, mid and hind tibiae darkened at apex; scape of antennae reddish-brown. Pygidial area, fig. 86.

As this female is the only specimen available and the differences are so small, I cannot decide yet on its systematic status.

Psen (Psen) coriaceus Van Lith (fig. 24-25)

1959, VAN LITH, Zool. Verh. Leiden **39**: 34-36.

Distribution: Philippine Islands.

This wasp with the peculiar fine coriaceous sculpture on the back of the propodeum and the very coarse puncturation of the scutum was recorded from Luzon, Mindoro, Negros and Mindanao.

Dr. C. R. Baltazar captured another female in the isle of Luzon: Mt. Makiling, 18 March 1954 and also a male in the isle of Bohol: S. Bullones, 1200 ft., 17 April 1955 (both BPIM).

Further there is a new record from Negros: 1 ♀, Mt. Talinas, 900-1200 m., 9 June 1958, in rain forest, H. E. Milliron (BISH).

In the material of the Bernice P. Bishop Museum I found a second male from Mindanao, Zamboanga del Norte, Masawan, trail to Mt. Malindang, in rain forest, 1290 m., 5 July 1958, H. E. Milliron. This specimen is deviating from the description in as far as that the propodeum behind the enclosed area is not only finely sculptured but also crossed by a number of carinae which reach the enclosed area (deformed?). The petiole is cylindrical. The genital apparatus is very similar to that of the group of *P. elisabethae* (fig. 24-25).

In the original description it was omitted to mention that the calcaria are white.

Psen (Psen) amboinensis n. sp. (fig. 87)

Female. — Black; scape of antennae and underside of flagellum, tegulae and veins of wings brown; femora black or dark brown, tibiae reddish, more or less darkened at apex, tibial spurs and first tarsal segments paler. Median part of mandibles reddish.

Broad anterior margin of clypeus very finely transversely striate, anteriorly slightly emarginate, as in *P. elisabethae*. The interantennal carina ends in a small tooth below the antennae. Frons densely punctate, vertex sparsely punctate, distinctly raised behind the ocelli. Thorax broader than in *P. elisabethae elisabethae*. Scutum, scutellum and metanotum sparsely punctate. Enclosed area of propodeum with longitudinal carinae, median two carinae strongly diverging, behind the enclosed area on both sides a large smooth and shining area, back of propodeum with irregular carination. Legs, notably femora, shorter and thicker than in *P. elisabethae*

elisabethae. Upper two thirds of hind femora posteriorly very smooth and shining, separated from the sparsely haired lower part by a dense row of short whitish hairs. Hind tibiae with a row of short strong spines along the outer side. Both recurrent veins of fore wings ending in the second submarginal cell. Petiole short, not reaching as far as hind femora, upper side slightly convex with lateral edge, underside rounded, on the sides near base an indistinct lateral depression. Pygidial area broader (fig. 87).

The whole body is silvery pubescent, appressed on face and on dorsal side of pronotum.

Length about 9 mm.

Male unknown.

Amboina: 1 ♀ (holotype), coll. F. Muir (BISH, ex coll. W. M. Giffard, 1908); 1 ♀ (paratype), 14 Jan. 1961, 70 m., A. M. R. Wegner (MR).

This form is very closely related to the two subspecies of *P. elisabethae* described in this paper. Provided that the broader pygidial area of the female proves to be a constant character it seems to be correct, however, to consider it as a separate species.

Psen (Psen) novahibernicus n. sp. (fig. 27-28, 57)

Male. — Black; ends of tibiae pale brown, tibial spurs white, tarsi from whitish at base to orange at end. Veins of wings black.

Anterior margin of clypeus gradually sinuate, median part finely transversely striate with shallow median emargination (fig. 57). The interantennal carina ends in a low tubercle connected with lower side of antennal sclerites by fine carinae. Frons and vertex shining, finely and minutely punctured. Vertex not distinctly raised. Antennae short, thickened towards the end, segments ten and eleven almost as long as broad, last segment about half as long again as broad at the base. No tyloidea.

Puncturation of scutum and scutellum widespread, somewhat stronger than on vertex. Enclosed area of propodeum concave, with sharp longitudinal carinae, median two carinae diverging. Back of propodeum very coarsely reticulate. On either side behind the enclosed area of the propodeum a large smooth and shining area, gradually sloping downwards. Legs slender, a longitudinal line of extremely fine punctures and hairs divides the back of the hind femora in a smooth and shining upper two-third part and a sparsely haired lower one-third part. Both recurrent veins of the fore wings end in the second submarginal cell. Petiole reaching almost as far as hind femora, dorsally somewhat flattened, laterally with sharp upper ridge and anterior lower carina, underside of petiole rounded, distinctly thickened apically. Gaster shining, very finely and sparsely punctate. Genitalia, fig. 27-28.

Face with silvery appressed pubescence, hairs on dorsal side of thorax brown, rest of body more whitish pubescent. Sternites three and four with long blackish-brown fasciculate hairs on apical margins.

Length about 9 mm.

Female unknown.

New Ireland: 2 ♂ (holotype and paratype), Schleinitz Mts., Lelet plateau, Oct. 1959; 1 ♂ (paratype), Kandan, 1 Jan. 1960, all coll. W. W. Brandt (holotype and 1 paratype BISH, 1 paratype ML).

This wasp resembles *P. elisabethae,* but the puncturation is somewhat stronger, the petiole is shorter and the colour of femora and tibiae is darker, although the tarsi are paler. As also the genitalia are different it will be regarded here as a separate species.

Group of *Psen rufiventris*

Five species, from widely separated localities, viz., *P. rufiventris* from South India, *P. rubicundus* from Java, *P. nigriventris* from Luzon, *P. angulifrons* from Mindanao and *P. richardsi* from Japan, are closely related and constitute a well-separated group of species.

This group is characterized by the narrow smooth area on the horizontal part of the propodeum, in this respect resembling the group of *P. politiventris,* but in the female sex differing from the latter group in the narrow, smooth and shining pygidial area. Moreover the second recurrent vein of the fore wings ends well in the third submarginal cell. In the group of *P. politiventris* the second recurrent vein also ends in the third submarginal cell but very close to the second submarginal cell.

The gaster may be red or black; in all five species known the mandibles are for the greater part reddish and also the scape of the antennae and the underside of the flagellum. Most species have a transverse red band before the anterior margin of the clypeus. The legs are for the greater part red.

The head is very thick and in the male of *P. angulifrons* it is even almost square, the frons protruding angularly. The vertex is smooth with very small punctures, if any. The antennae of the males have no tyloidea.

Psen (Psen) rufiventris Cameron (fig. 58-59, 88)

1890, CAMERON, Mem. Proc. Manch. Litt. Phil. Soc. (4) **3**: 267-268, ♀ (*Psen rufiventris*; Madras, India).

Redescription. Female. — Head and thorax black; the following parts are reddish: a narrow transverse band on the clypeus behind the dark margin, mandibles except dark tips and legs beyond coxae, but femora and tibiae

partially darkened, especially those of the hind legs. Antennae dark brown above, yellowish-brown below. Labium orange-red, with stiff golden hairs. Palpi pale yellowish-brown. Tegulae brown, veins of wings black-brown.

Petiole dark brown, gaster reddish but anterior two-thirds of first tergite dark brown, a small brown spot on the anterior margin of the second gastral tergite, third tergite dark brown except broad red posterior margin which is roundly protruding medianly, a small black-brown spot on the anterior part of the fifth tergite.

Anterior margin of clypeus smooth and shining, emarginate, bidentate (fig. 58); basal half of clypeus convex, finely but distinctly and closely punctate. Interantennal carina fine, ending below in a small tooth which is connected with the antennal sclerites by fine carinae (fig. 59). Frons closely and finely punctate. Vertex behind ocelli slightly raised, the raised part not sharply defined. Scutum somewhat finer punctate than in *P. rubicundus,* surface of scutellum very smooth with somewhat oily shine. Smooth part of propodeum behind enclosed area very narrow, as in *P. rubicundus.* The first recurrent vein of the fore wings ends in the second, the second recurrent vein in the third submarginal cell. Pygidial area elongate triangular, apex slightly emarginate, surface shining with a few punctures along the margin (fig. 88).

Pubescence of face pale golden and appressed, silvery on temples and sides of thorax, rest of body with greyish hairs.

Size about 9 mm.

Male unknown.

South India: 1 ♀ (lecto-holotype), Madras, coll. Rothney (OUM). The locality label is in red printed letters. The name label has been written by Cameron but has no indication of "type". In the same paper Cameron (1890) has also described *P. orientalis* from Madras, from a single female. This latter specimen is also in the collection of the Oxford University Museum and the pin bears the same locality label: "Madras/Rothney". Again the word type is missing on the name label. It may be that at that time Cameron was not yet accustomed to designate type specimens as he did in later years. In any case there do not seem to exist in the collections any more specimens of *P. rufiventris* from Madras, neither from other localities in South India. As the female that I have studied agrees well with the original description I do not hesitate to designate it as the lecto-holotype.

P. rufiventris is undoubtedly closely related with *P. rubicundus* from Java. The differences of the clypeus, such as the convexity of the basal half and the golden pubescence of the face easily distinguish *P. rufiventris* from its Javanese relative.

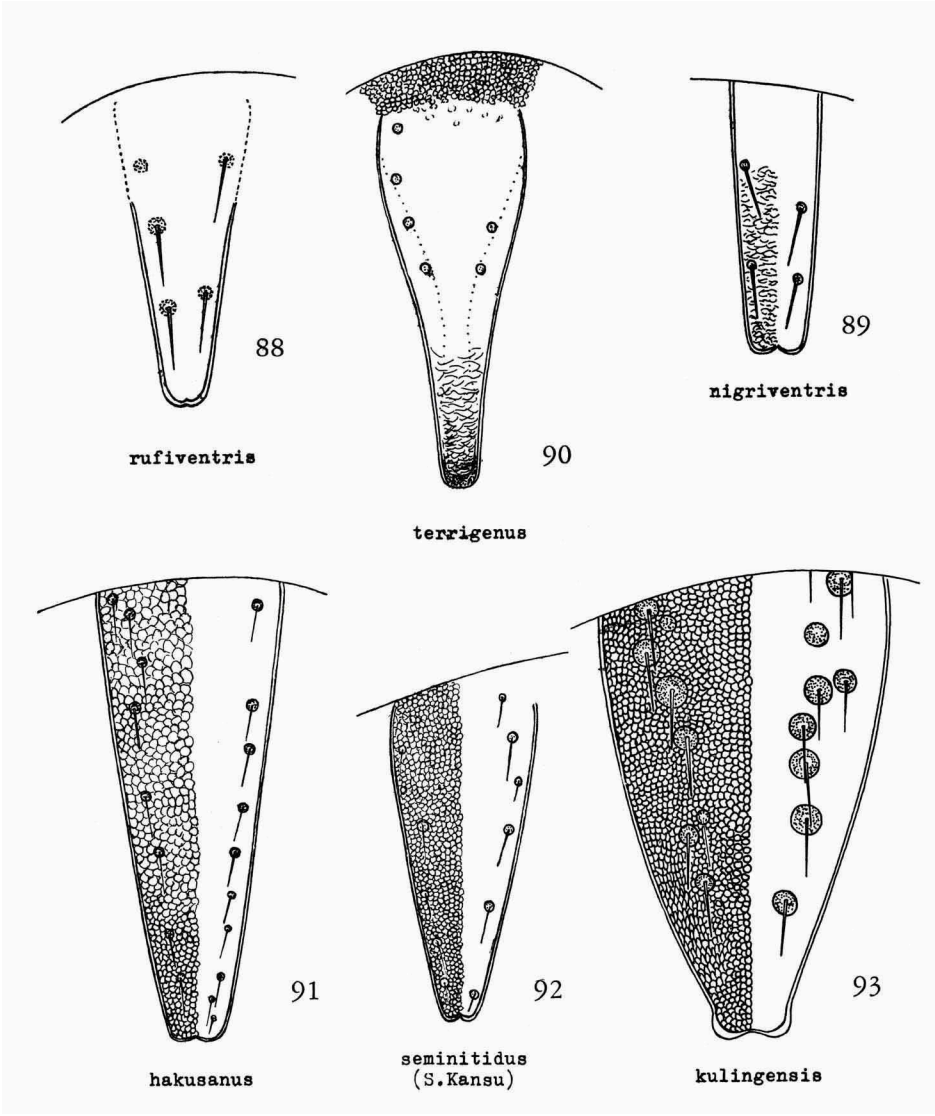

Fig. 88-93, pygidial area of female of various East-Asiatic and Indo-Australian *Psen* s. str. 88, *P. rufiventris* Cameron; 89, *P. nigriventris* n. sp.; 90, *P. terrigenus* Van Lith; 91, *P. hakusanus* Tsuneki; 92, *P. seminitidus* nom. nov., S. Kansu; 93, *P. kulingensis* n. sp.

Psen (Psen) rubicundus rubicundus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 37-38.

Distribution: West Java.

Psen (Psen) rubicundus lawuensis Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 38.

Distribution: East Java.

Psen (Psen) angulifrons n. sp. (fig. 21-22, 60)

Male. — Black, frons and vertex with bluish shine. Legs, including trochanters and hind coxae orange-red. Scape, pedicel and underside of flagellum orange-red. Lower half of clypeus reddish, mandibles more yellowish-red with dark red tips. Palpi testaceous. Veins of wings black-brown.

The interantennal carina ends in a small tooth. Anterior margin of clypeus broadly emarginate (fig. 60). Upper part of frons protruding angularly so-that frons and vertex are almost square and head in dorsal view looks very long. Frons and vertex almost impunctate. Antennae long, segments 4-12 about twice as long as broad at base. No tyloidea.

Scutum strongly punctate, punctures often in rows. Scutellum and metanotum almost impunctate. Enclosed area of propodeum not sharply separated from posterior horizontal part of propodeum. Longitudinal carinae of the concave part of the enclosed area partly incomplete. Median two carinae slightly diverging. Smooth area behind enclosed area narrow and only distinct on either side of the median longitudinal groove. Back of propodeum coarsely carinate but just behind the dorsal part the carinae are weaker and parallel, with fine coriaceous sculpture between the carinae. Legs slender, upper half of back of hind femora smooth, separated from lower half by a longitudinal zone of extremely fine punctures. The first recurrent vein of the fore wings ends in the second submarginal cell, the second recurrent vein ends well in the third submarginal cell. Petiole about half as long as hind femora, cylindrical, dorsally somewhat flattened, base dorso-laterally with short ridge. Gaster shining, with fine punctures. Genitalia, fig. 21-22.

Face with appressed golden pubescence. Rest of body, also ventrally, with golden brown hairs.

Length about 9 mm.

Female unknown.

Philippines: 1 ♂ (holotype), Mindanao, Misamis occ., L. Duminagat, 1500 m., 5 July 1958, in rain forest, coll. H. E. Milliron (BISH).

This wasp is easily recognized by the square frons and the red legs.

Psen (Psen) nigriventris n. sp. (fig. 61, 89)

Female. — Black, vertex and scutum with bluish shine; scape of antennae and first segment of flagellum brown, underside of following segments paler. Red are the following parts: mandibles except dark tips, legs including trochanters but except tarsi of hind legs which are dark brown. Tegulae and veins of wings black-brown.

Median part of anterior margin of clypeus shining, somewhat raised and slightly emarginate (fig. 61). Disk of clypeus densely punctate. The interantennal carina ends in a small tooth; owing to the dense pubescence the carinae, if any, connecting this tooth with the antennal sclerites, are not visible. Lower part of frons densely and finely punctate, upper half and vertex almost impunctate and bare. Antennae rather slender, the eighth and ninth segments being about twice as long as they are broad. Scutum with relatively coarse punctures, often placed in rows, scutellum and metanotum almost impunctate. Longitudinal carinae of enclosed area of propodeum converging, some of these carinae are not complete. Behind the enclosed area a very narrow smooth area, separated from the back of the propodeum by a very fine edge. Back of propodeum with relatively fine reticulate carination and also distinctly punctate. This puncturation is most distinct on both sides of the narrow longitudinal sulcus. Legs slender, hind femora reaching as far as petiole, upper two-thirds of back of hind femora smooth and shining. The second recurrent vein of the fore wings ends well in the third submarginal cell. Petiole cylindrical, except a short lateral carina at base. Pygidial area (partly concealed by the preceding segment), narrower than in the other species of the group, smooth and shining, apex with fine transverse striation, a few punctures along the margin (fig. 89).

Frons and lower half of face with beautiful golden pubescence, below antennae for the greater part appressed. Rest of body with greyish hairs.

Length about 11 mm.

Male unknown.

Philippines: 1 ♀ (holotype), Luzon, Mt. S. Tomas, 6800 ft., 29 Oct. 1953, C. Baltazar (BPIM).

Psen (Psen) richardsi Tsuneki

1959, Tsuneki, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 71-72, ♀.
1964, Tsuneki, Etizenia **6**: 7, ♂.

Distribution: Japan.

Almost as dark as *P. nigriventris* but back of propodeum not punctate. Antennae of female shorter, segments eight and nine about half as long again as they are broad.

According to the description of the male which has just been published by Tsuneki, it has a silvery face, the antennae have no tyloidea and judging from Tsuneki's drawing the genital apparatus is similar to that of *P. angulifrons*.

Group of *Psen orientalis*

As in the preceding group the propodeum is angular in lateral view and the narrow smooth area behind the enclosed area is situated on the horizontal part of the propodeum.

A few marked differences distinguish this group from that of *P. rufiventris*, the pygidial area being reticulate instead of shining, the mandibles for the greater part being dark instead of reddish and the second recurrent vein of the fore wings being interstitial or nearly interstitial.

Only *P. seminitidus* and *P. hakusanus*, possibly also *P. koreanus*, have the pygidial area narrower and shining on the basal half, resembling that of *P. rufiventris*, but the other characters have lead me to consider these species as being more closely related with *P. orientalis*.

This group is distributed over a large part of South and East Asia, only one species, *P. politiventris*, occurring in the Philippines whilst a subspecies of the latter has been found in Malaya.

Judging from the structure of the genitalia I think that *P. triangulatus* from Java and Sumatra, only known in the male sex, should also be placed into this group. *P. terrigenus* has much in common with *P. seminitidus* and although the pygidial area of the female is much narrower it will probably also belong to this group.

Psen (Psen) terrigenus Van Lith (fig. 62, 90)

1959, VAN LITH, Zool. Verh. Leiden **39**: 30-34, ♀.

Distribution: Java.

I have provisionally placed this wasp into the group of *P. orientalis* because of the shape of the propodeum and the nervation of the fore wings. The pygidial area (fig. 90) seems more closely related to that of *P. seminitidus* and *P. hakusanus*. Yet the wasp differs from these latter two species in the more shining and narrower pygidial area which is somewhat gutter-shaped. Moreover the median part of the triangularly emarginate clypeus is more protruding than usual and distinctly separated from the depressed and shining lateral parts of the margin.

The male has not yet been discovered.

Psen (Psen) seminitidus nom. nov. for *Psen (Psen) kohli* (Gussakovskij) not *Psen (Pseneo) kohlii* Fox, 1898 (fig. 63-64, 92)

1934, GUSSAKOVSKIJ, Ark. f. Zool. **27** (A): 7-8, ♀ (*Mimesa kohli*; China).
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 653-654 *(Psen (Psen) kohli)*.

Description of paratype (female) from S. Kansu. Black, hind tibiae and tarsi brown, claws yellowish-red, apex of hind tibiae, especially on the inner side, and the two tibial apical thorns reddish-brown. Tegulae brown. Nervation of wings almost black.

Clypeus densely punctate, interspaces shining, the broad anterior margin shining, almost smooth and with shallow emargination (fig. 64). The fine frontal carina ends in a small tooth which is the top of a small rectangularly arched carina (fig. 63). Frons with very fine puncturation and below anterior ocellus with fine longitudinal striation. Postocellar region slightly raised, finely punctate, vertex behind oculi impunctate. Mandibles not broadened medially but base rather broad. Eighth and ninth antennal segments about half as long again as they are broad.

Scutum finely punctate, with somewhat plumbeous shine. Scutellum sparsely punctate, metanotum with very fine punctures. Enclosed area of propodeum much depressed, bordered by a narrow horizontal area which is distinctly separated from the back of the propodeum. This horizontal area is very narrow on either side of the sulcus and very finely transversely striate there, laterally with a smooth area. The enclosed area of the propodeum has medially two slightly diverging carinae, the lateral parts have a few longitudinal carinae which are directed obliquely inwards. The back surface is densely irregularly reticulate with only a few stronger carinae, about as in *P. hakusanus*. Back of hind femora without longitudinal line of punctures, upper half almost impunctate. Second recurrent vein of fore wings nearly interstitial.

Petiole not reaching as far as end of hind femora, dorsal surface slightly convex with small apical depression, lateral sides with groove which is bordered above by a sharp edge and below by a sharp carina which does not reach the base. Petiole ventrally with median longitudinal carina. Gaster extremely finely punctate. Pygidial area fig. 92, base somewhat convex and shining, hardly reticulate, apical part with rather irregular sculpture.

Face with silvery appressed pubescence, back of propodeum with yellowish-grey backwardly directed hairs.

Length about 10 mm.

The male of this species is still unknown.

China: 1 ♀ (holotype), Tibet, Kam, Sept. 1900, Kozlov expedition (Lenin-

grad Museum); 1 ♀ (paratype), Nan-Chan, 15 Sept. 1908, Kozlov expedition (Leningrad Museum); 1 ♀ (paratype), S. Kansu, 28 Sept., coll. Dr. Hummel, Sven Hedin expedition (NRS). I have only seen the latter specimen.

In the collection of the United States National Museum at Washington is a female (with loose head) which is very similar and which I believe to be the same form. The pygidial area is slightly longer than that of the female from S. Kansu. It has the same size. It was collected by D. C. Graham at Wei Chow, 65 mi N.W. Chengtu, province of Szechuen in China, 15-21 Aug. 1933, 9000 — 12500 ft.

As I have only examined the paratype from Central China, not yet the holotype from Tibet and there being no males at all available I am unable to ascertain with certainty the relationship with *P. hakusanus* from Japan. They might be conspecific. The specific name which it has received from Gussakovskij in 1934 is preoccupied by *Psen kohlii* Fox, 1898, Trans. Amer. Ent. Soc. **25**: 9 (type of subgenus *Pseneo* Malloch, 1933). As another *Psen* has already been named in honour of Gussakovskij, I have chosen the name of *seminitidus* in view of the partly shining pygidial area.

Psen (Psen) hakusanus Tsuneki (fig. 8-9, 91)

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 72-73.

Distribution: Japan.

The structural differences with *P. seminitidus* are very slight. It seems possible that further studies will prove that they are conspecific. Pygidial area of female, fig. 91. Genitalia of male, fig. 8-9.

Psen (Psen) koreanus Tsuneki

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 73-74.

Of this species two females are mentioned by Tsuneki, both from Korea. According to the description they are closely related to *P. hakusanus*.

Psen (Psen) kulingensis n. sp. (fig. 66, 93)

Female. — Black; fore and mid tarsi, tibial spurs and middle part of mandibles reddish. Sides of first gastral segments also somewhat reddish. Palpi testaceous. Veins of wings dark brown.

The interantennal carina ends in a distinct tooth with angular carina just below this (fig. 66). The impunctate protruding median part of the clypeus is broad, emarginate (fig. 66). Disk of clypeus densely punctate. Mandibles rather broad. Antennae thick, segments 9-11 about 1 1/3 times as long as

broad. Frons with irregular punctures. Vertex also with irregular punctures but nearly smooth near oculi.

Scutum strongly punctate, punctures often in rows. Scutellum finer and less densely punctate. Metanotum finely punctate. Enclosed area of propodeum sharply separated from smooth horizontal part of propodeum, concave except on either side of the median sulcus, just behind the metanotum, where a finely irregularly striate raised area occurs. Smooth horizontal area behind enclosed area broad. Median two carinae slightly diverging. Back of propodeum with coarse irregular carination. Epicnemial areas distinctly separated from interepicnemial area. Legs thick, hind tibiae dorsally with strong reddish spines. First recurrent vein of fore wings ending in second submarginal cell, second recurrent vein interstitial. Petiole short and broad, hind femora ending far beyond petiole, almost cylindrical, sides only slightly depressed. Gaster finely punctate. Pygidial area elongate triangular, relatively broad (fig. 93), surface coriaceous, with irregular lateral row of large punctures.

Face with silvery pubescence which is hardly appressed so that the sculpture is well visible, rest of body greyish pubescent.

Length 11 mm.

Male unknown.

South China: Kuling, 1 ♀ (holotype), 13 June 1926; 1 ♀ (paratype), 25 June 1926, both coll. C. Y. Wong (USNM).

This wasp is closely related to *P. yomasanus* from Burma and *P. fuscinervis* from Assam. From the former it differs in the silvery pubescence of the face. From *P. fuscinervis* it differs in the stronger interantennal tooth, the shorter petiole, the more concave enclosed area of the propodeum, the stronger carination of the propodeum and stronger puncturation of the scutum and perhaps also in the larger size. The pubescence of the face is not appressed.

Psen (Psen) orientalis Cameron (fig. 1-4, 94)

1890, CAMERON, Mem. Proc. Manch. Lit. Phil. Soc. (4) **3**: 269, ♀ (*Psen orientalis*; Madras, India).

1902, CAMERON, Jl. Bombay Nat. Hist. Soc. **14**: 289, ♂ and ♀ (*Psen reticulatus*; Deesa (!), India).

1959, VAN LITH, Zool. Verh. Leiden **39**: 59.

Little difference, if any, exists between the types of *P. orientalis* (in OUM) and *P. reticulatus* (in BM). In *P. orientalis,* from South India, the pygidial area is not impunctate at base and finely and closely punctured at apex, as Cameron says, but it is completely very finely reticulate, with a few large punctures along the margin, as in *P. reticulatus* (fig. 94) from

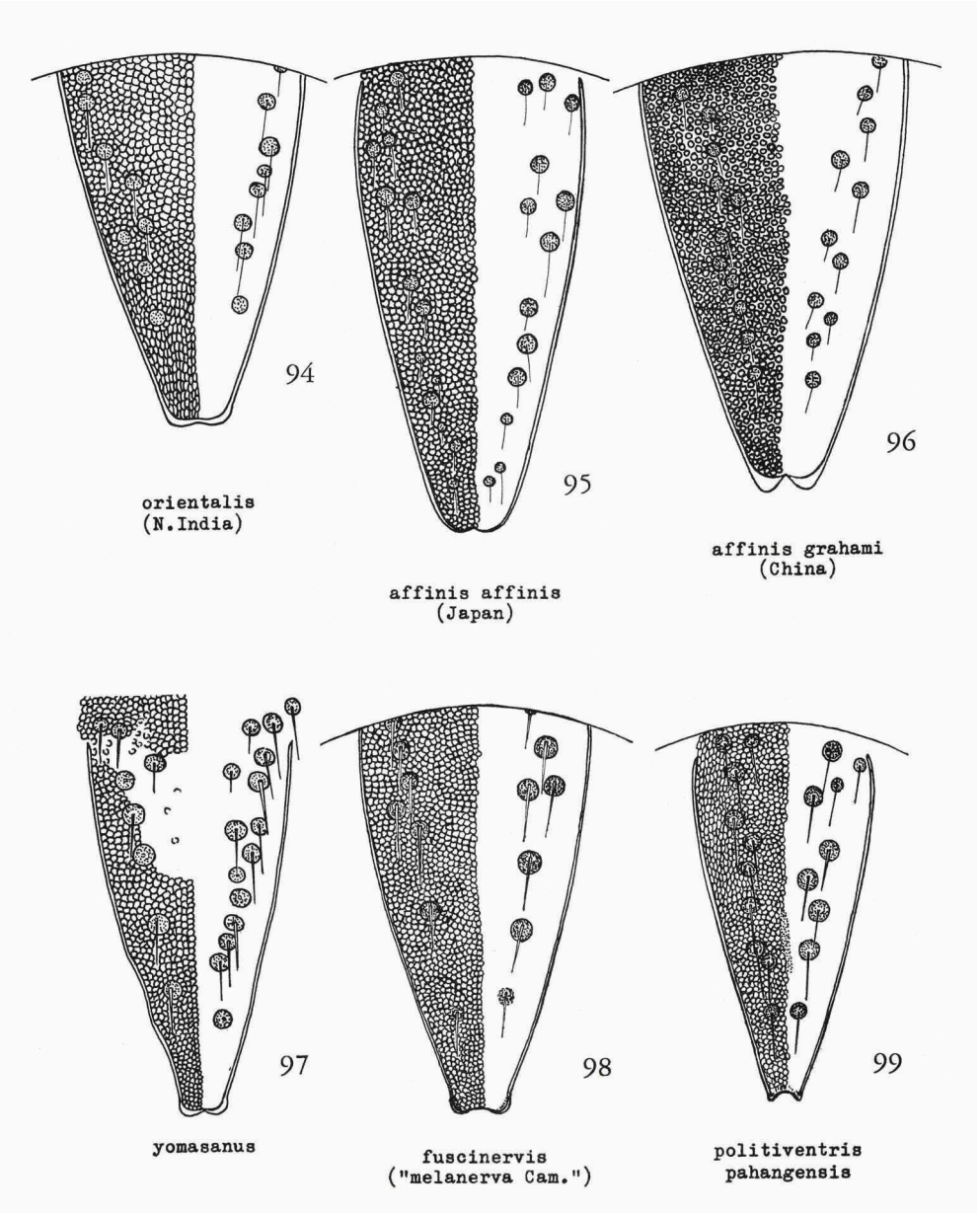

Fig. 94-99, pygidial area of female of various East-Asiatic and Indo-Australian *Psen* s. str. 94, *P. orientalis* Cameron; 95, *P. affinis affinis* Gussakovskij; 96, *P. affinis grahami* n. subsp., China; 97, *P. yomasanus* n. sp.; 98, *P. fuscinervis* (Cameron) (*"melanerva"* Cameron); 99, *P. politiventris pahangensis* n. subsp.

North India and resembling that of *P. politiventris* (fig. 99) from the Philippines and Malaya.

The thorax of *P. orientalis* has a plumbeous hue, perhaps not as distinct as in *P. reticulatus,* but this is to be attributed to the condition of the type which is somewhat dirty. Unfortunately I could not trace any more specimens from South India.

In *P. orientalis* the apex of the petiole is slightly broader. This makes it impossible to decide at this moment whether the two wasps are conspecific or perhaps even belong to the same subspecies.

During a short stay in the British Museum (Natural History) I could ascertain that the type (no. 21.813) of *P. reticulatus* Cameron does not originate from Deesa as stated in the original description, but that its pin bears a typewritten label "Simla/9.98". Simla, south of the Himalayas, is roughly 750 kilometres distant from Deesa which is situated in the extreme north of the province of Gujarat.

Psen (Psen) affinis affinis Gussakovskij (fig. 5-7, 95)

1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 652, ♀ (*Psen* (s. str.) *affinis*; prov. Ussuri).

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 65 *(Psen (Psen) affinis).*

The structure of the pygidial area (fig. 95), the petiole which is quadrate in cross section, with ventral keel, and the distinct puncturation of the scutum distinguish this species from the other species of the group of *P. orientalis.* In the male only the fifth and sixth articles of the antennae are carinate. Genitalia of male, fig. 5-7.

Tsuneki (1959) studied great series of males and females from Japan and also a couple from Korea. He could not compare with the holotype from Ussuri but he is certainly correct in considering his material as being identical.

In the P. Cameron collection in the British Museum (Natural History) is a male labelled "*Psen japonicus* Cam. / type / Japan". Although in this specimen the greater part of the gaster and one of the antennae are missing and moreover it is somewhat dirty, I could ascertain with sufficient certainty that it is completely identical with *P. affinis* Gussakovskij, sensu Tsuneki, 1959, from Japan. "*Psen japonicus* Cam." is a manuscript name and invalid.

Psen (Psen) affinis grahami n. subsp. (fig. 10-13, 96)

A few specimens from the province of Szechuan in Central China differ in a few minor details from the Japanese form of which Prof. Tsuneki kindly sent me some material.

In the female the striation of the frons, the carination of the propodeum and the puncturation of the vertex and the scutum are slightly stronger. The horizontal area behind the enclosed area of the propodeum is broader than in the nominate form. The pygidial area is somewhat broader (fig. 96).

A few males, from other localities in the same province, agree with the female to a great extent, but the horizontal area behind the enclosed area of the propodeum is very narrow. Provisionally I have labelled these males as *P. affinis grahami*. More material, of both sexes and from the same locality, is required to confirm their identity. Genitalia of male, fig. 10-13.

China: province of Szechuan, 1 ♀ (holotype), O-Er, 26 mi north Li-Fan, 9000 ft., 6-16 August 1933, D. C. Graham (USNM); 4 ♂ (one labelled as allotype), Yellow Dragon Temple near Songpan, 11000-14000 ft., 20-28 July 1924, D. C. Graham, 1 ♂, Shin Kai Si, Mt. Omei, 4400 ft., July 1935, D. C. Graham (USNM and ML).

Psen (Psen) yomasanus n. sp. (fig. 14, 97)

Female. — Black; palpi, tips of mandibles and tarsi pale brown. Gaster except petiole, brownish transparent, especially at the sides. Veins of wings dark brown.

Clypeus almost flat, slightly depressed before the anterior margin, surface densely but not sharply punctate, a few larger punctures along the impunctate but dull (coriaceous) margin. Margin with shallow emargination. Interantennal carina ending in an angular transverse carina which forms a small tooth when seen from above. Frons below ocelli distinctly punctate, near median carina with tendency to longitudinal striation, a broad margin along inner side of oculi is almost impunctate. Vertex sparsely punctate, somewhat denser behind ocelli, not distinctly raised there. Mandibles not broader than usual, end of teeth blunt. Third segment of antennae slender, more than four times as long as it is broad at end, half as long again as fourth segment, tenth and eleventh segments about one and a third time as long as they are broad.

Scutum with close and strong punctures, scutellum much more sparsely punctured, centrally with impunctate area. Enclosed area of propodeum depressed, shining; median two longitudinal carinae slightly diverging, on the lateral parts the carinae are converging. Behind enclosed area a broad smooth horizontal area, which is broadest at the sides. Back of propodeum irregularly, not very coarsely reticulate. Mesosternum and mesopleura finely and widely punctate. The first recurrent vein of the fore wings ends well in the second submarginal cell, the second recurrent vein in the third submarginal cell.

Petiole cylindrical, reaching beyond end of hind femora. Puncturation of first and second gastral tergites extremely fine, on following tergites more distinct. Pygidial area elongate triangular with fine coriaceous sculpture, along the lateral margins an irregular row of punctures, basal half between rows of punctures shining, apex emarginate (fig. 97, margin somewhat deformed).

Pubescence of face below antennae golden, temples silvery pubescent, back of propodeum with long greyish hairs, rest of body with brownish pubescence.

Length about 10 mm.

Male. — Like female but with following differences. Clypeus with fine and sparse puncturation; margin shining with median emargination. Antennae without tyloidea. Fourth gastral sternite only with fasciculate hairs at margin. Stipes, fig. 14.

Length about 10 mm.

Burma: 1 ♀ (holotype) and 3 ♂ (allotype and paratypes), Chan Yoma, coll. Gribodo (NMW, 1 paratype ML).

This species is certainly closely related to *P. fuscipennis*. It is easily distinguished from the latter by the lacking of the tyloidea in the male and in the golden pubescence of the face of the female.

Psen (Psen) fuscinervis (Cameron) (fig. 65, 98)

1899, CAMERON, Ann. Mag. Nat. Hist. (7) **4**: 55-56, ♀ [= ♂] (*Caenopsen fuscinervis*; Khasia Hills, Assam).

? 1902, CAMERON, Ann. Mag. Nat. Hist. (7) **10**: 63-64, ♀ (*Psen nigrinervis*; Khasia Hills, Assam).

1959, VAN LITH, Zool. Verh. Leiden **39**: 57-58.

The male in the collection of the British Museum (Natural History) mentioned in my paper of 1959 is not the holotype. In the collection of the Oxford University Museum I have found another which is designated as "type" by Cameron himself and which agrees with the original description.

Redescription of this type. Male. — Black; palpi and tarsi dark brown. Middle part of mandibles reddish. Nervation of wings, including stigma and also tegulae dark brown.

Clypeus convex, shining, very finely and densely punctate, margin smooth, slightly emarginate (fig. 65). Mandibles normal. Interantennal carina ending in a small tooth connected with underside of antennal sclerites by oblique carinae. Frons very densely but finely punctate, near upper part of oculi almost impunctate, below anterior ocellus with slight tendency to longitudinal striation. Vertex also densely punctate, somewhat stronger than frons, near eyes more sparsely. Interocellar and postocellar region slightly raised. An-

tennae long, most segments about twice as long as broad in the middle, segments 4-12 (on twelfth segment not distinct) with tyloidea (fine carinae).

Mesopleura and mesosternum with very fine and sparse puncturation. Lateral epicnemial carina strongly protruding, with sharp edge normally curved backward, almost connected with subpleural carina which consists of two sharp tubercles. No distinct acetabular carina. Scutum with close and deep puncturation, scutellum and metanotum slightly more sparsely punctate. Enclosed area of propodeum depressed; the two median carinae slightly diverging, lateral carinae obliquely inwards directed. Enclosed area margined posteriorly by a very narrow crenulated area. Behind this a smooth horizontal area, broadened at the sides and with very fine transverse striation near the median sulcus. Back and sides of propodeum with coarse reticulate carination, median part somewhat depressed and with much finer carination (not with three oblique keels as said in the original description). Fore femora rather broad, upper part of back of hind femora smooth and shining, no longitudinal dense row of punctures. Second recurrent vein of fore wings interstitial.

Petiole more than twice as long as first gastral sternite. Ventral side rounded, dorsal side somewhat flattened, lateral edge not sharp. Second sternite shining and almost impunctate, following sternites very finely sculptured. Transverse groove at base of second gastral sternite much exposed, at the bottom laterally with pale spot covered by short white bristles, the sides of the tooth are forming an angle of about 90 degrees.

Pubescence of face silvery, appressed and intermixed with a few long hairs. Scutum with short pubescence and long brownish hairs. Back of propodeum with long whitish hairs. Underside of fore femora with whitish hairs which are longer than the greatest width of the femora. Margin of fourth gastral sternite with very distinct fasciculate hairs, margin of third sternite with only a few hairs left.

The female of *P. fuscipennis* (*P. nigrinervis* Cameron, BM type no. 21.816) has a broad triangular pygidial area, somewhat shining, but distinctly reticulate. There are a few large punctures along the margin, the base is slightly raised. The pubescence of the face is silvery.

I have not been able to find any good structural characters to distinguish *P. fuscinervis* Cameron from *P. nigrinervis* Cameron, 1902. I have seen a few specimens labelled as *P. nigrinervis* Cameron in the collections in London and Oxford, including the holotype (♀) but they are all very similar to *P. fuscinervis*. There is some difference in the colour of the veins of the wings, but good series of females and males are required to confirm that this character or that of the colour of the hairs on the mesosternum,

has any taxonomic value. As long as this is not possible I prefer to consider all the specimens mentioned below as *P. fuscinervis* Cameron.

Distribution: Assam (India). I have seen the following specimens: 1 ♂ (holotype), labelled in Cameron's handwriting "*Caenopsen fuscinervis* Cam. type Khasia" (OUM), the gaster is broken off and glued on a label; 1 ♂ labelled by Cameron "*Caenopsen fuscinervis* Cam. Khasia" (BM); 1 ♀, Shillong, Sept. 1903, R. Turner (BM 1905-125); 1 ♀ labelled by Cameron "*Psen nigrinervis* type Cam. Khasia" (BM); 1 ♂ labelled by Cameron "*Psen nigrinervis* Cam. Khasia" (OUM); 1 ♀ labelled by Cameron "*Psen melanerva* Cam. type Khasia" (OUM) (pygidial area, fig. 98; lower part of face, fig. 65). Apparently the name "*melanerva*" has never been published by Cameron and I suppose that it is an earlier (MS) synonym for *nigrinervis*.

The male from Khasia, labelled by Cameron "*Psen nigrinervis*" is better preserved than the males which he has named *Caenopsen fuscinervis*. It has beautiful golden-brown fasciculate hairs on the median part of the hind margin of the third and fourth gastral sternites. In this specimen the petiole is distinctly slightly longer than the hind femora when these are stretched.

In the collection of the Oxford University Museum is another male labelled by Cameron "*Caenopsen fuscinervis* Cam. Khasia" but this is quite different and is one of the species with broad mandibles of the group of *P. tsunekii*.

Psen (Psen) politiventris politiventris Rohwer (fig. 15-18)

1921, ROHWER, Phil. Jl. Sc. **18**: 321, ♀ (*Psen (Mimesa) politiventris*; Philippines, Luzon).

1959, VAN LITH, Zool. Verh. Leiden **39**: 36-37, ♀ and ♂ (*Psen (Psen) politiventris*).

The structure of the propodeum and the pygidial area of this wasp (cf. fig. 99) very much resemble that of *P. orientalis*. It differs from the latter in the cylindrical petiole and is further easily recognized by the red legs. Genitalia of male, fig. 15-18.

New records: 2 ♀ and 2 ♂, Luzon, Mt. S. Tomas, 7300-6500 ft., 29 Nov. 1953, coll. C. R. Baltazar and A. Marmeto (BPIM).

Psen (Psen) politiventris pahangensis n. subsp. (fig. 99)

I have seen a single female from Malaya which seems to be a different subspecies. The femora are brown instead of red. Structurally it differs from the nominate form in the shorter petiole, which does not reach as far as the hind femora when these are stretched, and in the smooth area behind the enclosed area of the propodeum being broader. The frons is finer punctate below the ocelli than in the Philippine form, the interspaces are some-

what opaque. The punctures along the margin of the pygidial area are distinctly larger than in the nominate form (fig. 99).

Malaya: 1 ♀ (holotype), Pahang, Cameron Highlands, Ulu Menaum, 5500 ft., 31 July 1938, H. M. Pendlebury (BM, 1955-354, ex FMS Museums).

Psen (Psen) politiventris bellus n. subsp.

The structural differences between this subspecies from Mindanao and the nominate form from Luzon are not important. The lateral keels of the pygidial area are almost absent near the apex.

As in the Luzon form the legs are largely red, but the outer side of the fore femora is blackish over the whole length. The underside of the antennae is reddish, in the nominate form almost completely black. The pubescence of the face is golden, of the rest of the body golden-brown.

Length about 11 mm.

Male unknown.

Mindanao: 1 ♀ (holotype), Bukidnon, 1480 m., Mt. Katanglad, 27-31 Oct. 1959, Malaise trap, L. Quate and C. Yoshimoto (BISH).

Although *P. politiventris politiventris* is not rare in Luzon it has not yet been recorded from any of the other Philippine islands. Therefore the discovery of this Mindanao form is very interesting.

Psen (Psen) triangulatus Van Lith (fig. 19-20)

1959, VAN LITH, Zool. Verh. Leiden **39**: 25-26.

Of this species I had thus far seen two males from East Java. In the collection of the Naturhistorisches Museum, Vienna, is a male from Sumatra which is very similar, having the same structure of the propodeum and the same remarkably reticulate triangle on the base of the second gastral tergite. The legs are more slender, notably the hind femora. Although in the East Java form the tyloidea of the antennae are distinct on segments 3-13 and in the Sumatra male the tyloidea on the eighth and following segments are very small and indistinct, there is no doubt that both forms are conspecific.

New record: 1 ♂, Sumatra, Brastagi, July 1922, L. Fulmek (NMW) (subspecies?).

The shape of the propodeum of *P. triangulatus* tends to that of *P. politiventris,* in having an almost horizontal area behind the enclosed area, at least in the middle. No females being known as yet its systematic place is still uncertain. As the structure of the stipes (fig. 19-20) is also similar to that of the group of *P. orientalis* I have provisionally included *P. triangulatus* in this group.

Group of *Psen refractus*

Through the intermediary of Dr. K. V. Krombein of the United States National Museum, Washington, I was kindly allowed the study of a few *Psen* collected in South India.

These wasps proved to belong to two species. One of these is a subspecies of *P. refractus* Nurse, described in 1903 from North India. The other form is a new species, *P. krombeini,* closely related to the former but distinctly different. Fortunately both sexes were represented in the material, which fact is certainly important in view of the dimorphism.

The shape of the clypeus is very characteristic in the females of both species. The median part of the clypeus is strongly raised and protruding and separated from the depressed lateral parts by a sharp edge. In the South-Indian *P. matalensis* Turner the median part of the clypeus is also raised, but it is much less distinctly separated from the depressed lateral parts. Yet I think it is closely related and therefore I have placed it into this small group. The pygidial area is elongate-triangular, with many large punctures. The group seems to be restricted to India.

There is another group of Oriental *Psen* s. str. which have also a strongly raised clypeus, namely the group of *P. curvipilosus* Van Lith. The two species of this group, with their subspecies, have been found in Malaya, Java and Sumatra. In both sexes they are easily distinguished by the remarkable apically curved hairs along the posterior margin of the tergites and in the female sex by the single row of punctures along the margin of the pygidial area.

Psen (Psen) refractus refractus Nurse

1903, NURSE, Jl. Bombay Nat. Hist. Soc. **15**: 11-12, ♀ (*Psen refractus*; Mt. Abu, India).

Redescription based on one of the two paratypes (BM). Female. — Head and thorax black; palpi testaceous, middle part of mandibles yellowish-red, underside of antennae brown, anterior margin of clypeus reddish-transparent. Tegulae reddish, wings hyaline, veins of wings dark brown. Legs brown, tarsi and fore side of fore tibiae more yellowish-brown, spurs of hind tibiae whitish. Petiole black, but posterior ventral plate red, first and second gastral tergites pale red, second gastral sternite and base of third gastral segment also red.

Clypeus convex, lower half of median part raised and protruding and separated from the depressed lateral parts by sharp edges (cf. fig. 68). Anterior margin of clypeus slightly emarginate. The frontal carina ends in a small tooth between the antennae. This tooth is connected with the antennal

sclerites by a fine carina. Frons and vertex with very fine puncturation. Mandibles somewhat broadened on inner margin, apex distinctly bidentate. Scape of antennae thick, flagellum gradually thickened towards the apex, third segment about half as long again as the fourth segment.

Scutum shining, finely and sparsely punctate, near hind margin somewhat denser, no tendency to striation. Scutellum convex, very sparsely punctate. Metanotum rounded, almost opaque. Enclosed area of propodeum triangular, shining, with longitudinal carinae. Propodeum laterally, just behind enclosed area with nearly circular area which is almost smooth and completely bare; back of propodeum irregularly reticulate, with only a few coarse carinae. Legs rather thick, mid tibiae somewhat broadened, hind tibiae posteriorly with a longitudinal row of pale short spines, some more of these spines on the base. First recurrent vein of fore wings ending in second submarginal cell, second recurrent vein in third submarginal cell.

Petiole about as long as hind trochanter and hind tibia together, each side with two longitudinal carinae, dorsal side slightly rounded, ventral side more rounded. Gaster very finely punctate. Pygidial area elongate-triangular, coarsely punctate, punctures at irregular distances from each other, sometimes in oblique rows (cf. fig. 100). Surface of pygidium between the punctures finely coriaceous, impunctate margin slightly more coarsely sculptured.

Pubescence of face silvery, mostly appressed; also pronotum dorsally silvery pubescent. Frons, vertex, thorax and legs and greater part of gaster whitish pubescent. Hind surface of hind femora bare and shining. Base and apex of hind tibiae on inner side with very dense and short whitish pubescence. Hairs on last segment, notably those arising from the punctures of the pygidial area, somewhat golden and stiff.

Length about 11 mm.

Male unknown.

North India: 2 ♀ (holotype no. 21.817 and paratype), Mount Abu (typewritten label "Abu"), Colonel C. G. Nurse, collection no. 1920-72 (BM). According to the original description there should be three females from Mount Abu, but I could only find the above-mentioned two specimens.

Psen (Psen) refractus meridianus n. subsp. (fig. 35-38, 68-69, 100)

The female of this wasp very much resembles the nominate subspecies but it is much darker. Lower part of face, fig. 68.

Female. — Only first gastral tergite completely red, second gastral tergite black with a red spot on the sides. Posterior part of ventral plate of petiole red, also basal half of second gastral sternite. Legs black, tarsi of fore and mid legs partly reddish. Clypeus completely black.

Length about 10-11 mm.

Male. — Colour as in female. Median part of clypeus not separated from lateral parts; emargination of anterior margin of clypeus as in female (fig. 69). Scape of antennae thick, about twice as long as it is broad. Flagellum short, fifth and sixth segments about as long as they are broad; segments 5-13 with oval tyloidea, eighth segment flattened below, last five segments distinctly depressed on underside.

Back of propodeum with very coarse reticulate carination. Hind margin of third and fourth gastral sternites medially with long brown fasciculate hairs. Genitalia, fig. 35-38.

Length about 8-10 mm.

South India: 2 ♀ and 4 ♂ (♀ holotype, ♂ allotype and four paratypes), Kodaikanal, "Pulney Hills" (Palni Hills?), 6500 ft., April-May 1953, P. S. Nathan, ex coll. K. V. Krombein (USNM).

Psen (Psen) krombeini n. sp. (fig. 70-71, 101)

Female. — Black; tegulae reddish-brown, sides of first gastral tergite dark reddish-transparent. Palpi testaceous. Middle part of mandibles, fore side of fore tibiae, base and apex of mid tibiae and tarsi of fore and mid legs reddish-brown, tarsi somewhat paler. Tibial spurs of mid and hind legs whitish. Wings somewhat smoky, veins almost black.

Median part of clypeus very much raised and protruding, lower part with sharp lateral edges somewhat bent forward, separating the anterior median part from the depressed lateral parts. Surface of clypeus densely but finely punctate, anterior margin smooth and somewhat raised, with weak triangular emargination (fig. 70). Frontal carina ending between antennae in a distinct and protruding tooth which is not distinctly connected with antennal sclerites. Frons and vertex finely punctate, frons with low elevation near the eyes. Mandibles broadened on inner margin, apices with two rather blunt teeth. Antennae slightly more slender than in *P. refractus*, apical half of antennae gradually thickened. Third segment of antennae about half as long again as fourth segment.

Scutum with sparse and fine puncturation, medially and in front of scutellum with a few longitudinal rugae. Scutellum strongly convex, shining, with a few fine punctures. Metanotum dull, not distinctly punctate. Enclosed area of propodeum triangular, shining, with about twelve oblique carinae, median two diverging. Back of propodeum with irregular reticulate carination, on each side behind the base of the enclosed area a bare roundish area with fine reticulation, not quite smooth. Mesosternum between precoxal sutures dull owing to very fine sculpturation. Mesopleura and metapleura

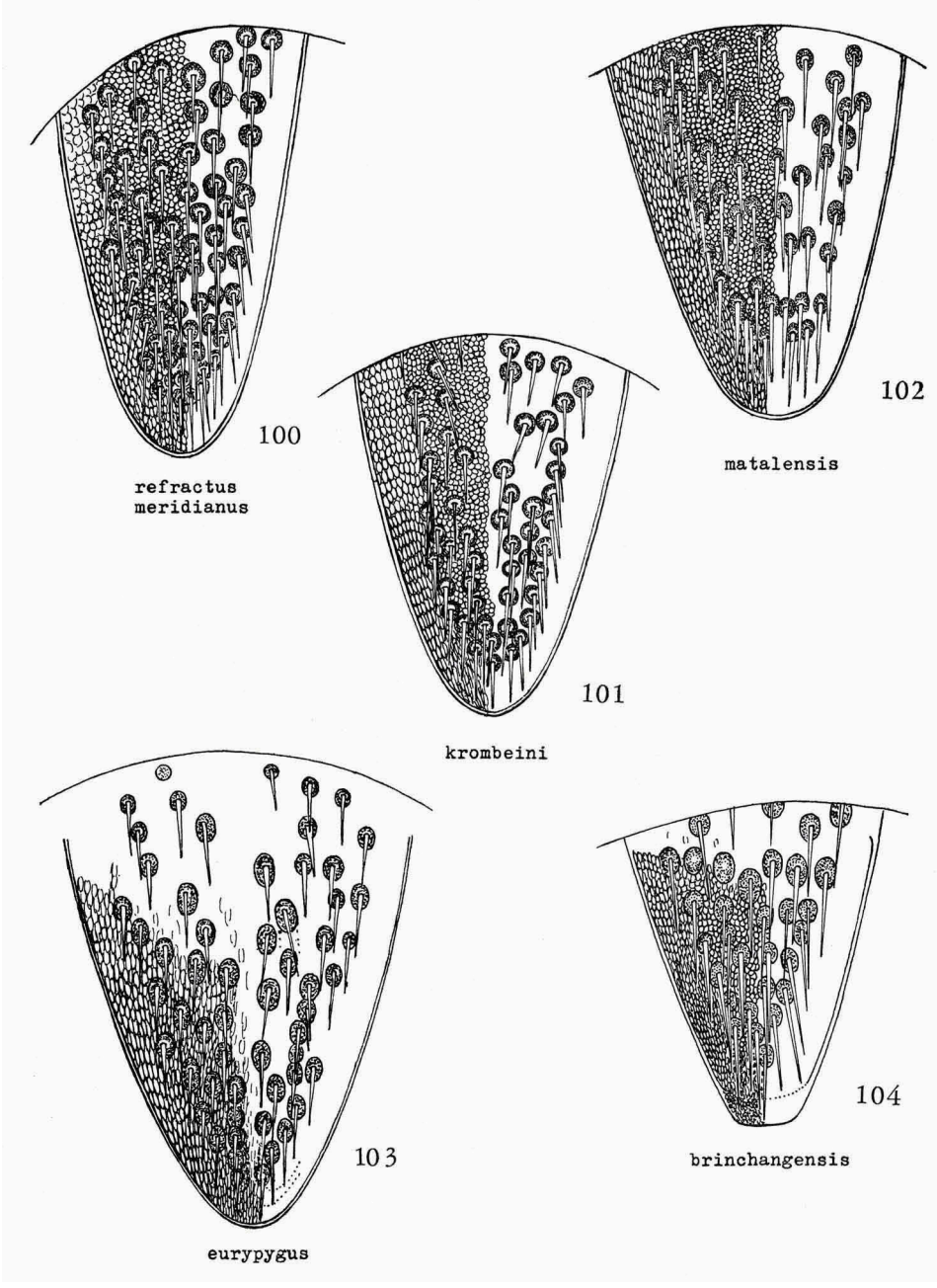

Fig. 100-104, pygidial area of female of various Indo-Australian *Psen* s. str. 100, *P. refractus meridianus* n. subsp.; 101, *P. krombeini* n. sp.; 102, *P. matalensis* Turner; 103, *P. eurypygus* n. sp.; 104, *P. brinchangensis* n. sp.

very finely punctate; hypo-epimeral area well-defined. Legs thick, mid tibiae broadened on basal half. Hind tibiae with a longitudinal row of pale short spines posteriorly. First recurrent vein of fore wings ending in second submarginal cell, second recurrent vein ending in third submarginal cell.

Petiole about as long as hind trochanter and hind tibia together, dorsally slightly rounded, sides each with two longitudinal carinae, ventral side rounded. Pygidial area elongate-triangular with large punctures in four or six irregular rows but these rows more regular than in *P. refractus*. Between the punctures the surface of the pygidial area is very finely coriaceous, the impunctate margin is somewhat more coarsely sculptured (fig. 101).

Pubescence of face below antennae golden, mostly appressed. Frons with beautiful golden pubescence. Behind the eyes pubescence more brassy. Dorsal side of thorax and whole gaster with golden-brown hairs, sides of thorax and mesosternum with whitish pubescence. Femora with fine white pubescence, hind femora on back surface very shining and bare; base and apex of hind tibiae on inner side with very dense and yellowish-white pubescence. Sternites with a few long hairs, especially along the posterior margin. Last tergite with short and stiff, golden-brown hairs, directed backwards, those arising from the punctures of the pygidial area are longer.

Length about 11-12 mm.

Male. — The male which I have associated with the female described above is very similar. Legs somewhat darker than in female. Sides of first gastral tergite reddish-transparent.

Median part of clypeus raised and protruding, but not separated from the lateral parts by sharp edges as in the female. Moreover the depression on either side of the raised part is very slight (fig. 71). Scape of antennae thick, about twice as long as broad, fifth and sixth antennal segments about twice as long as they are broad. Basal half of segments 5-13 depressed on posterior side. Antennal segments 5-7 also with slightly raised tubercle, segments 8-9 with small but distinct transverse carina and segments 10-13 with almost circular depression only. Lateral areas behind enclosed area of propodeum more shining than in female, with a few oblique carinae; back of propodeum coarsely reticulate. Femora more slender than in female, mid tibiae broadened.

Pubescence on face silvery, on dorsal side of thorax and gaster somewhat paler than in female, yellowish-grey. Hind margin of third and fourth gastral sternites with a tuft of golden fasciculate hairs. Last sternite with dense yellowish-golden pubescence.

Length about 10 mm.

South India: Kodaikanal, "Pulney Hills" (Palni Hills?), 6500 ft., April-

May 1953, P. S. Nathan, ♀ (holotype), ♂ (allotype) and 3 ♀ (paratypes), ex coll. K. V. Krombein (USNM).

This wasp is certainly closely related to *P. refractus* Nurse but is in the female sex easily distinguished from the latter by the golden pubescence of the face, by the difference in the shape and the length of the clypeus, by the shape and the more regular puncturation of the pygidial area and in the male sex by the shape and length of the antennae.

It is dedicated to Dr. Karl V. Krombein, Washington, to whom I am much obliged for his active interest in my study of the Oriental Psenini and who has himself contributed considerably to the knowledge of the Psenini of the New World.

Psen (Psen) matalensis Turner (fig. 72-73, 102)

1912, TURNER, Ann. Mag. Nat. Hist. (8) **10**: 362-363, ♀ (*Psen matalensis*; Matale, Ceylon).

Redescription of female based on paratype (BM). Head and thorax black, basal two-thirds of mandibles reddish, tegulae and tarsi of fore and mid legs brownish. Tibial spurs pale testaceous. Wings hyaline, veins black or blackish-brown. Gaster black, hind margin and sides of first gastral tergite, sides of second gastral tergite and sides of third tergite at base red.

Clypeus convex, anterior margin slightly emarginate (fig. 72), two blunt teeth, somewhat raised, laterally bounded by a short edge, separating middle part of clypeus from lateral parts, which are not depressed however. Mandibles rather broad. Anterior margin of clypeus rather broad and dull, disk punctate, with shining interspaces. Frontal carina ending in a distinct tooth between antennae. Frons very finely punctate, vertex more sparsely. Interocellar area not distinctly raised.

Scutum, scutellum and metanotum shining, finely but distinctly punctate. Enclosed area of propodeum shining, with usual longitudinal carination, median two carinae diverging. Back of propodeum not angular in lateral view, rather coarsely reticulate, no smooth areas. Legs rather thick, mid tibiae somewhat broadened, outer side of hind tibiae with paler spines. The second recurrent vein of the fore wings ends well in the third submarginal cell. Petiole not reaching as far as end of hind femora when stretched out, ventral side rounded, dorsal side more flattened, no distinct lateral carina or groove. Gaster very finely punctate. Pygidial area elongate triangular (fig. 102), very similar to that of *P. krombeini*.

Pubescence of face silvery, mostly appressed; base of mandibles and dorsal side of pronotum with same pubescence. Rest of body with normal greyish pubescence. Hind surface of hind femora bare and shining. Pygidial area

with stiff brown backwardly directed hairs. Inner side of hind tibiae at base and apex with short and dense white pubescence.

Length about 10-11 mm.

Male. — As female but femora more brownish. Clypeus completely without lateral edges or carinae marking the median part; emargination of anterior part somewhat deeper, teeth somewhat more pointed (fig. 73). Antennal segments 4-13 with tyloidea. On antennal segments 5 and 6 these tyloidea are flattened, to some extent also on the fourth segment, on segments 7-9 very slightly convex, on segments 10-12 with bare circular depression which is as long as the segment, on segment 13 with a small raised point at base.

Slightly smaller than female.

Material examined: 2 ♀ (one holotype, no. 21.812) and 1 ♂, Ceylon, all specimens with small round pinkish label "Ceyl./82/85". The male is damaged, the gaster and one of the antennae being broken off.

P. matalensis seems to be related to the species of the group of *P. refractus*, the shape of the clypeus of the female resembling that of *P. refractus* and the pygidial area of the female and the antennae of the male being also very similar. However, the median part of the clypeus and the petiole are different.

Group of *Psen aureohirtus*

The few species which I have, with some hesitation, put together into this group, are distinguished by the raised vertex, the cylindrical petiole, the almost interstitial second recurrent vein of the fore wings, the densely punctate pygidial area and the golden pubescence of the face of the female.

They occur in a restricted area, viz., *P. aureohirtus* in the Philippines, *P. toxopeusi* in Celebes and *P. melanosoma* also in the Philippines. Unfortunately the females of the latter two species are still unknown. It may be that *P. carbonarius* from Morotai (one single male only) also belongs to this group.

Psen (Psen) aureohirtus aureohirtus Rohwer (fig. 31)

1921, Rohwer, Phil. Jl. Sc. **18**: 322-323 (*Psen (Mimesa) aureohirta*).
1959, Van Lith, Zool. Verh. Leiden **39**: 49-50 (*Psen (Psen) aureohirtus*).

Distribution: Philippines. New record: 1 ♂, Mt. Makiling, Luzon, 2 Febr. 1954, coll. Ballesteros (BPIM).

Psen (Psen) aureohirtus rufopetiolatus Van Lith

1959, Van Lith, Zool. Verh. Leiden **39**: 50, ♂.

Distribution: Negros.

Psen (Psen) toxopeusi Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 47-49, ♀.

Distribution: Celebes.

Psen (Psen) melanosoma Rohwer (fig. 32-34)

1921, ROHWER, Phil. Jl. Sc. **18**: 322, ♂ (*Psen (Mimesa) melanosoma).*
1959, VAN LITH, Zool. Verh. Leiden **39**: 41-43 (*Psen (Psen) melanosoma*).

Two males have been reported sofar, one from Luzon, the second from Negros. There is a new record from Mindanao: 1 ♂, Misamis Or., Mt. Kibungol, 20 km S. E. of Gingoog, 700-800 m., 9-18 April 1960, H. Torrevillas (BISH). Genitalia, fig. 32-34.

Psen (Psen) carbonarius (Smith)

1865, SMITH, Jl. Proc. Linn. Soc. Lond., Zool. **8**: 86-87, ♂ (*Mimesa carbonaria*; Morty Island).
1959, VAN LITH, Zool. Verh. Leiden **39**: 27-28 (*Psen (Psen) carbonarius*).

The tyloidea, the somewhat raised vertex and the yellowish mandibles and legs of the holotype are the reasons that I have provisionally placed it into the group of *P. aureohirtus.*

Thus far it is the only specimen I have seen. Gussakovskij (1934) briefly mentioned five males and one female of *P. carbonaria* from S. Tomas (Luzon), coll. Staudinger, which he had studied together with material from Japan received from Yasumatsu. I could not yet ascertain whether he has really seen *P. carbonarius* or perhaps *P. aureohirtus* which has been described from Luzon by Rohwer in 1921. Gussakovskij did not refer to the colour of the pubescence of the face, which is golden in both sexes of *P. aureohirtus.* Usually the males have silvery pubescence, even when the females are golden.

Species of subgenus *Psen* which could not yet be classified more exactly

A number of species could not yet be placed into any of the preceding groups with a reasonable chance of correctness. After examination of the genitalia two species have been provisionally placed. They are *P. nitidus* which has been recognized as being very closely related to the group of *P. elisabethae* and *P. triangulatus* which should probably be placed into the group of *P. orientalis.* Also *P. terrigenus* of which unfortunately the male is still unknown, has after some hesitation been brought into the group of *P. orientalis.*

It is remarkable that in the remaining seven species the four males which are known have about the same broad tyloidea as the males of the groups of *P. refractus* and *P. aureohirtus.*

P. bakeri and *P. betremi* are isolated species sofar, the former easily distinguished by the very strong puncturation of the scutum, *P. betremi* by the broad pygidial area of the female. *P. brinchangensis* seems to be closely related to *P. eurypygus,* both species being represented in the female sex only. Of *P. opacus* and *P. rufoannulatus* there are no males to facilitate their classification and of the last species, *P. ruficrus,* the genitalia of the male are different from those of the other species.

In all of the seven last-mentioned wasps the propodeum is gradually curved in lateral view, without a distinct smooth area and the pygidial area of the females, as far as they are available, is densely punctate.

Psen (Psen) bakeri Rohwer

1923, ROHWER, Phil. Jl. Sc. **22**: 601 (*Psen (Mimesa) bakeri*).
1959, VAN LITH, Zool. Verh. Leiden **39**: 38-39 (*Psen (Psen) bakeri*).

Distribution: Philippines (Luzon).

The scutum has very coarse punctures, partly in rows.

Psen (Psen) betremi Van Lith (fig. 41-43)

1959, VAN LITH, Zool. Verh. Leiden **39**: 44-46.

Distribution: Java.

The pygidial area of the female is broader than in any of the other *Psen* s. str.

Psen (Psen) opacus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 46-47.

Sofar I have only seen one female from Luzon. The sculpture of the upper part of the propodeum differs from that of the other *Psen* s. str. but without additional material it will be impossible to say more about its systematic place.

Psen (Psen) rufoannulatus Cameron

1907, CAMERON, Ann. Mag. Nat. Hist. (7) **20**: 90, ♀ (*Psen rufoannulatus*; Simla, India).

Original description: "Black, shining, densely covered with longish white pubescence; the second and third abdominal segments bright red; the apical four joints of the tarsi rufo-testaceous; the wings clear hyaline, the stigma and nervures black; abdominal petiole as long as the thorax; the front with a distinct keel down the middle. ♀.

Length 9 mm.

Simla; August (Nurse).

A stout species.

Metanotal area bare, shining, large, clearly defined, the apex gradually roundly narrowed to a point shortly above the middle of the metanotum; in its centre are two parallel keels; at a distance from these is a keel; separated from it at the outer edge are three or four less distinct ones. The rest of the metanotum is opaque, irregularly striated, the striae more or less curved; the pubescence is long and dense. The first recurrent nervure is received near the apex of the basal third of the cellule, the second very shortly beyond the second transverse cubital. Hind tibiae with about a dozen white spines. The second abscissa of radius not quite half the length of third; the second cubital cellule wide in front".

The female which is in the type-collection of the British Museum (no. 21.818) bears a label in the handwriting of Cameron "*Psen rufobalteata* Cam. type Simla" and also a typewritten label "Simla 8.98", the latter agreeing with other locality-labels pinned under wasps collected by Nurse at Simla. There is not the slightest doubt that the name-label is incorrect and that Cameron intended to write "*Psen rufoannulatus* Cam. type Simla". This opinion is based on the following grounds:

a. I could not find any other specimen of *P. rufobalteatus,* neither in the British Museum nor in the Oxford University Museum.

b. the female in question completely agrees with the original description of *P. rufoannulatus* Cameron from Simla.

c. the type-locality of *P. rufobalteata* Cameron is Khasia. In the type-collection of the Oxford University Museum is a specimen labelled "*Psen rufobalteata* Cam. type Khasia". It is a *Psenulus* and corresponds with the original description (1904) so this wasp must be considered as the real type of *Psenulus rufobalteatus* (Cameron).

In the British Museum (Natural History) I have examined the type of *P. rufoannulatus* (no. 21.818) and made the following additional notes: "Clypeal margin protruding, slightly emarginate, not raised as in *P. refractus,* face silvery pubescent. Back of propodeum curved in lateral view, finely reticulate, no smooth margin. Second and following gastral tergites with dense white pubescence, longer and somewhat curved backwards at hind margins. Petiole black, tergites one and two red, the second tergite somewhat darkened in the middle. Pygidial area rather broadly triangular, densely punctate, margin impunctate".

As the median part of the clypeal margin is not raised I do not think that it will belong to the group of *P. matalensis* and *P. refractus* and I have provisionally placed it near the other *Psen* with broad triangular and densely punctate pygidial area, normal clypeus and extensive red colour on the gaster.

The dense white pubescence on the gaster seems to be characteristic and was also mentioned by Cameron in his description.

Psen (Psen) brinchangensis n. sp. (fig. 74, 104)

Female. Head and thorax black, tegulae dark brown, base of mandibles yellowish-brown, with red tips. Labium yellowish-red. Palpi testaceous. Underside of antennae brown. Legs including trochanters pale brown, femora darker on the back surface. Veins of wings black-brown. Petiole black, gaster reddish, fifth gastral tergite darkened at base, sixth tergite black, also sixth sternite and the greater part of fourth and fifth sternites.

Clypeus very slightly convex, anterior margin with triangular emargination (fig. 74). The interantennal carina ends in a small tooth which is connected with the antennal sclerites by a very fine carina. Frons with fine, not dense puncturation; vertex very sparsely and finely punctate, interocellar and postocellar areas not raised. Mandibles bidentate. Antennae slender, fourth, fifth and sixth segments more than twice as long as they are broad.

Scutum with deep punctures, sometimes in short rows, scutellum more sparsely punctate. Enclosed area of propodeum with longitudinal carinae, the median two parellel. Back of propodeum with fine and dense reticulate carination. Legs rather heavy, median part of mid tibiae distinctly broadened. Back of hind femora smooth and shining, bordered below by a row of very fine and short white hairs. Hind tibiae with a row of short spines on outer side, at base a double row enclosing a flattened area. The second recurrent vein of the fore wings ends in the third submarginal cell. Petiole cylindrical, not reaching as far as end of hind femora. Gaster with fine puncturation, stronger on fourth and fifth segments. Pygidial area broadly triangular, apex blunt, surface coriaceous except base, coarsely punctate with broad, impunctate and dull margin, base of area medianly almost smooth (fig. 104).

Face, temples and pronotum dorsally with silvery and appressed pubescence. Hairs on head, thorax, legs and petiole whitish; pubescence of gaster yellow, longer on the last tergites. Underside of thorax and of trochanter and femora with conspicuous dense, silvery-white appressed pubescence, also a number of long and erect hairs.

Length almost 9 mm.

Male unknown.

Malaya: 1 ♀ (holotype), Gunong Brinchang, 6600 ft., 7 March 1960, H. T. Pagden (HTP).

This species may be recognized by the extensive red colour of the gaster, together with the silvery pubescence of the face and the venation of the fore wings.

Psen (Psen) eurypygus n. sp. (fig. 75, 103)

Female. — Head and thorax black, petiole black but end of ventral plate reddish, first gastral tergite red with large black round patch covering anterior two-thirds, second tergite red, third and fourth tergites red with much darkening on anterior half. Legs including trochanters red, fore and mid femora darkened behind. Palpi testaceous, middle part of mandibles yellowish-red. Tegulae reddish, veins of wings dark brown.

Clypeus slightly convex, the protruding median part of the anterior margin impunctate and slightly emarginate (fig. 75). Mandibles bidentate. The fine interantennal carina ends below in an impunctate and small tooth. Frons below anterior ocellus finely punctate. Vertex very shining and with extremely fine and sparse puncturation. Interocellar and postocellar region not distinctly raised. Antennae slender.

Scutum with very fine and widespread punctures, puncturation towards posterior margin stronger and even with tendency to striation. Scutellum and metanotum with fine and sparse puncturation. Enclosed area of propodeum with distinct longitudinal carinae, a few incomplete. Behind the enclosed area the propodeum gradually sloping with fine reticulate carination, on both sides of the propodeum just behind the enclosed area a small almost smooth round area. Legs rather slender. Hind tibiae with a longitudinal row of spines, basal third with a double row, enclosing a longitudinal flattened and smooth area. The second recurrent vein of the fore wings ends well in the third submarginal cell.

Petiole almost cylindrical, on the sides on the posterior half a few distinct punctures. First two gastral tergites with very fine and widespread puncturation, base of following three tergites with much sharper punctures. Pygidial area broadly triangular, basal surface almost smooth and shining, margin rather broad and with dense fine reticulate sculpture, greater part of pygidial area with large punctures, partly in oblique rows with tendency to striation, leaving a distinct narrow impunctate line (fig. 103).

Face and lower part of frons with golden pubescence, appressed on face, gaster with yellowish-golden pubescence, hairs longer and stiffer near hind margin. Temples and dorsal side of pronotum with silvery pubescence, thorax dorsally with reddish-brown irregular pubescence, propodeum with longer and paler hairs, mesosternum with dense silvery pubescence.

Length about 11 mm.

Male unknown.

North India: 1 ♀ (holotype), Punjab, Dalhousie, Oct. 1917, N.B. Kinnear, no. 1919/332 (BM).

This wasp very much resembles *P. toxopeusi,* but it differs in the colour of the petiole and the stronger carination of the propodeum, moreover the vertex is not raised.

Psen (Psen) ruficrus n. sp. (fig. 39-40, 76)

Male. — Black, on head and thorax with bluish shine. Legs including trochanters and hind coxae, and petiole with ventral plate of first sternite orange-red. Greater part of mandibles reddish. Labrum red. Last antennal segment below brownish. Veins of wings dark brown.

Clypeus convex, anterior margin dull with broad triangular emargination (fig. 76). Interantennal carina ending in a flattened, low carina, a fine oblique carina connecting this with the underside of the antennal sclerites. Frons finely punctate, more densely near the median carina, almost impunctate near the eyes. Interocellar area somewhat stronger punctate, also postocellar area which is somewhat raised; on either side of the posterior ocelli vertex smooth and impunctate. Antennae long, segments 10-12 about half as long again as broad, last segment more than twice as long as broad. Antennal segments 6-12 with broad tyloidea, a small one on the thirteenth segment. Tyloidea resembling those of *P. melanosoma*: narrow on base of sixth segment and widening towards apex, rounded in profile on seventh segment, with tubercle on base of eighth segment, broad-oval on segments 9-12 and concave in dorsal view.

Scutum, scutellum and metanotum distinctly punctate. Enclosed area of propodeum with sharp posterior carina, median two much diverging, distance between these carinae and following longitudinal carina about as long as length of latter carina. Sulcus on back of propodeum narrow. Reticulate carination on back of propodeum coarse. Legs slender. First recurrent vein of fore wings ending well in second submarginal cell, second recurrent vein interstitial. Petiole cylindrical, reaching beyond hind femora. Gaster finely punctate. Genitalia fig. 39-40.

Face, temples and pronotum dorsally with silvery, mostly appressed pubescence. Long hairs on dorsal side of thorax blackish-brown. Mesosternum densely whitish pubescent. Gaster dorsally with sparse brownish pubescence. Third and fourth sternites on apical margin with very long dark brown fasciculate hairs. Sixth sternite with dense brown pubescence.

Length about 10-11 mm.

Female unknown.

N.E. New Guinea: 2 ♂ (holotype and paratype), Daulo Pass Area, 2500 m., 5 July 1957, coll. D. Elmo Hardy (BISH).

Although the tyloidea of the antennae are very similar to those of *P.*

melanosoma, the genitalia are different, but apparently closely allied. Therefore I have considered *P. ruficrus* as a separate species. It is easily recognized by its red legs and petiole and it is thus far the only *Psen* known from New Guinea.

KEY TO THE INDO-AUSTRALIAN AND EAST-ASIATIC SPECIES OF THE SUBGENUS MIMUMESA MALLOCH

Of the Palaearctic species only those of which the area of distribution reaches the East Coast are mentioned here. The south-eastern species *P. tridentatus* and *P. auratus* are quite different from the Palaearctic forms. *P. petiolatus* has been provisionally included in this subgenus though there are some considerable structural differences.

1. Petiole with V-shaped dorsal carina 2
— Petiole either with groove on apical dorsal half and strong punctures and gaster black or petiole cylindrical and gaster red 6
2. Interepicnemial area distinctly separated from epicnemial areas (but inner carinae not complete as in nominate forms). Acetabular carina angular 3
— Interepicnemial area not distinctly separated 4
3. Petiole shorter than hind tibia. Pygidial area of female elongate triangular, shining, one irregular row of punctures along the margin. Face of female with fine hairs, not appressed. Antennal segments 6-11 of male with elongate elliptic tyloidea. (Japan) . . . . . *dahlbomi pacificus* Tsuneki (p. 64)
— Petiole longer than hind tibiae. Pygidial area of female triangular, densely punctate. Antennal segments 9-11 with elongate tubercle. (Ussuri region, Japan) . . . . *atratinus longulus* (Gussakovskij) (p. 64)
4. Interepicnemial area distinctly depressed but no inner epicnemial carina. Acetabular carina more angular. Pygidial area of female with double row of punctures along margin. Face of female with silvery appressed pubescence. Antennae of female brownish below, antennae of male dark, segments 4-11 with narrow tyloidea. (Japan) . . . . . *vanlithi* Tsuneki (p. 65)
— Epicnemial areas and interepicnemial area more gradually confluent. Acetabular carina almost straight. Pygidial area of female densely punctate 5
5. Antennae brownish below in both sexes. Interantennal carina in female simple. Antennal segments 4-9 or 4-10 of male with narrow tyloidea. (from W. Europe to Ussuri region and Japan) . . . . . *littoralis* (Bondroit) (p. 65)
— Antennae dark, in male only extreme end of last segment pale brown. Interantennal carina in female tubercle-shaped. Antennal segments 4-10 of male with narrow tyloidea. (Kashmir) . . . . . *kashmirensis* Nurse(p. 65)
6. Petiole cylindrical, red, also gaster. Acetabular carina incomplete. Pygidial area of female unknown. Male unknown. (Celebes or Mysol) . . *petiolatus* Smith (p. 65)
— Petiole with apical groove, gaster black. Acetabular carina complete . . . 7
7. Clypeus with deep emargination and median tooth, in male tooth very small. Face silvery in both sexes 8
— Clypeus simply emarginate. Face of female golden, of male silvery 9
8. Hairs on apical margin of tergites black or brown. Male unknown. (Sumatra, Malaya) . . . . . *tridentatus tridentatus* Van Lith (p. 67)
— Hairs on apical margin of tergites golden brown. Antennae of male with oval tyloidea. Female unknown. (Burma) *tridentatus chrysomallus* n. subsp. (p. 68)

9. Bare areas behind enclosed area smooth. Raised area on frons near oculi oval and smooth 10
— Bare areas behind enclosed area longitudinally striate. Raised area near oculi narrower and higher 11
10. Scutum not strongly punctate, scutellum with smaller punctures. Thorax and gaster with golden pubescence. Male unknown. (Java, Bali, ? Sumatra) . . . . . *auratus auratus* Van Lith (p. 68)
— Scutum stronger punctate, scutellum on posterior half very strongly punctate, partly striate. Pubescence on mesonotum and gaster paler. Antennae of male without tyloidea. (Malaya, ? Sumatra) . . . . *auratus miltoni* n. subsp. (p. 69)
11. Puncturation of gaster as fine as in nominate form. Male unknown (Mindoro) . . . . . *auratus mindoroensis* Van Lith (p. 68)
— Puncturation of gaster much deeper and denser; gaster more pubescent. Male unknown. (Negros, Luzon) . . . . . *auratus multipunctatus* Van Lith (p. 68)

Old and new species of the subgenus Mimumesa Malloch and new records

Psen (Mimumesa) dahlbomi pacificus Tsuneki

1959, Tsuneki, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 59-61.

Distribution: Japan.

This subspecies was described by Tsuneki from Hokkaido and Honshu. Perhaps the couple recorded by Gussakovskij from Kamschatka (1932) and the female from Sakhalin (1934) as *P. (Mimesa) dahlbomi* Wesmael belong to the same subspecies.

Psen (Mimumesa) atratinus longulus (Gussakovskij)

1932, Gussakovskij, Ark. Zool. **24** (A): 5, ♂ (*Mimesa longula*).
1937, Gussakovskij, Trav. Inst. Zool. Acad. Sc. URSS **4**: 660-661, ♂ (*Psen (Mimesa) longulus*).
1937, Yasumatsu, Report Department Agric., Kyushu Imp. Univ. **8**: 19-23 (*Mimesa sameshimai*).
1959, Tsuneki, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 54, 78 (*Psen (Mimumesa) atratinus sameshimai*).

At the request of Prof. Tsuneki I have compared the holotype (male) of *Mimesa longula* Gussakovskij, 1932, from the Ussuri region (NRS) with a series of *Mimesa sameshimai* Yasumatsu, 1937, from Japan. Tsuneki (1959) expected that they would belong to the same subspecies of *P. (Mimumesa) atratinus* Morawitz. Indeed I could not find any difference between *P. longulus* and the Japanese material. The genitalia of *P. longulus* are dark reddish-brown, much darker than in the nominate form and in the Japanese specimens; probably they are discoloured.

The characteristic tyloidea of the antennae of the male point to a close relationship with *P. atratinus* and I agree with Tsuneki that they should be regarded as conspecific. The differences with the nominate form which has

been reported as far east as W. Siberia are the following: vertex not distinctly transversely rugose and puncturation finer; scutum also finer punctate, punctures not in rows; inner epicnemial carinae not distinct at lower end; pubescence of thorax denser. The petiole seems to be slightly longer and its sides more parallel, however the length of the petiole is not always a reliable characteristic in the Psenini.

From the Ussuri region only one single male is known; in Japan this wasp occurs in Hokkaido, Honshu, Shikoku and Kyushu.

Psen (Mimumesa) vanlithi Tsuneki

1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 61-62.

Distribution: Japan (Hokkaido and Honshu).

Psen (Mimumesa) littoralis (Bondroit)

1842, DAHLBOM, Disp. method. Hym.: 8, ♂ nec ♀ (*Mimesa borealis*).
1896, SAUNDERS, Hym. Acul. Brit. Isl.: 102 *(Mimesa unicolor)*.
1933, BONDROIT, Ann. Soc. Zool. Belg. **64**: 64-65 (*Mimesa littoralis*).
1937, DE BEAUMONT, Mitt. Schweiz. Ent. Ges. **17**: 53 (*Psen (Mimumesa) littoralis*).
? 1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 663 (*Psen Mimesa*) *fulvitarsis*).
? 1948, SPOONER, Trans. Ent. Soc. Lond. **99**: 164 *(Mimesa (Mimumesa) celtica)*.
1954, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **5**: 53 (♀, nec ♂).
1959, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **9**: 56-59 (♀ and ♂).

Distribution: throughout the whole Palaearctic region, including Japan.

Psen (Mimumesa) kashmirensis Nurse

1903, NURSE, Ann. Mag. Nat. Hist. (7) **11**: 520 (Kashmir).
1959, VAN LITH, Zool. Verh. Leiden **39**: 61-62.

This species and a few specimens from Quetta (Pakistan), which have not yet been described, seem to be closely related. Both forms are undoubtedly near relatives of the Palaearctic *P. (Mimumesa) unicolor* Van der Linden.

Psen (Mimumesa?) petiolatus Smith (fig. 80)

1864, SMITH, Jl. Proc. Linn. Soc., Zool. **7**: 37, ♀ (*Psen petiolatus*).
1959, VAN LITH, Zool. Verh. Leiden **39**: 56-57.

Original description: "1. 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.".

In the collections of the British Museum (Natural History) is a female labelled "*Psen petiolata* Smith" and "type F. Sm. Coll. 79.22" ("type" handwritten, "F. Sm. Coll. 79.22" printed, on one label). The locality-label is a small circular white card with the handwritten name "Menado" (Celebes). This label has probably been written later than the name-label as the ink is much darker. The wasp being repinned on a small card it may be that the two localities have been mixed up. The specimen in question agrees well with Smith's description and although this description is now inadequate I believe that it is really the holotype, there being no Psenini of this name in the collections of the Oxford University Museum.

The specimen is in a bad condition. Half of the gaster is broken off, the right antenna and the hind legs are missing, the head is nearly loose and the wings are damaged. It is certainly a *Psen* s.l. although I have had some difficulty to decide on the subgenus to which it belongs. It differs from the Oriental *Psen* I know in the very depressed area between the antennae (which are lower placed than usual) and the clypeus. The eyes are broad and close together, one eye in frontal view being about half as broad again as the shortest distance between the eyes. In view of the low (not protruding) interantennal carina and the epicnemial carinae not being distinctly connected with the precoxal sutures, I have provisionally placed this wasp into the subgenus *Mimumesa*. It differs from the few species described sofar from the Indo-Australian area, apart from the characters mentioned above, in the incompleteness of the acetabular carina, in the interepicnemial area being distinctly separated and in the cylindrical petiole having no dorsal carina or sulcus, finally also in the structure of the propodeum. I hope that more material of this very interesting form or of closely allied forms will become available for study as they may represent a new subgenus.

Redescription. Female. — Head and thorax black, with steel-bluish shine; pronotal tubercles and tegulae, legs and gaster including petiole yellowish-red. Antennae yellowish-red, dorsally brown. Middle part of mandibles yellowish. Palpi testaceous. Veins of wings pale brown.

Shining anterior margin of clypeus with slight emargination (fig. 80). Frons somewhat depressed with fine median carina, which is hardly raised between antennae. Face below antennae depressed. Clypeus convex, finely punctate. Eyes very broad, in frontal view each eye half as broad again as the shortest distance between the eyes. Frons and vertex very smooth and

shining with only a very few distinct punctures. Antennae clavate, segments short, ninth segment as long as it is broad at base, tenth segment shorter than it is broad at base. Mandibles normal.

Scutum and scutellum shining, sparsely punctured. Prescutal sutures reaching about halfway scutum, parapsidal sutures distinct. Enclosed area of propodeum shining, with few longitudinal carinae, the median two carinae diverging. The smooth areas on both sides behind the enclosed area much raised, back of propodeum perpendicular, not very coarsely reticulate, medially depressed, longitudinal sulcus narrow. Outer epicnemial carina not distinctly connected with precoxal sutures, inner epicnemial carinae distinct, almost extending to acetabular carina. Acetabular carina relatively short, not connected with outer epicnemial carina but ending between outer and inner epicnemial carina. Hypo-epimeral area raised, distinctly separated from lower part of mesopleuron. The first recurrent vein of the fore wings ends in the second submarginal cell, the third recurrent vein in the third submarginal cell. Petiole cylindrical.

Face below antennae and temples with appressed silvery pubescence, also dorsal side of pronotum. Sides of thorax silvery pubescent, dorsal side of vertex and thorax more sparsely haired.

Psen (Mimumesa) tridentatus tridentatus Van Lith (fig. 78)

1959, VAN LITH, Zool. Verh. Leiden **39**: 55-56.

I have seen three females in the collection of the British Museum (Natural History), all from the Malay Peninsula, which agree very well with the holotype from Sumatra.

The apex of the pygidial area is slightly excavate which is accentuated by the raised end of the lateral carina (fig. 78). In the holotype the apex of the pygidial area is somewhat deformed. Another character which was not so distinct in the type, owing to some dirt sticking to the thorax, is the short bristle-like pubescence of the scutum and of the first gastral tergites. Along the margin of the first and second gastral tergites and to a smaller extent also along the margin of the third and fourth tergites there is a row of longer dark stiff hairs. (Apparently the hairs of the gaster are easily worn off as in the holotype only few hairs are left on the margin of the tergites). The wings are somewhat fuscous.

Malaya: 1 ♀, Pahang, Fraser's Hill, 4200 feet, 22 July 1936, H. M. Pendlebury; 1 ♀, Kedah Peak, 3200 feet, Dec. 1915; 1 ♀, Kedah Peak, 3950 feet, 27 March 1928, H. M. Pendlebury (all BM, ex FMS Museums, 1955-354).

Psen (Mimumesa) tridentatus chrysomallus n. subsp. (fig. 77)

Two males from Burma are certainly closely related to the preceding form but, having a golden-brown pubescence on the gaster, they are distinctly different.

The structure of the body and the sculpture of head and thorax are generally like those of the nominate subspecies. The scape of the antennae and the first antennal segments are reddish below.

Emargination of clypeus with very small median tooth (fig. 77). Third antennal segment on apical half and segments 4-7 over the whole length with oval tyloidea, eighth segment with much smaller circular tyloidea. In the holotype the ninth and tenth segments have also traces of a small tubercle.

Petiole with two lateral carinae, ventrally with three carinae on apical half converging towards the base (I do not know whether this is a sexual difference). Hind tibiae without spines.

Face silvery pubescent as in nominate form but gaster densely brownish-golden pubescent, ventrally paler, with fringes of stiffer short hairs at apical margin.

Length about 12 mm.

Female unknown.

Upper Burma: 2 ♂ (holotype and paratype), Nam Tamai Valley, alt. 3000 ft., lat. N. 27° 42′, long. E. 97° 54′, 26 Aug. 1938, R. Kaulback (BM, 1938-741).

Psen (Mimumesa) auratus auratus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 52-55.

Distribution: Java, Bali, Sumatra.

Psen (Mimumesa) auratus mindoroensis Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 55.

Distribution: Mindoro (Philippines).

Psen (Mimumesa) auratus multipunctatus Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 55.

This subspecies was described from Negros where a series of females has been collected. In the collection of the United States National Museum at Washington is a female from Luzon (Mt. Makiling, no date, coll. Baker) which is very similar. It is slightly larger and the puncturation of the gaster is even somewhat stronger than in the Negros specimens.

Psen (Mimumesa) auratus miltoni n. subsp. (fig. 79)

More closely related to the nominate form than the subspecies from the Philippines are. Female. — The structure of the frons and of the propodeum agree with that of the Javanese form. Lower part of face, fig. 79.

The scutum and notably the scutellum are stronger punctate than in the Javanese form. On the posterior half of the scutellum the sculpture is even striato-punctate.

The pubescence on the lateral and ventral parts of the thorax is paler, also that on the propodeum and the gaster.

Longer, about 13 mm.

Male similar to female. Scape of antennae and underside of following six segments, also last segment below reddish-brown. Legs much darkened, hind tibiae almost completely black. Underside of petiole flattened, posterior dorsal groove deeper. Antennae without tyloidea. Face silvery.

Length about 10,5 mm.

Malaya: ♀ (holotype) and ♂ (allotype), Selangor, Ulu Langat, Sungli Chongkok, 29 July 1961, O. Milton (HTP). The couple was caught in copula; unfortunately the genitalia of the male are lost.

Although the differences are small only I have considered this form as a separate subspecies. Further material should confirm the constancy of the characters used. Probably the female from N. E. Sumatra (1959) belongs to the same subspecies.

KEY TO THE EAST-ASIATIC SPECIES OF THE SUBGENUS MIMESA SHUCKARD

A great number of *Mimesa* has been mentioned from the Asiatic continent or has been newly described by Gussakovskij in his excellent work of 1937. The species which he has treated are enumerated below with their region of distribution. For key and descriptions I may refer to Gussakovskij's paper. Only a few species are reaching the east coast and these will be discussed on the following pages.

P. equestris (Fabricius) (= *bicolor* Shuckard)	— Europe, Siberia, Mongolia
P. carinatus Gussakovskij (= *grandii* Maidl ?, cf. De Beaumont, 1941)	— Turkmenistan and Iran
P. lutarius (Fabricius)	— Europe, Siberia to Jakutsk
P. dispar (Gussakovskij)	— Manchuria and Kamschatka
P. japonicus (Pérez)	— Japan
P. bicolor (Jurine) (= *equestris* auct.)	— Europe, Turkestan, Siberia as far east as Transbaikalia
P. bidentatus Gussakovskij	— S.W. and Central Siberia

P. caucasicus (Maidl)	— Europe, Caucasia, S.W. Siberia and Mongolia
P. hissaricus Gussakovskij	— Turkestan
P. punctipleuris Gussakovskij	— E. Mongolia
P. mongolicus (F. Morawitz)	— Mongolia and Central China
P. concors Gussakovskij	— Mongolia
P. fallax (F. Morawitz)	— Turkestan
P. filippovi Gussakovskij	— China (Nanking)
P. aegyptiacus (Radoszkowski)	— Egypt and Arabia
P. jacobsoni Gussakovskij	— Pamir
P. shestakovi Gussakovskij	— Turkmenistan
P. brevis (Maidl)	— Europe, Caucasia, Asia Minor, S.W. Siberia
P. nigritus (Eversmann)	— S.E. Europe and S. Siberia (Irkutsk)
P. chinensis Gussakovskij	— Central China

De Beaumont (1937) has examined also a few specimens of *P. equestris* (Fabricius) from Siberia and Korea (coll. Radoszkowski) which completely agree with the western material. Yasumatsu (1942) recorded this species from Sakhalin.

Tsuneki (1959) who studied the Psenini from Japan and Korea, only mentioned *P. (Mimesa) lutarius japonicus* (Pérez) from Japan.

The subgenus seems not to occur in South-East Asia and the Malay Archipelago, at least I have not found any specimens in the material from these regions.

1. Petiole with distinct dorsal carina 2
— Petiole flattened dorsally, without carina. Carination on back of propodeum irregular 3
2. Carination on back of propodeum almost parallel. In both sexes first gastral tergite red except central black spot, following tergite completely, third tergite at least basally red. Mesopleura with very fine puncturation. (Siberia, Mongolia, Korea, Sakhalin) . . . . . *equestris* (Fabricius) (p. 70)
— Carination on back of propodeum irregular. End of first tergite red, second tergite completely red, third tergite black. Mesopleura much stronger punctate. (China) *filippovi* (Gussakovskij) (p. 71)
3. In female hind margin of first gastral tergite red, second tergite completely red. Transverse clypeal carina indistinct in both sexes. Male completely black. (Manchuria and Kamschatka) . . . . . *lutarius dispar* (Gussakovskij) (p. 72)
— Both sexes black, at most female with reddish margin of first tergite. Transverse clypeal carina large in female. (Japan) . . *lutarius japonicus* (Pérez) (p. 71)

East-Asiatic species of the subgenus Mimesa Shuckard

Psen (Mimesa) equestris (Fabricius)

1804, Fabricius, Syst. Piez.: 182 (*Trypoxylon equestre*).
1837, Shuckard, Essay indig. Fossor. Hym.: 230 (*Mimesa bicolor*).
1843, Dahlbom, Hym. Europ.: 4 (*Mimesa lutaria*).
1935, Richards, Trans. Ent. Soc. **83**: 166 (*Mimesa equestris*).
1937, De Beaumont, Mitt. Schweiz. Ent. Ges. **17**: 62 (*Psen (Mimesa) bicolor* Shuckard).

1937, DE BEAUMONT, Ibid.: 93 (*Psen (Mimesa) equestris*).
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 666-667 (*Psen (Aporina) bicolor* Jurine).
1942, YASUMATSU, Mushi **14**: 95 (*Psen (Mimesa) bicolor*).

This species, like *P. lutarius* (Fabricius), is common in Europe and has a wide distribution in Asia. It occurs in Siberia and Mongolia and has also been reported from Korea and Sakhalin (Yasumatsu, 1942) but not from Japan. No subspecies have been recognized sofar.

Psen (Mimesa) filippovi Gussakovskij

1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 681-682, ♂ (*Psen (Aporina) filippovi*; China (Nanking)).

In the collection of the British Museum (Natural History) in London I found a female which might be the other sex of *P. filippovi* described from two males from Nanking, China. It was collected by C. F. Wu at Peiping.

The mesopleura are more strongly punctate than in *P. equestris* (Fabricius) but hardly transversely rugose. The anterior margin of the clypeus is slightly rounded, not emarginate. The first gastral tergite is almost completely, the second tergite completely red.

The definite identification of the above-mentioned female will have to be postponed until more material from this region becomes available.

Psen (Mimesa) lutarius japonicus (Pérez)

1905, PÉREZ, Bull. Mus. Paris **11**: 150, ♀ (*Mimesa japonica*).
1934, GUSSAKOVSKIJ, Mushi **7**: 82 (*Psen (Aporia) japonicus*).
1937, DE BEAUMONT, Mitt. Schweiz. Ent. Ges. **17**: 65 (*Psen (Mimesa) shuckardi* Wesmael var. *japonica*).
1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 693 (*Psen (Aporina) japonicus*).
1941, DE BEAUMONT, Mitt. Schweiz. Ent. Ges. **18**: 329 (*Psen (Mimesa) shuckardi* var. *japonica*).
1954, TSUNEKI, Mem. Fac. Lib. Arts, Fukui Univ. (2, Nat. Sc.) **4** (5): 52 (*Psen (Mimesa) shuckardi japonicus*).
1959, TSUNEKI, Ibid. **9**: 53 (*Psen (Mimesa) shuckardi japonicus*).

This subspecies is easily recognized by the black colour in both sexes. Gussakovskij (1937) rightly assumed that it is closely related to *P. dispar* Gussakovskij and De Beaumont (1941) even suggested that they are conspecific, *P. dispar* and *P. japonicus* being geographical races. The nominate form is distributed in Europe and in Siberia eastward to Jakutsk. De Beaumont is the only recent entomologist who has seen the type but there is no doubt that the series which Tsuneki (1959) recorded from Japan is identical.

In the material which Tsuneki kindly sent to me, the pubescence of the

face of the female is hardly golden, almost completely silvery. The transverse carina of the clypeus is strikingly longer than in the European females of *P. lutarius* and the margin is very indistinctly emarginate.

Van der Vecht (1961) has discovered that *Psen (Mimesa) shuckardi* (Wesmael, 1852) is a synonym of *Sphex lutaria* Fabricius, 1787 (= *Pepsis lutaria* Fabricius, 1804), the lectotype of which is in the collection of Fabricius (University of Kiel).

In the collection of the British Museum (Natural History) is a female labelled "*Psen punctifrons* Cam./type/Japan". This specimen is a *Psen (Mimesa) lutarius japonicus* (Pérez) and Cameron's name is invalid, being an unpublished name.

On the other hand a male in the collection of this museum labelled "*Psen japonicus* Cam./type/Japan" is identical with Japanese material considered by Tsuneki and me as *Psen (Psen) affinis* Gussakovskij. Also this name of Cameron is apparently unpublished and therefore not valid.

Psen (Mimesa) lutarius dispar Gussakovskij

1937, GUSSAKOVSKIJ, Trav. Inst. Zool. Acad. Sc. URSS **4**: 670 *(Psen (Aporina) dispar)*.

This form has been reported from Manchuria and Kamschatka. In the female the hind margin of the first gastral tergite and the whole second tergite are red; in the male the gaster is completely black. I think that this form is nearer to the nominate race than *P. japonicus*. This opinion is not only based on the colour, but also on the fact that the clypeal margin is like that of the nominate subspecies and that the antemarginal clypeal transverse carina is not as much developed as that of *P. japonicus* but apparently even smaller than in the nominate race.

* * *

Psen (Pseneo) townesi Van Lith

1959, VAN LITH, Zool. Verh. Leiden **39**: 10-12.

Distribution: Philippines.

After the description of a female from Luzon (1959) I received from various sources a few more small collections of Psenini from the Philippines. Unfortunately, however, they did not contain any *Pseneo*.

Psen (Odontopsen) hanedai Tsuneki

1964, TSUNEKI, Insecta Matsumurana **27** (1): 12-15.

The manuscript of this paper had already been finished when I received from Prof. Tsuneki a reprint of his description of the exceedingly interesting

new subgenus *Odontopsen.* This subgenus has been erected by him to receive a new species, *P. hanedai,* described from a series of females and males collected in Nikko, Japan. It is easily recognized by the genal processes, which are very long in the female but considerably shorter in the male.

P. hanedai has these remarkable processes in common with the Hawaiian genus *Nesomimesa,* but otherwise it is quite different from that genus. It is the only East-Asiatic *Psen* with genal teeth known sofar. According to Tsuneki the subgenus *Odontopsen* is more closely related to the subgenus *Mimesa* than to the other subgenera of *Psen.*

A somewhat similar structure of the head is also found in *Psenulus dentatus* from Java.

Distribution of the genus Psen Latreille (East Asia and Indo-Australia)

In the present paper twelve new species and eight new subspecies belonging to the subgenus *Psen* have been described, bringing the total number of this subgenus in East and South Asia and the Indo-Australian Archipelago to 59. Two new subspecies have been added to the subgenus *Mimumesa* so that the total number of forms of this subgenus in the same area now amounts to 12 (table 1).

The distribution of the subgenus *Psen* over the area extending from South and East Asia to New Ireland is shown in table 2. The number of species from New Guinea and New Ireland is very small. It will undoubtedly be increased if more collecting could be done in these islands, although I have the impression that *Psen* is poorly represented in this region.

But not only in the Papuan area much remains to be done. This will be clear when we see that of the above-mentioned 59 forms of the subgenus *Psen,* only 27 forms, namely 23 species and 4 subspecies, have been described in both sexes. Of 20 forms (15 species and 5 subspecies) only females are known and of 12 forms (11 species and 1 subspecies) only the males have been collected.

The subgenus *Mimumesa* has only few radiations outside the Asiatic continent and the subgenus *Mimesa* is wholly Palaearctic. Of the subgenus *Pseneo* no additional material has been collected since 1959.

The subgenus *Odontopsen* has just been erected by Tsuneki (1964) to receive a new species from Japan.

TABLE 1

Distribution of subgenera of *Psen* in East Asia and the Indo-Australian region.

subgenus	total number of species and subsp. (a)	Europe and E. Asia	E. Asia (b)	S. Asia	Indonesia	Philippines	New Guinea	New Ireland
Psen	59 (10)	2	15	19 (c)	14	10	1	1
Mimumesa	12 (4)	1	4	4 (c)	3	2		
Mimesa	3 (1)	1	3					
Pseneo	1					1		
Odontopsen	1		1					
total	76 (15)	4	23	23	17	13	1	1

TABLE 2

Distribution of the subgenus *Psen* in East Asia and the Indo-Australian region.

groups	total number of species and subspecies (a)	Europe and E. Asia	E. Asia (b)	S. Asia	Indonesia	Philippines	New Guinea	New Ireland
ater	3	1	3					
exaratus	2	1	2					
emarginatus	3		1	1	1			
curvipilosus	3 (1)			2 (c)	2			
tsunekii	5 (1)		2	2	1			
elisabethae/nitidus	7 (2)			2	3	1		1
rufiventris	6 (1)		1	1	2	2		
orientalis	14 (3)		6	4	2	2		
refractus	4 (1)			4				
aureohirtus	5 (1)				2	3		
unclassified	7			3	1	2	1	
total	59 (10)	2	15	19 (c)	14	10	1	1

a: the number of subspecies (included in total number) is given between brackets.
b: including the species which also occur in Europe.
c: including one species which also occurs in Indonesia.

List of East-Asiatic and Indo-Australian species of the genus *Psen* Latreille with their range of distribution

subgenus **Psen** Latreille

group of *ater*

P. ater (Fabricius), ♀ ♂	— Europe, Siberia, China, Mongolia, Korea, Japan
P. aurifrons Tsuneki, ♀ ♂	— Japan
P. yasumatsui Gussakovskij, ♂	— Japan

group of *exaratus*

P. exaratus (Eversmann), ♀ ♂	— Europe, Siberia, Korea, Japan
P. santoro Yasumatsu, ♂	— Japan

group of *emarginatus*

P. emarginatus Van Lith, ♀ ♂	— Java
P. dzimm Tsuneki, ♀ ♂	— Japan
P. pilosus n. sp., ♂	— Malaya

group of *curvipilosus*

P. curvipilosus Van Lith, ♀ ♂	— Java
P. lieftincki lieftincki Van Lith, ♀ ♂	— Sumatra, Malaya
P. lieftincki minor n. subsp., ♀ ♂	— Malaya

group of *tsunekii*

P. tsunekii nom. n., ♀ ♂	— Japan
P. ussuriensis Van Lith, ♂	— Siberia
P. vechti vechti Van Lith, ♀	— Java
P. vechti birmanicus n. subsp., ♀	— Burma
P. assamensis n. sp., ♂	— India

group of *nitidus*

P. nitidus Van Lith, ♀ ♂	— Java, Krakatau, Bangka, ? India

group of *elisabethae*

P. elisabethae elisabethae Van Lith, ♀ ♂	— Java, Sumatra
P. elisabethae auricomus n. subsp., ♀ ♂	— Malaya, Pulau Tioman
P. elisabethae subsp. ?, ♀	— S. India
P. coriaceus Van Lith, ♀ ♂	— Philippines
P. amboinensis n. sp., ♀	— Amboina
P. novahibernicus n. sp., ♂	— New Ireland

group of *rufiventris*

P. rufiventris Cameron, ♀	— S. India
P. rubicundus rubicundus Van Lith, ♀	— W. Java
P. rubicundus lawuensis Van Lith, ♀	— E. Java
P. angulifrons n. sp., ♂	— Mindanao
P. nigriventris n. sp., ♀	— Luzon
P. richardsi Tsuneki, ♀ ♂	— Japan

group of *orientalis*

P. terrigenus Van Lith, ♀ — Java
P. seminitidus nom. nov., ♀ — China, Tibet
P. hakusanus Tsuneki, ♀ ♂ — Japan
P. koreanus Tsuneki, ♀ — Korea
P. kulingensis n. sp., ♀ — S. China
P. orientalis Cameron, ♀ ♂ — India
P. affinis affinis Gussakovskij, ♀ ♂ — Siberia, Korea, Japan
P. affinis grahami n. subsp., ♀ ♂ — China
P. yomasanus n. sp., ♀ ♂ — Burma
P. fuscinervis (Cameron), ♀ ♂ — India
P. politiventris politiventris Rohwer, ♀ ♂ — Luzon
P. politiventris bellus n. subsp., ♀ — Mindanao
P. politiventris pahangensis n. subsp., ♀ — Malaya
P. triangulatus Van Lith, ♂ — Java, Sumatra

group of *refractus*

P. refractus refractus Nurse, ♀ — N. India
P. refractus meridianus n. subsp., ♀ ♂ — S. India
P. krombeini n. sp., ♀ ♂ — S. India
P. matalensis Turner, ♀ ♂ — Ceylon

group of *aureohirtus*

P. aureohirtus aureohirtus Rohwer, ♀ ♂ — Luzon
P. aureohirtus rufopetiolatus Van Lith, ♂ — Negros
P. toxopeusi Van Lith, ♀ — Celebes
P. melanosoma Rohwer, ♂ — Philippines
P. carbonarius (Smith), ♂ — Morotai

unclassified species, probably closely related

P. bakeri Rohwer, ♀ ♂ — Philippines
P. opacus Van Lith, ♀ — Philippines
P. betremi Van Lith, ♀ ♂ — Java
P. rufoannulatus Cameron, ♀ — N. India
P. brinchangensis n. sp., ♀ — Malaya
P. eurypygus n. sp., ♀ — N. India
P. ruficrus n. sp., ♂ — N. E. New Guinea

subgenus **Mimumesa** Malloch

P. dahlbomi pacificus Tsuneki, ♀ ♂ — Japan
P. atratinus longulus (Gussakovskij), ♀ ♂ — Ussuri region, Japan
P. vanlithi Tsuneki, ♀ ♂ — Japan
P. littoralis (Bondroit), ♀ ♂ — Palaearctic region, including Japan
P. kashmirensis Nurse, ♀ ♂ — Kashmir
P. petiolatus Smith, ♀ — Mysol or Celebes
P. tridentatus tridentatus Van Lith, ♀ — Sumatra, Malaya
P. tridentatus chrysomallus n. subsp., ♂ — Burma
P. auratus auratus Van Lith, ♀ — Java, Bali, ? Sumatra
P. auratus mindoroensis Van Lith, ♀ — Mindoro
P. auratus multipunctatus Van Lith, ♀ — Negros, Luzon
P. auratus miltoni n. subsp., ♀ ♂ — Malaya

subgenus **Mimesa** Shuckard

P. equestris (Fabricius), ♀ ♂ — Palaearctic region, including Sakhalin
P. lutarius japonicus (Pérez), ♀ ♂ — Japan
P. lutarius dispar Gussakovskij, ♀ ♂ — Manchuria, Kamschatka
?*P. filippovi* Gussakovskij, ♀ — ? E. China

subgenus **Pseneo** Malloch

P. townesi Van Lith, ♀ — Luzon

subgenus **Odontopsen** Tsuneki

P. hanedai Tsuneki, ♀ ♂ — Japan

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