

STUDIES ON INDO-AUSTRALIAN AND EAST-ASIATIC EUMENIDAE (HYMENOPTERA, VESPOIDEA)

by

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INTRODUCTION

The present paper contains some further results of my continuing studies of the diplopterous wasps. It is based in first instance on the collection of the Leiden Museum, in which my private collection, brought together during a stay in Indonesia (1928-1955), is incorporated. Many additional specimens have been obtained from several sources. Two very important collections were sent to me by Dr. Fred Keiser of the Naturhistorisches Museum at Basel; they comprise the material collected by the Swiss Sumba Expedition (1949; for details see Verh. Naturf. Ges. Basel, vol. 62, pp. 181-215, 1951), and that

brought together by Dr. Keiser during a stay in Ceylon from May 1953 to March 1954. Dr K. Iwata, Sasayama, Japan, kindly sent me some interesting specimens collected in Siam.

Further collections were received from — or studied in — the museums listed below; this list also contains the abbreviations used in the text. It is a pleasant duty to express my sincere gratitude to the authorities and hymenopterists of these institutions for their valuable cooperation.

BM	= British Museum (Natural History), London.
BPBM	= Bernice P. Bishop Museum, Honolulu, Hawaii.
CAS	= California Academy of Sciences, San Francisco.
DAPM	= Department of Agriculture, Port Moresby, Papua.
ETHZ	= Entomologisches Institut, Technische Hochschule, Zürich.
IRSNB	= Institut Royal des Sciences Naturelles, Bruxelles.
MA	= Zoologisch Museum, Amsterdam.
MCG	= Museo Civico di Storia Naturale, Genova.
MHNG	= Muséum d'Histoire Naturelle, Genève.
ML	= Rijksmuseum van Natuurlijke Historie, Leiden.
MP	= Muséum National d'Histoire Naturelle, Paris.
MR	= Natuurhistorisch Museum, Rotterdam.
MT	= Museo di Zoologia della Università, Turin.
MZB	= Museum Zoologicum, Bogor, Indonesia.
NMB	= Naturhistorisches Museum, Basel.
NMW	= Naturhistorisches Museum, Wien.
NRS	= Naturhistoriska Riksmuseet, Stockholm.
OUM	= Oxford University Museum, Oxford.
USNM	= U. S. National Museum, Washington, D.C.
UZMC	= Universitetets Zoologiske Museum, Copenhagen.
ZMAK	= Zoologisches Museum A. Koenig, Bonn.
ZMB	= Zoologisches Museum der Humboldt Universität, Berlin.

Furthermore I am much indebted to the following entomologists for supplying me with material from their private collections: Dr. A. Giordani Soika, Venice, Mr. H. F. Hamann, Lienz, Mr. J. P. van Lith, Rotterdam, Mr. H. T. Pagden, Penang (HTP), and Dr. Henry K. Townes, Ann Arbor.

With the exception of figs. 1, d-h, and 6, the accompanying figures have been drawn by Mr. W. Bergmans under the supervision of the author.

Concerning the literature references it may be remarked that as a rule I have attempted to give a complete bibliography for each species or subspecies discussed in this work. In the case of some species occurring in Japan and China, however, I have restricted the references to the original descriptions.

I. ON *LABUS* SAUSSURE AND A RELATED NEW GENUSGenus *Labus* Saussure

Labus Saussure, 1867, Reise Novara, Zoology, vol. 2, part 1, p. 3 (genus).

Type species: *Labus spiniger* Saussure, 1867 (designated by Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 348).

The description of the characters which the Javanese species, including the type species *L. spiniger* Saussure, have in common (see van der Vecht, 1935, pp. 160-161), applies well to the following species. Some corrections and additions to this description are as follows: The clypeus is indeed longer than it is wide at the base, but its greatest width always exceeds its length. Female with a distinct subcircular fovea in front of the anterior ocellus. The transition from the anterior, vertical, surface of the pronotum to the horizontal part is slightly angular, and sometimes conspicuous by being rather shiny, but there is no formal transverse carina. On p. 161, line 19 from above, the word "vertex" must be replaced by "frons". The scutellar spots are absent in *Labus humbertianus* Saussure.

Labus humbertianus Saussure (fig. 1a)

Labus humbertianus Saussure, 1867, Reise Novara, Zool., vol. 2, Hym., p. 4, ♀ ♂, pl. 1 fig. 2 — Ceylon, leg. A. Humbert (NMW). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 8 (cat.). Bingham, 1896, Proc. Zool. Soc. Lond. 1896, p. 448 (cat.); 1897, Fauna Brit. India, Hym., vol. 1, p. 349, ♀ ♂, fig. 100 (Ceylon, etc.) [? incorrectly identified; see van der Vecht, 1935]. Dalla Torre, 1904, Gen. Insect., vol. 19, p. 13 (cat.). Van der Vecht, 1935, Treubia, vol. 15, p. 158 (notes).

In November 1957 I have examined a female from the original series ("Trincomali") in the collection of H. de Saussure in the Natural History Museum at Geneva. A male in this Museum, probably from the same origin, agrees with the female in the structure of the propodeum, but has the clypeus mainly white, and a large pale mark on each mandible.

The following characters of the female may serve more particularly to distinguish this species from the other Ceylonese species of *Labus*.

♀ — Frontal fovea large, distinctly larger than the anterior ocellus; the concavity somewhat shining and divided by a blunt and low median ridge. — Clypeus black. — Pronotum with narrow yellow band, slightly interrupted in the middle, running exactly along the anterior margin of the horizontal portion. — Scutellum black. — Propodeum on each side with a short and sharp tooth above the apical lamellar spine (fig. 1a). — Head and thorax densely and coarsely punctate; also the propodeum distinctly punctate, the punctures on the convex areas on each side of the median furrow rather

coarse, about as large as the interspaces. — Gastral petiole coarsely and densely punctate, except on the swollen part which is sparsely and more finely punctate; second gastral segment finely, superficially and rather sparsely punctate. — Metathorax, propodeum, gastral petiole and hind coxae not partly reddish. — Legs black; fore tibiae yellow on outer side, mid tibiae with one or two yellow marks at base; tarsi partly brownish. — Tegulae dark brown with small yellow spot at base and at apex. — Wings rather strongly infuscated. — Length (h. + th. + t. 1 + 2): 7.5-8.3 mm.

Ceylon: North Western Province, 1 ♀ Puttalam, 22 Febr. 1954 (ML); Central Province, 1 ♀ Kandy, Deyiannewela, 18 Jan. 1954 (NMB); Sabaragamuva Province, 1 ♀ Mavanella, 18 Nov. 1953 (NMB); all leg. Dr. F. Keiser.

Labus pusillus sp. n. (fig. 1, b, c)

In the following description this species is compared with *Labus humberianus*, described above; the characters are arranged in the same order.

♀ — Frontal fovea smaller, hardly larger than the anterior ocellus, the bottom of the concavity slightly raised in the middle. — Clypeus with transverse yellow mark, more or less emarginate anteriorly, on the basal half. — Pronotum with two obliquely transverse, yellow, spots, separated by a distance almost equal to one third of the width of the pronotum; each spot is about twice as long as it is wide; the spots enclose the lateral teeth, which have dark tips, but are somewhat distant from the anterior margin of the horizontal portion near the middle. — Scutellum with two transverse yellow spots, slightly further from the anterior than from the posterior margin. — Propodeum with only the apical spines, which are slightly more acute than in *L. humberianus* (see fig. 1b). — Head and thorax somewhat less coarsely punctate; sides of propodeum partly almost impunctate; dorsum of propodeum more finely and sparsely punctate, the interspaces much larger than the punctures. — Puncturation of gastral segments similar, but throughout slightly less coarse than in *L. humberianus*. — Propodeum and gastral petiole red; the propodeum somewhat infuscated at the base, the petiole with broad, ill-defined, blackish longitudinal band on dorsal side; metapleura, metasternum, and hind coxae partly red; in some specimens also the base of the mid coxae partly red. (Pale yellow apical bands of petiole and second segment as in *L. humberianus*). — Legs black; fore and mid femora with yellow mark at apex, fore and mid tibiae yellow on outer side, hind tibiae with yellow mark at base; tarsi and inner side of fore tibiae

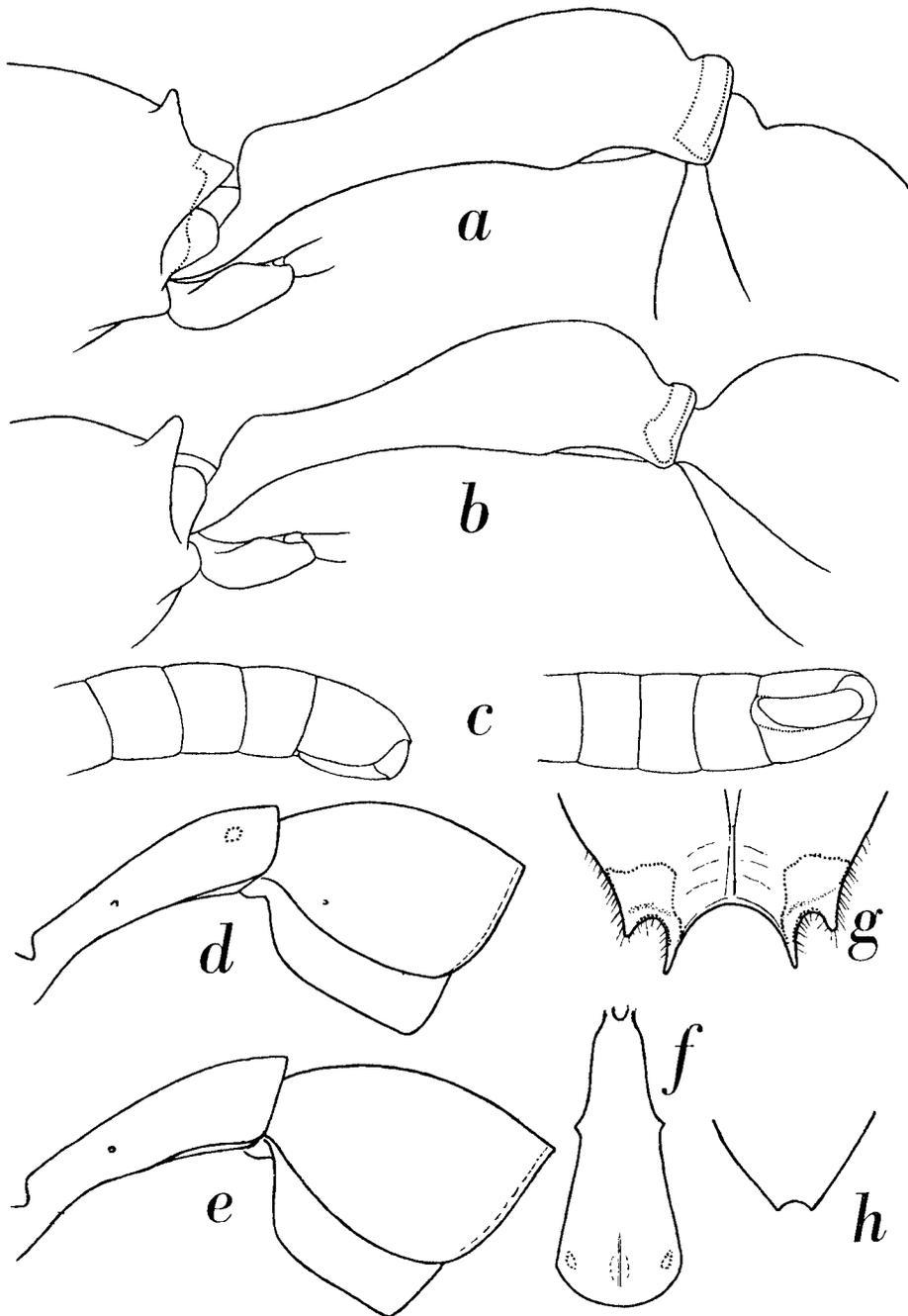


Fig. 1. a: lateral view of propodeum and first gastral segment of *Labus humberianus* Saussure, ♀ — b: do. of *Labus pusillus* sp. n., ♀; c: lateral and ventral view of apex of antenna of *Labus pusillus* sp. n., ♂ — d-h: *Pareumenes nigerrimus* sp. n., ♀; d and e: lateral view of first and second gastral segments of type and paratype, resp.; f: dorsal view of gastral petiole; g: apex of propodeum; h: anterior part of clypeus. — Figs. a-c are much more enlarged than d-h.

brownish. — Yellow spots of tegulae larger, nearly connected in the middle of the outer margin (holotype and most of the paratypes), or forming a complete marginal band (2 paratypes); in one paratype the spots more widely separated. — Wings slightly less infuscated.

♂ — Very similar to the female. Clypeus entirely pale yellow, mandibles with large yellow mark, under side of antennal scape yellow, flagellum ferruginous beneath. Apex of antennae: fig. 1c. Mid tibiae dilated at base and with a dense brush of short silvery white hairs. Propodeum entirely dark; gastral petiole as in the female, or slightly darker; in two males the petiole entirely black.

Length (h. + th. + t. 1 + 2): ♀ 6.8-7.2 mm, ♂ 6.3-7 mm.

This species is apparently allied to *L. spiniger* Saussure, with which it agrees in various characters, including the shape of the frontal fovea and of the pronotal spots; it differs amongst other things in having no pale spots on the mesepisternum and in the shape of the propodeum.

The holotype is a female from Deiyannewela, Kandy, Ceylon, 18 Jan. 1954, leg. F. Keiser (NMB); the other specimens recorded below are paratypes.

Ceylon: Central Province, 2 ♂ Kandy, Pitakanda, 19 June 1953 (NMB, allotype; ML); 2 ♀ Kandy, 12 Aug. and 20 Sept. 1953 (NMB, ML); 1 ♂ Kandy, Deiyannewela, 18 Jan. 1954 (ML); 1 ♀ Balakuduwa, 18 Dec. 1953 (ML); 1 ♂ Hindagala, 1 Oct. 1953 (NMB). — Uva, 2 ♀ Welimada, Uva Ben Head, 23 Sept. 1953 (NMB; ML). — Southern Province, 2 ♂ Yala, 21 Oct. 1953 (NMB; ML). — All specimens were collected by Dr. F. Keiser.

India: Coimbatore, 1 ♂ 29 July 1939, 1 ♀ 1 ♂ Nilgiri Hills, Devala, 3200 ft., April and May 1961, P. S. Nathan (paratypes, ML). — In the continental females the yellow mark on the clypeus is restricted to a narrow arcuate transverse band at the base; in the specimens from the Nilgiri Hills and in one of the males from Coimbatore metapleura and propodeum are black and the petiole is only partly reddish.

***Labus rufomaculatus* sp. n.**

♀ — Closely allied to *Labus amoenus* van der Vecht from Java and South Sumatra, with which it has the following characters in common: Head higher than wide, the sides slightly flattened, the greatest width below the middle. Anterior lateral angles of pronotum each produced into a sharp spine. Postscutellum with sharp median tooth. Propodeum, as seen in profile,

with short blunt tooth above the apical tooth. Gastral petiole relatively long and slender (Van der Vecht, 1935, fig. 1a).

The morphological characters separating the two species are as follows:

L. amoenus

Frontal fovea shallow, longer than wide, not distinctly defined.

Inter-antennal carina continued on lower part of frons.

Median part of scutellum (the yellow-coloured part) posteriorly with slightly prominent and rather sharp lateral angles.

L. rufomaculatus

Frontal fovea deeper and slightly smaller, circular or even a little wider than long, distinctly defined.

Frons not carinate.

Median part of scutellum regularly rounded posteriorly, without prominent angles.

The two species agree in puncturation, though the punctures on head and thorax appear to be very slightly coarser in *L. rufomaculatus*. There are marked differences in coloration, however, for whereas *L. amoenus* is marked with yellow, this colour is lacking entirely in the present species.

L. rufomaculatus is black, with the following parts red: an ill-defined transverse spot at base of clypeus, a rather wide transverse band at anterior margin of horizontal surface of pronotum, a small spot in upper part of mesepisternum below tegulae, a transverse band on scutellum, interrupted by the black median groove, and the greater part of the gastral petiole (dorsal surface of the swollen part stained with fuscous). Tegulae and posttegulae¹) ferruginous. Depressed apical margin of second gastral segment testaceous. Legs: coxae black, trochanters II and III and all tarsi brownish, trochanters I and all femora and tibiae ferruginous-red.

Length (h. + th. + t. 1 + 2): 9 mm.

S u m b a: 1 ♀ Pogobina, 14 Sept. 1949, Swiss Sumba Expedition (holotype, NMB).

Labus vandervechti Giordani Soika

Labus vandervechti Giordani Soika, 1960, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 11 (1958), p. 83, ♀ ♂ — Flores and Sumbawa (types Zool. Mus. Berlin; paratypes in Zool. Mus. Berlin and in coll. Giordani Soika).

The following description had already been drawn up some years ago. As it gives a comparison of *L. vandervechti* with *L. spiniger*, whereas Dr. Gior-

1) posttegulae = postero-lateral processes of the mesoscutum (see Richards, 1962, p. 13).

dani Soika compared the new species with *L. amoenus*, it may be published as an addition to the original description. Through the kindness of Dr. Giordani Soika I could compare my specimens with his paratypes in December 1961.

♀ — Very closely allied to *L. spiniger* Saussure (see van der Vecht, 1935, p. 165), but the horizontal part of the propodeum more distinctly punctate, the punctures not much closer, but slightly larger, and better defined; the sides of the propodeum more shiny between the punctures (rugose and rather dull in *L. spiniger*), the transverse ridge at apex of propodeum more pronounced, as seen in profile forming a more distinctly projecting tooth; swollen part of gastral petiole relatively longer, nearly half as long as the petiole; second gastral segment relatively longer (length: width = 1.2 : 1, in *L. spiniger* = 1.1 : 1).

Black; gastral petiole red with narrow yellow apical band; legs ferruginous, coxae and trochanters dark brown to black, femora I with vague yellow spot at apex, femora II and III fuscous at base, tibiae III fuscous at apex, tarsal segments 2-5 of mid legs and 1-5 of hind legs fuscous. Markings of head and thorax as in *L. spiniger*, but their colour darker, yellow (creamy white in *L. spiniger*): a narrow, curved, transverse band at base of clypeus, a widely interrupted band on pronotum (interruption as wide as each marking), outer margin of tegulae, a spot on mesepisternum below tegulae, two small spots on scutellum, a small spot on each posttegular process, a minute spot on each apical tooth of propodeum; narrow bands at apex of gastral segments 1 and 2. Central part of tegulae ferruginous (black in *L. spiniger*).

♂ — A single male from Flores has the thorax and legs darker than the above described female, but agrees well in other respects.

Clypeus yellow with narrow black margin. Mandibles yellow, reddish at apex. Under side of antennal scape yellow. Pronotal spots very small, the distance between them longer than the shortest interocular distance on the vertex. Mesepisternum black. Tegulae slightly darker than in the female, posttegular processes dark, spots on scutellum smaller than the space between them. Spots on propodeal teeth as in the female. Femora and apex of hind tibiae more extensively infuscated than in the female. Gastral petiole slightly fuscous at base and apex.

Length (h. + th. + t. 1 + 2): ♀ ♂ 7-8 mm.

Flores: 1 ♀ West Flores, Reo, 7 Nov. 1949, Swiss Sumba Expedition (NMB); 1 ♂ at km 14 along road from Endeh to Wolawaru, 13 Aug. 1950, J. van der Vecht (ML).

Cyrtolabus gen. n.

Closely related to *Labus* Saussure, with which it has the following characters in common: Mandibles short, with three (♀) or two (♂) teeth on the inner side (apex quadri- and tridentate, respectively); propodeum on each side with apical lamellar tooth above the valvula; second submarginal cell of fore wing much narrowed anteriorly, the first (proximal) abscissa of its lower margin forming almost a right angle with the second, the first recurrent being almost the straight continuation of the second abscissa (fig. 2a).

Cyrtolabus differs from *Labus* as follows: Female without fovea on the frons (in *Labus* with fovea in front of anterior ocellus); postscutellum not unidentate; propodeum with extensive horizontal portion, somewhat narrowed apically, behind the postscutellum, abruptly sloping posteriorly, as seen in profile the two surfaces forming almost a right angle; gastral petiole not conspicuously swollen in apical half.

Type species: *Cyrtolabus suavis* spec. n.

Besides the two species discussed below this genus will probably prove to contain some African species, hitherto regarded as *Leptomenes*, subgenus *Eumenidiopsis* Giordani Soika. At first I had placed my species in this subgenus, mainly because the Oriental species show a remarkable resemblance to *Leptomenes* (*Eumenidiopsis*) *stenosoma* Giordani Soika (1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 191, fig. 13). Comparison of this species with the type species of the subgenus *Eumenidiopsis*¹⁾ (*Leptomenes subtilis* Giordani Soika, 1939) showed, however, that these two species are not very similar and must be regarded as belonging to different genera. Very probably *L. stenosoma* may be placed in *Cyrtolabus*, but I do not like to take this decision before having seen both sexes; *L. stenosoma* differs in certain respects from the Oriental species and may eventually be regarded as representing a separate subgenus.

Cyrtolabus suavis sp. n.

♀ — Head, seen in front, slightly higher than wide (43 : 40), very thick, as seen from above only $1\frac{1}{3}$ times as wide as long (40 : 30). Eye-emarginations wide and deep, the upper lobe of the eyes hardly smaller than the lower. As seen in profile, frons, supra-clypeal area and clypeus form a regular curve.

Clypeus slightly convex, wider than long (17 : 14), narrowed towards the

1) I am much indebted to Dr. Giordani Soika for sending me on loan a specimen of each of these African species.

anterior margin, which is very shallowly emarginate, the lateral angles of the emargination not produced, their distance less than one third of the greatest width of the clypeus. Antennae inserted well below the middle of the head, very close to the inner margin of the eyes and to the upper margin of the clypeus; the distance between them almost equal to the diameter of one antennal socket. Antennae short and thick; their third segment hardly longer than it is wide at the apex (6 : 5.5), the tenth segment nearly twice as wide as it is long (10 : 5.5). Mandibles rather short, about as long as the distance between the lower angles of the mandibular bases; outer side almost straight, slightly curved inwards at tip; inner side with three somewhat irregular and rather short teeth; the cutting edge forming a sharp angle with the outer side of the mandible. Temples narrow, seen in profile in the middle about half as wide as the eye, strongly narrowed both to the vertex and to the mandible bases. Frons convex; ocelli in a flat triangle, POL: OOL = 8: 3.5; the latter distance slightly longer than the diameter of one ocellus.

Thorax in dorsal view about $1\frac{1}{2}$ times as long as it is wide in front of the tegulae (60 : 39); the anterior part, up to the end of the posterior margin of the tegulae, almost square in outline (very slightly narrowed anteriorly) with almost straight sides, the anterior lateral angles of the pronotum distinct, but hardly projecting. Scutellum flat, postscutellum with a low and somewhat irregular transverse crest anteriorly, both scutella horizontal. Propodeum, as seen in profile, forming a rectangular hump (as in *L. stenosoma*); the horizontal area is trapezoidal in shape, about as long as the scutellum, it is gradually narrowed towards the end, where it is truncate and slightly emarginate; posterior surface concave, the concavity narrow and shallow at top, wider and deeper below, bordered on each side with a carina running from the top of the hump to the lamellar tooth on each side of the apex of the propodeum; these carinae not quite straight, almost parallel in upper third, strongly diverging towards the apex.

Gastral petiole similar to that of *L. stenosoma*; slightly longer than the second gastral segment (47 : 42), as seen from above gradually widening from the base to the apical rim, which is distinctly thickened (width at base 7, at the distinctly projecting spiracles 11, in front of the rim 17, at the rim 21); in lateral view the petiole is moderately curved, slightly higher in the posterior two thirds than in the basal third, faintly constricted before the apical rim; first gastral sternite consisting of a small area at the apex of the ventral side of the petiole, wider than long and rounded anteriorly; the sides of the tergite fused in the median line of the ventral side over most of the length of the petiole. Second gastral segment slightly longer than wide (42 : 39), its height slightly less than its width (36 : 39); apical margin

depressed and translucent, its base with a row of coarse, but superficial, punctures.

Body dull, owing to a delicate and superficial sculpture, and moreover coarsely punctate; the punctures very dense on head, pronotum, upper part of mesepisternum, scutellum, postscutellum, and horizontal part of propodeum, slightly sparser on mesoscutum and lower part of mesepisternum, where narrow interspaces are visible. Anterior, vertical, surface of pronotum coarsely punctate on each side of the median impression. Metapleura in lower half with some coarse and superficial punctures; sides of propodeum almost impunctate anteriorly, very coarsely, but superficially and reticulately, punctate posteriorly and on the sloping areas on each side of the median horizontal part; the concave declivity more finely sculptured. Tegulae finely, but distinctly, punctate.

Gastral petiole coarsely and densely punctate, except at extreme base and on apical rim; second tergite densely but very superficially and not very coarsely punctate, the sternite more distinctly, but less densely punctate, with distinct interspaces.

Pubescence short, silvery white; some longer hairs are visible on the scutella, the horizontal part of the propodeum, and on the ventral side of the gaster.

Black; mandibles, under side of antennae and part of tegulae ferruginous; legs and gastral petiole partly reddish; the following parts yellow: a narrow transverse band at base of clypeus, an elongate spot on first antennal segment, a narrow band at anterior margin of horizontal part of pronotum (narrowly interrupted in the middle), a spot at base and apex of tegulae, posttegulae, two small transverse spots on scutellum, close to the posterior margin; a spot on each propodeal spine (covering the whole non-membranous part); the apical rim of the gastral petiole, and a narrow subapical band on the second tergite and sternite; posteriorly these bands have a peculiar crenellated margin, caused by the row of punctures at the base of the depressed apical lamella. Gastral petiole red, with dark blotch (probably variable) on basal two thirds of dorsal side.

Legs ferruginous, tips of claws black; mid tarsi and hind legs beyond the trochanters more or less infuscated; yellow markings: an elongate mark on outer side of apical two thirds of fore femora, a smaller mark on apical half of mid femora, outer side of fore and mid tibiae, a line on apical two thirds (not quite reaching the apex) of dorsal surface of hind tibiae.

Wings hyaline, anterior margin not infuscated; stigma and veins dark brown to blackish.

♂ — Similar to the female. Head less high and less thick, almost circular

in frontal view (distinctly wider than high if the clypeus is not included), as seen from above about twice as wide as thick (43 : 22). Clypeus flatter; mandibles with two teeth on inner side; temples less narrowed towards the vertex; antennae more slender, the tenth segment about $1\frac{1}{2}$ times as wide as long; the 11th segment longer than the 10th, the 12th segment very small, the apical segment hook-like, narrow, recurved, flattened and fitting in a groove of segment 11; it just reaches the apex of the tenth segment.

Propodeal hump blunter than in the female, the dorsal surface less narrowed posteriorly, broadly rounded, the posterior concavity less pronounced, its edges not distinctly carinate.

Clypeus entirely yellow, mandibles with yellow spot in basal triangle, under side of first antennal segment entirely yellow; legs partly darker than in the female: trochanters, femora, mid tibiae, apical tarsal segments of mid and hind legs infuscated, partly paler; fore tarsi ferruginous yellow. Tegulae dark brown, their yellow spots slightly smaller; gastral petiole black above, partly or entirely reddish beneath (apical rim yellow). Coloration otherwise as in the female.

Length (h. + th. + t. 1 + 2): ♀ 7 mm, ♂ 7-7.5 mm.

Ceylon: Central Province, 1 ♀ Dambulla, 6 Febr. 1954 (holotype, NMB). — North Western Province, 1 ♂ Kalpitiya, 24 Jan. 1954 (allotype, NMB). — Uva, 1 ♂ Kataragama, 7 Jan. 1954 (paratype, ML). — All specimens were collected by Dr. F. Keiser.

India: Coimbatore, 1 ♀ 2 ♂, July-Oct. 1939, P. S. Nathan, coll. Lindemans (1 ♀ 1 ♂ MR, 1 ♂ ML).

Cyrtolabus interstitialis (Cameron)

Zethus interstitialis Cameron, 1902, Jl. Bombay Nat. Hist. Soc., vol. 14, p. 291, ♀ ♂ — Matheran, Bombay Presidency, leg. Nurse (types BM).

Labus interstitialis; Meade Waldo, 1914, Ann. Mag. Nat. Hist., ser. 8, vol. 14, p. 404. Bequaert, 1928, Ann. Mag. Nat. Hist., ser. 10, vol. 2, p. 150 (holotype: ♀). Van der Vecht, 1935, Treubia, vol. 15, p. 159 (note). Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 218 (notes on types).

This species is at once distinguished from *C. suavis* by its larger size (h. + th. + t. 1 + 2 = 10 mm), the produced clypeus (sharply bidentate anteriorly in the ♂), the ferruginous tegulae, and the less curved gastral petiole.

2. ON *PAREUMENES* SAUSSURE AND RELATED GENERA

The genera belonging to this old-world group agree in the following characters.

Thorax depressed, distinctly wider than high, oval as seen from above; as seen in profile the dorsal outline forms a fairly regular and unbroken arc; disk of postscutellum very slightly convex, usually well defined laterally, but not marked here by a projecting carina, the posterior margin bluntly produced in the middle. Mesoscutum often with prescutal furrows. Propo-

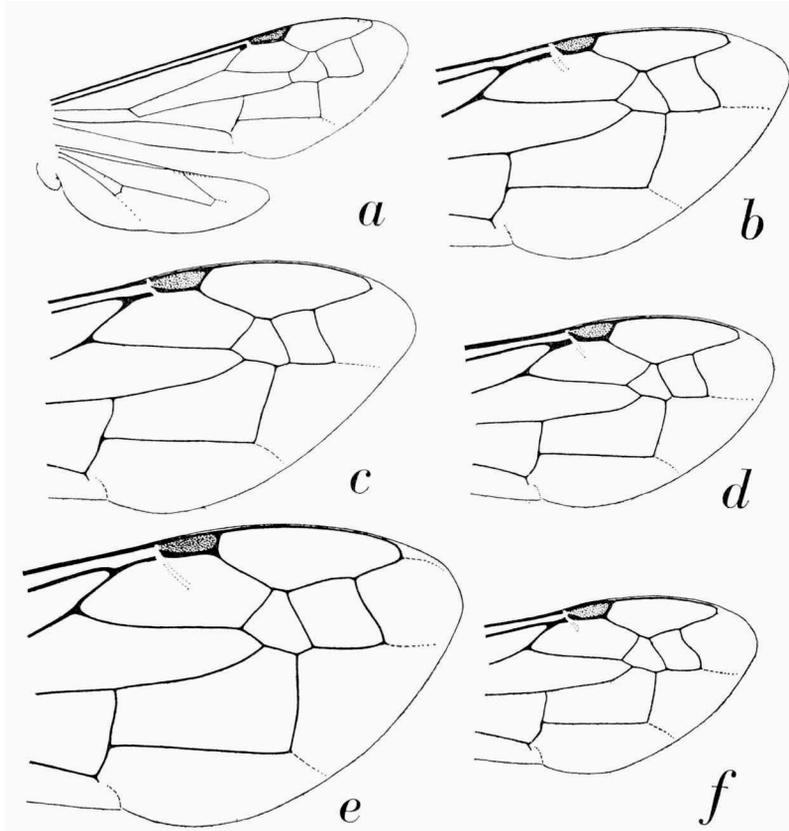


Fig. 2. a: wings of *Cyrtolabus suavis* sp. n., ♀ (type, Ceylon). — b: fore wing (base omitted) of *Pareumenes quadrispinosus javanus* van der Vecht, ♂ (Java). — c: do. of *Pseumenes eximius eximius* (Smith), ♂ (Batjan). — d: do. of *Ectopioglossa polita polita* (Smith), ♂ (Batjan). — e: do. of *Pseudozumia indica* (Saussure), ♂ (Bali). — f: do. of *Coleumenes multicolor* (Giordani Soika), ♂ (Sumba).

deum gradually sloping from base to apex, its dorsal outline seen in profile varying from almost straight to moderately convex, the transition from dorsal area to lateral areas usually sharply marked, more or less angular, often produced into a more or less distinct spine or tooth near the apex; dorsal area at base with fovea or longitudinal slit (very long in *Pseudozumia*), from which runs a median carina to the apex. Gaster more or less

distinctly petiolate, the first segment always longer than its width at the apex.

First and second abscissae of the base of the second submarginal cell in a straight line or at least the angle formed by them very blunt (fig. 2, b-f). Mid tibiae with one apical spur.

Key to the Indo-Australian genera

1. Mesepisternum with epicnemial carina. 2
- Mesepisternum without epicnemial carina. 5
2. First gastral tergite with transverse carina at base. 3
- First gastral tergite without transverse carina at base. 4
3. First gastral sternite reduced to small triangular area at apex of the segment.
Ectopioglossa Perkins
- First gastral sternite narrow at base, widening into elongate triangular posterior part, which is distinctly carinate medially. *Nortozumia* van der Vecht
4. First gastral sternite smooth at base, the posterior two thirds rather regularly transversely striate. Mesoscutum without distinct prescutal grooves
Coeleumenes gen. n.
- First gastral sternite irregularly rugose, the rugae running in longitudinal direction. Mesoscutum with prescutal grooves. *Pseudozumia* Bequaert
5. First gastral sternite with long and narrow anterior part which is more or less distinctly fused with the tergite and sometimes superficially striate; the posterior part short, triangular, not striate. Outer side of hind tibiae not spinose.
Pseumenes Giordani Soika
- First gastral sternite more or less gradually widening from base to apex, rather regularly transversely striate. Outer side of hind tibiae with a variable number of short spines. (Parastigma of fore wing longer than stigma, and gastral petiole long: the nominate subgenus¹). *Pareumenes* Saussure

Genus *Pareumenes* Saussure

Pareumenes Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 133 (division of genus *Eumenes* Latreille).

Type species: *Eumenes quadrispinosus* Saussure, 1855 (designated by Bequaert, 1918, Bull. Amer. Mus. Nat. Hist., vol. 39, p. 271).

Pareumenes chinensis Liu

Pareumenes (Pareumenes) chinensis Liu, 1941, Notes Ent. Chin., vol. 8, no. 6, p. 256, ♀ — Szechuan, 1 ♀ 4000 ft., July 1929, D. C. Graham (type, USNM); Kuling, 1 ♀ 1935, O. Piel (Mus. Heude, Shanghai).

This species is easily recognized by the characters given by Liu; it varies considerably in size: the smallest specimens are hardly larger than *P. quadrispinosus* and measure about 20 mm to the end of the second gastral segment (2 ♀ from Tsha-jiu-san), whereas the female from Lung-tao-shan is about 27 mm long.

1) The palaeartic *Nortonia* Saussure may be regarded as a subgenus of *Pareumenes* Saussure; it differs in having the parastigma shorter than the stigma, and the gastral petiole shorter and wider (see Giordani Soika, 1938, Ann. Mus. Civ. Stor. Nat. Genova, vol. 60, pp. 111-116, and Blüthgen, 1940, Mitt. Königl. Naturw. Inst., vol. 13, pp. 239-240).

China: 4 ♀ Fukien, Kuatun, 2300 m, (40° N., 117°.40 E.), 27 June-20 July 1938, J. Klapperich (ZMAK; 1 ♀ ML); 2 ♀ Tsha-jiu-san, June 1910, S. Mell, 1 ♀ Canton, 1 ♀ Lung-tao-shan, S. Mell (ZMB). — The colour pattern appears to be rather constant; the propodeum is usually black, but in one female from Kuatun and in that from Lung-tao-shan there are two ill-defined ochreous yellow spots at the apex; third gastral tergite always with a laterally abbreviated apical fascia.

Pareumenes bengalensis (Fabricius)

Polistes bengalensis Fabricius, 1804, Syst. Piez., p. 277 — “Bengalia, Dom. Daldorff. Mus. Dom. Lund” (UZMC). Saussure, 1853, Ét. fam. Vesp., vol. 2, p. 41 (? *Icaria bengalensis*; doubtful species). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 123 (cat.); 1904, Gen. Insect., vol. 19, p. 71 (doubtful species) [erroneously recorded from Senegal].

Pareumenes bengalensis; Schulz, 1912, Berl. Ent. Zeitschr., vol. 57, p. 84 (type examined; probably identical with *P. brevisrostratus* (Saussure)).

The type is a male in the Sehestedt-Lund collection of the Copenhagen Museum; it bears a label “*P. bengalensis*” in what is probably Lund’s handwriting. The specimen differs in some respects from all Indian *Pareumenes* which I have seen so far. It will perhaps prove to be characteristic of a population inhabiting Bengal, but this must remain doubtful so long as no material from this area has become available. The following notes are based on the type.

♂ — Head, seen in front, slightly wider than high (mandibles excluded), as seen from above about twice as wide as long, moderately narrowed behind the eyes; vertex only slightly raised above the level of the eyes. Clypeus strongly convex, but somewhat flattened in the middle, very slightly longer than wide; emarginate anteriorly (width: depth = 10 : 3), on each side with fairly sharp, distinctly carinate tooth, the distance between the teeth slightly less than one third of the greatest width of the clypeus. Third antennal segment nearly 1½ times as long as the fourth and about twice as long as the last segment, the antennal hook, which in recurved position reaches slightly beyond the apex of the tenth segment.

Length of prescutal grooves about one fifth of the length of the mesoscutum. Concavity of propodeum with narrowly triangular basal fovea, which is slightly longer than one third of the total length, behind the fovea with sharp median carina, flanked on each side by some short, obliquely transverse, ridges; apical teeth of propodeum short, approximately rectangular, separated from the valvulae by an almost semi-circular emargination.

Gastral petiole gradually widening from the base (actually the extreme base containing the muscular slit forms a narrowed neck); width at base: width at the strongly projecting spiracles: width at apex: length = 9 : 17 : 25 : 58;

greatest width of second segment = 48; apical, lamellar, margins of tergites 2 and 3 distinctly raised, that of the third segment narrowed laterally.

Frons with a rather coarsely and densely punctate area between ocelli and upper level of the eye-emarginations; clypeus with some scattered and superficial punctures; the remainder of the head almost impunctate, the vertex with only a few distinct punctures near the top of the eyes. Pronotum and anterior half of mesoscutum coarsely, but not very densely punctate, with several interspaces that are larger than the punctures; mesopleura coarsely punctate, the sutures coarsely crenulate; dorsal areas of propodeum with rather coarse, ill-defined punctures, the puncturation sparse and indistinct at the base and near the median excavation; lateral areas rather coarsely striate, the striae more or less distinctly continuing on the metapleura. Apical half of first gastral tergite sparsely, but fairly coarsely punctate, sides and apex of second tergite more finely punctate, the puncturation on tergites 3 and 4 even less distinct, the following tergites impunctate; first sternite transversely striate, sternites 2-5 sparsely punctate.

Head black, somewhat reddish on vertex and occiput and more distinctly so on lower part of temples and adjacent areas; mandibles brownish, the base and the teeth darker; antennae ferruginous, brownish above, scape yellow beneath; the following parts yellow: clypeus, frons, with the exception of two curved, dark, lines running from the ocelli to the base of the clypeus (enclosing the antennal sockets), a broad band on the temples along the outer orbits ending on the vertex a little beyond the top of the eyes.

Thorax reddish, suffused with black on pronotum, mesoscutum, and scutellum, and at most of the sutures; yellow markings approximately as in "*Pareumenes quadrispinosus intermedius*" (see van der Vecht, 1937, fig. 3c), but the pronotal band wider, the mesoscutal lines not narrowed anteriorly and the band on the postscutellum reduced to two small, irregular, spots. Mesepisternum with subtriangular spot below the tegulae. Gaster ferruginous red, somewhat infuscated on the disk of the second tergite and at the bases of the following tergites; first tergite with preapical yellow band, widened laterally, deeply incised, almost interrupted, in the middle, on each side enclosing a small subcircular reddish spot; preapical band of second tergite much wider, in the middle almost covering the posterior half of the tergite, anteriorly with deep median incision, close to the posterior margin with two small transverse brownish spots; tergite 3 with broad yellow band, emarginate anteriorly, tergite 4 with narrower band, twice angularly incised anteriorly, 5-7 with median yellow mark, rather large and transverse, with narrow lateral extension, on tergite 5, much smaller on 6 and hardly visible on 7; first gastral sternite with yellow line at lateral margins of posterior

third; second and third sternites with minute yellow spot in posterior lateral angles. Legs ferruginous, apical two thirds of femora I yellow on outer side, tibiae I yellow with reddish line on inner side, II and III yellow on outer side. Wings yellowish hyaline.

Length (h. + th. + t. 1 + 2): 12-13 mm.

***Pareumenes brevirostratus* (Saussure)**

Eumenes brevirostratus Saussure, 1855, Ét. fam. Vesp. vol. 3, p. 136, ♀ ♂, pl. 7 fig. 1 — "Les Indes Orientales", from F. Smith (type? BM) (in division *Pareumenes*). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 23 (cat., *brevirostrata*); 1871, Jl. Proc. Linn. Soc. Zool. vol. 11, p. 372 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 19 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 337, ♀ ♂ (Sikkim; Calcutta; Madras) [probably partly misidentified!]. Schulz, 1906, Spolia Hym., p. 214 (♀ from Malabar in Mus. Strassbourg). Dover, 1921, Rec. Ind. Mus. Calc., vol. 22, p. 386 (Barkuda Island, Chilka Lake, India). Dusmet, 1930, Bol. Soc. Ent. Esp., vol. 13, p. 102 (var.? from Khandala, India, in Mus. Madrid).

Pareumenes brevirostrata; Dalla Torre, 1904, Gen. Insect., vol. 19, p. 19 (cat.). Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 252 (specimens from Bombay and Travancore in BM).

Pterochilus fulvipennis Cameron, 1898, Mem. Proc. Manch. Lit. Phil. Soc., vol. 42, part 11, p. 39, ♀ — Poona, India (OUM); 1903, Jl. Straits Br. Roy. As. Soc., vol. 39, p. 165 (compared with *Montezumia flavobalteata* Cameron). Dalla Torre, 1904, Gen. Insect., vol. 19, p. 58 (cat.).

Pareumenes fulvipennis; van der Vecht, 1937, Treubia 16, p. 272 (notes on holotype) (in subg. *Pareumenes*).

Eumenes fulvipennis; Cameron, 1907, Jl. Bombay Nat. Hist. Soc., vol. 17, p. 1008 [misidentification; in a footnote Cameron refers to the description and figures of *Pterochilus fulvipennis* Cameron, 1898, but the specimens from Deesa recorded here (1907) are not identical with his type and belong indeed to the genus *Eumenes*].

Eumenes campaniformis (Fabricius), var. *cameroni* Bequaert, 1928, Ann. Mag. Nat. Hist. ser. 10, vol. 2, p. 167 (new name for "*Eumenes fulvipennis* Cameron, Jl. Bombay Nat. Hist. Soc. 17, p. 1008 (1907) (not *Eumenes fulvipennis* Smith, 1857)")¹).

For the moment I restrict the name *brevirostratus* to Indian specimens which agree in having the head (except for the occiput and transverse band across the vertex enclosing the ocelli) and a broad band on the pronotum yellow, with the remainder of the thorax entirely (or almost entirely) ferruginous. Such specimens differ from the type of *P. bengalensis* in certain details of sculpture and structure. It seems possible that these differences are due to clinal geographic variation, for the species is undoubtedly rather

1) Bequaert has overlooked that *Eumenes fulvipennis* (Cameron), 1907, was a new combination (based on the misidentification of the previously described *Pterochilus fulvipennis* Cam.) and not a new species. The specimens from Deesa, designated by Bequaert as "holotype" and "allotype", cannot be regarded as types, for *Eumenes campaniformis cameroni* has the same type as *Eumenes fulvipennis* (Cameron, 1907) = *Pterochilus fulvipennis* Cameron (Article 72d of the International Code of Zoological Nomenclature).

variable, but the available material is not sufficiently extensive to state this with certainty.

♂ — Differs from *P. bengalensis* as follows: thirteenth antennal segment slightly shorter, hardly more than one third of the third segment, in recurved position not quite reaching the apex of the tenth segment; anterior margin of clypeus narrower (only one fourth of greatest width of clypeus); apical teeth of propodeum sharper, forming an angle of about 60°; gastral petiole relatively wider at base: relative widths at base, at spiracles and at apex = 13 : 22 : 35, length = 74, greatest height = 23; second gastral sternite strongly convex, the disk extensively impunctate and polished (second and third tergites with raised apical lamella as in *P. bengalensis*).

Puncturation on frons and mesoscutum much finer and sparser than in *P. bengalensis*; pronotum, mesepisternum and dorsal areas of propodeum rather coarsely punctate; metapleura smooth, not distinctly striate; puncturation of the gastral segments slightly finer.

Colour pattern distinguished from that of *P. bengalensis* by the absence of yellow markings on the greater part of the thorax in contrast to the greater extension of the yellow colour on the head; markings of gaster similar, but in all my specimens the gastral petiole without apical band (as in de Saussure's original description; the figure on plate 7 of de Saussure's work, 1855, represents a female of the "Var. Petiole bordé de jaune").

There is some variation in the extent of the yellow markings: in the male from Allahabad the dark band on the vertex has two anterior extensions in the direction of the antennal bases, and a posterior one connecting it with the dark occiput (in the other specimens the yellow band at posterior margin of vertex is entire); in this same specimen there are two short yellow lines on the mesoscutum, two small spots on the tegulae, and a spot on the mesepisternum just below the tegulae (in the other specimens these spots are lacking); the male from Dharwar has a small spot in each apical lateral angle of the propodeum, and the apical band of the second gastral tergite is dissolved into two separate, ill-defined, spots (entire in the other males).

♀ — Similar to the male; in the available specimens the yellow band on the vertex is not interrupted; the dark band in front of it varies in width, it is ferruginous in three females, black in the specimen from Orissa. Thorax ferruginous except for the yellow band on the pronotum; gastral petiole ferruginous (the sternite more or less extensively yellow posteriorly), the band of the second tergite entire (1 ♀ Orissa, 1 ♀ Kerala), partly dissolved (1 ♀ Kerala) or reduced to two spots (type of *Pterochilus fulvipennis* Cameron). Legs ferruginous; apex of femora I and a line on tibiae I yellow.

Length (h. + th. + t. 1 + 2): ♀ 17-20 mm, ♂ 14-17 mm.

India: 1 ♂ Allahabad, coll. Rothney (OUM); 1 ♀ Orissa, Jeypore, Sept. 1958, P. Susai Nathan (ML); 1 ♂ Nasik, leg. E. Comber, ex coll. C. G. Nurse (BM); 1 ♀ Poona (type of *Pterochilus fulvipennis* Cam., OUM); 1 ♂ Dharwar, on flower, 9-8-1917, coll. Bell (BM); 3 ♀ Kerala State, Wailayar Forests, 700 ft., Oct. 1959 and Aug. 1960, P. Susai Nathan (ML) (the ♀ collected in Aug. 1960 is marked with yellow on mesoscutum, scutellum, and apex of petiole).

Pareumenes quadrispinosus (Saussure)

Eumenes quadrispinosus Saussure, 1855, Ét. fam. Vesp., vol. 3, p. 134, ♀ ♂, pl. 7 figs 2-2g — "Indes Orientales" (BM; ML; coll. Smith; lectotype from "India" in BM, no. 18.196, selected by Bequaert, 1928) (in div. *Pareumenes*). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 23 (cat., *quadrispinosa*); 1858, Jl. Proc. Linn. Soc. Zool., vol. 2, p. 108 (Malaya, leg. Wallace); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 372 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 31 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 336, ♀ ♂, fig. 94 (N.W. Himalaya-Tenasserim). Rothney, 1903, Trans. Ent. Soc. Lond. 1903, p. 106 (Barrackpore, Bengal). Bequaert, 1918, Bull. Amer. Mus. Nat. Hist., vol. 39, p. 271 (type of the genus *Pareumenes* Saussure). Dover & Rao, 1922, Jl. Proc. As. Soc. Bengal, new series, vol. 18, p. 236 (Nilgiri Hills; Burma; Assam).

Pareumenes quadrispinosa; Dalla Torre, 1904, Gen. Ins., vol. 19, p. 19 (cat.). Dover, 1925, Jl. Proc. As. Soc. Bengal, new series, vol. 20 (1924), p. 296 (Bhutan; Rungeet Valley; Tavoy) [*Eumenes eximius* Smith erroneously regarded as synonym]; 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 252 (Hongkong; Hoabin; Sikkim; Tenasserim). Bequaert, 1928, Ann. Mag. Nat. Hist., ser. 10, vol. 2, p. 172 (*P. quadrispinosus*; type examined). Giordani Soika, 1935, Ann. Mus. Stor. Nat. Genova, vol. 57, p. 137. Van der Vecht, 1937, Treubia, vol. 16, p. 269 (notes).

Pareumenes quadrispinosus has been misidentified by Piel (1935) and by Liu (1941), who applied this name to a species which belongs to *Pseumenes* and which is evidently identical with *P. depressus* (Saussure). The latter author described six new species in the genus *Pareumenes*; the first of these, *P. chinensis* from Szechuan and Kuling, is at once distinguished by its large size and by its colour pattern (mesoscutum black; only the second gastral tergite with yellow apical band); the others are characterized by slight differences in structure and sculpture, but they have all approximately the same colour pattern. In my opinion it seems probable that these supposed species are no more than local representatives of one wide-spread and variable species. Both *conjunctus* and *transitorus* are relatively dark inhabitants of Central and Eastern China; the first is recorded from Anhwei province ($\pm 32^\circ$ N.), the other from the coastal area from about 28 to 33° or 34° N. *Pareumenes interruptus* inhabits the coastal area of Southern China (Swatow and Hainan Island); whether the male specimen from Yunnan really belongs here, remains to be seen. Unfortunately Liu's data on the coloration of his specimens are somewhat incomplete (the third and following gastral segments

are not mentioned, though in Chinese specimens before me they are abundantly marked with yellow), and the data on the habitat of two of the new species (*P. obtusus* and *P. acutus*), described from "South China", were not accessible when Liu's paper was published. Evidently the problem of the representation of *Pareumenes* in China deserves further study.

The continental material before me at this moment is much too limited for a satisfactory study of the geographic variation; it consists of small series of females from Sikkim and China, and of single females from S. India, Khasia, and Malaya. The specimen that agrees best with the original description is a female from Karwar, India, July 1926, ex coll. Bell (BM); it has the head slightly more extensively black, the transverse black band on the vertex being connected by two irregularly curved lines with the antennal sockets; the petiole is darker, but the base is distinctly tinged with reddish. Apparently this form is sympatric with *P. brevirostratus* (see above). This Indian specimen agrees with a female from Perak, Malaya (Kuala Kangsar, leg. Grubauer, 1902, "*arcuatus* det. Kohl" [!], NMW), in having practically no coarse punctures on the vertex behind a line through the posterior ocelli. In both specimens the anterior half of the mesoscutum is only sparsely and superficially punctate. Head and thorax are less extensively marked with yellow in the Malayan specimen (yellow band on temples ending at the top of the eyes; pronotum less extensively yellow; spots on scutellum farther apart), but the apical margin of the second sternite has a widely interrupted yellow band (the median black part about one third of the width at the apex) instead of a small spot in each angle. This specimen is evidently transitional between the typical form from India and the subsp. *intermedius* van der Vecht (see below) from Borneo.

The other continental specimens are distinguished by the coarse puncturation of vertex and anterior half of mesoscutum; they show some variation in the shape of the apical margin of the third gastral tergite, and mainly on the basis of this character I have provisionally identified them as subsp. *acutus* Liu and subsp. *interruptus* Liu.

***Pareumenes quadrispinosus acutus* Liu**

Pareumenes acutus Liu, 1941, Notes Ent. Chin. vol. 8, p. 255 (key), 262, ♀, pl. 1 fig. 5, pl. 2 figs. 3 and 13 — "South China" (coll. Liu).

The specimens recorded below agree well with Liu's description, but the small spots laterad of the posterior ocelli are lacking and the legs are slightly less extensively marked with yellow (coxae all black). Gastral tergites 3-5 with apical yellow band, the bands on 3 and 4 incised anteriorly in the middle

and at the sides, that on 5 abbreviated laterally; tergite 6 with irregular median spot.

I n d i a: Sikkim, 1 ♀ March-April, H. Fruhstorfer, "*depressa* Sss. det. Kohl" (NMW); 1 ♀ April 1894, leg. Bingham, coll. Rothney, "*Eumenes quadrispinosa* Sauss." (OUM); 1 ♀ May 1894, leg. Bingham, coll. Rothney (OUM); 1 ♀ from Staudinger (ML); 3 ♀ coll. Bingham (ZMB). Assam, 1 ♀ Khasia Hills, coll. Rothney (OUM). — Basal half of the second gastral sternite with broad yellow band in the Sikkim specimens, with two sub-quadrangle spots in the female from Assam.

***Pareumenes quadrispinosus interruptus* Liu**

Pareumenes interruptus Liu, 1941, Notes Ent. Chin., vol. 8, p. 273, ♀, pl. 1 figs. 6, 9, pl. 2 figs. 7, 16 — Swatow (holotype, ♀), Hainan Island (paratype, ♀) and Chingtung, Yunnan (allotype, ♂), all in Mus. Heude, Shanghai.

Puncturation of vertex slightly denser than in the females from Sikkim (see above); occipital carina somewhat variable, and always rather indistinct in upper part; apical teeth of propodeum variable, in the three females from Tsha-jiu-san ranging from nearly rectangular to rather sharp (approximately from fig. 13 to fig. 16 on pl. 2 of Liu's paper); apical margin of tergites 2 and 3 more or less distinctly raised, the latter in the middle only. As in the type the tegulae are yellow with round dark spot on disk and the propodeum has four large yellow spots; usually the second gastral sternite has a broad yellow band on the basal half, but in one specimen this band is narrowly interrupted, as in the type; there is a small spot in each posterior angle of this sternite.

C h i n a: 1 ♀ Foochow, June 1936, M. S. Yang (BM); 3 ♀ Tsha-jiu-san, May-June 1910, S. Mell, 2 ♀ 3 ♂ Wa-sha-toui, Kwang-tung, April-June, S. Mell, 1 ♀ Gaofung, June, S. Mell, 1 ♂ Lung-tao-shan, S. Mell (ZMB).

***Pareumenes quadrispinosus interjectus* nom. n.**

Pareumenes quadrispinosus var. *intermedius* van der Vecht, 1937, Treubia, vol. 16, p. 270, ♀ ♂, fig. 3 c — Borneo (holotype, ♀, OUM); Sumatra (allotype, ♂, ML).

There appear to be good reasons to regard *Nortonia* Saussure 1869 (type species *Odynerus intermedius* Saussure, 1852) as a subgenus of *Pareumenes* Saussure, 1855 (see p. 16, footnote). The name *intermedius* van der Vecht, 1937, proposed for a "variety", and herewith raised to subspecific rank, then becomes a secondary homonym, and the name *interjectus* is therefore proposed as a replacement name.

M a l a y a: 1 ♀ Penang, Tandjong Bungah, Catchment Area, 4 Febr. 1956, H. T. Pagden (HTP).

Borneo: 1 ♀ E. Borneo, Tabang, Bengen River, 20 Sept. 1956, A. M. R. Wegner (ML).

Sumatra: 1 ♂ Bindjei Estate, 19 Jan. 1922, leg. Fulmek (NMW); 1 ♀ Deli, L. Martin (coll. Giordani Soika). — Agree well with specimens from South Sumatra.

***Pareumenes quadrispinosus javanus* van der Vecht (fig. 2b)**

Pareumenes quadrispinosus var. *javanus* van der Vecht, 1937, Treubia, vol. 16, p. 270, ♀ ♂, fig. 3 c¹ — Wijnkoop Bay, S. W. Java (holotype ML).

East Java: 2 ♀ Tengger Mts., 4000 ft., 1890, leg. H. Fruhstorfer, obtained by Rothney from "Fr. v. d. Poll" (coll. Rothney, OUM).

***Pareumenes nigerrimus* sp. n. (fig. 1, d-h)**

♀ — General shape and sculpture mainly as in *Pareumenes quadrispinosus* (Saussure), but the punctures on the vertex, the anterior half of the mesoscutum, the propodeum and the sides of the second gastral tergite deeper and better defined, and the second gastral sternite more strongly swollen at base (fig. 1 d). Apical margin of second gastral tergite slightly raised, that of the third tergite linear (bordered anteriorly by an irregular row of fine punctures) and not raised. Anterior margin of clypeus slightly more deeply emarginate than in *P. quadrispinosus* from Java and Borneo.

Characterized by an extreme reduction of the yellow markings and by the dark wings. Black; the following parts yellow: a line on under side of antennal scape, a small triangular spot between antennae, a spot or short line along inner orbits at lower side of eye-sinus, two marks at apex of propodeum (fig. 1 g), two minute spots at apex of first gastral tergite (absent in the paratypes), and a vague spot at the base of tibiae I. Ferruginous: inner side of tibiae I and apical half of femora I, fifth segment of fore tarsi (the other segments brownish), under side of flagellum of antennae, small spots at apex of femora II and III, and the tibial spurs.

Wings dark brown, darkest along anterior margin, with strong bluish-violet effulgence.

Length (h. + th. + t. 1 + 2): 15.5-17 mm.

Flores: 3 ♀ West Flores, Reo, 15 Sept. 1949, Swiss Sumba Expedition (type NMB, paratypes ML). — In one paratype the gastral petiole is slightly wider at base than in the others, the stigmata are more strongly projecting, and the second gastral sternite is more strongly swollen (fig. 1 e). In all other respects this specimen agrees so well with the others that I have provisionally accepted that the shape of the gaster is subject to considerable variation within

the species. When additional material becomes available, a closer study of this phenomenon is desirable.

West Sumba: 1 ♀ Pogobina, 15 Sept. 1949, Swiss Sumba Expedition (paratype, NMB). — This female agrees well with the Florinese specimens; the eye-sinus and the gastral petiole are entirely black; the second gastral sternite is slightly less convex at the base.

Genus *Pseumenes* Giordani Soika

Pseumenes Giordani Soika, 1935, Ann. Mus. Civ. Stor. Nat. Genova, vol. 57, p. 145 (subgenus of *Pareumenes* Saussure).

Type species: *Eumenes eximius* Smith, 1861 (original designation).

Pseumenes depressus depressus (Saussure)

Eumenes depressus Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 135, ♀ — “Indes Orientales” (MP) (in div. *Pareumenes*). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 23 (cat., *depressa*); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 372 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 22 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 337, ♀ ♂ (Tenasserim).

Pareumenes depressa; Dalla Torre, 1904, Gen. Ins., vol. 19, p. 19 (cat.). Dover, 1929, Bull. Raffles Mus., vol. 2, p. 44 (Sarawak, Borneo). Van der Vecht, 1937, Treubia, vol. 16, p. 273, fig. 3b (*depressus*; distribution; subspecies; in subgenus *Pseumenes*).

?*Pareumenes quadrispinosa* var. *depressa*; Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 252 (Tenasserim; Hongkong).

Pareumenes “quadrispinosus Saussure”; Piel, 1935, Notes Ent. Chin., vol. 2, pp. 105-139 (bionomics in China) [incorrect identification]. Liu, 1941, Notes Ent. Chin., vol. 8 (no. 6), p. 256 (in key), 280 (description, figures, distribution) [incorrect identification].

It is uncertain whether the type of this species is still in existence. In 1956 I tried in vain to find it in the Paris Museum; three specimens labelled as types of *depressus* in this Museum do not agree with the original description; they are from “Bengal, leg. Macé” and belong to *Pareumenes brevirostratus* (Saussure).

De Saussure’s description is not quite clear, for he compares his species with “*Eum. brevirostratus*” which has a quite different aspect. In my opinion the solution of this problem may be found by accepting that he actually meant to compare the species with *E. quadrispinosus*, the first species described in the same work in the group *Pareumenes*. This view is supported by the apparent error in the description of *E. brevirostratus* (l.c., p. 136): “Formes exactement les mêmes que celles de l’*Eum. brevirostratus*”, a statement that does not make sense unless this name is replaced by *E. quadrispinosus*. I suspect that initially de Saussure used the name *brevirostratus* for the latter species and overlooked to make the necessary corrections in the descriptions after having changed his mind.

The description of the propodeum applies well to the specimens recorded

below ("cotés du métathorax jaunes avec chacun une tache circulaire noire"), and I regard therefore as typical *depressus* a form which appears to have approximately the same area of distribution as *Eumenes (Delta) flavopictus continentalis* Zimm. A form with more extensive yellow markings, occurring in Southern India, is described below as a new subspecies; its area of distribution will perhaps be found to coincide with that of the nominate subspecies of *Eumenes flavopictus* Blanchard (see van der Vecht, 1959, 1961).

The typical form is widely distributed. In addition to the material recorded in a previous paper (1937) I have seen the following specimens.

India: West Bengal, 1 ♀ Darjeeling, S. Gutmann, coll. Schulthess (ETHZ); Sikkim, 1 ♀ Tavoy Valley, April 1893, coll. Bingham (ZMB).

Indo-China: 1 ♂ Tonkin, Hanoi (coll. Giordani Soika).

Formosa: 1 ♀ Taihorin, Sept. 1910, H. Sauter (ZMB); 1 ♂ Kankau (Koshun), 1912, H. Sauter, coll. Schulthess (ETHZ).

Siam: 1 ♂ Bangkok, 20 Oct. 1919, F. J. Godfrey, 1920-244 (BM).

Malaya: 1 ♀ Upper Perak, Sedong, Raja Rahin, 17 Sept. 1941 (BM).

***Pseumenes depressus annulatus* subsp. n.**

♀ — Yellow markings more extensive than in the nominate subspecies: lines at inner orbits not interrupted, extending upwards to the posterior ocelli; markings on temples continued as a band across the vertex (twice incised anteriorly, near the top of each eye, and once posteriorly, in the middle); dorsal areas of pronotum almost entirely yellow; the recurved yellow lines on the mesoscutum extending to the posttegulae; dorsal area of propodeum yellow on each side of the median concavity, without black spots; spots on petiole connected with the apical band. Second gastral sternite yellow, except for irregular black bands at base and at apex.

For a figure of the colour pattern see van der Vecht, 1961, p. 471, fig. 3, middle figure of top row.

Southern India: 1 ♀ Bolampatti Valley, Coimbatore District, 20 April 1937, BM-CM Exp. (type BM).

***Pseumenes depressus thoracicus* (van der Vecht)**

Pareumenes depressus var. *thoracicus* van der Vecht, 1937, Treubia, vol. 16, p. 273, ♀ ♂, fig. 3 b¹ — Java (ML).

The Rothney collection (OUM) contains one female which bears the same labels as the specimens of *Pareumenes quadrispinosus javanus* recorded above; furthermore I examined a female from Bali, "Baliling" (?Buleleng), 1931, E. Verga, coll. Schulthess (ETHZ).

***Pseumenes depressus insignis* subsp. n.**

As regards the yellow markings of head and thorax, this remarkable form is intermediate between *P. depressus depressus* (Sauss.), occurring in continental South East Asia and in Sumatra, and the Javan subspecies *thoracicus* (van der Vecht). In the former these parts are extensively marked with yellow, in the latter they are almost entirely black (compare van der Vecht, *Treubia*, vol. 16, p. 268, fig. 3b). The yellow markings of the gaster show a slight reduction as compared with the typical form.

♀ — Black; the following parts yellow: clypeus (a narrow line along anterior margin black), a line at under side of antennal scape, a line along each inner orbit from clypeus to the almost completely yellow eye-sinus, a large spot between antennae, a longitudinal spot in front of median ocellus, a triangular spot on each side between ocelli and eyes, a line on the temples (reaching up to or beyond level of eye-sinus); two or four irregularly shaped spots on pronotum (remains of transverse band), a spot in upper part of mesepisternum, two spots on tegulae, the posttegular processes, two spots on the scutellum, an irregular line along outer margin of dorsal face of propodeum (bent inwards basally), two very small spots on dorsal face of first gastral tergite, a line along sides and apex of the swollen part of this tergite, two spots at base of second tergite (smaller than in typical *depressus*); apical bands of tergites 2-4; a transverse spot on apical margin of tergite 5; two spots of variable size on second sternite (coalescent in the type specimen which also has a small spot in each posterior angle); outer side of femora I; tibiae I (brownish stripe on inner side); a line on under side of apical half of femora II, a small spot at apex of femora III; outer side of tibiae II and III.

Antennal flagellum ferruginous below; front tarsi brown, the last segment yellowish.

Length (h. + th. + t. 1 + 2): 17-19 mm.

♂ — Colour pattern very similar to that of the female, but the spots between eyes and ocelli absent, and the apical band on tergite 5 abbreviated laterally. Mesoscutum and lower half of mesepisternum always black, as in the female. There is a little more variation as regards the degree of reduction of the yellow markings. The most brightly coloured specimen has an almost complete band on the pronotum, a yellow line on each side of the median furrow of the propodeum, forming an almost complete quadrangle with the lines at the base, the outer side, and the apex; etc. In the darkest specimen, a ♂ from Lokojengo, the pronotum has some small spots, the scutellum is entirely black, the propodeum has only a narrow line along part of the outer

margin (including the apical spines), the band at sides and apex of the swollen part of the petiole is dissolved into four spots; the basal spots of tergite 2 are almost absent; sternite 2 and tergites 5-7 black; tegulae with small apical spot only. — The other males have two yellow spots on the scutellum, but in some specimens they are very small.

Length (h. + th. + t. 1 + 2) : 12-13 mm.

S u m b a: Central Sumba, 3 ♀ Lindiwatju, 1 Oct. 1949, 6 ♂ Langgaliru, 5-9 Oct. 1949, 1 ♂ Lokojengo, 22 Sept. 1949, leg. Swiss Sumba Expedition (holotype ♀ from Lindiwatju and 3 ♂ paratypes in NMB; other paratypes in ML).

***Pseumenes depressus hamanni* subsp. n.**

♂ — Very similar to a male of *Ps. depressus* from Sumatra, but the yellow marks on the mesoscutum interrupted in the anterior part of the inner branch, the yellow spots between eyes and ocelli lacking, and the sculpture of head and thorax more superficial. The fine basic puncturation of frons, vertex, pronotum and mesoscutum is rather indistinct and partly almost lacking, the coarser punctures are slightly smaller; posterior half of mesoscutum strongly shiny, almost impunctate.

As in the other forms of *Ps. depressus* the extreme posterior margin of the second gastral tergite is distinctly duplicated.

C e l e b e s: 2 ♂ Central Celebes, Palu, 9 May 1955, H. H. F. Hamann (holotype, ML; paratype, coll. Hamann).

***Pseumenes eximius eximius* (Smith) (fig. 2c)**

Eumenes eximius Smith, 1861, Jl. Proc. Linn. Soc. Zool., vol. 5, p. 126, ♀ — Batjan, leg. Wallace (OUM) (in division *Pareumenes*). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 24 (cat.).

Pareumenes eximia; Dalla Torre, 1904, Gen. Ins., vol. 19, p. 19 (cat.). Giordani Soika, 1935, Ann. Mus. Stor. Nat. Genova, vol. 57, p. 145, ♀, fig. V (*eximius*; redescription; type species of subgenus *Pseumenes*).

♀ ♂ — Very closely allied to *Pseumenes depressus*. Dorsal areas of pronotum somewhat less densely punctate; mesoscutum impunctate; propodeum more convex, the transition from dorsal area to lateral areas more rounded, the lateral areas distinctly punctate in upper part (in *Ps. depressus* the puncturation superficial and indistinct), the median concavity narrower, the apical spines blunt, shorter than their width at the base, in some specimens almost absent; apex of gastral petiole more abruptly swollen.

N o r t h e r n M o l u c c a s: 1 ♀ "Bac" (= Batjan, leg. Wallace) (type, OUM); 1 ♀ South Batjan, Wajaua, o m, June-July 1953, A. M. R. Wegner

(ML). — Obi Island, 1 ♀ Kasowari, 0-50 m, Aug.-Sept. 1953, 3 ♂ Laiwui, 0-50 m, Sept.-Oct. 1953, A. M. R. Wegner (ML). — The female from Obi has the thoracic markings slightly more distinct than those from Batjan (median lines of mesoscutum distinct, though not recurved as in subsp. *arcuatoides*; propodeum with ill-defined line at lateral margins), but the apical band of tergite 2 is more strongly reduced, almost absent except in the middle third. The pattern of the males is similar to that of the female, but rather variable, the yellow lines on the mesoscutum ranging from distinct to almost absent.

***Pseumenes eximius arcuatoides* subsp. n.**

♀ ♂ — Similar to typical *eximius*, but more abundantly marked with yellow (for a figure of the colour pattern see van der Vecht, 1961, p. 471, fig. 3, last row); mesoscutum with recurved yellow lines as in *Pseumenes depressus depressus* and in certain forms of *Eumenes flavopictus* and *E. arcuatus*; scutellum with large spots; dorsal area of propodeum mainly yellow, on each side with central dark spot connected with the median black band. Gastral bands wider, and spots at base of second tergite larger, than in *P. eximius eximius*. Gastral sternites black (in the female from Ambon the second sternite with elongate yellow spot in the middle of the lateral margins).

Length (h. + th. + t. 1 + 2): ♀ 19-21 mm, ♂ 14-16 mm.

The holotype is a female from N.W. New Guinea, Sorong, 8 July-14 Aug. 1948, M. A. Lieftinck; the other specimens recorded below are paratypes.

New Guinea: N. W. New Guinea, 3 ♀ 4 ♂ Sorong (1 ♂ Kp. Baru, 3 ♂ Malano), July-Oct. 1948, M. A. Lieftinck (ML; 1 ♀ 1 ♂ coll. Giordani Soika); N. New Guinea, 2 ♂ Hollandia, June 1937, W. Stüber (ML); 1 ♀ S. E. New Guinea, Dilo, June-July 1890, L. Loria (MCG).

Southern Moluccas: 1 ♀ Ambon, Passo, 18 Oct. 1949, M. A. Lieftinck (ML).

Genus *Ectopioglossa* Perkins

Ectopioglossa Perkins, 1912, Ann. Mag. Nat. Hist., ser. 8, vol. 9, p. 118.

Type species: *E. australensis* Perkins, l.c. p. 119 (by monotypy) [= *E. polita australensis* Perkins, new status].

The few species of this group are spread from Ceylon through the Indo-Australian Archipelago to Northern Australia. They appear to be very rare everywhere. The species before me may be distinguished as follows.

1. Second gastral tergite at least in the middle with strongly raised, lamellar, apical margin, which, as seen in profile, projects above the level of the segment. 2

- Posterior margin of second gastral tergite very narrow, not distinctly raised. 7
- 2. Also the apical margin of the third gastral tergite raised. Excavation of propodeum with median carina and 3-4 transverse ridges. (Ceylon). *keiseri* sp. n.
- Apical margin of third gastral tergite normal. 3
- 3. Median excavation of propodeum on each side of the median carina with a few sublongitudinal ridges which converge towards the basal fovea. 4
- Median excavation of propodeum with some transverse, or only slightly oblique, ridges. (Apical teeth of propodeum short, not longer than their width at the base. Mesoscutum black.). 6
- 4. Gastral petiole coarsely punctate. (Sunda shelf; Palawan). *sublaevis* (Smith)
- Gastral petiole almost impunctate. (Philippine Islands). 5
- 5. Apical lamella of second gastral tergite widest in the middle, gradually narrowed towards the sides. (Mindanao; Basilan). *laminata* sp. n.
- Apical lamella of second gastral tergite hardly wider in the middle than at the sides, abruptly narrowed near the lateral margin of the tergite. (Samar; Masbate). *samariensis* (Giordani Soika)
- 6. Body very finely and superficially punctate. Black with yellow markings. (Java). *palustris* sp. n.
- Frons, vertex, pronotum, mesoscutum, and gastral petiole distinctly, partly rather coarsely, punctate. Black, sparsely marked with yellow; legs (except the coxae) bright ferruginous. (Lesser Sunda Is.: Sumba). *sumbana* sp. n.
- 7. Maxillary palpi normal, 6-segmented. Apical margin of first gastral segment (petiole) not raised. Frons, pronotum and mesoscutum very superficially punctate. (Fourth gastral tergite black). (Philippine Is.: Mindoro). *lucida* sp. n.
- Maxillary palpi reduced, 3-segmented. Apical margin of first gastral tergite distinctly raised. Frons, pronotum and mesoscutum distinctly, partly rather coarsely, punctate. Fourth gastral tergite (?always) marked with yellow 8
- 8. Legs black, marked with yellow. Second gastral tergite with yellow spot on each side of the base. 9
- Legs ferruginous, more or less distinctly marked with yellow, coxae I more or less infuscated. Second gastral tergite without basal spots (? always). Punctuation approximately as in subsp. *volatilis*. (Northern Moluccas). *polita polita* (Smith)
- 9. Head and thorax with several coarse punctures. (New Guinea and neighbouring islands). *polita volatilis* (Smith)
- Punctuation of head and thorax less coarse. (Queensland, Australia). *polita australensis* Perkins

***Ectopioglossa sublaevis* (Smith)**

Eumenes sublaevis Smith, 1857, Cat. Hym. Br. Mus. vol. 5, p. 23, ♀ — Sarawak, Borneo (type BM, no. 18.197); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 372 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 32 ("*sublaevis*", emend.); 1904, Gen. Insect., vol. 19, p. 25 (cat.).

Pareumenes sublaevis; Bequaert, 1928, Ann. Mag. Nat. Hist., ser. 10, vol. 2, p. 171 (note on type). Van der Vecht, 1937, Treubia, vol. 16, p. 275 (Sumatra; Borneo; in subgenus *Pseumenes* Giord. Ska.). Giordani Soika, 1941, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 2, p. 219 (note on type).

In addition to the specimens recorded in 1937, I have seen the following material.

Sumatra: 1 ♀ Laut Tador, 90 m, 8 April 1951, R. Straatman (ML), 1 ♀ Deli, L. Martin (coll. Giordani Soika).

Borneo: East Borneo, 1 ♀ Maluwi, May 1937, Mrs. M. E. Walsh (ML); 1 ♀ Balikpapan, Mentawir River, Oct. 1950, A. M. R. Wegner (ML); 2 ♀ Tabang, Bengen River, 4 Oct. 1956, A. M. R. Wegner (MZB; ML).

Palawan: 1 ♀ Pto. Princesa, 7 Dec. 1952, H. Townes (ML).

Java: 1 ♀ 1 ♂ Djasinga, 28 Nov. 1939, M. A. Lieftinck (ML); 1 ♀ Bandung, Aug. 1933, coll. S. Leefmans (MA).

Dr. Giordani Soika showed me some specimens from Sikkim, China (Kwangtung), and Tenasserim (coll. ZMB), which appear to agree in structural characters with *E. sublaevis*; the yellow markings, however, are somewhat more extensive than in the specimens recorded above (apical band of second gastral tergite not interrupted).

Ectopioglossa laminata sp. n.

♀ — Very similar to *E. sublaevis* (Smith), with which it agrees in most characters, including the presence of a raised lamella at the apex of the second gastral tergite; this lamella is rather gradually narrowed towards the sides and ends at a short distance from the lateral margin. Propodeum more strongly swollen, the transition from dorsal area to lateral areas rounded (more angular in *E. sublaevis*), the sides somewhat irregularly striate, but not distinctly punctate; median excavation narrower, with only a few oblique carinae (sharply converging towards the basal slit), apical spines moderately sharp, slightly longer than wide at the base; gastral petiole impunctate (except for the microscopically fine basic puncturation, and a few indistinct and shallow punctures at the base), very slightly narrowed behind the basal rim, gradually widening from the projecting spiracles to the apex, where the width is more than twice that in front of the spiracles (28: 13); apical margin of petiole hardly depressed; third tergite with very narrow depressed apical margin.

Colour pattern as in *E. sublaevis*; clypeus with elongate median black mark, connected anteriorly with the narrow dark margin; apical band of petiole narrow, not dilated laterally; markings on propodeum rather narrow; tergites 2 and 3 with rather wide, twice interrupted, apical band; 4 with median band only (in the type on one side a vestigial spot). Coxae II and III, and all femora and tibiae, marked with yellow (under side of hind femora with yellow line on apical half only). — Mandibles ferruginous, with dark base and cutting edge; basal triangle with small yellow spot.

♂ — The Schulthess collection contains a single male from Basilan which I regard as belonging to this species; it agrees with the female in the shape of the apical lamella of tergite 2, but differs in being considerably smaller, in having the propodeum rather strongly convex with blunt apical teeth (much

shorter than their width at the base) and the gastral petiole more strongly swollen posteriorly (the greatest height almost $2\frac{1}{2}$ times the height in front of the spiracles).

Colour pattern mainly as in the female; basal triangle of mandibles almost entirely yellow; clypeus yellow; no spots between eyes and ocelli; mesoscutum without yellow lines; stripes on propodeum without lateral extensions at base; apical band of fourth gastral tergite complete, emarginate anteriorly on each side of the middle. Yellow markings of fore and mid legs extensive, hind femora entirely dark.

Length (h. + th. + t. 1 + 2): ♀ 16 mm, ♂ 9-10 mm.

Philippine Is.: Mindanao, 1 ♀ Surigao, leg. Baker (holotype, coll. Schulthess, ETHZ); Basilan Island, 1 ♂ leg. Baker (allotype, coll. Schulthess, ETHZ).

***Ectopioglossa samariensis samariensis* (Giordani Soika)**

Pareumenes (Pscumenes) samariensis Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat. vol. 2, p. 220, ♂, p. 211, fig. 17 (2, 3) — Samar Island, Philippine Is., leg. Baker (type in coll. Giordani Soika).

In addition to the type specimen, kindly sent to me on loan by Dr. Giordani Soika, I have seen two males labelled "Catbalogan, Samar" (coll. Schulthess, ETHZ, and coll. Giordani Soika). These specimens agree in the shape of the apical lamella of tergite 2 (compare the key); the apical margin of tergite 3 is very narrowly depressed, that of tergite 4 is hardly depressed at all. There is some variation in the shape of the apical teeth of the propodeum, which are slightly sharper in the Catbalogan specimens than in the type (sharpest in the ♂ in coll. Schulthess).

The scutellar spots are slightly larger in these specimens than in the type; the type has traces of yellow lines on the mesoscutum and is in this respect intermediate between the two Catbalogan specimens, in one of which these lines are absent, whereas they are distinct (about half as long as the mesoscutum) in the other specimen (coll. G. S.). In both the Catbalogan specimens the propodeum has a transverse yellow spot on each side at the base (smaller in the male in coll. Schulthess, absent in the type), which is narrowly separated from the top of the yellow stripe.

In addition to the yellow markings mentioned in the original description there is a twice interrupted band at the apex of the fourth gastral tergite; the lateral parts of this band are reduced to irregular small spots, the median part is slightly longer than that of the band on tergite 3, but it is distinctly narrower, especially at the sides.

Length (h. + th. + t. 1 + 2): ♂ 10-11 mm.

***Ectopioglossa samariensis nigra* subsp. n.**

♀ — Agrees with the available males of *E. samariensis* in the shape of the apical lamella of the second gastral tergite, and will probably differ from the female of the typical form only in being strongly melanistic.

Head slightly higher than wide (59 : 53); emargination of anterior margin of clypeus about three times as wide as deep (width measured as the distance between the apical teeth, from apex to apex); apical spines of propodeum sharp, longer than wide at the base; excavation of propodeum with some distinct carinae, converging towards the basal slit; gastral petiole narrowest between the basal carina and the — distinctly projecting — spiracles, here less than half as wide as at the apex (11 : 24); length of petiole (from carina to apex) equal to $2\frac{1}{2}$ times the width at apex (60 : 24); apical median groove of tergite 1 distinct; second tergite with well developed, raised apical lamella, margined anteriorly by a rather deep groove and ending abruptly on each side at a short distance from the lateral margin of the tergite; third tergite with a very narrow depressed apical margin, about one third as wide as that of the preceding tergite; the narrow apical margin of tergite 4 only slightly depressed (segments 5 and 6 lacking in the type).

Punctuation very sparse and superficial; body rather strongly shining.

Black; pale yellow: two irregular spots on basal half of clypeus, an interrupted mark between and above the antennae, a spot on the lower half of each eye-emargination, an elongate spot (about one third of the length of the eye) on the temples, a small spot on each side of the narrow middle of the dorsal surface of the pronotum, a minute spot on mesepisternum below the tegulae, a spot on each side of apex of propodeum (including the apical spines), a narrow band at apical margin of gastral petiole (narrowly interrupted in the middle), a short line on each side of apex of second tergite, a small spot at apex of femora I, anterior surface of tibiae I and a reduced line on outer side of tibiae II. — The irregular shape of most markings indicates that the pattern is reduced and likely to be very variable. — Wings fuscous, hind wings paler at base and posteriorly.

Length (h. + th. + t. 1 + 2): 14 mm.

Philippine Is.: 1 ♀ Masbate Island, Aroroy ("Arorog" on label), 12.30 N., 123.25 E., July 1917, leg. Böttcher, coll. von Schulthess (ETHZ).

***Ectopioglossa lucida* sp. n.**

♀ — Structurally very similar to *E. samariensis nigra* ♀ (described above), but the apical margin of the second gastral tergite very narrowly depressed (not raised), the apical teeth of the propodeum slightly less sharp (though

still longer than their width at the base), and the puncturation of the clypeus slightly finer and more superficial.

Black; the following parts pale yellow: clypeus (except for a narrow black margin and a large median black spot which is attenuated above and here narrowly connected with the base), a small spot at inner orbit between antenna and clypeus, a large mark in each eye-emargination, a dagger-shaped mark on frons, extending from the clypeus to close near the anterior ocellus, an obliquely transverse, oval, spot on each side between eye and posterior ocellus, a line on the temples (from top of eye to below the middle), a broad band on dorsal surface of pronotum, dilated laterally and very narrowly interrupted medially, two narrow lines on the mesoscutum (slightly diverging anteriorly, hardly longer than half the length of the mesoscutum), a large spot on upper part of mesepisternum, tegulae (except for a large dark spot which interrupts the yellow mark on the outer side), posttegulae, two subtriangular spots on the scutellum, two curved lines, dilated at apex, on the propodeum, an irregular narrow band at apex of gastral petiole, somewhat produced on each side at lateral margin, a twice interrupted band at apex of tergite 2, and a similar band (but with much smaller lateral portions) on tergite 3. Legs black; tarsi brownish; femora I and II yellow beneath (except at the base), tibiae with yellow stripe on outer side (reduced on hind tibiae). Wings pale brownish, anterior margin of fore wings infuscated and with distinct violaceous reflections.

Length (h. + th. + t. 1 + 2) : ♀ 13 mm.

Philippine Is.: Mindoro, 1 ♀ Alcate, Victoria, 10 April 1954, H., M., and D. Townes (type ML).

***Ectopioglossa keiseri* sp. n.**

This species is remarkably similar to the new species from Sumba described below. In both species the body is black, with sparse pale yellow markings, the legs are ferruginous and the wings rather strongly infuscated. The sculpture of the excavation of the propodeum is also rather similar. The distinguishing characters are mentioned in the descriptions.

♀ — Head slightly higher than wide (height measured from top of vertex to apex of clypeus) (11 : 10); vertex distinctly raised above the upper level of the eyes; the fovea forms a slightly arcuate impression behind the ocelli, about as far from the ocelli as from the posterior margin and contains two minute pits, close together; as seen from above the head is distinctly narrowed behind the eyes; as seen in profile the temples are less than half as wide as the eyes; clypeus slightly narrower than in *E. sublaevis*, a little longer

than wide, narrowed anteriorly and here with an approximately semi-circular incision. The broad basal tooth of the mandibles is subdivided into four small, irregular, blunt teeth, the fourth of which is slightly larger than the others and resembles in shape the three apical teeth.

Thorax slightly more stream-lined than in *E. sublaevis*, egg-shaped in dorsal view (length: greatest width = 50 : 30), strongly depressed in lateral view (length: greatest height = 50 : 27). Transverse groove of mesepisternum less coarsely crenulate than in *E. sumbana*. Propodeum excavated in the middle, the basal fovea about $\frac{1}{3}$ of the length of the median carina which runs from the fovea to the apical rim; lower half of the excavation on each side with three or four transverse rugae which are less than half as high as the median carina; the transition from the convex dorsal areas to the lateral areas is gradual; apical spines fairly sharp, but slightly shorter than in *E. sublaevis*.

Shape of gastral petiole as in *E. sublaevis*; its apical margin distinctly raised; apical margin of second and third tergite forming a conspicuously raised, thin lamella, which is separated from the segment by a deep groove; in both segments the margins are narrowed towards the sides where their shape is entirely normal.

Clypeus very finely punctate on basal half, its anterior part and also the frons, the vertex and the dorsal areas of the pronotum more coarsely punctate, but the punctures ill-defined and rather superficial. Mesoscutum and mesepisternum sparsely, finely and superficially, punctate; scutellum, post-scutellum and dorsal convex areas of propodeum even less distinctly punctate, strongly shiny; lateral areas of propodeum finely and superficially striate with some scattered punctures. Gastral petiole with well defined and fairly large punctures on the sides of the swollen part; elsewhere the punctures smaller and less deep; second gastral tergite with a very fine basic puncturation, on the sides with additional coarser punctures (nearly as large as those on the sides of the petiole).

Black; apical half of mandibles brownish, flagellum of antennae pale ferruginous beneath, tegulae brownish, legs beyond the coxae bright ferruginous (trochanters partly fuscous and outer side of hind tibiae somewhat infuscated); the following parts very pale yellow (almost ivory white): anterior surface of first antennal segment, an irregular spot on each side of the clypeus, a dagger-shaped mark between the antennae, ending close to the anterior ocellus; a transversely oval spot in each eye-emargination, a short line in upper half of the temples, a narrow line at anterior margin of dorsal surface of the pronotum (narrowly interrupted in the middle), a subcircular spot on mesepisternum just below the tegulae, a small mark in anterior and posterior angles of tegulae, the posttegulae, two small spots on the scutellum

(separated by a distance which is nearly twice their diameter), two spots at apex of propodeum (including the apical spines), a band at apex of gastral petiole (wide laterally, narrowed towards the middle and here narrowly interrupted, deeply incised anteriorly on each side close to the lateral margin). Fore wings rather strongly infuscated, with violaceous reflections, hind wings paler.

Length (h. + th. + t. 1 + 2): 13-14 mm.

Ceylon: 1 ♀ Central Province, Kandy, L. Horton's Drive, 13 July 1953, F. Keiser (holotype, NMB).

Ectopioglossa sumbana sp. n.

In general appearance very similar to *E. keiseri* from Ceylon, but differing in the coarser sculpture and the absence of a raised lamella at the apex of the second gastral tergite.

♀ — Head distinctly higher than wide (19 : 16), mainly because the vertex is more strongly raised above the eyes than in the related species (though somewhat less than in *Pseumenes polillensis* (Giord. Ska.), l.c. 1941, p. 221, fig. 17, 1); cutting edge of the broad basal tooth of the mandible straight. Head and thorax mainly shaped as in *E. keiseri*; measurements of thorax: length: greatest width: greatest height = 47 : 28 : 27; apical spines of propodeum shorter, not longer than their width at the base; excavation of propodeum with similar basal fovea (perhaps slightly longer) and median carina, the lower part more irregularly transversely rugose. Gaster as in *E. keiseri*; the petiole slightly stouter and the median longitudinal groove at the apex more pronounced; third tergite without raised apical lamella.

Puncturation similar to that in *E. keiseri*, but everywhere coarser and more conspicuous.

Colour pattern as in *E. keiseri*; spots on clypeus and in eye-emarginations small (their size undoubtedly variable!), the median mark on the frons more strongly dilated just above the antennae; pronotal band reduced at the sides; spots on mesepisternum and scutellum smaller; tegulae with only the anterior mark; apical band of gastral petiole narrowed laterally, second and third tergites with short transverse mark in the middle of the posterior margin. Wings as in *E. keiseri*.

Length (h. + th. + t. 1 + 2): 13-14 mm.

Sumba: 1 ♀ West Sumba, Kodi, 30 July 1949, Dr. Bühler and Dr. Sutter, Swiss Sumba Exp. (holotype, NMB); 1 ♀ "Sumba" (paratype, coll. Giordani Soika). — In the paratype the clypeus has no distinct yellow spots.

***EctopioGLOSSA palustris* sp. n.**

This remarkable and undoubtedly very rare wasp agrees with the dark, red-legged species of Ceylon and Sumba in the shape of the thorax and the sculpture of the propodeum, but its colour pattern resembles that of *E. sublaevis*; the gastral segments are even more extensively marked, the apical bands of tergites 2 and 3 being not interrupted.

The only available specimen was collected by Dr. Lieftinck in 1953, in a small swampy lowland forest reservation in West Java, not far from Djasinga where he had collected a couple of *E. sublaevis* in 1939. So far we know at present, West Java is the only area where two species of *EctopioGLOSSA* occur sympatrically.

♀ — Head higher than wide (13 : 11.5), the vertex distinctly raised above the level of the eyes; the angle between frons and vertex, as the head is seen in profile, slightly greater than in *E. sublaevis*. Apical teeth of clypeus a little sharper than in that species. Cutting edge of the broad basal tooth of the mandibles weakly subdivided into some irregular smaller teeth.

Thorax depressed as in *E. keiseri* and *E. sumbana*; measurements: length : greatest width : greatest height = 43 : 26 : 24. Apical spines of propodeum short, shorter than their width at the base; the median excavation with the usual median fovea and carina, and with 5-6 transverse or slightly oblique ridges.

Gaster much as in *E. sublaevis*, but the raised apical margin of the second tergite somewhat sooner narrowed on each side of the middle.

Body shiny, very finely and sparsely punctate; clypeus with a few scattered, coarser, punctures on anterior half; on frons, vertex, pronotum and mesoscutum the punctures smaller than the interspaces; scutellum, postscutellum and dorsal convex areas of propodeum almost impunctate; gastral petiole very finely and superficially punctate, with some larger and better defined punctures on the sides; second gastral tergite with only a few larger punctures (on the sides) in addition to the microscopically fine basic puncturation.

Black; flagellum of antennae pale ferruginous beneath; the following parts pale yellow: clypeus (except for the extreme margin, and a small elongate spot on the disk), the anterior surface of the first antennal segment, a dagger-shaped inter-antennal mark, almost reaching the anterior ocellus, a large spot in each eye-emargination, an elongate spot on upper part of temples, a minute spot on vertex between each lateral ocellus and eye; a line at anterior margin of prothorax (ending at the shoulders, and narrowly interrupted in the middle), a spot on upper part of mesepisternum, a triangular mark in anterior and posterior angles of tegulae, the posttegulae,

two spots on the scutellum (narrowed towards the middle, and separated by a distance about equal to their width), a band on each side of the median excavation of the propodeum, dilated outwardly below, but distinctly separated by a black area from the postscutellum; two spots at apex of petiole, a rather broad band at apex of second tergite (its width laterally more than one fifth of the length of the tergite, slightly narrowed in the middle to about one seventh of the length); third tergite with slightly narrower band (with two broad and shallow incisions anteriorly), fourth tergite with short band in the middle only. Legs black; tarsi partly brownish, apex of femora and outer side of tibiae of fore and mid legs marked with yellow. Wings moderately infuscated, as in *E. sublaevis*.

Length (h + th. + t. 1 + 2): 12-13 mm.

J a v a: West Java, 1 ♀ Dungus Iwul, 9 Jan. 1953, M. A. Lieftinck (type, ML).

***Ectopioglossa polita* (Smith)**

The wasp described by Smith as *Eumenes politus* appears to be the Batjan representative of a species which is widely distributed in the Papuan area and which also occurs in Queensland. At present I recognize three subspecies; it seems possible that "*Eumenes medianus* Smith" from Ceram also belongs here, but this requires further investigation.

This species is remarkable for the reduction of the maxillary palpi which are only three-segmented. It was probably mainly on the basis of this character that Perkins created a new genus for his Australian species, but it is now evident that this species is very closely allied to a group of Oriental species with normal palpi. This is another striking example of the repeatedly observed phenomenon that certain characters, which have a considerable degree of stability elsewhere, tend to show peculiar modifications in the Papuan subregion.

***Ectopioglossa polita polita* (Smith) (fig. 2d)**

Eumenes politus Smith, 1861, Jl. Proc. Linn. Soc. Zool., vol. 5, p. 127, ♀ — Batjan, leg. Wallace (type OUM).

Eumenes pomiformis var. *politus*; Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 268 (cat.; Batjan; Djailolo). Dalla Torre, 1894, Cat. Hym. vol. 9, p. 31 (cat.); 1904, Gen. Insect., vol. 19, p. 24 (cat.).

Pareumenes (*Pseumenes*) *politus*; van der Vecht, 1937, Treubia, vol. 16, p. 275 (notes on type). Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 219 (mentioned under *P. (Ps.) medianus*).

B a t j a n: 1 ♀ Batjan, 15 Dec. 1939, R. G. Wind (CAS); 1 ♂ Labuha, S. Batjan, June-July 1953, A. M. R. Wegner (ML).

Ectopioglossa polita volatilis (Smith)

Eumenes volatilis Smith, 1864, Jl. Proc. Linn. Soc. Zool., vol. 7, p. 38, ♀ — Misool, leg. Wallace (OUM); 1865, do., vol. 8, p. 87 (New Guinea); 1871, do., vol. 11, p. 373 (cat.). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 275 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 33 (cat.); 1904, Gen. Ins., vol. 19, p. 25 (cat.).

Pareumenes (Pseumenes) volatilis; Giordani Soika, 1935, Ann. Mus. Civ. Stor. Nat. Genova, vol. 57, p. 148, ♀, fig. VI (redescription). Van der Vecht, 1937, Treubia, vol. 16, p. 276 (notes on ♀ from Aru).

New Guinea: 1 ♀ "Nw. Guinea" (ML); 1 ♀ Vogelkop, Manokwari, 75 m, D. Elmo Hardy (BPBM); 1 ♀ Hollandia, Tami River, 1930, R. Voorhoeve (MA); 1 ♀ Hollandia, July 1938, L. J. Toxopeus, Third Archbold Exp. (ML); 1 ♀ Bernhard Camp, 50 m, July-Nov. 1938, J. Olthof, Third Archbold Exp. (ML); 1 ♀ Papua, Kokoda, 1200 ft., July 1933, Miss L. E. Cheesman (BM); 1 ♀ Finshhafen, 1910, leg. Hertle (coll. Giordani Soika); 1 ♀ Simbang, Huon Golf, 1898, leg. Biro (Mus. Budapest) (generally more finely sculptured; mesepisternum very superficially punctate, yellow markings a little more extensive, spots on scutellum larger).

Aru Islands: 3 ♀ Aru, leg. Rosenberg (ML). — Yellow markings slightly more extensive than in the specimens from Hollandia; clypeus entirely yellow or with small black mark; pronotal band extending backwards beyond the middle of the lateral dorsal areas; gastral bands slightly wider.

Ectopioglossa polita australensis Perkins

Ectopioglossa australensis Perkins, 1912, Ann. Mag. Nat. Hist., ser. 8, vol. 9, p. 119, ♀ ♂ — Cairns, Queensland (BM).

Besides the types I have examined some specimens from Kuranda, 1100 ft., May 3-June 20, 1913, R. E. Turner (BM; 1 ♀ 1 ♂ ML).

Genus **Nortozumia** van der Vecht

Nortozumia van der Vecht, 1937, Treubia, vol. 16, p. 263 (genus).

Type species: *Zethus rufofemoratus* Cameron, 1903 (original designation).

Nortozumia rufofemorata peninsularis subsp. n.

This form appears to agree with *Nortozumia rufofemorata* (Cameron) from Borneo (see van der Vecht, 1937, p. 264), but the yellow markings are rather strongly reduced.

♀ — Clypeus black with a nearly circular yellow band, which is interrupted at the base, and which encloses a large black spot; lateral margins narrowly black. Yellow line on under side of antennal scape reduced near the apex; yellow spot above antennal insertions small; no markings at inner

and outer orbits. Transverse band on pronotum narrow, scutellum entirely black; further thoracic markings reduced, the basal spots of the propodeum smaller than the spots of the postscutellum. The band on the first gastral tergite is narrow, and begins at a short distance behind the stigma, the second tergite is black, except for some traces of a strongly reduced yellow band at the apical margin. Legs as in the nominate subspecies, but the fore tibiae have only a very small yellow spot on the outer side; tibiae II are black, slightly reddish at apex; coxae and femora II and III red, the trochanters fuscous.

Length (h. + th. + t. 1 + 2): 13 mm.

M a l a y a: 1 ♀ Selangor, Ulu Langat, Sungei Chongkok, 31 Dec. 1947, no. 01114, H. T. Pagden (holotype, coll. Pagden).

***Nortozumia picea* sp. n.**

This species agrees in many respects with *N. rufofemorata*, but it is more stoutly built and more coarsely sculptured.

♀ — Clypeus not distinctly delimited laterally, but the punctate part separated from the inner orbits by a narrow and shiny margin; it is distinctly wider than long (32 : 25); anterior portion produced, slightly emarginate anteriorly, angular on each side of the emargination, here measuring about two fifths of the greatest width of the clypeus.

Vertex, as seen in profile, more strongly convex than in *N. rufofemorata*, but otherwise very similar; as in that species the posterior ocelli are about three times as far from the occiput as from the eyes.

Thorax as in *N. rufofemorata*; transverse groove at base of scutellum with eight ridges; propodeum more convex (the bottom of the basal fovea forming an angle with that of the posterior concavity), on each side produced into a strong flattened tooth which in lateral view projects as a sharp spine above the apical lamella, at a distance of about its own length.

Transverse carina at base of first gastral tergite bluntly quadridentate, connected on each side with the projecting stigma by a distinct ridge; this segment distinctly stouter than in *N. rufofemorata*: length from carina to apex: greatest width = 31 : 19 (24 : 10 in *N. rufofemorata*); there is a distinct median impression in front of the wide, moderately convex, apical rim.

As in *N. rufofemorata* the inner spur of the hind tibiae is short and flattened, and obliquely truncate at apex; it bears a dense and regular comb of fine bristles on its inner side; the bristles are short and decrease in size from base to apex of the spur.

Head and thorax rather dull, gaster moderately shiny; the bottoms of the

coarse punctures on the sides of the thorax conspicuously shiny. The sculpture is in general similar to that in *N. rufofemorata*, but there are some important differences. Whereas in *N. rufofemorata* the microscopically fine, basic, puncturation (not mentioned in the description published in 1937) is rather dense, the interspaces between the coarser punctures are much more sparsely punctate in *N. picea*; on the vertex the smaller punctures are only a few times more numerous than the coarse ones, and on the temples they are practically absent. On the frons and the pronotum the coarse puncturation is somewhat sparser than in *N. rufofemorata*, but on the other hand the propodeum is much more coarsely sculptured than in that species; the sides are rather coarsely rugose, the triangular depression behind the basal fovea has a distinct median carina and about six transverse carinae; the space on each side of this depression is coarsely and densely punctate, but as in *N. rufofemorata* the dorsal lateral areas have an extensive smooth and impunctate space. First gastral tergite rather densely and coarsely punctate, the punctures even coarser, but considerably sparser, on the sides, the apical rim sparsely and less coarsely punctate; second tergite more sparsely punctate than the first, particularly in the middle, the punctures not well defined posteriorly, the puncturation is densest just in front of the posterior margin, which is slightly depressed, not well defined anteriorly, and almost impunctate, except for the microscopic, basic, puncturation, which is here slightly more distinct than on the disk; third and following tergites much more sparsely and less coarsely punctate than the second; puncturation of the first and second sternite sparser than that of the corresponding tergites, on the other sternites more similar.

Body deep black; wings dark brown with violaceous iridescence. The pubescence consists of very short black stiff hairs arising singly from the coarse punctures, and of shorter and finer hairs which are particularly distinct on the gastral segments (magnification at least 16 x!); there is some greyish pubescence on the under side of the teeth of the propodeum, and on the posterior lateral angles of the first gastral tergite.

Length (h. + th. + t. 1 + 2): 17 mm.

Indo-China: 1 ♀ "Cochinchine, Phuquoc, 2.IX.1924, R. Vitalis de Salvaza" (holotype, IRSNB).

Genus *Pseudozumia* Saussure

Pseudozumia Saussure, 1875, Smiths. Misc. Coll. no. 254 (I), p. 128 (division of *Montezumia* Saussure).

Type species: *Montezumia indica* Saussure, 1855 (by monotypy).

The revision of the Indo-Malayan species, published by Giordani Soika in

1941, has been followed by this author's descriptions of some new species and subspecies in 1960. The following notes are to be regarded as a supplementary contribution to our knowledge of the genus. It should be noted, however, that the generic name is used here in a more restricted sense than in Giordani Soika's first paper, where this genus also includes some of the species discussed below under the generic name of *Coeleumenes*.

***Pseudozumia indica* (Saussure) (fig. 2e)**

This appears to be a polytypic species. It has been recorded from several localities, ranging from India to Formosa and Celebes, but the nominate race has not been found with certainty outside of Java and Bali. The question which of the described forms are only subspecifically distinct from *M. indica* and which of them are to be regarded as separate species deserves further study. In Sikkim and South China (Canton) the genus is said to be represented by a race of *P. indica* (subsp. *continentalis* Giordani Soika, 1960 and subsp. *paulomotata* Giordani Soika, 1941, resp.) as well as by a different species (*P. indosinensis* Giordani Soika, 1960). It would be of particular interest to investigate the conditions under which these closely related forms occur together.

***Pseudozumia indica indica* (Saussure)**

Montezumia indica Saussure, 1855, Ét. fam. Vesp., vol. 3, p. 167, pl. 9, figs. 4, 4a (in division *Parazumia*) — "Java (collection de M. le marquis Spinola)" [lectotype by present designation: ♀ in coll. Spinola, MT]. Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 41 (cat.); 1871, Jl. Proc. Linn. Soc. Zool. vol. 11, p. 374 (cat.) [excl. records from India and Celebes]. Saussure, 1875, Smiths. Misc. Coll. 254 (I), p. 128 (in new division *Pseudozumia*). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 276 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 39 (cat.) [erroneously recorded from "Am."!]; 1904, Gen. Ins., vol. 19, p. 28 (cat.) [excl. record from Sikkim!]. Bequaert, 1921, Rev. Zool. Afric., vol. 9, p. 249 (cat.) [excl. records from Sikkim and South China].

Pseudozumia indica ("forma tipica"); Giordani Soika, 1960, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 11 (1958), p. 91 ♀ ♂ (additional description; Java; Lombok).

Type. — De Saussure described this species from a female in the Spinola collection. The only specimen in this collection is labelled "Java, coll. Serville"; it bears an unpublished name dedicated to this French entomologist, with de Saussure as author. There seems to be little doubt that this is the type of *Montezumia indica*, for it agrees well with the description in being unusually large (23 mm from head to apex of second gastral segment) and in other characters. Consequently I have selected this specimen as the lectotype.

J a v a : 1 ♀ "Java" (lectotype, coll. Spinola; MT); 3 ♀ "Java", S. Müller (ML). — West Java: Banten, 2 ♀ Tjimidur, Nov. 1939, coll. van der Vecht (ML); 1 ♀ Mt. Botol, 2500', 26 Jan. 1940 (ML; this specimen is black,

without the usual metallic blue shine), 1 ♀ Pasauran, 23 May 1931, M. A. Lieftinck (MZB). 1 ♀ Mt. Halimun, May 1936, Mrs. M. E. Walsh (ML). Environs of Bogor: 1 ♀ Mt. Pantjar, Aug. 1936, F. Dupont (ML); 1 ♀ "Buitenzorg", leg. Moens (ML), 1 ♀ Tjiapus, Mt. Salak, 16 May 1932, W. C. van Heurn (ML); 2 ♀ Tapos on Mt. Gedeh, 800 m, Oct. 1932, L. G. E. Kalshoven, and Dec. 1932, J. van der Vecht (ML). Environs of Sukabumi: 1 ♂ from Lindemans, coll. van der Vecht (ML), 4 ♀ leg. F. Verbeek, van Groenendael and van der Vecht (ML). South coast: 1 ♀ Tjisolok, Dec. 1936, F. Dupont (ML); 1 ♀ Tjibamben, Dec. 1935, F. Dupont (ML). Djampang Tengah: 2 ♀, 1934 and April 1935, Mrs. M. E. Walsh (ML); 2 ♀ 1 ♂ Mt. Tjisuru, 1933, Mrs. M. E. Walsh (MZB); 1 ♀ Bodjong Lopang, April 1939, coll. van der Vecht (ML). Radjamandala: 1 ♀ 30 June 1935, L. J. Toxopeus (ML), 1 ♀ Dec. 1939, van Groenendael (ML), 4 ♀ April 1940 and Dec. 1940, J. Olthof (ML; MZB). — East Java: 1 ♀ Idjen, Bajukidul, 450-700 m, 14 Febr. 1932, H. Lucht (ML).

B a l i: 1 ♀ Ubud near Den Pasar, April 1940, W. Spies (ML); 1 ♀ Den Pasar, June 1935, Awibowo (ML).

***Pseudozumia indica borneana* Giordani Soika**

Pseudozumia indica borneana Giordani Soika, 1960, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 11 (1958), p. 92 — Borneo, Mount Dulit (holotype Mus. Berlin).

M a l a y a: 1 ♀ Kedah Peak, 2000 ft., 21 April 1930, no. 1860, H. T. Pagden (coll. Pagden). — Body black, with only very faint metallic reflections on head and thorax, slightly more shiny than in Javan specimens (typical *indica*) on account of the sparser basic puncturation (particularly the scutellum and the posterior part of the mesoscutum rather shiny); second gastral tergite with a narrow, smooth, slightly raised, apical margin; apical margin of third tergite similar, but only half as wide at the sides and even narrower in the middle. Wings less strongly infuscated than in typical *indica*, with coppery and purplish iridescence.

***Pseudozumia orientalis* (Gribodo)**

Montezumia orientalis Gribodo, 1892, Boll. Soc. Ent. Ital. 23 (1891), p. 272, ♀ — Pulo-Laut (island south east of Borneo) (1 ♀ MCG). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 40 (cat.) ["As."!]; 1904, Gen. Ins., vol. 19, p. 28 (cat.) ["Indien"!]. Bequaert, 1921, Rev. Zool. Afric., vol. 9, p. 249 (cat.) [error: type locality said to be "au nord-ouest de Borneo"].

Pseudozumia orientalis; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 164 (in key), 167, fig. 9, ♀ (holotype examined).

This appears to be a rare species, which was hitherto known from the type specimen only. Some years ago I found a second female among unidentified

material sent to me for study by the British Museum. I have compared this specimen with Gribodo's type in Genoa in 1957, and noted that the two agree in details of structure and sculpture as well as in coloration. The species is undoubtedly very closely allied to *P. indica*, but it is smaller, and the longitudinal striation of the dorsal part of the first gastral tergite is poorly developed. Whereas *P. indica* has here a median carina, flanked on each side by 5-6 distinct carinae, the sculpture on each side of the median carina in *P. orientalis* consists only of a few rows of very elongate punctures, separated by incomplete and irregular carinae. The petiole is very gradually dilated from base to apex; its length is 1.7 times the width at the apex (in the Bettotan specimen; I did not measure the holotype, in which the petiole is about twice as long as wide at apex, according to Giordani Soika, 1941, p. 164). The apical margins of tergites 2 and 3 are distinctly separated from the remainder of the tergites by a transverse impression; as seen in profile they appear to be slightly raised. As in the females of all other known *Pseudozumia* species the clypeus is flattened, with truncate anterior margin.

Borneo: 1 ♀ Pulo Laut, coll. Gribodo (holotype, MCG); 1 ♀ North Borneo, Bettotan near Sandakan, 31 July, 1927, C. Boden Kloss and H. M. Pendlebury (BM).

***Pseudozumia viridipennis* Giordani Soika**

"*Montezumia indica* Saussure", Smith, 1859, Jl. Proc. Linn. Soc. Zool., vol. 3, p. 19 (Celebes, leg. Wallace) [erroneous identification!].

Pseudozumia viridipennis; Giordani Soika, 1960, Boll. Mus. Civ. Stor. Nat. Venezia vol. 11 (1958), p. 92, ♀ ♂ — Celebes, 2 ♀ Patunuang, 1 ♀ Samanga, 1 ♂ Toli-toli, leg. H. Fruhstorfer (holotype from Patunuang and paratypes in coll. Giordani Soika).

The Celebes representative of *Pseudozumia* is distinguished by its relatively short and wide gastral petiole (length: width at apex = 1.42 : 1) and agrees in this respect with *P. indosinensis*, in which, however, the striation of the first gastral tergite is only poorly developed.

Celebes: South Celebes, 1 ♀ Samanga, Nov. 1895, 1 ♀ Patunuang, Jan. 1896, 1 ♀ "Lompa-Battau" (?Lompo Batang), 3000 ft., March 1896, all leg. H. Fruhstorfer, coll. von Schulthess (ETHZ); 2 ♀ "Mak" (= Makassar, leg. Wallace), ex coll. Smith (BM); 2 ♀ Bantimurung, July 1949, C. J. H. Franssen (ML); 1 ♂ Bonto-bonto, May 1949, C. J. H. Franssen (ML).

***Pseudozumia gracilis* sp. n.**

♀ — Very similar to *Pseudozumia indica* (Saussure), but differing in some morphological characters as well as in colour.

Fovea on vertex shallower; apical teeth of propodeum forming a sharp

angle, as seen from above (nearly rectangular in *P. indica*); gastral petiole longer, its length approximately twice its width at apex (1.9 to 2.06 \times , against 1.5 to 1.66 \times in *P. indica*); body slightly more shiny, the fine basic puncturation being less conspicuous and the coarser punctures somewhat shallower; scutellum only sparsely and rather finely punctate, without basic puncturation, the postscutellum even less distinctly punctate. Pubescence of gastral petiole thicker and more conspicuous, blackish.

Body black, without metallic blue iridescence; a small spot at the base of the mandibles and two small spots at apex of propodeum (sometimes absent) pale yellow; wings dark brown with violaceous reflections.

♂ — Similar to the male of *P. indica*, and like the female differing in being black, with more slender gastral petiole (length: width at apex = 1.9 : 1 to 2.1 : 1, against 1.5 : 1 to 1.7 : 1 in *P. indica*); the apical teeth of the propodeum, however, are short and blunt, much less developed than in the corresponding female (in the available males of *P. indica* the teeth are shaped as in the female of that species). Whereas in *P. indica* ♂ the apical margins of gastral tergites 2 and 3 are distinctly depressed at base and slightly raised, there is no trace of an apical depression in this species, these segments being regularly cylindrical at apex; the margins are even slightly swollen, and distinguished by being smooth, impunctate and somewhat brownish. In both species the anterior margin of the clypeus is rather deeply emarginate, but in *P. gracilis* the lateral teeth are a little sharper, and the emargination slightly deeper (width : depth = 3 : 1). Pubescence of propodeum and gastral petiole slightly denser than in the female; antennal scape yellowish anteriorly; inter-antennal spots absent (in *P. indica* ♂ two minute inter-antennal spots, always?); spots at apex of propodeum small or lacking.

Length (h. + th. + t. 1 + 2): ♀ 19-24 mm, ♂ 15-19 mm.

Philippine Islands: 1 ♀ Mindanao, from Staudinger (holotype, ML); 1 ♀ 4 ♂ Samar, Borongan (paratypes, ZSM; 2 ♂ ML); 1 ♀ Palawan, near Puerto Princesa, June 1945, H. H. Blakemore (CAS); 1 ♂ Luzon, Mt. Banahao, July 1917, leg. Böttcher (paratype, coll. von Schulthess, ETHZ); 1 ♀ "Philipp." (paratype, coll. Giordani Soika). — The gaster of the female from Samar is lacking beyond the petiole; in the female from Palawan the fine basic puncturation is more distinct than in the other specimens, and the apex of the propodeum is entirely black; perhaps the population inhabiting Palawan will prove to be subspecifically distinct.

Coeleumenes gen. n.

Head subcircular, rather thick, not much narrowed behind the eyes,

posterior ocelli about three times as far from the occiput as from the eyes; vertex hardly raised above the level of the eyes, with shallow postocellar fovea which is not margined anteriorly. Mandibles moderately elongate, their length about $\frac{3}{4}$ of that of the eyes, the cutting edge longer than the distance from the proximal tooth to the base, with three blunt and short, somewhat irregular teeth between the minute proximal tooth and the moderately sharp apical tooth. Labial palpi 3-segmented (the third segment with short narrowed apex or with partly fused fourth segment?), maxillary palpi 5-segmented. Clypeus about as wide as long, its sides strongly converging towards the narrow anterior margin which is more or less emarginate.

Thorax distinctly wider than high, as seen in profile regularly convex from pronotal carina to apical lamellae of propodeum. Pronotal carina distinct, but hardly raised, rounded at the shoulders; propleura with distinct pit slightly below the middle and directly behind the carina. Prescutal grooves of mesoscutum absent or only faintly indicated as short impressions which are narrowly but distinctly separated from the suture between scutum and scutellum. Mesepisternum with epicnemial carina and with crenulate furrows. Tegulae elongate, produced into a sharp tooth posteriorly, but not surpassing the apex of the posttegulae. Scutellum and postscutellum flattened, the former with more or less distinct impressed median line. Metapleura with pronounced transverse carina in upper part (as in *Calligaster*). Propodeum without apical spines, at the base with an elongate fovea, which is separated by a transverse ridge from the concavity in which a median carina is visible; the apex of the propodeum transformed into a partly translucent acarinarium.

First gastral segment (petiole) gradually widening from base to apex, without basal carina, as seen in profile the dorsal surface forming a regular arc, the tergite with more or less strongly projecting spiracles, and with a median groove near the apex, the sternite elongately triangular, more or less distinctly fused with the tergite at the base, the greater part of its surface rather regularly transversely striate.

Type species: *Montezumia impavida* Bingham, 1897.

Coeleumenes burmanicus (Bingham)

Montezumia burmanica Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 350, ♀ ♂, fig. 101 (p. 349) — Tenasserim (BM, type no. 18.212a). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 28 (cat.). Meade-Waldo, 1910, Ann. Mag. Nat. Hist., ser. 8, vol. 5, p. 47 (syn.: *Montezumia bisulcata* Cameron, 1900). Bequaert, 1921, Rev. Zool. Afr., vol. 9, p. 248 (cat.). Dover & Rao, 1922, Jl. Proc. As. Soc. Bengal, new series, vol. 18, p. 239 (Sikkim). Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 254 (Sikkim; Assam; Tenasserim).

Pseudozumia burmanica; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, pp. 165, 168, fig. 8 (1, 2, 7) (syn.: ? *Montezumia thoracica* Sonan, 1939).

Montezumia bisulcata Cameron, 1900, Ann. Mag. Nat. Hist., ser. 7, vol. 6, p. 535, ♀ — Khasia Hills, Assam, leg. Rothney (OUM). Meade-Waldo, 1910, Ann. Mag. Nat. Hist., ser. 8, vol. 5, p. 47 (syn. of *M. burmanica* Bingham).

Montezumia burmanica var. *malayana* Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 253, ♀ — Jor Camp, Perak, Malaya (BM).

?*Montezumia (Pseudozumia) thoracica* Sonan, 1939, Trans. Nat. Hist. Soc. Formosa, vol. 29, p. 132, ♀, figs. 2 and 4 — Formosa, "Suigen, Suô-gun, Taihoku-shu, 24 July 1930, J. Sonan" (coll. Sonan).

Pseudozumia burmanica var. *malayana*; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 168 (unknown to Giordani Soika).

The female is characterized by the very densely and finely, rugosely, punctate dorsal areas of the propodeum; except near the median furrow and at the apex the surface is rather dull, without any distinct interspaces between the punctures; the swollen apex (acarinarium) is impunctate and shiny; the pubescence on the yellowish-brown acarinarium is distinctly longer than that on the punctate parts of the propodeum.

As in *C. impavidus* the sculpture of the male is sparser than that of the female; the punctures on the dorsum of the propodeum are separated by distinct interspaces.

The status of *Montezumia thoracica* Sonan, 1939, probably a synonym of *C. burmanicus* (Bingham), deserves further investigation.

In both sexes *C. burmanicus* differs from *C. impavidus* in the coarser sculpture of several parts of the body; the mesepisternum is coarsely, reticulately, punctate, and the first gastral sternite is coarsely, transversely costate (finely striate in *C. impavidus*); the gastral petiole is relatively shorter.

Sikkim: 1 ♂ "Sikkim", coll. von Schulthess (ETHZ); 1 ♂ "Sikkim", April-June 1900, coll. Bingham (ZMB).

Assam: 1 ♀ Khasia Hills, coll. von Schulthess (ETHZ) (numerous Acari on thorax); 1 ♂ Naga Hills, coll. Bingham (ZMB).

Indo-China: 1 ♀ Tonkin, Than Moi, June-July, H. Fruhstorfer, coll. von Schulthess (ETHZ).

Siam: 1 ♀ Muok Lek, 1000 ft., January, H. Fruhstorfer (ML, received from Dr. Giordani Soika).

Malaya: Perak, 1 ♀ Batang Padang, Jor Camp, 1800 ft., 4 June 1923, H. M. Pendlebury (type of *Montezumia burmanica* var. *malayana* Dover); 1 ♀ Larut Hills, 500-1000 ft., 27 April 1938, H. M. Pendlebury (BM). — The specimen from Larut Hills is less extensively marked with yellow than that from Perak: clypeus with only two yellow spots at anterior margin; the pronotal band is partly obliterated and the yellow mark on the tegulae is hardly visible.

Coeleumenes rufopetiolatus (Wickwar)

Montezumia rufopetiolata Wickwar, 1908, Spol. Zeyl., vol. 5, pp. 118, 120, ♂, figs. 14, 15 — "Mamadu, Ceylon" (BM, type no. 18.214); 1909, Spol. Zeyl., vol. 6, p. 54 (Ceylon).

Pareumenes rufopetiolata; Dover, 1925, Jl. Proc. As. Soc. Bengal, new series, vol. 20 (1924), p. 297 (probably a *Pareumenes*).

Pseudozumia rufopetiolata; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 165 ["*rufopetoliata*"!], 168, ♂, fig. 8 (3, 6, 9) (holotype examined).

Very probably the males with partly red petiole, on which this species was based, will prove to be conspecific with *C. impavidus* (Bingham); the name *rufopetiolatus* may then be used for the Indian subspecies which in that case will probably be found to intergrade with the darker typical form of the Malayan subregion (see under *C. impavidus*, p. 49).

For the moment, however, I regard the status of this form as uncertain. I have not seen any other material than two males in the British Museum, both in rather poor condition. It would be desirable to study both sexes from Ceylon and to determine whether in the population inhabiting this island the colour pattern resembles that of the partly reddish specimens recorded under *C. impavidus* from Sikkim to Tenasserim. Perhaps this form will eventually also be found in Southern India.

Coeleumenes impavidus impavidus (Bingham)

Montezumia impavida Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 351, ♀ — Burma; Tenasserim (type ♀ Thaungyin Valley, Tenasserim, BM, no. 18,210). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 28 (cat.). Wickwar, 1908, Spolia Zeyl., vol. 5, p. 111 (Ceylon); 1909, Spol. Zeyl., vol. 6, p. 54 (Ceylon). Bequaert, 1921, Rev. Zool. Afric., vol. 9, p. 249 (cat.). Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 254 (in BM from Singapore).

Pseudozumia impavida; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, pp. 165, 168, fig. 8 (4, 5, 8).

This species shows considerable variation in the relation between the length of the gastral petiole (measured from the end of the muscular slit to the apex of the tergite) to the greatest width at the apex; it ranges from 2.0 to 2.2 in most females, but it is only 1.8 in a female from Sikkim and 1.7 and 1.9 in two females from Malaya; in the males the petiole is relatively longer, the length being 2.3 to 2.4 times the width, but only 2.1 in one of the males from Sikkim. The specimens with the stouter petiole appear not to be different in other respects.

It should be noted that in Giordani Soika's key (1941, p. 164) the statements concerning the gastral petiole under no. 4 have been exchanged; on p. 166 the petiole of *P. burmanica* is correctly figured as being stouter than that of *P. impavida* and *rufopetiolata*.

The males are rather different from the females (I have not yet seen males from localities South of Siam); the body is more shiny, with finer and more superficial puncturation, and more slender; the yellow markings are more or less reduced: markings of face cut off at level of upper margin of eye-emarginations; yellow mark on temples behind upper part of eye only; pronotal band more or less reduced, mesoscutum black, further markings of thorax reduced or absent, gastral petiole with narrow apical band, the band on tergite 2 wider, but usually relatively narrower than in the female, the apical bands of tergites 3 and 4 often reduced to a short line in the middle, in some specimens these tergites even entirely black.

Sikkim: 4 ♀ 3 ♂ "Sikkim", coll. Bingham (ZMB). — One female has the yellow markings more extensive than usual; median mark on frons confluent with the lines at the inner orbits, ground colour of mesepisternum, metapleura, propodeum, and first and second gastral segments ferruginous; the other females are darker, only the basal two thirds of the gastral petiole being mainly reddish; in all females the legs beyond the fuscous bases of the femora are ferruginous with some yellow markings. In the males the ground colour of the petiole and the legs is either black (2 ♂) or partly ferruginous (1 ♂).

West Bengal: 1 ♂ Darjeeling, ex coll. Fruhstorfer (ZMB). — Ground colour of petiole red, but the tergite with ill-defined black band at apex.

Assam: 1 ♂ Naga Hills, coll. Bingham (ZMB). — Ground colour of sternite and basal two thirds of tergite of petiole ferruginous.

Tenasserim: 1 ♂ Ataran Valley, April 1898, coll. Bingham (ZMB); 1 ♀ 2 ♂ Thaungyin Valley, March 1890, coll. Bingham (BM; ZMB); 4 ♂ Haundraw Valley, Oct. 1891 (BM) and March 1894 (ZMB), coll. Bingham. — Ground colour of gastral petiole usually black; partly red (as in the male from Assam) in the specimen from Ataran Valley.

Siam: 1 ♂ Hinlap, January, leg. Fruhstorfer (NMW); 1 ♂ Muangfang, 16 March 1961, K. Iwata (ML).

Malaya: 1 ♀ Perak, Kuala Kangsar, 1902, leg. Grubauer (NMW); 1 ♀ Pahang, Jerantut Batu Balai, 19 March 1927, E. Seimund (BM); 1 ♀ Kuala Lumpur, 1 May 1932, H. M. Pendlebury (BM) (gastral petiole shorter than usual, length: width at apex = 1.7); 1 ♀ Singapore, H. N. Ridley (BM). — In the female from Perak several Acari protrude from under the posterior margin of the fourth gastral segment, ventrally as well as dorsally; there are also some mites on the propodeum and at the base of the second gastral tergite.

Borneo: West Borneo, 1 ♀ Bengkajang, Ledo at Upper Sambas River.

25 July 1933, H. R. A. Muller (ML); East Borneo, 3 ♀ Maluwi, Palawan-besar, and Ketapan, all May 1937, leg. Mrs. M. E. Walsh (ML). — Yellow markings generally somewhat less extensive than in the female from Perak, which has the clypeus entirely yellow and the apical band of the third tergite almost complete; in the Bornean specimens there is usually a small black median mark on the anterior half of the clypeus, the yellow line at the inner orbits may be more or less reduced above the eye-emargination, the yellow lines on the mesoscutum are somewhat reduced, the band on the second tergite is narrower and that on the third reduced to a transverse line on the middle third of the tergite. In all specimens only the apical angles of the second sternite are marked with yellow, but these markings are smaller in the Bornean specimens.

***Coeleumenes impavidus conformis* subsp. n.**

♀ — Similar to typical *C. impavidus*, but the yellow markings of head and thorax reduced and those of the gaster more extensive.

Structure and sculpture mainly as in the typical form; the striae on the sides of the propodeum slightly more distinct and the raised apical margin of the second gastral tergite a trifle narrower.

Black; mandibles partly reddish brown, first gastral tergite with reddish blotch on basal half, apical half of first sternite red; femora I reddish at apex, II and III reddish, more or less infuscated at base and above, tibiae I brownish on inner side, II and III partly reddish, the latter rather strongly infuscated; tarsi brown, the apical segments paler; the following parts yellow: a small spot at the base of the mandibles, four spots on the clypeus, an inter-antennal spot (narrowest in lower half), a line at inner orbits between the clypeus and the centre of the eye-emargination, a short line on the temples, two small transverse marks at anterior margin of dorsal surface of pronotum, an indistinct spot at lateral margins of mesoscutum, just in front of the tegulae, a spot in posterior angle of tegulae, the posttegulae, two spots at apex of propodeum (not quite covering the posterior half), apical bands of gastral tergites 1-3 (the band on 1 narrow in the middle, strongly dilated at the sides, that on 2 gradually widening from the middle, where it is hardly wider than the first band, to the sides where it covers nearly the posterior half of the tergite, the band on 3 moderately wide, shallowly emarginate on each side anteriorly), a transverse spot in the middle of the posterior margin of tergites 4 and 5 (on 4 larger than on 5), an elongate spot at the sides of the first gastral sternite near the apex, a triangular spot in the apical angles of the second sternite, a spot at apex of femora I and a line on anterior surface of tibiae I.

Length (h. + th. + t. 1 + 2): 13-14 mm.

West Java: 1 ♀ Radjamandala, 350 m, 20 Dec. 1940, J. Olthof, at light (holotype, ML); 1 ♀ Djasinga, 100 m, 2 Aug. 1952, M. A. Lieftinck (paratype, ML). — In the paratype the yellow markings are more extensive than in the holotype: mesepisternum with yellow spot in upper part, spots on propodeum larger (near the black median furrow covering the posterior half), apical band of second tergite wider (laterally covering the posterior two thirds), gastral petiole and legs slightly more extensively reddish.

Central Java: 1 ♀ Semarang, 1905, E. Jacobson (paratype, coll. Giordani Soika).

Coeleumenes multicolor (Giordani Soika) (fig. 2f, p. 15)

Pareumenes multicolor Giordani Soika, 1935, Ann. Mus. Civ. Stor. Nat. Genova, vol. 57, p. 138, ♀ — Tambora, Sumbawa (in subgenus *Pareumenes*; 2 ♀, type in coll. Gribodo, MCG). Van der Vecht, 1937, Treubia, vol. 16, p. 272 (cat.).

♂ — The following notes are based on two males from Sumbawa: Anterior margin of clypeus with a deep, almost semicircular, emargination. Apex of antenna as in "*Pareumenes*" *vindex* (Sm.). (Compare Giordani Soika, l.c., fig. IV, 5). Propodeum on each side with a remarkable translucent, bluntly rounded expansion, which has an approximately circular opening laterally¹⁾.

Sculpture much finer than in the female, especially head and thorax more sparsely and superficially punctate and more shiny.

Yellow markings as in the female, but the spots on the clypeus coalescent, mandibles with yellow spot, scutellum black, tegulae black with a small yellow spot in front and a larger one behind, propodeum with yellow line along the margin of the translucent expansions, apical band of second tergite narrow. Basal half of gastral petiole red; legs ferruginous, but coxae, trochanters and base of femora blackish, mid and hind tibiae and tarsi slightly infuscated on outer side, femora II and III with pale yellow spot or line at apex.

Length (h. + th. + t. 1 + 2): 10-11 mm.

A series from Sumba, consisting of one female and ten males, appears to differ in some respects from the few specimens hitherto described from Sumbawa, but the available material is not extensive enough to decide at this moment whether the Sumba population must be regarded as a separate subspecies.

1) Some specimens bear great numbers of Acari in and around these openings, indicating that this peculiar structure functions as acarinarium.

The female agrees well with the original description; the males have the gastral petiole slightly more extensively red, the colour of the yellow markings darker, the band on the second gastral tergite wider (laterally nearly $\frac{1}{4}$ of the length of the tergite), and the legs more brightly ferruginous (only coxae, trochanters and extreme base of femora dark). The extent of the yellow markings is variable: the series contains one male with four coalescent spots on the clypeus, two without spots, the others representing various transitions between these two extremes. The most brightly coloured male has two small yellow spots on the scutellum, and a small median spot at apex of tergites 3-5.

In the female from Sumba the apex of the propodeum is not marked with yellow, except in the median furrow, it is more swollen and more extensively translucent than in *C. impavidus*; the puncturation of the dorsal areas of the pronotum is coarser, but not denser than in that species, and the clypeus is more deeply emarginate; the sides of the propodeum are only finely striate, with some punctures between the striae.

S u m b a w a : 1 ♂ Raba, 20 May 1949, Swiss Sumba Expedition (allotype, NMB); 1 ♂ West Sumbawa, 15 May 1927, Dr. B. Rensch (ZMB).

S u m b a : 1 ♀ Waimangura, 18 Aug. 1949 (NMB); 8 ♂ Lokojengo, 2 ♂ Pogobina (NMB, MZB, ML); all collected by the Swiss Sumba Expedition.

***Coeleumenes timorensis* sp. n.**

♀ — Similar to *C. multicolor* (Giordani Soika), but the gastral petiole relatively longer, the sides of the propodeum not striate, the apical teeth of the clypeus slightly blunter, and the coloration different.

Head and thorax mainly as in *C. multicolor*; clypeus more shallowly emarginate anteriorly (depth: width of emargination = 1 : 4, against 1 : 3 in *C. multicolor*); prescutal furrows of mesoscutum very faintly indicated; propodeum as in *C. multicolor*, with a remarkable, somewhat swollen, translucent acarinarium; lateral areas of propodeum finely coriaceous, without distinct striation, and with only a few superficial punctures. Gastral petiole with slightly finer puncturation, its length more than twice its width at the apex (less than twice in *C. multicolor*); apical margin of second tergite slightly wider than in *C. multicolor*, and hardly raised.

Black; mandibles partly dark brown, inner side of fore and mid tibiae and fifth segment of all tarsi pale brown; tegulae brownish on outer side; the following parts pale yellow: a triangular spot at the base of the mandibles, a broad band on the base of the clypeus, usually coalescent with two spots on anterior half, a line at under side of antennal scape, a spot on the frons, narrowed between the antennae, a line at inner orbits, from

clypeus to a spot in the eye-emarginations, a line on the temples, a narrow band (narrowest in the middle) at the anterior margin of the dorsal surface of the pronotum, a spot in upper part of mesepisternum, four short lines on the mesoscutum (two near the middle and close to the scutellum, and two smaller ones at lateral margin in front of the tegulae), spots in anterior and posterior angles of tegulae, the posttegulae, a small spot on each side of the scutellum, two oblique and slightly larger spots on postscutellum, an irregular band in front of the membranaceous apex of the propodeum, narrow pre-apical bands on tergites 1 and 2 (the band on 2 with broad and shallow emargination on each side of the middle, slightly dilated laterally, but even here its width less than one fifth of the length of the segment), a small median spot at apex of tergites 4 and 5, a line at lateral margins of sternite 1, running from the level of the stigmata to the apex, where the lines are connected by a narrow transverse band (indistinct in the middle), a spot in apical angles of sternite 2, a line on outer side of coxae II and III, a mark at apex of femora (large on femora I and very small on III), a line on outer side of tibiae I and II, and a small spot at apex of tibiae III. — In the paratypes the markings are slightly less extensive; the spots on tergites 4 and 5 are usually lacking, and the lines on the mesoscutum may be entirely absent.

♂ — Similar to the female, but smaller and more shiny, particularly the vertex and the second gastral tergite more finely and shallowly punctate. Thirteenth antennal segment (hook) slightly curved, in recurved position reaching the apex of the tenth segment; clypeus rather broad anteriorly, the apical teeth slightly sharper; apex of lateral areas of propodeum with deep and large fovea; apical margin of second gastral tergite distinctly raised. Puncturation of dorsal areas of pronotum coarse, but distinctly sparser than in the female.

Yellow markings of thorax and gaster reduced; mesoscutum and scutellum entirely black or only the posttegulae yellow, spot on mesepisternum small, tegulae with small spot in posterior angle, propodeum without yellow band, apical bands of tergites 1 and 2 strongly reduced (in both males the second tergite has only a short line in the middle of the apical margin), spots on sternites 1 and 2 small, third and following segments black; yellow markings of legs reduced or absent.

Length (h. + th. + t. 1 + 2): ♀ 12-14 mm, ♂ 10-11 mm.

T i m o r: 5 ♀ 2 ♂ "Timor", leg. Wienecke (holotype ♀ and paratypes, ML); 1 ♀ Kapan, Nusimetan, 900 m, March 1939, S. Bloembergen (paratype, ML); 1 ♀ Kupang ("Cupan"), April 1889, leg. Loria (paratype, coll. Giordani Soika); 1 ♀ "Timor" (paratype, hind legs entirely black; MHNG).

Coeleumenes vindex (Smith)

Eumenes vindex Smith, 1859, Jl. Proc. Linn. Soc. Zool., vol. 3, p. 20, ♂ — Celebes, leg. Wallace (OUM); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 373 (cat.). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 269 (cat.; regarded as a variety of *E. pomiformis* Rossi).

Eumenes pomiformis Fabr. var. *vindex*; Dalla Torre, 1894, Cat. Hym. vol. 9, p. 31 (cat.); 1904, Gen. Ins., vol. 19, p. 24 (cat.).

Pareumenes vindex Giordani Soika, 1935, Ann. Mus. Stor. Nat. Genova, vol. 57, p. 142, ♂, fig. IV, pl. 2 fig. 6 (in subgenus *Pareumenes*, redescription; Makassar; perhaps to *P. artifex*?). Van der Vecht, 1937, Treubia, vol. 16, p. 272 (compared with *P. artifex*).

Eumenes artifex Smith, 1861, Jl. Proc. Linn. Soc. Zool., vol. 5, p. 86, ♀ (in division *Pareumenes* Saussure) — "Makassar", leg. Wallace (OUM); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 373 (cat.). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 269 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 18 (cat.); 1904, Gen. Ins., vol. 19, p. 21 (cat.) [error: "Senegal"].

Pareumenes artifex; Giordani Soika, 1935, Ann. Mus. Stor. Nat. Genova, vol. 57, p. 140, ♀ (in subgenus *Pareumenes*; redescription; Makassar). Van der Vecht, 1937, Treubia, vol. 16, p. 272 (South Celebes).

In the female the colour pattern of the gastral segments appears to be rather variable. According to Smith the type of *E. artifex* has only "a narrow subinterrupted yellow fascia" at the apex of the second tergite; the female from the collection of the British Museum, described by Giordani Soika (1935), has a very narrow band on both the first and the second tergites. In the specimen recorded by me in 1937 (1 ♀, South Celebes) under *P. artifex* the first band is reduced to a hardly visible spot near the middle of the apical margin, and the second to a short and narrow line on each side of the apical margin of the second tergite. The specimens recorded below from North Celebes agree with that in the BM; the first band is narrow, and abbreviated laterally, the second somewhat wider, dilated at the sides, but narrowed on each side of the middle.

In view of the variability of the yellow markings, and of the sexual differences in colour and sculpture observed in some other species of this genus, I do not hesitate any more to regard *vindex* and *artifex* as the sexes of one species. It should be noted that my statement concerning the length of the apical "spines" (actually only blunt teeth) of the propodeum (van der Vecht, 1937, under *P. vindex*) is incorrect; these teeth are very short in the male (see Giordani Soika, 1935, fig. IV, 4), but obsolete in the female. The name *vindex* has priority; the species appears to be restricted to Celebes.

Celebes: 1 ♀ "Mak" (OUM; type of *Eumenes artifex* Smith); 1 ♂ "Mak" (OUM; lectotype of *Eumenes vindex* by present selection, without spots on postscutellum), 1 ♂ "Celebes" (syntype of *E. vindex*, with spots on postscutellum); 1 ♀ South Celebes, Dec. 1936 (ML); 1 ♀ North Celebes, Mt.

Bugason, 300 m, 15 Aug. 1941, F. Dupont (ML), 1 ♀ Toli-toli, Nov.-Dec. 1895, H. Fruhstorfer, coll. von Schulthess (ETHZ; many Acari on propodeum).

***Coeleumenes secundus* (Dalla Torre)**

Odynerus fallax Smith, 1862, Jl. Proc. Linn. Soc. Zool., vol. 6, p. 58, ♀ — Djailolo, Northern Moluccas, leg. Wallace (type OUM); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 377 (cat.).

Odynerus secundus Dalla Torre, 1889, Wien. Ent. Ztg., vol. 8, p. 125 [new name on account of secondary homonymy with *Leptochilus fallax* Saussure, 1852, a species which Dalla Torre considered to belong to *Odynerus*]; 1894, Cat. Hym., vol. 9, p. 95 (cat.); 1904, Gen. Insect., vol. 19, p. 54 (cat.).

Pareumenes (Pareumenes) secundus; van der Vecht, 1937, Treubia, vol. 16, p. 272 (note on type).

♀ — Similar to *C. vindex* (Smith), but less slender, the puncturation much finer, and the gastral petiole relatively shorter (length: width at apex = 1.6 : 1, against 1.9 : 1 in *C. vindex*). Apical margin of second gastral tergite narrow, only about half as wide as in *C. vindex*, slightly raised.

Colour pattern of head and thorax mainly as in *C. vindex*; supraclypeal area with yellow spot (3 ♀) or black (1 ♀ Obi, 1 ♀ Batjan), dark spot on clypeus variable, in the darkest specimen (Batjan) the yellow area reduced to four spots. Mesoscutum with two yellow lines near the middle and two at lateral margins in one specimen (Obi; markings similar to those of *Eumenes arcuatus amboinensis* but less complete); in the others the lines near the middle absent and those at the lateral margins somewhat reduced. Apex of propodeum on each side with large yellow spot which encloses a discoloured membranaceous area; the spots not coalescent in the middle, the concavity being at most somewhat yellow laterally near the apex; the apical rim translucent and less strongly swollen than in *E. vindex*.

Apical bands of gastral segments ochreous yellow; those of tergites 1-3 rather wide, the first and second bands more or less dilated on the sides, tergite 4 with short band in the middle of the apical margin, 5 black or with small spot; first and second sternites with narrow apical band, which is dilated laterally and more or less reduced or interrupted in the middle, tergite 3 with small spot in apical angles. Legs red; coxae and trochanters mainly or almost entirely blackish, apex of femora I and II with yellow spot, tibiae I yellow anteriorly.

Length (h. + th. + t. 1 + 2) : 13-14 mm.

Northern Moluccas: 1 ♀ "Gil.", (= Gilolo or Djailolo, Halma-hera), holotype (OUM); Obi Island, 2 ♀ Anggai, 2 ♀ Laiwui, Sept.-Oct. 1953, A. M. R. Wegner (ML; MZB); Batjan Island, 1 ♀ Wajaua, June-

July 1953, A. M. R. Wegner (ML). — The specimen from Batjan is slightly darker than the others (see above); the yellow markings at apex of propodeum are reduced to some small spots around the translucent areas.

***Coeleumenes ruficrus* sp. n.**

♀ — Similar to *C. secundus* (Dalla Torre), but differing as follows: anterior margin of clypeus shallowly emarginate (width: depth of emargination = 11 : 3, against 11 : 4 in *C. secundus*), the distance between the apical teeth slightly more than one fourth of the interocular distance at the clypeus (11 : 40); apex of propodeum with a shallow depression on each side of the median excavation, without distinct translucent areas. Gastral petiole slightly more slender (length: greatest width = 1.7 : 1, against 1.6 : 1 in *C. secundus*). Puncturation of propodeum and gastral petiole slightly coarser and denser; the punctate area of the propodeum almost reaches the apex.

Black; colour pattern similar to that of *C. secundus*, but the legs (including the coxae) and the greater part of the mandibles and the first and second antennal segments bright red (apical margin of coxae I beneath, a spot at apex of femora I, a spot at the base of the mandibles, and a line on the first antennal segment, pale yellow); colour of yellow markings distinctly paler; clypeus black with crescent-shaped band at base; inner orbits with yellow line near antennal bases; band on prothorax narrowly interrupted in the middle, gradually widening to the sides; mesoscutum with only a small spot at lateral margins in front of the tegulae; apex of propodeum with two small spots in the apical part of the median excavation, and a minute spot or line near the apical lamella (markings of head and thorax otherwise as in *C. secundus*); gastral tergites 1 and 2 with rather narrow apical band (on 2 slightly emarginate in the middle anteriorly and more broadly on each side of the middle); apex of tergites 3 and 4 with traces of yellow band in the middle; apical margin of sternite 1 brownish, with small yellow spot in lateral angles.

♂ — More slender than the female and with slightly different colour pattern; anterior margin of clypeus relatively wider (two fifths of greatest width of clypeus), rather deeply emarginate (width: depth = 3 : 1) with sharper lateral teeth; apical antennal segment (hook) slightly curved, reaching back to the apex of the tenth segment; apex of propodeum on each side of the apical valvulae obliquely truncate, this part forming a bluntly rounded angle with the sides; translucent areas distinct; length of gastral petiole more than twice its width at apex; clypeus yellow with median black spot; apical antennal segments ferruginous beneath; tegulae with only a yellow spot in posterior angle; mesoscutum black (except for the post-

tegulae), spots on postscutellum confluent or separated; propodeum at apex on each side with large yellow mark enclosing a translucent area (the spot somewhat reduced in the ♂ from Laha); apical band of second gastral tergite very narrow and twice interrupted; coxae and trochanters slightly infuscated.

Length (h. + th. + t. 1 + 2) : ♀ 14 mm, ♂ 12-13 mm.

Southern Moluccas: Ambon, 1 ♀ 1 ♂ Laha, 16 Oct. 1949, M. A. Lieftinck (holo- and allotype resp., ML); 1 ♂ Ambon, Oct. 1949, M. A. Lieftinck (paratype ML); 1 ♂ "Amboina" (coll. Giordani Soika) (clypeus more extensively black than in the allotype, gastral tergite 2 with only a short and thin yellow apical line in the middle).

3. ON *ANTERHYNCHIUM* SAUSSURE AND SOME RELATED GENERA

The genera discussed in this section comprise most of the East Asiatic and Indo-Australian wasps that have hitherto been placed in the genus *Rhynchium* or *Rygchium*. They have the following characters in common:

Pronotum with complete transverse carina, its anterior surface smooth, without median pits or impressions. Tegulae as a rule not extending beyond the apex of the posttegulae. Propodeum without apical spines above the valvulae. Second recurrent vein in fore wing never very close to the third intercubital vein.

Most of these characters are also found in the genera *Euodynerus* Dalla Torre and in *Pseudepipona* Saussure¹⁾, but both these groups are distinguished by the longer tegulae; moreover the parastigma of the fore wing is relatively shorter than in the genera discussed below.

Key to the genera

1. Third submarginal cell separated from the apex of the marginal cell by a short distance, about equal to half the width of this cell (fig. 5, a-c). Postscutellum usually entirely forming part of the dorsal surface of the thorax, rarely slightly sloping towards the propodeum, never with a pronounced declivous, posterior, surface. Transverse basal groove of second gastral sternite indistinctly carinate. Seventh gastral sternite of ♂ with one or two tubercles, in some species also the second sternite in this sex tuberculate. Basal lamina of volsella of ♂ armed with a spine. *Allorhynchium* gen. n.
- Third submarginal cell further away from the apex of the marginal cell (fig. 5, d-h, fig. 7) 2

1) These genera are delimited here in accordance with Blüthgen (1938, Deutsch. Ent. Zeitschr. 1938, pp. 434-496, in key); Giordani Soika has been inclined to use the name *Pseudepipona* in a much wider sense (1953, Bull. Soc. Nat. Maroc 32, pp. 235-267).

2. First gastral tergite with a distinct transverse ridge separating the anterior, vertical, portion from the posterior part (as in *Ancistrocerus* Wesmael). Anterior margin of clypeus wide, more or less emarginate 3
- First gastral tergite without transverse ridge or carina. (Parastigma of fore wing more than half as long as the stigma) 4
3. Labrum of female rather densely covered with long stiff hairs (best visible as seen in profile!). Parastigma of fore wing nearly half as long as the stigma. Dorsal areas of propodeum not extending medially to form a horizontal area behind the postscutellum; the declivity not margined by a crest . . . *Orancistrocerus* gen. n.
- Labrum of female with very short pubescence, at most with a few longer hairs at the anterior margin. Parastigma shorter, distinctly less than half as long as the stigma. Concavity of propodeum margined by a crest (which is incised dorsally in the middle), separated from the postscutellum by a short horizontal area. *Pararrhynchium* Saussure
4. Scutellum and posterior part of mesoscutum smooth, at most finely and sparsely punctate; postscutellum depressed medially and bluntly projecting laterally, as seen from above and in front distinctly concave; mid femora of ♂ emarginate at base; digitus volsellaris of male genitalia rather short, with a marginal comb of spines. *Rhynchium* Spinola
- Mesoscutum and scutellum densely punctate throughout; postscutellum not conspicuously raised laterally, its outline as seen from above and in front slightly arcuate, usually irregularly crenulate; mid femora of ♂ at most slightly flattened at the base beneath; digitus volsellaris of male genitalia longer, pubescent, at base with short black denticles (fig. 6) *Anterhynchium* Saussure

Allorhynchium gen. n.

Mandibles dull, microscopically granulate, the usual carinae only faintly indicated, the teeth very wide and low.

Vertex of ♀ with small fovea, more or less distinct, sometimes absent or indicated by a tuft of hairs.

Postscutellum usually forming part of the dorsal surface of the thorax (and then the propodeum raised to, or even partly above, the level of the postscutellum) or slightly sloping; declivity of propodeum with median carina which runs upwards into a deep, oval, fovea at a short distance from the postscutellum; the declivity more or less concave, but not sharply margined.

Basal, narrow, part of first gastral sternite rather dull, microscopically rugose, not transversely striate, enclosed area sunken, bordered anteriorly by a strongly developed arcuate carina, irregularly rugose. First gastral tergite often with tendency to form a transverse rim at the junction of the anterior and the dorsal faces; longitudinal carinae in transverse groove at base of second sternite weakly developed and rather irregular.

Wings: outer vein of third submarginal cell anteriorly very close to apex of marginal cell, the fourth abscissa of the marginal vein usually only about half the length of the third; parastigma slightly shorter than stigma, and also a little shorter than the anterior part of the basal vein (Rs).

Gaster: seventh gastral sternite of male with one or two tubercles; in some species the second sternite excavated or armed with two teeth or with a flattened tubercle.

Type species: *Vespa argentata* Fabricius, 1804.

Key to the species

1. Pronotal carina forming at most a bluntly rounded angle at the shoulders. Sides of pronotum in dorsal view almost straight. 2
- Pronotal carina forming a right or even sharp angle at the shoulders. Sides of pronotum in dorsal view sinuate. Larger species with dark brown, or half yellow, half brown, wings. 3
2. Clypeus anteriorly with two flat, rounded teeth, separated by a narrow and rather deep (♀) or deep (♂) median incision (fig. 3, a, b). Basal half of wings yellow, apical half brown. Clypeus of ♂ with pale yellow mark. (Java). *concolor* sp. n.
- Shape of clypeus and colour of wings different (throughout Oriental region). Group of *A. argentatum* (F.).
3. Clypeus anteriorly truncate or very shallowly emarginate (fig. 3, c, d). (Frons and vertex with dense, short, erect, pubescence, intermingled with sparser and longer, curved, hairs). (Java; Thailand) *vollenhoveni* (Saussure)
- Anterior margin of clypeus bidentate, the teeth short, but rather sharp, and separated by a wide trapezoidal or arcuate incision (much wider than deep). 4
4. Propodeum dorsally produced into two sharp teeth, protruding close to the middle behind the postscutellum. Gastral sternite 7 of ♂ with two tubercles at base. (Celebes). 5
- Propodeum at most somewhat bluntly projecting behind the postscutellum. Gastral sternite 7 of ♂ with one large, flattened, semicircular tubercle at base. (Islands of the Sunda shelf and Philippines) 6
5. Tomentum of thorax black, of gaster greyish. Wings dark brown with violaceous reflections (North and Central Celebes). *laminatum laminatum* (Gribodo)
- Thorax without distinct tomentum, gaster dull, with fine black tomentum. Wings as in *A. l. laminatum*, but with a distinct greenish tinge. (South Celebes). *laminatum nigrescens* subsp. n.
6. Emargination of anterior margin of clypeus angular, trapezoidal; the lateral teeth rather sharp (fig. 3, e, f). (Islands of the Sunda shelf). 7
- Emargination of anterior margin of clypeus arcuate, the lateral teeth blunter. (Philippine Islands). *quadrituberculatum* (Schulthess)
7. Tomentum of body greyish; wings dark brown with violaceous (sometimes also greenish) reflections. (Borneo, Banka, Billiton, N. W. Java, and islands in Java Sea). *snelleni snelleni* (Saussure)
- Tomentum of body very dark brown to black 8
8. Wings dark brown, at most slightly yellowish at extreme base. (Java, perhaps restricted to part of Central Java). *snelleni javanum* (Saussure)
- Basal half of wings translucent yellow, apical half brown with bronzy and violaceous reflections. (Java). *snelleni imitator* subsp. n.

Group of *Allorhynchium argentatum* (Fabr.)

The forms of this group inhabit the entire Oriental region, occurring northward to China (perhaps also in Japan) and eastward to the Moluccas. The taxonomy of the group requires further study, and for the moment I

shall only give a list of the available specific names, in chronological order.

A. argentatum (Fabricius) = *Vespa argentata* Fabricius, 1804, Syst. Piez., p. 260 — Sumatra, leg. Daldorff (type in coll. Fabricius).

A. metallicum (Saussure) = *Rygchium metallicum* Saussure, 1852, Ét. fam. Vesp., vol. 1, p. 114, ♀ ♂, pl. 14 fig. 8 (♀) — locality not given.

A. obscurum (Smith) = *Rhynchium obscurum* Smith, 1858, Jl. Proc. Linn. Soc. Zool., vol. 2, p. 110, ♀ — Sarawak, Borneo, leg. Wallace (type OUM).

A. iridipenne (Smith) = *Rhynchium iridipenne* Smith, 1861, Jl. Proc. Linn. Soc. Zool., vol. 5, p. 128, ♀ — Amboina, leg. Wallace (type OUM).

A. chinense (Saussure) = *Rhynchium* (div. *Prorhynchium*) *chinense* Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 186, ♀ ♂ — “La Chine” (type coll. Saussure, MHNG).

A. clypeatum (Cameron) = *Rhynchium clypeatum* Cameron, 1900, Ann. Mag. Nat. Hist., ser. 7, vol. 6, p. 531, ♂ — Barrackpore, Bengal, India (type BM, no. 18.457).

A. lugubrinum (Cameron) = *Rhynchium lugubrinum* Cameron, 1900, Ann. Mag. Nat. Hist. ser. 7, vol. 6, p. 532, ♀ — Khasia Hills, Assam (type coll. Rothney, OUM).

A. maldivense (Cameron) = *Rhynchium maldivense* Cameron, 1901, in Gardiner, Fauna Geogr. Maldive & Laccadive Archip., vol. 1, p. 57, ♀ ♂ — Maldive and Laccadive Is. (types BM, no. 18.456, a-c).

? *A. brevilineatum* (Cameron) = *Rhynchium brevilineatum* Cameron, 1911, Entomologist, vol. 44, p. 287, ♂ — “Japan, sent by Mr. T. Fukai, of Konosu, Saitama” (type BM, no. 18.466, consists only of head and anterior part of thorax).

The following form is of particular interest, because it appears to be a richly decorated representative of *A. argentatum* (F.), a species which is uniformly black in most of its area of distribution. Careful comparison of this form with specimens from Sumatra and Java has failed to reveal distinguishing structural characters; even the shape of the male genitalia of the Sumbanese specimens is practically identical with that of typical *argentatum*.

Allorhynchium argentatum tigrinum subsp. n.

♀ — Black; apical half of mandibles partly brownish; tegulae brownish yellow; inner orbits with pale yellow spot above the clypeus (often absent); the following parts ferruginous: labrum, first and second antennal segments, dorsal area of pronotum (more or less suffused with yellow and extending

on the anterior surface), a small spot in upper part of mesepisternum, two large marks on the propodeum, and all the legs beyond the trochanters; coxae and trochanters black, more or less marked with ferruginous at apex. Apical margins of gastral tergites 1-5 broadly testaceous, moreover these tergites with dull reddish yellow pre-apical band, fairly wide on tergites 1 and 2, narrow and sometimes indistinct on tergites 3-5; sternites narrowly reddish at apical margin, apex of sixth segment dull red. In one specimen from Pogobina the clypeus, the postscutellum, and a line at the posterior margin of the scutellum, are ferruginous yellow. Tomentum and pubescence brownish yellow, on the lower half of the face the tomentum rather conspicuous and in certain lights with a faint golden shine.

Wings less strongly infuscated than in typical *argentatum*, with pronounced yellowish tinge and with coppery effulgence, only very slightly violaceous.

♂ — Very similar to the female, clypeus as a rule with two transverse yellowish spots at the base, but in some specimens entirely black; mandibles only slightly reddish at apex; seventh gastral segment black, often narrowly reddish at apex.

Length (h. + th. + t. 1 + 2) : ♀ ♂ 9-11 mm.

The holotype is a female from Sumba, Lokojengo, 26 Sept. 1949, Dr. Bühler and Dr. Sutter, Swiss Sumba Expedition (NMB); the other specimens recorded below are paratypes.

S u m b a: 26 ♀ 56 ♂ from several localities (Kodi, Waimangura, Rua, Waikarudi, Pogobina, Lokojengo, Lindiwatju, Langgaliru and Laluku), July-Oct. 1949, Swiss Sumba Expedition (NMB; MZB; ML).

Allorhynchium concolor sp. n. (fig. 3, a, b, fig. 5, c)

Rhynchium vollenhoveni; Schulz, 1904, Berl. Ent. Zeitschr., vol. 49, p. 223 (note), 224 (Lawang, East Java). Schulthess, 1931, Mitt. Schweiz. Ent. Ges., vol. 15, p. 51 ("*Rh. vollenhofeni*"; compared with *Rh. mamillatum* Schulthess) [not *Rh. vollenhoveni* Saussure].

This species may be regarded as a somewhat aberrant member of the *argentatum*-group. It agrees with *argentatum* and allied species in the shape of the pronotum, but it differs in the shape of the clypeus, the propodeum, the seventh gastral sternite of the male, and in coloration.

♀ — Clypeus and mandibles: fig. 3a; eyes hardly farther apart on the vertex than at the clypeus (29 : 28), posterior ocelli very slightly farther apart than from the eyes. Temples, as seen from above, convex, narrowed posteriorly, in lateral view narrower than the eyes. Vertex with small post-ocellar fovea. General shape of thorax as in *A. argentatum*, but the propodeum not raised behind the postscutellum, and the latter therefore with a tendency to form part of the posterior surface of the thorax; propodeum

with short basal fovea and distinctly raised median carina. Gastral segments not depressed at posterior margin; as seen from behind the extreme edge of the tergites appears to be finely sulcate.

Puncturation generally as in *A. argentatum*; very dense on front and vertex and on the thorax, where the punctures are generally larger than the interspaces; propodeum coarsely, reticulately punctate, with some irregular transverse rugae in the median concavity. Gastral segments more finely, sparsely and rather superficially punctate, except on the sides of the first and second tergite and on the second sternite which bear coarser punctures.

Body dull, covered with an exceedingly fine tomentum, dark brown on head and thorax, black on the gaster; moreover there is some short, erect, brownish pubescence which is longest on frons and vertex, on the postscutellum and on the first gastral tergite; on frons and vertex the longer hairs are distinctly intermingled with some shorter hairs.

Body black, apex of mandibles, mouth-parts, tibial spurs and tarsal claws brownish; wings flavo-hyaline; the apical two-fifths to half of both pairs of wings rather strongly infuscated, with coppery and violaceous reflections.

♂ — Clypeus more deeply incised anteriorly (see fig. 3b), with pale yellow median band which is often abbreviated above and bidentate below; antennal hook (apical segment) rather large, in recurved position almost reaching the middle of the tenth segment; seventh gastral sternite with two elongate, parallel, tubercles which as seen in profile are gradually sloping basally, abruptly truncate at apex.

Length (h. + th. + t. 1 + 2): ♀ ♂ 12.5-14 mm.

The holotype is a ♀ from West Java, Djasinga, Toge, 17 Sept. 1939, J. van der Vecht (ML); all other specimens recorded below are paratypes.

J a v a: 1 ♀ Java, leg. Kuhl and von Hasselt (ML); 1 ♀ Java, S. Müller (ML); 1 ♀ 1 ♂ Java (*Rhygchium vollenhoveni* Sauss, det. Giordani Soika, 1947) (MHNG).

W e s t J a v a: Ujung Kulon, Tjigeunteur, 1 ♂ July 1955, 1 ♂ June 1958, 2 ♂ Tjibunar, June 1958, A. M. R. Wegner (ML; MZB); 1 ♀ Djasinga, 18 July 1937, Mrs. E. van der Vecht (at nest hole in hollow branch); 1 ♂ Dungus Iwul near Djasinga, 18 Sept. 1952, A. M. R. Wegner (ML); 2 ♀ Tapos on Mt. Gedeh, Jan. 1933, J. van der Vecht (ML); 4 ♀ 3 ♂ environs of Sukabumi, March 1933, from F. Verbeek (ML); 1 ♀ 4 ♂ Sukabumi, ex coll. J. Lindemans (MR); 11 ♀ 3 ♂ Djampang Tengah (some on Mts. Tjisuru and Tjimerang), 1933-5, Mrs. M. E. Walsh (MZB; ML); 1 ♀ Djampang Wetan, Mt. Bèsèr, May 1936, Mrs. M. E. Walsh (ML); 1 ♂ Genteng Bay, July 1939, M. A. Lieftinck (ML); 1 ♂ Radjamandala, 5 Nov. 1939, J. Olthof (MZB).

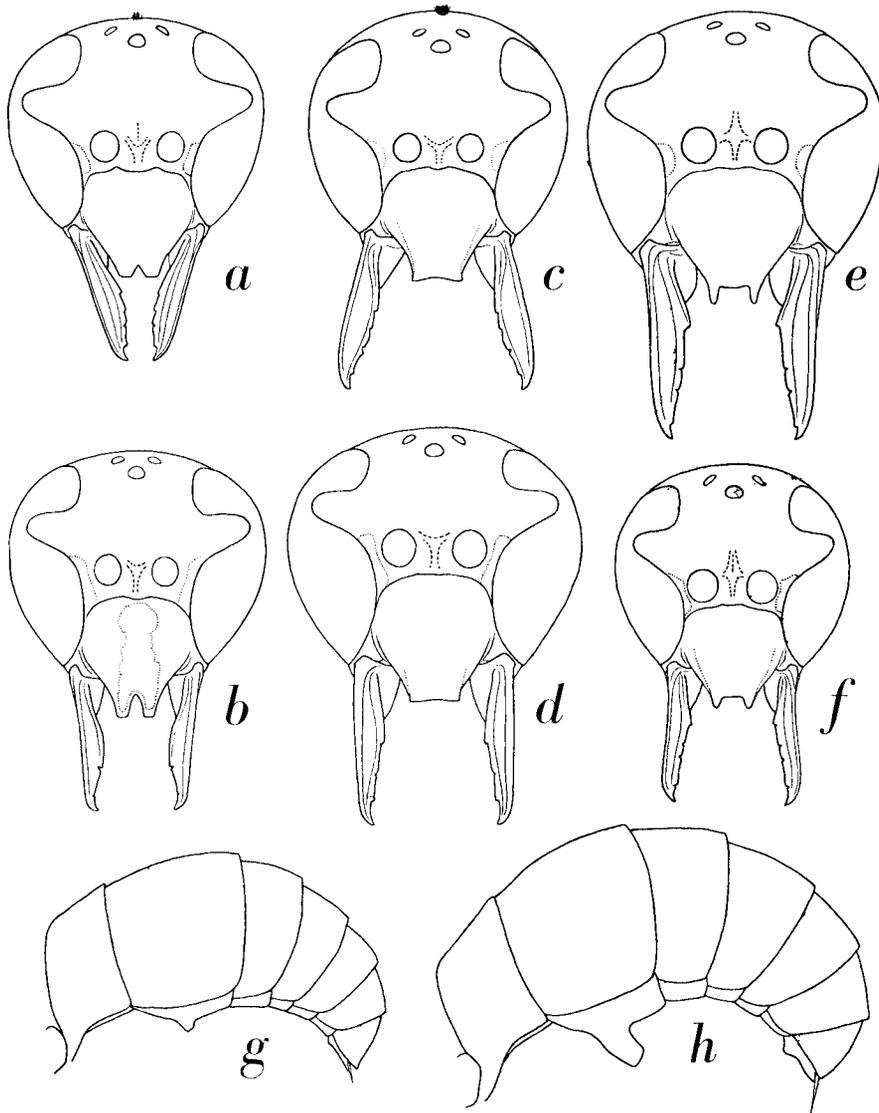


Fig. 3. *Allorhynchium* species from West Java; a and b: frontal view of head of *A. concolor* sp. n., ♀ and ♂, resp.; c and d: do. of *A. vollenhoveni* (Saussure), ♀ and ♂, resp.; e and f: do. of *A. snelleni imitator* subsp. n., ♀ and ♂, resp. — g and h: lateral view of gaster of *A. vollenhoveni* (Saussure), ♂, g = medium-sized specimen and h = large specimen (in small specimens the tubercle on gastral sternite 2 is entirely lacking).

Central Java: 1 ♀ 1 ♂ Mt. Muria, 15 Dec. 1935, Mrs. M. E. Walsh (ML).

East Java: 6 ♀ Malang, Waterfall Baung, 350 m, Dec. 1934, Jan. 1935 and Aug. 1935, J. G. Betrem (ML); 2 ♀ Idjen Mts., Bajukidul, 4 May 1932, H. Lucht (ML); 2 ♀ Tengger Mts., 4000', 1890, H. Fruhstorfer, coll. Rothney (OUM); 1 ♀ 2 ♂ Lawang, 1897, ex coll. H. Fruhstorfer ("*Rhynchium vollenhoveni* Sauss., W. A. Schulz det.") (coll. Schulthess, ETHZ).

Group of *Allorhynchium snelleni* (Saussure)

Allorhynchium vollenhoveni (Saussure) (fig. 3, c, d, g, h)

Rhynchium (*Prorhynchium*) *vollenhoveni* Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 184, ♀ [♂] — Java (types ML). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 280 (variety of *Rh. atrum* Saussure) [incorrect!].

Rhynchium haemorrhoidale var. *vollenhovenii*; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 45 (cat.); 1904, Gen. Insect., vol. 19, p. 34 (cat.; *vollenhoveni*).

Rhynchium (*Pararhynchium*) *mamillatum* Schulthess, 1931, Mitt. Schweiz. Ent. Ges., vol. 15, p. 51, ♂, fig. 1 — "Batavia, Java" (coll. Schulthess, ETHZ) [new synonym].

The female described by de Saussure is herewith designated as the lectotype. It bears a label "Java, K. & v. H." (= Kuhl and von Hasselt) and was probably collected in West Java around 1825. The male associated with this female by de Saussure belongs to a different species (*A. snelleni imitator* m.). De Saussure wrote concerning this male: "la forme de son métathorax ... est embarrassante et semblerait indiquer qu'il y a là une seconde espèce..." Actually the shape of the propodeum ("metathorax") is very similar in the two species, but the comparison was rendered difficult by the fact that in the lectotype the propodeum is partly hidden by the gaster.

Schulz (1904) misidentified this species; his "*vollenhoveni*" from Lawang is *A. concolor* m.

Allometric growth of the ventral spines in the male.

In the majority of the males the second gastral sternite bears two teeth or spines (see fig. 3, g and h), but in some specimens this sternite is unarmed and, as seen in profile, regularly convex. Careful examination of such males, including a comparative study of their genitalia, did not reveal any other differences, and I have therefore regarded them as conspecific with the specimens with ventral spines. The size of these spines is subject to considerable variation. Since a superficial examination showed these structures to be particularly well developed in the larger specimens, it seemed worth while to make a closer study of this apparent correlation. The width of the pronotum was measured as an indicator of the general size of each of the available specimens, and this dimension was compared with the length of the spines.

The results are shown in fig. 4. The following conclusions may be drawn.

(1) Spines are absent in smaller specimens (pronotal width 3.44-4 mm), and present in larger specimens (pronotal width 4.06-5 mm; one exception: a specimen in which the pronotum measures 4.12 mm).

(2) In the larger specimens (with ventral spines) the development of the spines is distinctly positively correlated with the body size, the spines reaching their greatest length in some large specimens with pronotal width above 4.5 mm¹).

(3) There is a conspicuous gap between specimens with spines of 0.25 mm

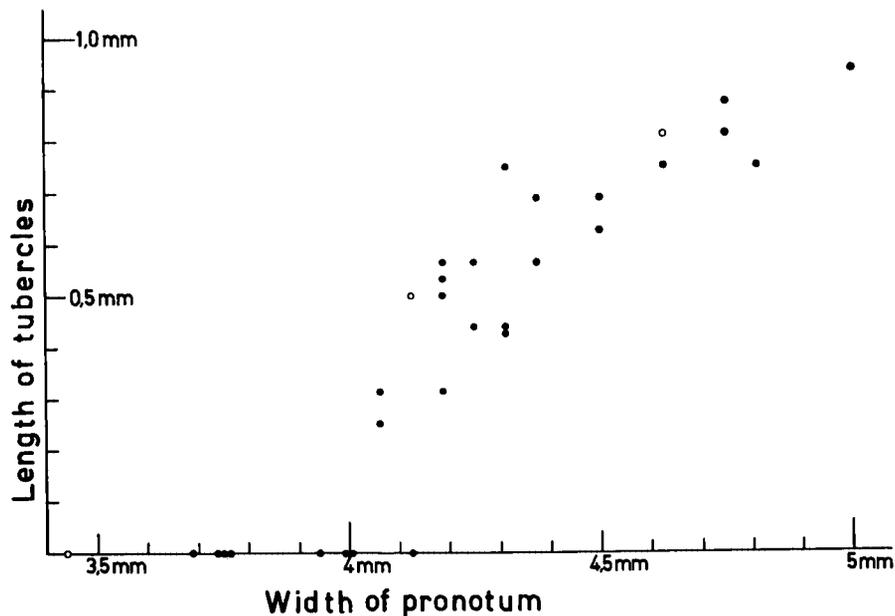


Fig. 4. Relation of body size (width of pronotum) to dimensions of ventral spines in *Allorhynchium vollenhoveni* (Saussure), ♂, mainly from West Java (compare fig. 3, g, h); open dots = specimens from East Java.

long and those without spines. This suggests that a certain amount of spine development is realized rather suddenly when the size of the insect surpasses a certain threshold value.

For practical purposes the male specimens without spines are indicated below as "forma *inermis*"; it should be noted that it is not my intention to give this name nomenclatorial status.

1) The growth of the spines is evidently positively allometric, but since the regression on a log-log plot is not a straight line, this is apparently not a case of "simple" allometry (see E. O. Wilson, 1953, *Quart. Rev. Biol.*, vol. 28, pp. 136-156, and further literature cited in this paper).

The locality records show that the forma *inermis* occurs together with the typical form and that specimens of both forms have been obtained from nests of *Calligaster cyanopterus* Saussure. Apparently *A. vollenhoveni* often uses the empty cavities of these nests for the construction of her cells.

S i a m: 1 ♂ Prew, 18 June 1961, K. Iwata (Hyogo Agric. Univ., Sasayama, Japan). — Although this specimen is rather large (13 mm to the end of the second gastral segment), it has no tubercles or spines on the second gastral sternite; this sternite, however, has on each side a blunt carina which runs from the anterior lateral angle to near the middle, where the carinae are about as far apart as they are from the lateral margins; as seen in profile the sternite is strongly convex, the outline bluntly angular just behind the middle. Wings etc. as in Javan specimens.

I s l a n d s i n S u n d a S t r a i t s: 1 ♀ Pulu Panaitan, 2 July 1955, A. M. R. Wegner (ML).

J a v a: 1 ♀ Java, Kuhl and von Hasselt (lectotype, ML); 1 ♂ do. (ML).
West Java: 1 ♂ Djasinga, 18 July 1937, from nest of *Calligaster cyanopterus* Saussure, J. van der Vecht (ML); Udjung Kulon, 2 ♀ Tjibandawak, July 1955, 1 ♂ Tjidaon, Aug. 1958, A. M. R. Wegner (MZB; ML); Mt. Salak, Tjianten, 1 ♂ March 1939, 3 ♂ forma *inermis*, May 1938, all from nests of *Calligaster cyanopterus* Saussure, J. van der Vecht (ML); Mt. Tjiampea near Bogor, 1 ♀ 21 Febr. 1937, M. A. Lieftinck (ML), 1 ♀ Jan. 1937, C. J. H. Franssen (ML); 2 ♀ 1 ♂ environs of Sukabumi, 1933 and 1935 (ML); 2 ♀ 1 ♂ Sukabumi, ex coll. J. Lindemans (MR); 1 ♀ Sukabumi (IRSNB); 1 ♀ Pelabuhan Ratu, 12 Dec. 1955, A. M. R. Wegner (ML); 1 ♀ Mt. Gedeh, 1200 m, Dec. 1932, L. G. E. Kalshoven (ML); 8 ♀ 6 ♂, including 3 ♂ forma *inermis*, Djampang Tengah, 1934-1936, Mrs. M. E. Walsh (MZB; ML); 1 ♂ Udjung Genteng, March 1937, from nest of *Calligaster cyanopterus* Saussure (ML), 2 ♂ Udjung Genteng, March 1938, Mrs. M. E. Walsh (ML); 2 ♀ 3 ♂ Djampang Wetan, Mt. Bèsèr, 1936, 1938, Mrs. M. E. Walsh (ML); 3 ♀ 3 ♂, including 2 ♂ forma *inermis*, Djampang Wetan, Bibidjilan, Mrs. M. E. Walsh (ML); Radjamandala, 1 ♂ June 1935, from nest of *Calligaster cyanopterus* Sauss., E. Jacobson (ML), 1 ♂ 20 April 1940, J. Olthof (MZB).

C e n t r a l J a v a: 1 ♀ Mt. Muria, 15 Dec. 1935, Mrs. M. E. Walsh; 1 ♀ South Wates, in village with dense vegetation, nesting in dry bamboo, Dec. 1937, J. van der Vecht (ML).

E a s t J a v a: 1 ♀ Malang, Waterfall Baung, 1200 ft., 17 Dec. 1934, J. G. Betrem (ML); 2 ♂ Idjen Mts., Bajukidul, 4 March 1931, 1 ♂ forma *inermis*, same locality, 11 April 1932, H. Lucht (ML).

B a l i: 2 ♀ Ubud, near Den Pasar, April 1940, W. Spies (ML).

Allorhynchium snelleni (Saussure) (fig. 3, e, f, fig. 5, b)

This is a polytypic species, inhabiting Borneo, Java, and neighbouring islands. In addition to the characters given in the key it may be noted that in the female the vertex does not have a tuft of hairs as in *A. concolor* and *vollenhoveni*, and that in contrast to these species the sparse pubescence of front and vertex consists of curved hairs of fairly uniform length. As in *A. vollenhoveni*, the first gastral tergite is bluntly angular in lateral view (rounded in *A. concolor*). In the male the second gastral sternite is broadly concave in the middle, the concavity divided by a slight median ridge; the seventh sternite bears a flat tubercle, which posteriorly is arcuate in ventral view and abruptly truncate in profile.

Allorhynchium snelleni snelleni (Saussure)

?*Rhynchium nitidulum* F."; Smith, 1858, Jl. Proc. Linn. Soc. Zool., vol. 2, p. 110 (Borneo; Java) [incorrect identification].

Rhynchium snelleni Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 185, ♀ (in subgenus *Prorhynchium*) — "Borneo" (type ML). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 280 (probably a variety of *Rh. atrum* Saussure). Schulz, 1904, Berl. Ent. Zeitschr., vol. 49, p. 223, 224 (errors of Maindron and Dalla Torre corrected;? subsp. of *Rh. vollenhoveni* Saussure). Cameron, 1905, Tijdschr. v. Entom., vol. 48, p. 75 (Java).

Rhynchium haemorrhoidale var. *snelleni*; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 45 (cat.); 1904, Gen. Insect., vol. 19, p. 34 (cat.).

Odynerus (Hypancistrocerus) aurivillianus von Schulthess, 1913, Ark. Zool. Stockholm, vol. 8, no. 17, p. 4, figs. 3-5, ♀ ♂ — Mindanao, Philippine Is.; Biliton I., east of Sumatra, leg. C. Aurivillius, Oct. 1899 (types in Mus. Stockholm and coll. von Schulthess; lectotype see below); 1934, Arb. Morph. Tax. Ent., vol. 1, p. 69 (in key; under subg. *Ancistrocerus*, div. *Hypancistrocerus*) [new synonym].

In Dalla Torre's catalogue (1894) this species is erroneously recorded as a variety of *Rhynchium haemorrhoidale* (F.), evidently because Maindron (1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 280) had tentatively identified it as a variety of *Rh. atrum* Saussure. These errors have been corrected by Schulz (1904, l.c.).

The distribution of this form is highly remarkable. It inhabits Borneo, Bangka, and Billiton as well as several small islands in the Java Sea, but on Java itself it is replaced by two different subspecies, of which the commoner one agrees in coloration with *A. concolor*, *A. vollenhoveni* and *Anterhynchium (Dirhynchium) flavomarginatum flavonigrans*. Only very recently some specimens of subsp. *snelleni* have been collected in N. W. Java (see below).

The lectotype of *Odynerus aurivillianus* Schulthess is a female from Billiton (distr. Linggang ("Lingang" on label), 8 Oct. 1899, leg. Aurivillius, NRS), by present designation. This specimen is figured in von Schulthess's

paper (figs. 3 and 4, p. 5), but it should be noted that the labrum is slightly shorter than in fig. 3.

The syntypes from Mindanao are different and are probably identical with *Allorhynchium quadrituberculatum* (Schulthess), see p. 70.

Borneo: 1 ♀ "Borneo", leg. Schwaner (holotype, ML); 2 ♀ "Borneo", leg. S. Müller (paratypes, ML); Samarinda, 1 ♂ Nov. 1937, Mrs. M. E. Walsh (ML), 2 ♂ Nov. 1950, 1 ♀ Dec. 1956, A. M. R. Wegner (ML; 1 ♂ MZB); 1 ♀ Balikpapan, Nov. 1950, A. M. R. Wegner (MZB).

Bangka I.: 1 ♀ 1 ♂ Bangka, v. d. Bossche (ML); 1 ♀ Bangka, leg. Budding (ML); 2 ♀ 1 ♂ Aer Mesu, Nov. 1929, J. van der Vecht (ML); 1 ♀ Aer Item, Nov. 1935, J. van der Vecht (ML); 1 ♂ Bangka, March 1955, J. van der Vecht (ML).

Billiton I.: 1 ♀ "Billiton", Febr. 1903 (ML).

Islands in Sunda Straits: 1 ♀ 1 ♂ Pulu Sangijang, June 1955, A. M. R. Wegner (ML).

Java: 4 ♀ 1 ♂ North West coast, Mauk, 1956, H. F. Hamann (coll. Hamann; 1 ♀ ML; 1 ♀ coll. Giordani Soika).

Karimon Djawa Is.: 2 ♂ Nov. 1930, M. A. Lieftinck (ML).

Bawean I.: 2 ♀ 3 ♂ Bawean, H. Fruhstorfer (ML); 2 ♂ Bawean, 25 and 26 May 1954, A. Hoogerwerf (MZB; ML).

Kangean Is.: 3 ♀ 1 ♂ Petapan, Febr. 1936, Mrs. M. E. Walsh (ML); 1 ♀ 4 ♂ Bujutan, 1 ♂ Batuputih, Aug. 1954, A. Hoogerwerf (MZB; ML).

— In these specimens the wings have a distinct greenish tinge.

Allorhynchium snelleni javanum (Saussure)

Rhynchium (*Prorhynchium*) *javanum* Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 186, ♀ — Java (type ML). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 280 (regarded as a variety of *Rh. atrum* Saussure). Schulz, 1904, Berl. Ent. Zeitschr., vol. 49, p. 223 (note).

Rhynchium haemorrhoidale var. *javanum*; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 44 (cat.); 1904, Gen. Insect., vol. 19, p. 34 (cat.).

Like the preceding form, *A. snelleni javanum* has been incorrectly regarded as conspecific with the widely different *R. haemorrhoidale* (Fabr.) (see Schulz, l.c.).

The distribution of this subspecies is very incompletely known, but since the subspecies *imitator* has been collected in West- as well as in East-Java, it seems possible that *javanum* is restricted to certain areas in or near Central Java.

Java: 2 ♀ 1 ♂ Java, leg. S. Müller (holotype = ♀, "la tête manque"); 2 ♂ Patjitan on South Coast of Central Java, 12 Dec. 1937, J. van der Vecht

(ML); 1 ♂ Java, 1935, Mrs. M. E. Walsh (ML; wings slightly yellowish at base).

Allorhynchium snelleni imitator subsp. n.

It seems desirable to regard the form of *A. snelleni*, which has the basal half of the wings translucent yellow, as subspecifically different from the dark-winged subsp. *javanum*, which is known with certainty only from one coastal locality in the Madiun residency. As noted above, the new form is remarkable for its homeochromy with some other wasps occurring exclusively in this island; it has been collected mainly in the scarce remains of primary forest in West Java, but it has proved to occur also in East Java.

The dark, apical, part of the fore wing is generally a little more extensive than in *A. vollenhoveni*; in some dark specimens the discoidal cells are almost entirely infuscated. If in Java there exist areas where the two subspecies of *A. snelleni* meet, transitional forms are very likely to be found there.

The holotype is a ♀ from Mt. Tjampea, Febr. 1937, F. Dupont (ML); all other specimens recorded below are paratypes.

Islands in Sunda Straits: 1 ♀ Pulu Panaitan, July 1955, A. M. R. Wegner (ML).

Java: 1 ♂ Java, leg. Kuhl and von Hasselt (allotype of *Rhynchium vollenhoveni* Saussure! ML); Ujung Kulon: 1 ♀ Tandjung Alang-alang, 1 ♀ Niur, July 1955, 1 ♀ Teluk Peutjang, Febr. 1956, 3 ♀ 3 ♂ Tjidaon, Dec. 1958, A. M. R. Wegner (MZB; BM; ML) (some of these specimens have great numbers of Acari on both sides of the wings); Bogor: 4 ♀ Mt. Tjampea, Nov. 1936 and Febr. 1937, F. Dupont and C. J. H. Franssen (ML), 2 ♀ Mt. Pantjar, Jan. 1937, F. Dupont (ML), 1 ♀ Mt. Gede, Jan. 1935; Djampang Kulon: 1 ♀ Tjikaso, 12 April 1956, A. Hoogerwerf (ML); East Java, 1 ♀ Bajukidul on Idjen mountains, 4 May 1932, H. Lucht (ML).

A male in coll. von Schulthess (ETHZ) bears a printed label "Sumatra", but the occurrence in this island needs confirmation; the specimen was erroneously identified by von Schulthess as *mamillatum* ♀!

Allorhynchium quadrituberculatum (Schulthess)

Rhynchium (*Prorhynchium*) *quadrituberculatum* Schulthess, 1913, Ark. f. Zool., vol. 8, no. 17, p. 1, ♂, figs. 1, 2 — "Philippinen, Weg von Asingay nach Begnet, 1. VI. 1861" (1 ♂, NRS).

The type of this species was kindly sent to me for study by Dr. Erlandsson. It is a male *Allorhynchium* which is undoubtedly closely allied to *A. snelleni* (Saussure). Apparently von Schulthess has not realised that the specimen is

abnormal, but this appears clearly from the peculiar asymmetrical impressions of the propodeum and the second gastral tergite. It is therefore difficult to say to what extent these parts of the body will prove to be different from *A. snelleni* in normal specimens.

The main reason for regarding *A. quadrituberculatum* as a separate species appears to be found in the shape of the clypeus, which is only shallowly emarginate anteriorly, the depth of the emargination being only about one sixth of the total width; the apical teeth are blunter than shown in fig. 2 in Schulthess's paper, but a little more pronounced than in the female of *A. vollenhoveni* (fig. 3c, p. 63). In addition the type has a narrow, transverse, slightly raised, impunctate area on the vertex behind the ocelli (about twice as far from the occiput as from the posterior ocelli) and an elongate impunctate area on each side of the mesoscutum, close to the tegulae; the scutellum is slightly convex, shallowly impressed in the middle, and the post-scutellum is rather strongly convex. These thoracic characters are not clearly pronounced in two males from Mindanao (syntypes of *Odynerus aurivillianus* Schulthess, NRS and ETHZ), which appear to agree with *A. quadrituberculatum* in the shape of the clypeus. In all Philippine specimens the gaster is more coarsely punctate than in *A. snelleni*. Further study of the Philippine representative of the *snelleni*-group is desirable.

Allorhynchium laminatum (Gribodo)

The type of this species is a male from "Minahasa", North Celebes, in the Gribodo collection (MCG). It is remarkable for having a strongly developed transverse lamella with bidentate apex on the second gastral sternite. Such a lamella is absent in most of the males recorded below, but the presence of two small tubercles on this sternite in two specimens (in one slightly larger than in the other) indicates that this may prove to be a variable character, similar to that observed in *A. vollenhoveni* (see p. 64).

A. laminatum is undoubtedly very closely allied to *A. snelleni*, and thus presents another example of the occurrence of specifically different representatives of a "superspecies" on both sides of the line of Wallace. I have observed the same phenomenon in *Vespa multimaculata* and *bellicosa* (Sunda shelf) and *V. fervida* (Celebes) (van der Vecht, 1957, p. 43), in *Eumenes flavopictus* Blanchard (India-Sunda shelf) and *E. fulvipennis* Smith (Celebes) (van der Vecht, 1959, fig. 7), in *Sceliphron madraspatanum* (F.) (palaeartic region to Sunda shelf) and *S. intrudens* Smith (Celebes), etc. In all these cases the close relationship of the Celebes form with the mainland species is unmistakable, but apparently the isolation has lasted long enough to allow the development of pronounced morphological differences.

Allorhynchium laminatum laminatum (Gribodo)

Ryngchium laminatum Gribodo, 1892¹⁾, Boll. Soc. Ent. Ital., vol. 23 (1891), p. 258, ♂ — Celebes (MCG).

Rhynchium laminatum; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 46 (cat.); 1904, Gen. Insect., vol. 19, p. 34 (cat.).

North Celebes: 1 ♂ "Minahasa", coll. Gribodo (type, MCG); 1 ♂ Manado, 10 Nov. 1937, J. S. Phillips (ML); 1 ♀ 3 ♂ Manado, 1 ♂ Mapanget, July and Aug. 1949, C. J. H. Franssen (ML); 1 ♀ Toli-toli, Nov.-Dec. 1895, H. Fruhstorfer (*metallicum* Sauss., det. Schulz; *laminatum* det. Schulthess) (coll. von Schulthess, ETHZ; excavation and lateral orifices of propodeum densely covered with Acari); 1 ♂ Palu Valley, 8 May 1955, H. F. Hamann (coll. Hamann).

Allorhynchium laminatum nigrescens subsp. n.

♀ ♂ — Agrees in structural characters with specimens from North Celebes, but differs conspicuously in the colour of the tomentum. On head and thorax the short pubescence is whitish, and these parts are therefore greyish in appearance, just like the gaster of the typical form. On the other hand the gaster of subsp. *nigrescens* is deep coal black and agrees in this respect with the thorax of the typical form.

Wings dark brown, with violaceous reflections, in certain lights also with greenish effulgence.

The two available females are rather robust as compared with the typical specimen from Manado (h. + th. + t. 1 + 2 = 17-18 mm); one of the males is much smaller (h. + th. + t. 1 + 2 = 13 mm).

Central and South Celebes: 1 ♀ Rantepao, Nanggala, 900 m, May 1938, F. C. Drescher (ML); 1 ♀ Malakadji, 700 m, June 1949, C. J. H. Franssen (ML); 1 ♂ Todjambu, 900 m, July 1936, L. J. Toxopeus (ML); 1 ♂ Samanga, Nov. 1895, H. Fruhstorfer (coll. Giordani Soika). — In the male from Samanga the second gastral sternite bears a prominent, flattened tubercle; in profile this tubercle has about the same outline as that shown in fig. 3h, but it consists of a single thick lamella which is somewhat convex in front and excavated posteriorly, it is rounded at apex, with faintly indicated blunt angles at the tip and at the sides.

1) Gribodo's paper, usually dated as of 1891, was published in 1892 according to a printed statement on an "Estratto" in my library; the last line reads "Torino dicembre 1891" and supports the view that the paper is not likely to have been published in that same month.

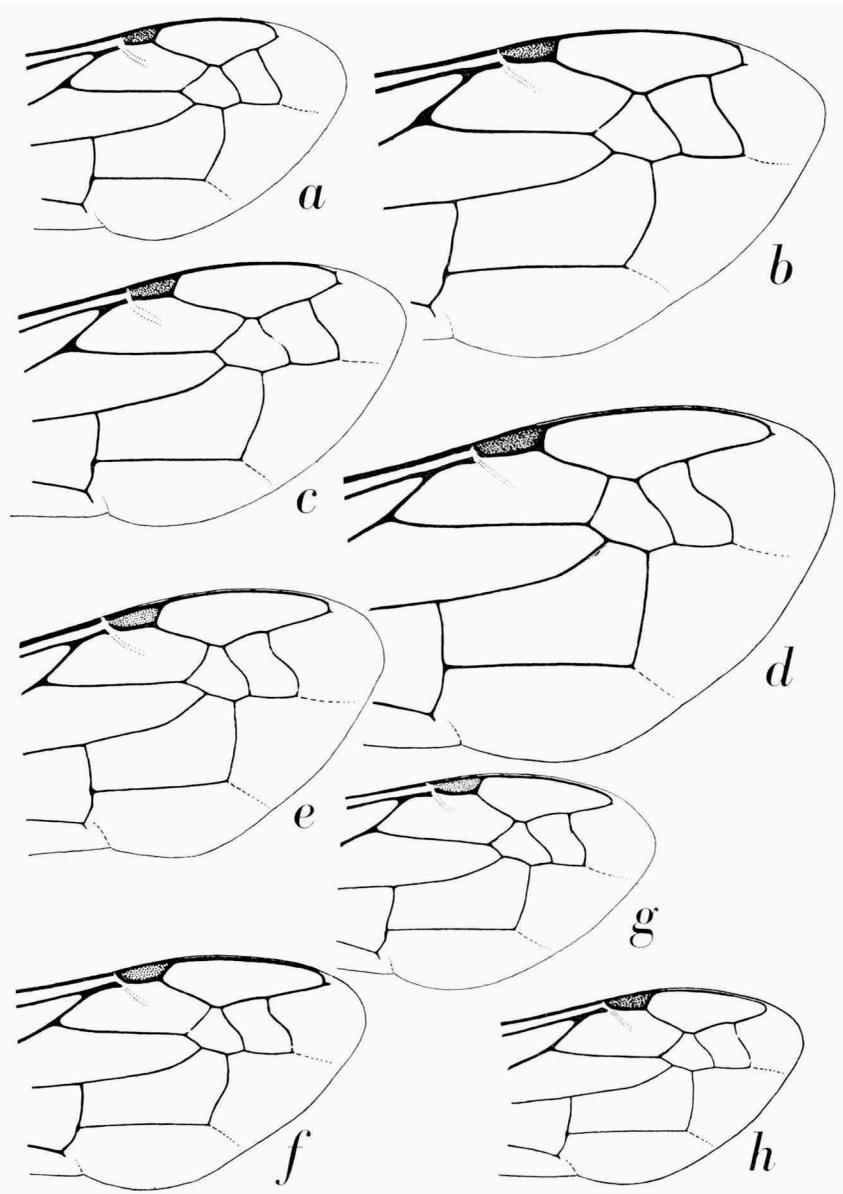


Fig. 5. Fore wing (base omitted) of

- a: *Allorhynchium argentatum* (Fabr.), ♂, (Borneo)
 b: — *snelleni* (Sauss.), ♂ (Kangean Is.)
 c: — *concolor* sp. n., ♂ (Java)
 d: *Anterhynchium synagroides* (Sauss.), ♂ (Gabun, Africa)
 e: — *abdominale* (Ill.), ♂ (Ceylon)
 f: — *flavomarginatum* (Sm.), ♂ (Fukien, China)
 g: — *fulvipenne* (Sm.), ♂ (Celebes)
 h: — *alecto* (Lep.), ♂ (New Caledonia).

Genus *Anterhynchium* Saussure

Anterhynchium Saussure, 1863, Mém. Soc. Phys. Hist. Nat. Genève, vol. 17 (1), p. 205 (name for *Rygmium* or *Rhynchium*, I Division, Saussure, 1852, p. 103; 1855, p. 175) (as division of *Rhynchium* Spinola).

Type species: *Rygmium synagroides* Saussure, 1852 (by present designation).

In the first part of de Saussure's monograph (1852), Division I of the genus *Rygmium* contains four species: (1) *R. synagroides* n. sp., (2) *R. abyssinicum* n. sp., (3) *R. ardens* (Guérin), and (4) *R. auromaculatum* n. sp., all inhabitants of the Ethiopian region. In 1855 (Ét. Fam. Vesp., vol. 3) de Saussure added three African and one Indian species (*R. bengalense* n. sp.), and in 1863, when he introduced the name *Anterhynchium*, he discussed *R. synagroides* and *abyssinicum* under this name, and described another African species. Apparently no subsequent author has designated a type species for this group, but as de Saussure indicated *Anterhynchium* as "*Rhynchium* à formes synagroides", the present selection of the first species described in this division in 1852, *R. synagroides* (figs. 5d, 6a), appears to be well justified.

Anterhynchium is a widely distributed group of old world solitary wasps; it is related to *Pseudepipona* Saussure and *Euodynerus* Dalla Torre, but it is easily distinguished by the longer parastigma of the fore wing, and the shorter tegulae, which never extend beyond the apex of the posttegulae. The available species of *Anterhynchium* agree in the following characters.

Clypeus of ♀ approximately as in *Rhynchium haemorrhoidale*, pear-shaped, usually somewhat constricted before the narrow and slightly emarginate apex. Mandibles of ♀ on inner side with three rather broad and irregularly shaped teeth, the basal tooth emarginate at apex, in the male the inner side of the mandible often considerably modified. Vertex of ♀ with shallow post-ocellar fovea.

Pronotum with distinct transverse carina, separating the smooth vertical part from the dorsal and lateral areas. Tegulae short, their apex not reaching beyond the apex of the parategulae. Postscutellum with a horizontal part, and a usually somewhat longer declivous part, the transition often not sharply indicated, more or less distinctly marked by an irregularly crenulate ridge.

Propodeum without horizontal part behind the postcutellum, the declivity at base with a more or less elongate triangle, bordered on each side by a groove, the lower half with more or less distinct median carina, which is gradually dilated towards the apex.

Dilated part of first gastral sternite bordered anteriorly by an arcuate carina. Transverse basal groove of second gastral sternite not distinctly costate.

Mid femora of ♂ not distinctly emarginate at base.

Parastigma of fore wing long, at least as long as two thirds of the anterior part of the basal vein, and more than half as long as the stigma; abscissae 1 + 2 of radial vein shorter than 3 + 4 (approximately 2 : 3); first intercubital vein steep to moderately oblique; second recurrent vein never very close to the second intercubital vein; outer vein of third discoidal cell almost straight to moderately curved, its anterior part $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as the posterior part; anal vein of hind wing usually with short appendage running from the submedian cell in the direction of the preaxillary excision.

Genitalia: see fig. 6.

The genus may be divided into three subgenera, as follows:

1. Narrow basal part of first gastral sternite densely transversely striate over almost its entire width, rather dull. Third and following gastral tergites (except in the Papuan species) very coarsely punctate at base (not visible unless the segments are unusually extended) (Mandibles of ♂ not deeply emarginate on inner side). — China, Japan, Oriental region, eastward to New Guinea. *Dirhynchium* subgen. n.
- Narrow basal part of first gastral sternite smooth, or with only a narrow median band of short and shiny transverse striae. Gastral tergites only finely punctate at base. 2
2. Mandibles of ♂ deeply emarginate on inner side near the middle. Basal triangle of propodeum short, approximately equilateral; upper part of inferior ridges of propodeum irregularly dentate or spinose (these ridges run from the lateral projecting tooth to the apex). Second gastral tergite coarsely punctate near the apical margin, the basal three fourths more finely punctate or almost impunctate. — Africa and India. *Anterhynchium* s. str.
- Mandibles of ♂ not deeply emarginate on inner side, or with an emargination directly behind the pre-apical tooth; this latter tooth often larger than the others. Basal triangle of propodeum long, its length distinctly exceeding the width at the base; upper part of inferior ridges of propodeum rounded, without projecting teeth or spines. Puncturation of second gastral tergite more uniform. — From Celebes, East Java and the Lesser Sunda Islands to Australia and several Pacific islands. *Epidynerus* Giordani Soika

Subgenus *Anterhynchium* Saussure

This group is mainly distributed in Africa; it is represented in India by two species which may be distinguished as follows.

1. Basal two thirds of second gastral tergite distinctly punctate, except in the middle the interspaces generally larger than the punctures. Anterior margin of clypeus narrow and shallowly emarginate in the female, wider and rather deeply emarginate in the male. Inferior ridges of propodeum with only a few small teeth in upper part. Posterior, transverse, area of first gastral sternite rather irregularly transversely rugose. Mandibles of ♂ with only two distinct teeth on inner side; the basal tooth thick, subcircularly excavated at apex, the other tooth wide, low, and bluntly rounded. *mellyi* (Saussure)
- Basal two thirds of second gastral tergite very finely and shallowly punctate, the interspaces everywhere much larger than the punctures. Anterior margin of clypeus slightly more deeply emarginate in the female, in the male the anterior margin

(as well as the whole clypeus) wider, also rather deeply emarginate. Inferior ridges of propodeum more distinctly spinose. Posterior area of first gastral sternite dull, rather regularly and finely transversely striate. Mandibles of ♂ with three teeth on inner side, the basal tooth normal, separated from the others by a rather deep incision, the other teeth separated by a shallow emargination only.

abdominale (Illiger)

Anterhynchium abdominale (Illiger)

The name *abdominale* is applied here to two colour forms which have usually been regarded as different species. Since I have been unable to find differences in structure or sculpture, and since these forms are at least to some extent geographically segregated, I treat them as subspecies. It should be noted, however, that both forms are recorded below from the Walayar Forests in South India, a fact which indicates that their status requires further study.

The nominate subspecies has the gaster mainly red; in subsp. *bengalense* (Saussure) this part of the body is brown to black, the apical margins of the second and following tergites often more or less extensively brownish red.

Anterhynchium abdominale abdominale (Illiger) (fig. 5e)

Vespa abdominalis Illiger, 1802, Magaz. f. Insektenk., vol. 1, p. 192 — "Bengalen"; leg. Daldorff, coll. Hellwig (?ZMB).

Rhynchium abdominale; Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 172 (syn.: *R. transversum* (Fabricius); *R. dichotomum* Saussure is a variety); 1890, in Grandidier, Hist. phys. nat. Madagascar, vol. 20, p. 159 (Indes; doubtfully recorded from Madagascar [where the species does not occur!]). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 42 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 357, ♀ ♂ (throughout India, lowlands; Pegu, Burma). Rothney, 1903, Trans. Ent. Soc. Lond. 1903, p. 106 (Barrackpore, Bengal; common). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 33 (cat.). Wickwar, 1908, Spolia Zeyl., vol. 5 (no. 19), p. 118 (Ceylon).

Odynerus abdominalis; Dover & Rao, 1922, Jl. Proc. As. Soc. Bengal, n.s., vol. 18, p. 239 (in subgenus *Rygchium*; Sikkim; Karachi; Bilaspur, Centr. Prov.; Lyallpur, Punjab).

Vespa transversa Fabricius, 1804, Syst. Piez., p. 257 — "Tranquebar", leg. Daldorff, coll. de Sehestedt (UZMC).

Rygchium transversum; Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 117, ♀, pl. 14 fig. 7 ("Rhygchium" in do., 1853, p. XXXI and p. 276; ?Madagascar; Indes Orientales, coll. Romand).

Rhynchium transversum; Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 172 (syn. of *R. abdominale* (Ill.)). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 48 (cat.) [erroneously recorded from Madagascar].

Rygchium dichotomum Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 116, ♀ ♂ ("Rhygchium" in do., 1853, p. XXXI and p. 276) — "Indes Orientales" (MP).

Rhynchium dichotomum; Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 172 (var. of *R. abdominale* (Ill.)). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 45 (cat.); 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 375 (cat.).

Rhynchium abdominale var. *dichotomum*; Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 172. Dalla Torre, 1894, Cat. Hym., vol. 9, p. 42 (cat.); 1904, Gen. Ins., vol. 19, p. 33 (cat.).

India: 1 ♀ "Bengale", leg. Calkoen (ML); 1 ♀ 1 ♂ Calcutta, coll. Rothney, from F. Smith (ML); 1 ♀ 1 ♂ Southern India, Kerala State, Walayar Forests, 700 ft., Oct. 1959, P. S. Nathan (ML) (first gastral segment of male black); 1 ♂ Southern India, Anamalai Hills, Cinchona, 3600 ft., May 1960, P. S. Nathan (ML).

Ceylon: Northern Province, 1 ♀ Kuchchaveli, 1 July 1953 (ML); North Central Province, 1 ♂ Polonnaruwa, July 1953 (NMB); North West Province, 5 ♂ Puttalam, 23 Febr. 1954 (NMB; 1 ♂ ML; 1 ♂ OUM); Central Province, 1 ♂ Haragama, 5 Nov. 1953 (ML); Southern Province, 1 ♀ Tissamaharama, Oct. 1953 (NMB); all leg. F. Keiser. — The extent of the black colour on the gaster of the males is variable; in the darkest specimen the first and seventh segments are entirely black, tergite 2 has a median longitudinal black band, and tergites, 3, 4, and 6 are blackish in the middle at apex.

Anterhynchium abdominale bengalense (Saussure)

Rygchium argentatum (Fabricius) Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 115 ("Les Indes Orientales. Le Bengale") [misidentification].

Rhynchium bengalense Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 176, ♂, pl. 9 fig. 8 — "Le Bengale" (MP). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 44 (cat.). Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 191 (syn.: *Rh. argentatum* (F.) sensu Saussure, 1852, not *Vespa argentata* Fabricius). Smith, 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 374 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 359, ♀ ♂ (Bengal; Allahabad; probably through Central India). Rothney, 1903, Trans. Ent. Soc. Lond. 1903, p. 107 (Barrackpore, Bengal; common). Dutt, 1912, Mem. Dept. Agric. India, Ent. Ser., vol. 4, no. 4, p. 240 (Pusa; prey: caterpillars).

Rhynchium argentatum var. *bengalense*; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 43 (cat.); 1904, Gen. Ins., vol. 19, p. 33 (cat.).? Dover, 1925, Jl. Proc. As. Soc. Bengal, n. s., vol. 20 (1924), p. 297 ("I follow Dalla Torre in regarding *bengalense* as a variety"). [incorrect, the two belong to different genera!].

India: Bengal, 2 ♀ 2 ♂ Barrackpore, coll. Rothney (OUM; 1 ♂ ML); United Provinces, 1 ♀ Benares, Nov. 1929, Dr. Enslin ("*Rhynchium luctuosum* Grib., det. Schulthess"), coll. von Schulthess (ETHZ); Southern India, 1 ♀ Kerala, Walayar Forests, 700 ft., May 1960, P. S. Nathan (ML). — In the specimen from Kerala the gaster is entirely coal black, but in the Bengal specimens the apical margins of the second and following tergites, as well as the sides of the first and second, are partly brownish.

Anterhynchium mellyi (Saussure)

Rygchium mellyi Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 116, ♀ — "Les Indes, La Chine" (MP and coll. Saussure) (*Rhygchium* in do., 1853, p. XXXI and p. 276).

Rhynchium mellyi; Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 172 (description of ♂; China). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 45 (cat.); 1871, Jl. Proc. Linn.

Soc. Zool., vol. 11, p. 375 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 46 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 356, ♀ ♂ (Allahabad; Bengal; Burma; China). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 34 (cat.).

Odynerus mellyi; Dover, 1929, Bull. Raffles Mus., Mus., vol. 2, p. 44 (in subgenus *Rygdium*; Rangoon).

China: 2 ♀ 2 ♂ "China, Heine" (ML).

Indo-China: 1 ♀ Tonkin, region of Hoa-Binh, A. de Cooman (MP).

Siam: 2 ♂ Me Fack, 17 May 1961, K. Iwata and Yosikawa (ML).

Dirhynchium subgen. n.

The narrow basal part of the first gastral sternite is densely transversely striate and rather dull. As a rule the declivity of the propodeum is bordered dorsally by a somewhat irregular carina, which forms a tooth on each side behind the postcutellum; these teeth are much closer together than the lateral, short, longitudinal carinae of the postscutellum. In some forms, however, these carinae show a tendency to disappear. The triangular area at the base of the propodeum is much longer than wide, bordered on each side by a deep groove.

Type species: *Ancistrocerus flavopunctatus* Smith, 1852.

Key to the species of *Dirhynchium*

1. Mesoscutum posteriorly very densely punctate, the interspaces showing a tendency to run into irregular longitudinal striae. (Gaster black, or the basal segments (at most 1-4) with apical band; only in a form from Formosa all tergites have an apical band). 2
- Mesoscutum posteriorly more sparsely punctate; here several interspaces at least as large as the punctures. (Often all gastral segments with yellow bands, the bands absent or reduced in a form occurring in Southern India). 10
2. At least the anterior half of the pronotal dorsum yellow or orange. Both scutella marked with yellow or orange 3
- Pronotum black or with narrow yellow band at anterior margin. Scutellum black, postscutellum black or marked with yellow 4
3. Markings orange-yellow. All gastral tergites with apical band. — Formosa and Ishigaki Island. *flavomarginatum umenoi* (Yasumatsu)
- Markings yellow. At least tergite 5, as a rule also 3 and 4, without apical band. — Korea and Japan *flavomarginatum micado* (Kirsch)
4. First and second gastral tergites with wide, dark yellow, apical band; on the second tergite at least one fourth of the length of the tergite. Clypeus with large yellow mark; postcutellum marked with yellow; sometimes tergite 3 with narrow apical band. — China. *flavopunctatum* (Smith)
- Gaster tergites 1 and 2 at most with narrow apical band 5
5. Wings brown; clypeus black, or black and yellow 6
- Wings with pronounced yellow tinge, more or less infuscated at base or at apex. 8
6. Gaster black. (Basal half of clypeus, a small inter-antennal spot and two transverse spots on pronotum, yellow). — Tsushima. *flavomarginatum tsushimarum* (Yasumatsu)
- First and second gastral tergites with narrow, pale yellow, apical band. 7

7. Postcutellum with yellow line. — Assam.
flavomarginatum curvimaculatum (Cameron)
- Postcutellum black. — China, Sikkim, Burma, Borneo.
flavomarginatum flavomarginatum (Smith)
8. Wings infuscated at the base only. Body black, antennal scape and certain parts of the legs dull reddish. — Philippine Islands.
flavomarginatum townesi subsp. n.
- Wings yellow at the base, apex more or less infuscated. 9
9. Wings slightly infuscated at apex. First, or first and second, gastral tergites with narrow, pale yellow, apical band. Femora red, femora I partly fuscous. Clypeus and anterior surface of scape dark red. Length of ♀ 17-19 mm. — Sumatra.
flavomarginatum silvaticum subsp. n.
- Wings rather strongly infuscated beyond the end of the subcostal cell (the extent of the dark part is somewhat variable). Body, including the legs, black; femora in some specimens reddish at apex. Length of ♀ 14-16 mm. — Java.
flavomarginatum flavonigrans subsp. n.
10. Anterior margin of clypeus very shallowly emarginate, the apical teeth bluntly rounded. (Note that the yellow area may be deeply incised anteriorly!). Basal half of scutellum rather densely punctate, except near the distinct median groove the interspaces rarely larger than the punctures. (India-Sumba). 11
- Anterior margin of clypeus more deeply emarginate, the depth of the incision about one third of its width, the apical teeth sharper. Basal half of scutellum sparsely punctate, the interspaces generally larger than the punctures, the median groove absent or only very faintly indicated. Antennal hook of male relatively longer. (Body extensively marked with yellow, but eye-emarginations black). (Aru; New Guinea). 13
11. Gaster black; head and thorax with sparse yellowish white markings. Wings brown with violaceous reflections. — Southern India. *coracinum* sp. n.
- Gastral tergites with yellow apical bands; the bands on tergites 1 and 2 dilated laterally. Wings fusco-hyaline, darkest at anterior margin of fore wings. 12
12. Thorax almost entirely black, (in the unique ♀ type the postcutellum with rudimentary yellow mark; dorsal areas of propodeum with yellow spot). Coxae black. — Burma. *flavolineatum malaisei* subsp. n.
- Thorax extensively marked with yellow. Mid and hind coxae with yellow spot on outer side. — Borneo, Sumatra, Java, Lesser Sunda Is. to Sumba.
flavolineatum flavolineatum (Smith)
13. Postcutellum black. — Aru Island. *hamatum aruense* subsp. n.
- Postcutellum with yellow band. — N. New Guinea. *hamatum hamatum* sp. n.

The forms belonging to this group are widely distributed in Southern and Eastern Asia, and seem to have reached New Guinea via the islands of the Sunda arc. No representatives have been found in Celebes and the Moluccas.

The synonymy of the members of this subgenus has proved to be rather complicated, and the following arrangement must be regarded as provisional.

Anterhynchium flavopunctatum (Smith)

Ancistrocerus flavo-punctatus Smith, 1852, Trans. Ent. Soc. Lond., ser. 2, vol. 2, p. 36, ♀ — "Ningpo, North China" (BM, no. 18.465).

Rhynchium mandarineum Saussure, 1855, Ét. fam. Vesp., vol. 3, p. 180, ♀ — "La

Chine" (received from Smith) [location of type uncertain] [new synonym].

Rhynchium flavomaculatum Saussure, 1855, Ét. fam. Vesp., vol. 3, pl. IX, fig. 7 [lapsus, rectified on explanation of plate: *R. flavopunctatum* Smith; "A tort *flavomaculatum* sur la planche"].

Rygchium inamurai Sonan, 1937, Trans. Nat. Hist. Soc. Formosa, vol. 27, no. 164, p. 110, ♀, fig. 1 (no. 1) — "Tamaru (Ratô-gun, Taihoku - Shû)", Formosa (coll. Sonan) [new synonym].

The type collection of the British Museum contains two females of this species. No. 18.465a originates from Smith's private collection, obtained by the Museum in 1879 ("79-22"), and bears a label in Smith's handwriting: "*Rh. flavopunctatum* Sm. (Type), *Ancistrocerus* do. Trans. Ent. Soc. Supp. New Ser."; furthermore it bears a round label "Shanghai" and a rectangular one (blue paper): "Teingtung". No. 18.465b is labelled "N. China, 54.8" and was obtained by the Museum in 1854.

This species differs from the closely allied *A. flavomarginatum* in the shape of the clypeus, which in both sexes is distinctly wider than in that species; the anterior margin is also wider, the teeth are distinctly divergent.

The synonymy given above is based on a comparison of the descriptions of *mandarineum* Saussure and *inamurai* Sonan with some specimens which I had compared with Smith's types previously (in 1958). If possible, it should be confirmed by examination of the types of these two species.

Furthermore it will be desirable to ascertain whether the notes on the habits of *Rhynchium mandarineum*, published by Torikata, 1930 (Mushi, vol. 3, pp. 84-88, 2 figs.), and Shibuya's description of the nest of "*Odynerus flavopunctatus*" (Mushi, vol. 13, pp. 102-104, 1941) do indeed refer to this species.

China: 2 ♀ 1 ♂ Ningpo, leg. Felder (ML); 1 ♀ Chekiang, Hangtchéou, A. Pichon, 1925 (MP); 1 ♀ Pingshiang (coll. Giordani Soika).

The distribution of this species requires further investigation.

***Anterhynchium flavomarginatum* (Smith) (figs. 5 f, 6 b)**

The type of *R. flavo-marginatum* Smith was not labelled as such when I studied the Vespidae of the British Museum in 1958; it was found in the general collection and could be recognized because it bears a label written by Smith, and because it is a stylopized male, as stated in the original description.

A. flavomarginatum is here regarded as a polytypic species which is widely distributed in Southern and Eastern Asia; the forms occurring in Sumatra and Java are rather aberrant and will perhaps eventually be regarded as separate species.

Anterhynchium flavomarginatum flavomarginatum (Smith)

Rhynchium flavo-marginatum Smith, 1852, Trans. Ent. Soc. Lond., ser. 2, vol. 2, p. 35, ♂ — China [locality not given] (BM).

Odynerus nigrifrons Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 62, ♀ — "North China (Shanghai)" (BM, type no. 18.325).

China: 1 ♀ Mongolia, 1 ♀ Canton, 1 ♀ Foochow, 1 ♀ Amoy (BM); 1 ♀ Amoy, leg. Budding, 1 ♂ Nanking (ML).

Sikkim: 2 ♀ Sikkim (ML), 3 ♀ 1 ♂ Sikkim (BM), 1 ♀ Tukvar, 2 ♀ Rungit Valley (BM), 1 ♂ Sikkim, April 1894, leg. Bingham, coll. Rothney (OUM).

Anterhynchium flavomarginatum micado (Kirsch)

Rhynchium ardens Smith, 1873, Trans. Ent. Soc. Lond. 1873, p. 196, ♀ "Nagasaki, George Lewis" (?BM) [invalid primary homonym of *Rh. ardens* Walker, 1871; secondary homonym of *Odynerus ardens* Guérin, 1848].

Odynerus (Leionotus) micado Kirsch, 1878, Mittheil. Zool. Mus. Dresden, vol. 3, p. 380, ♀ — "Japan" (Mus. Dresden).

Rhynchium japonicum Dalla Torre, 1894, Cat. Hym., vol. 9, p. 46 (new name for *Rh. ardens* Smith).

Rhynchium varipes Pérez, 1905, Bull. Mus. Hist. Nat. Paris 1905, p. 85, ♀ — "Japon central", M. Harmand (MP).

The geographic variation of this form requires further study. The type of *R. ardens* could not be found in the British Museum, for a specimen marked as such bears a label "77/11" (received from Mr. Jonas) and is apparently not the true type. According to Smith's description this species differs from *R. micado* in having a yellow fascia on the third gastral tergite; it may therefore perhaps prove to be subspecifically different from *micado*.

The habits of this form have been described by Iwata (1938, pp. 112-116); the wasps nest in dry stalks of bamboo and reed, in cavities in wood and sometimes in old mud cells of other wasps; the cells are separated with clay partitions and provisioned with larvae of Pyralidae and Tortricidae.

The following specimens are all typical *micado*, having the third and following gastral segments entirely black.

Korea: 1 ♀ "Korea, 1893, Erz. Franz Ferd." (ML).

Japan 1 ♀ "Japan" (ML); 1 ♀ Tamba, Sasayama, 16 July 1958, K. Iwata (ML); 1 ♂ Kyoto, Arasiyama, Matuo - Sh., 20 June 1958, K. Iwata (ML); 1 ♀ Tokyo, 18 July 1909, Edme Gallois (MP).

Anterhynchium flavomarginatum tsushimarum (Yasumatsu)

Rhynchium flavopunctatum f. *tsushimarum* Yasumatsu, 1935, Mushi, vol. 8, p. 86, ♀ — "Izuhara-Komoda, Tsushima, leg. Hori et Fujino" (Ent. Lab., Fukuoka; paratype in coll. Schulthess).

Many years ago Dr. von Schulthess kindly sent me a female of this species from Tsushima, collected by H. Fruhstorfer; this specimen is now in the Leiden Museum. Another specimen, collected in Tsushima, Tsutsu-Komoda, 28 July 1930, Mori and Chô, is in the collection of Dr. Giordani Soika.

***Anterhynchium flavomarginatum umenoi* (Yasumatsu)**

Rhynchium umenoi Yasumatsu, 1933, Annot. Zool. Jap., vol. 14, p. 262, ♀, figs 1, 3, 6 (p. 260), pl. 14 fig. 3 — 1 ♀ "Ishigaki Island" (coll. Umeno).

Odynerus (Lionotus) flavopunctatus var. *formosicola* Schulthess, 1934, Arb. Morph. Tax. Ent., vol. 1, p. 75, ♂ ♀ — "Formosa, Kankau, Taihorin, Taihanroku" (18 ♂ 6 ♀, coll. Schulthess and Deutsch. Ent. Inst.) [new synonym].

Rygchium taiwanus Sonan, 1937, Trans. Nat. Hist. Soc. Formosa, vol. 27, no. 164, p. 111, ♂ ♀, fig. 1 (nrs. 2-5) — "Taihoku", Formosa (coll. Sonan) [new synonym].

A specimen from Formosa in the Leiden Museum (Taihorin, 1911, leg. H. Sauter) agrees well with the description given by Yasumatsu (which even mentions the striation on the basal part of the first sternite!), but the markings on the face are slightly less extensive (interantennal spot separated from orange-yellow area on clypeus, no distinct line at inner orbits, and the trochanters and the basal half of the femora are infuscated). The collection Giordani Soika contains a paratype from Taihanroku, 6 July 1908, H. Sauter. Furthermore I have seen some males from Kankau and Kosempo in coll. von Schulthess (ETHZ).

***Anterhynchium flavomarginatum curvimaculatum* (Cameron)**

Rhynchium curvimaculatum Cameron, 1903, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 328, ♀ — Khasia Hills, Assam, leg. Rothney (OUM).

Rhynchium collinum Cameron, 1903, Ann. Mag. Nat. Hist. ser. 7, vol. 11, p. 329, ♀ ♂ — Khasia Hills, Assam, leg. Rothney (OUM) [new synonym].

From a comparison of Cameron's types in the Rothney collection in Oxford, I have concluded that *R. collinum* ♀ is nothing but a rather small specimen of *R. curvimaculatum*; it has the clypeus entirely black, not marked with a basal, pale yellow band as in the type and some paratypes of *R. curvimaculatum*.

A s s a m : 4 ♀ Assam (coll. Giordani Soika); 1 ♀ Assam (ML).

***Anterhynchium flavomarginatum silvaticum* subsp. n.**

♀ — Black; mandibles dark red, blackish at base and along the edges; tegulae and tarsi partly dark brown; the following parts dull reddish: clypeus (the margins partly narrowly infuscated), anterior surface of antennal scape, anterior surface of coxae I, all femora (femora I blackish on outer side, the others slightly infuscated at extreme base and apex);

pale yellow: a minute spot between the antennae, and a very narrow pre-apical band on first and second gastral tergites (in the Sumatran paratype the second band is reduced to a short line on each side of the tergite, in the Malayan female the gaster is entirely black). Wings yellowish-hyaline, brownish in distal angle of costal cell and slightly infuscated at apex.

Dorso-lateral carina of propodeal declivity weakly developed; otherwise agreeing well in structure and sculpture with the typical form.

♂ — Clypeus slightly longer than wide (32 : 29), its basal half rather strongly convex, the anterior half flattened, anterior margin wider than in the female, about one third of the greatest width (10 : 29), shallowly emarginate (depth of emargination less than $\frac{1}{5}$ of its width). Mandibles with four short and blunt teeth on inner side. Third antennal segment twice as long as its width at the apex, length of fourth segment $1\frac{1}{2}$ times its width; segments 8-10 with conspicuous and dense, but short, pubescence posteriorly (on inner side of the curved apex), last segment curved, in the only available specimen (which has only one antenna) not reaching beyond the emarginate apex of the tenth segment. Gastral tergites 3-6 with large and deep, crater-like, punctures at base (not visible unless the segments are more than usually extracted!).

Black; pale yellow: a large spot on the clypeus (basal and lateral margins irregularly black, apical margin narrowly fuscous), a small spot between the antennae, under side of first antennal segment, an elongate spot on the temples, two small spots at anterior margin of pronotum, a very widely interrupted narrow band at apex of first gastral tergite (the two markings about half as long as the distance between them), a small spot in apical angles of the second tergite, and irregular marks at apex of fore and mid femora and tibiae; femora only slightly brownish at apex.

Length (h. + th. + t. 1 + 2): ♀ 17-19 mm, ♂ 15-16 mm.

Sumatra: 2 ♀ Benkulen, Muara Tenam, June (paratype) and July (holotype) 1935, Mrs. M. E. Walsh (ML).

Malaya: Kedah, 1 ♂ Kedah Peak, 3000-3500', 15 March 1928, H. M. Pendlebury (allotype, BM); Perak, 1 ♀ Larut Hills, 3700-4000', 10 Febr. 1932, H. M. Pendlebury (paratype, BM). — In these specimens the apical half of the wings is more strongly infuscated than in the Sumatran females; in the female the margins of the clypeus are rather strongly infuscated.

***Anterhynchium flavomarginatum flavonigrans* subsp. n.**

♀ — Black; antennae slightly brownish at apex; tegulae partly dark brown; wings yellowish hyaline, outer two fifths rather strongly infuscated.

♂ — Very similar to the female, a minute spot between the antennae and

the anterior surface of the antennal scape pale yellow. Antennal hook (13th segment) rather long, in recurved position almost reaching the middle of the tenth antennal segment (as in the typical form!).

This form agrees with the Sumatran subspecies in having the dorso-lateral carina of the propodeal declivity only weakly developed.

Length (h. + th. + t. 1 + 2): ♀ 14-16 mm, ♂ 12-13 mm.

The holotype is a female from West Java, Djampang Tengah, Mt. Tjisuru,

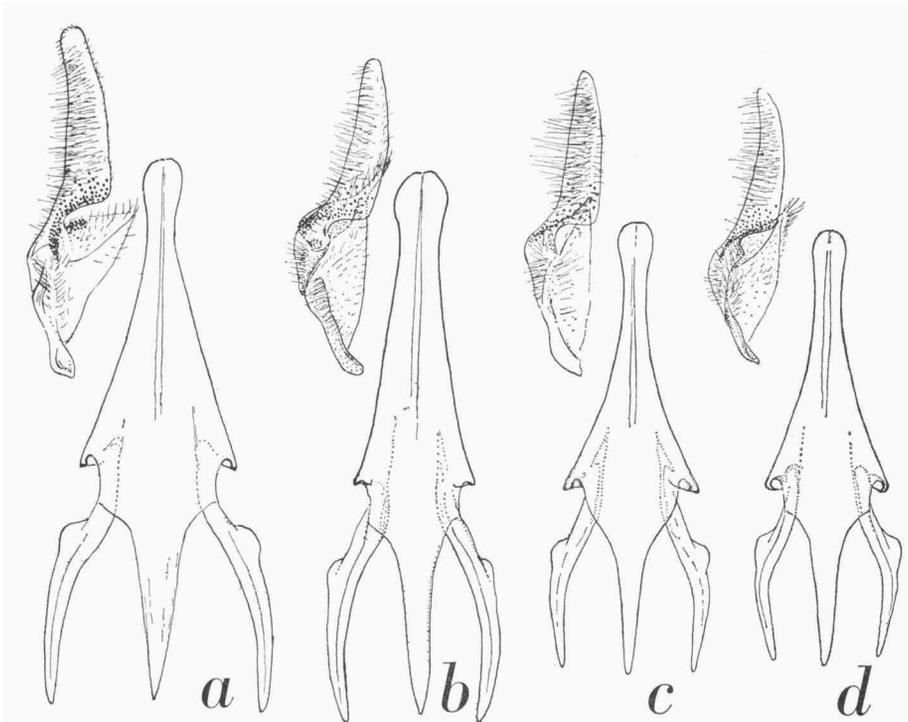


Fig. 6. Volsella and aedeagus (flattened) of male of
 a: *Anterhynchium* (*Anterhynchium*) *synagroides* (Sauss.) (Gabun, Africa)
 b: — (*Dirhynchium*) *flavomarginatum* (Sm.) (Fukien, China)
 c: — (*Epiodynerus*) *fulvipenne* (Sm.) (Celebes)
 d: — (*Epiodynerus*) *alecto* (Lep.) (New Caledonia).

600-800 m, May 1935, Mrs. M. E. Walsh (ML); the other specimens recorded below are paratypes.

West Java: 1 ♀ Mt. Tjampea near Bogor, Febr. 1937, F. Dupont (ML); 1 ♂ Mt. Pantjar near Bogor, 21 Nov. 1936, C. J. H. Franssen (ML); 1 ♂ Djampang, Mt. Malang, 3000', Febr. 1935, Mrs. M. E. Walsh; 1 ♂ Djampang, Bibidjilan, July 1936, Mrs. M. E. Walsh (ML); 3 ♀ Sukabumi, ex coll. J. Lindemans (MR, 1 ♀ ML).

Central Java: 1 ♀ Mt. Muria, Dec. 1935, Mrs. M. E. Walsh (ML).

East Java: 1 ♀ Bajukidul, Idjen Mts., May 1933, H. Lucht (ML).

This remarkable form agrees exactly in coloration with *Allorhynchium concolor*, *A. vollenhoveni* and the similarly coloured subspecies of *A. snelleni*. It is of interest to note that in the Archipelago this mimetic series appears to be restricted to well forested areas of Java (and Bali).

***Anterhynchium flavomarginatum townesi* subsp. n.**

♀ — Black; a small inter-antennal spot yellow; distal two thirds of mandibles partly dark reddish; antennal scape and the greater part of the second antennal segment ferruginous red; distal half of all femora and inner side of the tibiae more or less distinctly brownish red, the reddish areas nowhere well defined; apical tarsal segments brownish. Wings yellowish hyaline, darker towards the basal third which is distinctly infuscated; there is also a small infuscated area at the extreme apex of the fore wings.

The puncturation is generally slightly less dense than in subsp. *silvaticum*, and the dorso-lateral carina of the propodeum is even less distinct than in that form; moreover the impressed area of the post-ocellar fovea is slightly less extensive.

Length (h. + th. + t. 1 + 2) : 15-16 mm.

Luzon: 2 ♀ Los Baños, Laguna, 19 Aug. 1952 (holotype, coll. Townes) and 1 Aug. 1953 (paratype, ML), Townes family.

***Anterhynchium flavolineatum flavolineatum* (Smith)**

Odynerus flavolineatus Smith, 1857, Cat. Hym. Br. Mus., vol. 5, p. 60, ♀ — Java (type BM, no. 18.454); 1858, Jl. Proc. Linn. Soc. Zool., vol. 2, p. 110 (Mt. Ophir, Malaya, leg. Wallace). Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 197 (in subg. *Odynerus*, div. *Epsilon*; description ♀ ♂; Java). Smith, 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 376 (cat.). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 282 (in subg. *Ancistrocerus*; cat., "Malaya; Sumatra (Wallace)"). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 68 (cat.); 1904, Gen. Insect., vol. 19, p. 45 (cat.). Dover, 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 255 (in subg. *Rygchium*; Malaya). Van der Vecht, 1937, Treubia, vol. 16, p. 289 (Borneo; Sumatra; Java).

Rhynchium flavolineatum; Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 360, ♀ (Sikkim; Tenasserim; Java).

In both sexes of this species the third, fourth and fifth gastral tergites are rather coarsely punctate, with an irregular band of very coarse, crater-like punctures at the base; these larger punctures are visible only when the segments are extracted to a more than usual extent. Such coarse puncturation is absent in the related Papuan species *A. hamatum*, which moreover has the

pre-apical bands of the gastral tergites 3-5 a little closer to the posterior margin.

The volsellar digitus of the male genitalia is much less tapering towards the tip than in *A. hamatum* and has longer pubescence.

Malaya: 1 ♀ Mt. Ophir (OUM); 1 ♀ Upper Perak, Tapors, 26 Aug. 1941, ex FMS. Mus. (ML).

Borneo: 2 ♀ 2 ♂ Bengkajang, Ledo at Upper Sambas, 25 July 1933, H. R. A. Muller (ML); East Borneo, 1 ♀ Pelawan Besar, 1 ♂ Maluwi, May 1937, Mrs. M. E. Walsh (ML); 2 ♀ Samarinda, Muara Kaman, Nov. 1950, A. M. R. Wegner (MZB; ML); 4 ♂ Gunungsari, 1 ♂ Tabang, Aug. 1956, A. M. R. Wegner (MZB; ML), 1 ♂ Kembang Djangut, 28 Nov. 1956, A. M. R. Wegner (ML).

Sumatra: 1 ♀ Sumatra (OUM), 1 ♀ Sumatra, Dr. Ploem (ML); 1 ♀ Simawang, June 1877, Sumatra-Expedition (ML); 2 ♀ Benkulen, Tandjong Sakti, June 1935, 1 ♀ Benkulen, July 1935, Mrs. M. E. Walsh (ML); 1 ♂ Lampong Districts, Kedaton, Wai Rilau, 25 March 1937, Mrs. E. van der Vecht (ML).

Java: 1 ♀ Java, Kuhl and von Hasselt (ML); 1 ♀ 2 ♂ Java, S. Müller (ML); 1 ♂ Java, v. Lansberge (ML). — **West Java:** 1 ♀ Dungus Iwul near Djasinga, 18 March 1953, A. M. R. Wegner (ML); 1 ♂ Genteng, Tjikepuh, 2 July 1939, M. A. Lieftinck (ML); 6 ♀ 1 ♂ Djampang Tengah, 1933-6, Mrs. M. E. Walsh (ML), 1 ♀ Sukanegara, Febr. 1940 (MZB), 1 ♀ 1 ♂ Bodjong Kalong, Sept. 1935, Mrs. M. E. Walsh (ML); 1 ♂ Djampang, March 1933, F. Verbeek (ML); 1 ♀ 1 ♂ Djampang Wetan, Bibidjilan, July 1935, Mrs. M. E. Walsh (ML); Radjamandala, 350 m, 2 ♀, March and July 1940, J. Olthof (MZB; ML), 1 ♂ 15 Febr. 1939, M. A. Lieftinck (MZB), 1 ♀ 2 ♂ 1936, 1938, Mrs. M. E. Walsh (ML). — **East Java:** 2 ♀ 3 ♂ Malang, Baung, 350 m, Dec. 1934 and Aug. 1935 (ML); 1 ♀ Mt. Smeru, R. Darungan, 800 m, June 1941, M. A. Lieftinck (ML); 1 ♀ Idjen Mts., Bajukidul, 14 April 1931, H. Lucht (ML).

Sumba: 1 ♀ Kananggar, 700 m, May 1925, K. W. Dammerman (ML). — **West Sumba,** 5 ♀ 11 ♂ Waimangura, Rua and Pogobina, Aug.-Sept. 1949; **Central Sumba,** 11 ♀ 80 ♂ Lokojengo, Lindiwatju and Langgaliru, Sept.-Oct. 1949; **East Sumba,** 6 ♀ 1 ♂ Laluku, Mau Marru, Melolo and Prai Jawang, May-July 1949, all leg. Swiss Sumba Expedition (NMB; MZB; ML). — Approximately 50 % of the specimens from Sumba have no yellow spots on the mesoscutum. This is not an absolute character, for when present, the spots vary considerably in size, being very small in some specimens. Moreover, in specimens without these spots a tendency towards some reduction of other yellow markings is often apparent. This variability

appears noteworthy, however, for in an extensive series from Java, Sumatra and Borneo the mesoscutum is always marked with yellow.

Flores: 2 ♂ Ruteng, 1 ♂ Rana Mese, Nov. 1949, Swiss Sumba Expedition (NMB; ML); 1 ♀ 1 ♂ Wolawaru, 13 and 14 Aug. 1950, J. van der Vecht (ML). — Mesoscutum with yellow spots, except in the male from Wolawaru.

***Anterhynchium flavolineatum malaisei* subsp. n.**

♀ — Structural and sculptural characters as in *A. flavolineatum* from Java; lateral angles of propodeum rather sharp, dorsal areas not sharply separated from the declivity; gastral tergites 3-5 with a band of very coarse punctures at the base. Clypeus yellow with irregular black margin; eye-emarginations with only a small oval spot on lower half; thorax black with some faint rudiments of a yellow mark on the postscutellum, propodeum with fairly large yellow mark on each dorsal area; gastral bands well developed, even slightly wider than in the typical form, the band on tergite 2 strongly dilated laterally, here about $2\frac{1}{2}$ times as wide as in the middle, where its width is twice the distance from the posterior margin. Legs black, femora I and II with short yellow line at apex, all tibiae yellow on outer side; tarsi partly brownish.

Length (h. + th. + t. 1 + 2): 13 mm (? unusually large specimen).

Burma: 1 ♀ North East Burma, Punkataung, Road Sadon-Myitkyina, 8 July 1934, R. Malaise (NRS).

***Anterhynchium coracinum* sp. n.**

♀ — Closely allied to *A. flavolineatum*, but slightly larger, and differing in some structural details as well as in the colour pattern.

Concavity of propodeum with sharply projecting, tooth-like lateral angles, more coarsely striate than in *A. flavolineatum*, separated on each side by a strong ridge from the dorsal areas; on the inner side these ridges form a projecting tooth behind each posterior angle of the convex part of the postscutellum. As in *A. flavolineatum*, the puncturation of the third to fifth gastral tergites is coarser at the base than elsewhere, but the basal punctures are not as large and deep as in that species.

Black; the following parts pale yellow: a short and narrow transverse line at the base of the clypeus, a nearly circular spot between the antennae, and two transverse spots, close to the middle, at the anterior margin of the dorsal area of the pronotum; tegulae slightly brownish on outer side; femora II and III brownish at apex, tarsal spines and claws brown.

Length (h. + th. + t. 1 + 2) : 14-15 mm.

Southern India: 2 ♀ Tenmalai, 500-800', Travancore, 11-17 Oct. 1938, BM-CM Expedition (holotype BM; paratype ML); 3 ♀ Nilgiri Hills, Devala, 3200', Oct. 1960, P. S. Nathan (paratypes ML).

Anterhynchium hamatum sp. n.

♂ — Very similar to *A. flavolineatum* in general appearance, but differing in several structural characters as well as in some details of the colour pattern.

Clypeus broadly pear-shaped, slightly longer than wide, anterior margin rather deeply emarginate, the distance between the two lateral teeth about equal to three times the depth of the emargination, and to one fourth of the greatest width of the clypeus. Inter-ocellar area not raised (distinctly raised and faintly bituberculate in *A. flavolineatum*). Propodeum with distinct ridge separating the dorsal areas from the concavity, the ridges forming a short tooth on each side behind the posterior angles of the disk of the post-scutellum; lateral angles of propodeum distinct, but not strongly projecting.

Sculpture generally similar to that of *A. flavolineatum*, but the mesoscutum posteriorly a little more sparsely punctate, the scutellum without distinct median groove and except at posterior margin more sparsely punctate, with several interspaces larger than the punctures; puncturation of the gastral segments generally somewhat finer and more superficial than in *A. flavolineatum*, the third to fifth tergites without any trace of coarser puncturation at the base.

Black; yellow markings partly less extensive than in *A. flavolineatum*: anterior two thirds of the clypeus, eye-emarginations, mesoscutum and lower part of mesepisternum black; spots on temples and markings of legs usually smaller; partly more extensive: the spots on the tegulae connected at inner side or only narrowly separated, scutellum with two widely separated, sub-circular, spots (black in *A. flavolineatum*) and dorsal areas of propodeum often more extensively yellow. Gastral bands only slightly different: the band of the second tergite a little closer to the posterior margin (the width of the black margin in the middle only about one third of that of the yellow band, against nearly two thirds in *A. flavolineatum*) and not dilated laterally.

Wings moderately infuscated, darkest at anterior margin.

♂ — Similar to the female; clypeus narrower, distinctly longer than wide (6 : 5), the distance between the apical teeth slightly more than one third of the greatest width. Antennal hook (thirteenth segment) curved and rather large, in recurved position it reaches the basal third of the tenth antennal segment; mesoscutum and scutellum slightly more sparsely punctate and

more shiny. Genitalia similar to those of *A. flavolineatum*, but the volsellar digitus rounded at the base and strongly narrowed towards the finger-like tip.

Clypeus entirely yellow; metatarsi with yellow line (black in the female); other yellow markings less extensive than in the female: pronotal band narrower, scutellum and anterior two thirds of tegulae black, spots on dorsal areas of propodeum small, gastral bands often slightly narrower.

Length (h. + th. + t. 1 + 2): 10-12 mm, ♂ 8-11 mm.

New Guinea: 6 ♀ 5 ♂ Bewani Mountains near Hollandia, March 1937, W. Stüber, ex coll. J. van der Vecht (holotype, ♀, and paratypes, ML, 1 ♀ 1 ♂ BM); 1 ♀ Cyclops Mountains above Ifar, Hollandia area, 350 m, 21 Aug. 1957, D. Elmo Hardy (paratype, BPBM); 1 ♀ South New Guinea, Tanah Merah (Digoel), 3 April 1959, Neth. N.G. Exp. (ML).

***Anterhynchium hamatum aruense* subsp. n.**

♀ — Pronotum with two transverse spots at some distance from the anterior carina, tegulae with only a small spot in posterior angle, mesepisternum with yellow spot in upper part (slightly smaller than tegula); propodeum black or with small yellow spots on dorsal areas, remainder of thorax black. Gastral bands slightly wider than in typical *hamatum*; legs a little less extensively marked with yellow. Otherwise as in *A. hamatum* from New Guinea.

Aru Islands: 5 ♀ Aru, leg. Rosenberg (holotype and paratypes, ML).

Subgenus *Epiodynerus* Giordani Soika

Epiodynerus Giordani Soika, 1958, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 10 (1957), p. 195 (subgenus of *Pseudepipona* Saussure).

Type species: *Odynerus alecto* Lepeletier, 1841 (original designation).

In addition to the species discussed below, this group contains a number of species occurring in the Pacific Islands and in Australia. Among the former are *Anterhynchium alecto* (Lepeletier) (see figs. 5 h and 6 d) and *A. rufipes* (Fabricius), both discussed by Giordani Soika in 1958; four Australian species, including *nigrocinctum* (Saussure), have been treated by this author in his recent revision of Australian "*Odynerus*" (1962). *A. nigrocinctum* has also been collected in New Guinea and on Guadalcanal in the Solomon Islands (see below).

Key to the species of Eastern Indonesia, New Guinea and the Solomon Islands.

1. Scutellum, postscutellum, and first gastral segment, black. 2
- Scutellum and postscutellum marked with yellow, orange or brown; first gastral

- segment at least with apical band of one of these colours. 3
2. Frons (except for inter-antennal spot) and vertex black; clypeus black (♀) or yellow (♂); pronotum black (♀) or with narrow yellow band at anterior margin of dorsal surface; second gastral segment of ♀ black or with narrow brownish apical band, do. of ♂ with narrow yellowish apical band; tergites 3 and 4 with narrow brownish apical band, remaining tergites almost entirely brown. Legs partly ferruginous, hind legs in some specimens almost entirely dark. — Celebes.
fulvipenne fulvipenne (Smith)
- Frons and vertex with more extensive ferruginous markings; clypeus (♀) with ferruginous band or spots at base or almost entirely orange-brown; clypeus of ♂ yellow, more or less ochreous at base (rarely entirely black); pronotum usually with broad orange band in both sexes; second and following tergites with rather wide orange-brown apical band, the band on tergite 2 often slightly paler than the others, its width about equal to one sixth of the length of the tergite. Legs black, in the ♀ the fore tibiae yellowish anteriorly, in the ♂ rarely the mid and hind femora partly ferruginous above. — New Guinea. *fulvipenne venustum* subsp. n.
3. Head orange, occiput and a band across the ocelli black; pronotum, scutellum (anterior margin narrowly black), postscutellum, and propodeum (except for large black spot in concavity) orange; gaster orange with black second segment (apical margin of tergite more or less extensively yellow or orange), the first segment black at extreme base. Legs ferruginous, coxae partly black. 4
- Colour pattern different; first gastral tergite black with apical yellow or brownish band which does not cover the entire posterior, horizontal, part of the tergite . . . 5
4. Mesoscutum orange, with black band on posterior third to half; apical margin of second gastral tergite with narrow and ill-defined orange band, abbreviated laterally.
nigrocinctum nigrocinctum (Saussure)
- Mesoscutum black or with small orange spots anteriorly; second gastral tergite with complete and well defined apical band which is a little narrower at the sides than in the middle.
nigrocinctum meraukense (Cameron)
5. Apical bands of tergite 1 and 2 yellow, the width of the latter less than one sixth of the length of the tergite; mesoscutum with two yellow lines, scutellum with widely separated yellow spots, postscutellum with narrow, sometimes interrupted, arcuate yellow band across the middle. — Solomon Islands . . . *woodfordi* (Meade-Waldo)
- Apical bands of tergite 1 and 2 wider, orange-yellow to brown, the first covers about the posterior half of the horizontal part of the tergite, the width of the second is about equal to one fourth of the length of the tergite. Dorsal area of pronotum almost entirely orange or brown; scutellum and postscutellum mainly yellow or brown. 6
6. Markings orange, more or less suffused with yellow; apical bands of gastral tergites 1-3 mainly bright yellow, about equally wide. — Sumba.
fulvipenne perpulchrum subsp. n.
- Markings brownish; the band on tergite 1 usually strongly dilated laterally, the band on tergite 3 much narrower than the preceding band. — Timor.
fulvipenne aureum (Saussure)

Anterhynchium fulvipenne fulvipenne (Smith) (figs. 5g, 6c)

Odynerus fulvipennis Smith, 1859, Jl. Proc. Linn. Soc. Zool., vol. 3, p. 22, ♂ — "Celebes", leg. Wallace (OUM). Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 198 (subg. *Odynerus*, div. *Epsilon*) (♂, Gorontalo, Celebes; ML). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 283 (in subg. *Ancistrocerus*) (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 69 (cat.); 1904, Gen. Ins., vol. 19, p. 45 (cat.).

Celebes: North Celebes, Manado, 3 ♀ 8 ♂ 8-10 Nov. 1937, J.S. Phillips (ML), 1 ♂ leg. Mohari (MZB), 6 ♀ 5 ♂ May-Aug. 1949, C. J. H. Franssen (ML); 5 ♀ 1 ♂ Mapanget near Menado, May-Aug. 1949, C. J. H. Franssen (ML); 9 ♀ 3 ♂ Kinamang, 0 m, Nov. 1941, F. Dupont (ML); 2 ♀ Mt. Bugason, 300 m, 15 Aug. 1941, F. Dupont (ML); Gorontalo, 14 ♀ 5 ♂ leg. Rosenberg (ML), 1 ♂ leg. Forsten (ML); 2 ♀ 1 ♂ Tulabollo, leg. Rosenberg (ML); 4 ♀ 2 ♂ Toli-toli, Nov.-Dec. 1895, H. Fruhstorfer (MHNG; 1 ♂ ETHZ). — Central Celebes, 7 ♀ 13 ♂ Palu, Dec. 1936 (ML); 1 ♂ Palu Valley, 9 May 1955, H. H. F. Hamann (ML); 1 ♀ Ampana, 30 Sept. 1952, leg. M. Inen (ML). — South Celebes, 1 ♂ Watang Lamuru, 30 May 1948, J. van der Vecht (ML); 1 ♀ 2 ♂ Bantimurung, 1 June 1948, J. van Vecht (ML); 2 ♀ 6 ♂ Makassar, March-May 1949, C. J. H. Franssen (ML).

Java: 1 ♀ East Java, Sukowono, C. J. Louwerens (ML).

Kangean Is.: 1 ♀ Tembajangan, 1 ♂ Petapan, Febr. 1936, Mrs. M. E. Walsh (ML); 1 ♀ Paliat I. near Kangean, 7 March 1936, Mrs. M. E. Walsh (ML).

Flores: 1 ♀ 1 ♂ Wolosambi, 10 May 1950, Miss H. C. Vos (ML); 2 ♀ Boa Wae, 450 m, 2-3 April 1957, A. M. R. Wegner (ML); 5 ♀ 1 ♂ N. doa-Endeh, April 1958, Fr. M. Vianny (ML); 3 ♀ 2 ♂ Mborong, 30-31 March 1958, A. M. R. Wegner (ML).

Alor: 1 ♀ Kalabahi, 30 March 1957, A. M. R. Wegner (ML).

***Anterhynchium fulvipenne perpulchrum* subsp. n.**

♀ — Structurally very close to *A. fulvipenne* from Celebes, but the body extensively marked with yellow and orange to ferruginous; in general appearance similar to *Rhynchium haemorrhoidale bathyxanthum* (see p. 110).

Black; the following parts orange-ferruginous (some markings suffused with yellow, see below): clypeus (ill-defined dark spot in the centre), mandibles (brownish at apex and lower margin), antennae, a transverse spot between antennal insertions, a line at inner orbits, ending in the eye-emargination and here slightly dilated, an ill-defined band on the temples, extending to the vertex, but here rather dark and indistinct, pronotum (except for part of anterior surface, the lower part of the sides, and the groove in front of the tubercles), tegulae (brownish at anterior inner angle), a spot on upper part of mesepisternum, a broad band on the scutellum, a narrower one on the postscutellum, an elongate mark on each side of the propodeum; a yellowish tinge is most distinct at the base of the mandibles, the base of the clypeus, along the pronotal carina, in upper part of mesepisternal spot, and

at posterior end of the markings of the propodeum. Gastral tergites with wide apical bands which are bright yellow, more or less ferruginous at anterior margin on tergites 1-3, with ferruginous tinge on 4, and entirely ferruginous on 5 and 6; the band on tergite 1 slightly dilated at the sides; sternites 2-4 with narrower apical yellow band, at least on 2 often incised or interrupted, 5-6 almost entirely ferruginous. Legs ferruginous; coxae and trochanters of mid and hind legs fuscous, femora of hind legs partly fuscous. Wings flavo-hyaline, darkest anteriorly, slightly infuscated at outer margin.

♂ — Similar to the female; clypeus entirely yellow, antennal scape yellow in front, yellow spot at base of mandibles more pronounced, frontal markings more yellowish, supraclypeal area with small yellow spot; mark on temples often reduced; antennae often somewhat brownish above; pattern of thorax and gaster mainly as in the female; front side of tibiae I and apex of femora I and II marked with yellow; femora I and II sometimes blackish at base. In a few males the mesoscutum bears a ferruginous spot on each side close to the tegula, one specimen also has such a spot in the middle anteriorly.

Length (h. + th. + t. 1 + 2): ♀ 12-14 mm, ♂ 10-12 mm.

The holotype is a female from Sumba, Prai Jawang (NMB); the other specimens recorded below are paratypes.

S u m b a: West Sumba, 1 ♀ Kodi, 1 ♂ Waimangura, 1 ♂ Rua, 1 ♀ 3 ♂ Waikarudi, 2 ♂ Pogobina, July-Sept. 1949; Central Sumba, 1 ♂ Lokojengo, Sept. 1949; East Sumba, 1 ♀ 1 ♂ Melolo, 2 ♀ 1 ♂ Prai Jawang, May-June 1949; all leg. Swiss Sumba Expedition (NMB; ML).

Anterhynchium fulvipenne aureum (Saussure)

Odynerus aureus Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 197, ♀ — "Timor", leg. Macklot (ML) (in subg. *Odynerus*, div. *Epsilon*). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 55 (cat.); 1904, Gen. Ins., vol. 19, p. 40 (cat.).

♀ ♂ — Similar to subsp. *perpulchrum*, but the body slightly smaller and more slender, the markings not distinctly tinged with yellow (rather dull brownish, but the colour may be brighter in fresh specimens); clypeus of ♀ without median mark; frons with a large spot on each side near the upper lobe of the eye, these spots extend to the ocellar area where they meet behind the anterior ocellus; markings of thorax practically as in *perpulchrum*; gastral tergites 1 and 2 with wide apical band (on 1 dilated laterally), but the bands on the following segments narrower and darker, little conspicuous (especially in the ♂); sternites 2-5 (2-6 in the ♂) with reduced and indistinct apical band; apical segment mainly blackish. Legs and wings as in *perpulchrum*.

Length (h. + th. + t. 1 + 2): ♀ 11-12 mm, ♂ 10-11 mm.

Timor: 2 ♀ "Timor, Macklot" (incl. the lectotype by present designation); 1 ♀ 3 ♂ "Timor, Wienecke" (ML).

The "Zoologische Sammlung des Bayerischen Staates" contains 2 ♀ 2 ♂ with label "Indo-mal. Region"; three of these specimens have the frontal spots connected with the inter-antennal mark.

***Anterhynchium fulvipenne venustum* subsp. n.**

♀ — Agrees in structure with the nominate subspecies, but differs in colour pattern; black, with the following parts orange: antennae, a band on basal half of clypeus, in some specimens reduced to two spots, in others extending to near the anterior margin, the frons (except for a black transverse band above the clypeus, an oblique band from each antenna to the anterior angle of the upper lobe of the eye, and a mark in front of the anterior ocellus), two large spots on the vertex (separated from each other and from frontal markings by dark triangle, with base through posterior ocelli and top in post-ocellar fovea), an ill-defined mark on the temples behind the upper lobe of the eye, a broad band on dorsal surface of pronotum, narrowed towards the middle and obliquely cut off laterally, well defined bands at apical margins of tergites 2-5, and almost the entire tergite 6; sternites 2-5 with narrow apical band, very widely interrupted on 2, less so on the following sternites and almost entire on 5. Legs black; tibiae I yellowish anteriorly, tarsi I pale brown, tarsi II and III dark brown. Wings with pronounced yellow tinge, moderately infuscated at base.

♂ — Similar to the ♀; clypeus almost entirely yellow, on basal half with orange tinge; antennal scape yellowish anteriorly.

Length (h. + th. + t. I + 2): ♀ 14-15 mm, ♂ 12-14 mm.

The colour pattern appears to be rather variable: in some specimens the pronotal band is rather narrow, and in one ♀ and one ♂ from Hollandia clypeus and pronotum are entirely black (the clypeus of the female has two small and indistinct brownish spots).

The holotype is a ♀ from Hollandia, Pim, Dec. 1936, W. Stüber (ML), the allotype a ♂ from the same locality and date; the other specimens recorded below are paratypes.

New Guinea: North New Guinea, 3 ♀ 2 ♂ Hollandia, Pim, Dec. 1936, W. Stüber (ML; 1 ♀ coll. Giordani Soika), 1 ♀ Bewani Mts., March 1937, W. Stüber (ML); 3 ♀ Bernhard Camp, 50 m, 3rd Archbold Exp., July-Nov. 1938, J. Olthof (ML); 1 ♀ Hollandia, 24 May 1910, P. N. van Kampen (ML; dark specimen). — North East New Guinea, Lae, 1 ♀ Bubia, 29 March 1955, J. Szent-Ivany (DAPM). — Papua, 1 ♂ Central Distr., Aroa Plantation, 16 May 1957, J. Szent-Ivany (DAPM).

Anterhynchium nigrocinctum nigrocinctum (Saussure)

Odynerus nigrocinctus Saussure, 1853, Ét. Fam. Vesp., vol. 1, p. 152 (in key), 201, ♂ (in subg. *Leionotus*) — "La Tasmanie" (MP); 1855, Ét. Fam. Vesp., vol. 3, p. 240 (in subg. *Odynerus*, div. *Epsilon*; notes). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 82 (cat.); 1904, Gen. Ins., vol. 19, p. 50 (cat.). Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 252 (description of ♀).

Pseudepipona (Epiodynerus) nigrocincta; Giordani Soika, 1962, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 14 (1961), p. 82 (in key), 95 (Australia).

New Guinea: North New Guinea, Hollandia, 8 ♀ 1 ♂ July 1956-Oct. 1957, G. den Hoed (ML); 2 ♀ coll. van Lith), 4 ♀ 28 Aug. 1956, J. van den Assem (ML), 1 ♀ Dojo, April 1958, G. den Hoed (ML), 4 ♀ Kota Nica, Sept. 1957-April 1958, R. T. Simon Thomas (ML), 1 ♀ Ifar, March 1959, J. van den Assem (ML); 3 ♀ Joka on Lake Sentani, Oct. 1954, L. D. Brongersma and L. B. Holthuis (ML); 2 ♀ Hollandia, March 1959, Neth. New Guinea Exp. (ML). — North East New Guinea, Lae, 1 ♀ Bubia, 25 March 1955, J. Szent-Ivany (DAPM). — Papua, 1 ♀ Central Distr., Aroa Plantation, 16 May 1957, J. Szent-Ivany (DAPM).

Solomon Islands: 1 ♀ 1 ♂ Guadalcanal I., Honiara, 10-14 Sept. 1953, J. D. Bradley (BM); 1 ♀ Guadalcanal, Kukum, 19 June 1956, J. L. Gressitt (BPBM). — As this species is not represented in the rich collection of wasps brought together in Guadalcanal and other Solomon Islands by Mr. H. T. Pagden in 1933, I suspect that it has been accidentally introduced into Guadalcanal during the second world war.

Anterhynchium nigrocinctum meraukense (Cameron)

Odynerus meraukensis Cameron, 1906, Tijdschr. voor Ent., vol. 49, p. 224, ♀ — "Merauke", South New Guinea (MA).

New Guinea: 1 ♀ Merauke, New Guinea Exp. 1906 (lectotype, MA). — Biak Island, 5 ♀ Jan.-July 1952, L. D. Brongersma (ML).

Anterhynchium woodfordi (Meade-Waldo)

Odynerus woodfordi Meade-Waldo, 1910, Ann. Mag. Nat. Hist., ser. 8, vol. 6, p. 108, ♀ — Solomon Islands (BM, type no. 18,351).

The female specimens recorded below agree well with the type; the male had not yet been described.

♂ — Mandibles with four teeth on inner side (probably the basal tooth subdivided), the fourth or subapical tooth prominent, and larger than the others; clypeus anteriorly rather deeply emarginate (width of emargination: depth = 5 : 3); apical antennal segment (hook) short, in recurved position hardly reaching the apex of the tenth segment. Genitalia very similar to those of *Anterhynchium alecto* (Lepeletier), the type species of subg. *Epiodynerus*.

Colour pattern mainly as in the female, but the clypeus yellow except for a crescent-shaped spot or band; mandibles orange-yellow with dark margin; antennal scape black above; yellow lines on mesoscutum absent (always?), coxae and trochanters mainly blackish; apical bands of gastral tergites 3 and 4 often more or less reduced.

S o l o m o n I s . : Bougainville, 1 ♀ Kangu Hill, southern tip of island, secondary forest, 1954, J. Szent-Ivany (DAPM); 1 ♀ Mosigeta, 25 m, 3 June 1956, 2 ♀ Buin, 2 June 1956, J. L. Gressitt (BPBM; ML); 1 ♀ Arawa, 22 June 1956, 1 ♀ Simba Mission, 29 June 1956, E. J. Ford Jr. (BPBM; ML). Buka I., 1 ♀ Gagan, 40 m, 16 June 1956 (BPBM). — Shortland Is., 1 ♂ 23 April 1934, no. 1192 (ML), 1 ♀ 2 ♂ Korovo, 25-29 April 1934 (nrs. 1238, 1219 and 1244 (HTP; ML), 1 ♀ Kamaliai, 26 April 1934 (no. 1213) (HTP), all leg. H. T. Pagden. — Tulagi, 3 ♀ 8 ♂, 30 June-16 Sept. 1933 (♀: nrs. 86, 381, 871; ♂: nrs. 51, 52, 420, 577, 578, 1424, 1425, 1610) (2 ♀ 3 ♂ "flowers", 5 ♂ "Antigonon flowers", 1 ♀ "quarters"), all leg. H. T. Pagden (HTP; ML).

Genus *Pararrhynchium* Saussure

Pararrhynchium Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 173 (division of genus *Rhynchium* Spinola).

Type species: *Rhynchium ornatum* Smith, 1852, (monotypic).

Prorrhynchium Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 174 (division of genus *Rhynchium* Spinola).

Type species: *Rhynchium smithii* Saussure, 1855 (monotypic).

Prorrhynchium Saussure, 1856, Ét. Fam. Vesp., vol. 3, Index, p. 8 [= *Prorrhynchium* Saussure, incorrect spelling].

Pararrhynchium Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 182 [= *Pararrhynchium* Saussure, incorrect spelling].

Parrhynchium; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 42 [= *Pararrhynchium* Saussure, incorrect spelling].

This peculiar genus contains only a small number of species which appear to be restricted to Eastern Asia. The following notes may serve as a contribution to our knowledge of this group. The available material is not sufficient to enable me to give a complete revision. I have examined a small series of the type species, but of the other species discussed below I have seen only a few specimens.

P. smithii (Saussure), the type of *Prorrhynchium*, was said to be common in Formosa by Sonan (1937), but up to the present I have not found this species in collections containing Formosan material. Some years ago I examined the type from Shanghai in the British Museum and came to the same conclusion as Bequaert (1941), who remarked that *Prorrhynchium* is not separable from *Pararrhynchium*.

Pararrhynchium ornatum ornatum (Smith)

Rhynchium ornatum Smith, 1852, Trans. Ent. Soc. Lond., ser. 2, vol. 2, p. 36, ♀, pl. 8, fig. 10 — "Teitung, near Ningpo, amongst the mountains" (BM, type no. 18,323). Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 173, ♀ (in division *Pararrhynchium*; China; type in coll. Smith examined). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 45 (cat.). Saussure, 1862, Stett. Ent. Ztg., vol. 23, p. 182 (description). Sickmann, 1894, Zool. Jahrb. Syst., vol. 8, p. 232 (Tientsin). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 47 (cat.); 1904, Gen. Ins., vol. 19, p. 35 (cat.).

Odynerus ornatus; Schulthess, 1913, Ark. f. Zool., vol. 8, no. 17, p. 8 (in subg. *Ancistrocerus* Wesm., div. *Hypancistrocerus* Saussure) (Fukai, Japan; syn. *Od. shinto* Schulthess); 1934, Arb. Morph. Tax. Ent., vol. 1, p. 70 (in key).

Odynerus shinto Schulthess, 1908, Mitt. Schweiz. Ent. Ges., vol. 11, p. 286, ♀ (in subg. *Ancistrocerus*, div. *Stenancistrocerus*) — "Japan, Yokohama(?)", from Staudinger (coll. Schulthess, ETHZ).

Odynerus meyeranus Cameron 1906, Tijdschr. v. Ent., vol. 49, p. 226 — "New Guinea" (MA) [label incorrect!] [new synonymy].

Ancistrocerus ornatus; Iwata, 1938, Tenthredo, vol. 2, pp. 27-29, fig. 6 (bionomics in Japan; nests in reed tubes; prey: lepidopterous larvae).

J a p a n: 1 ♀ "Japan", von Siebold (ML), 1 ♀ Awati, 18 Aug. 1954, T. Mori (ML); in both these specimens tergites 3-6 are black, as in typical *ornatum*. 1 ♀ Osaka, Shirokita Park, 30 July 1950, T. Schmidzu (ML) (tergites 3 and 4 with narrow apical band).

C h i n a: 1 ♀ 1 ♂ Chekiang, Chusan, July 1931, leg. O. Piel, ex coll. van der Vecht (ML) (♀: tergite 3 with reduced apical band, ♂: tergites 3 and 4 with complete, narrow, apical band).

Pararrhynchium ornatum sauteri (Schulthess)

Odynerus sauteri Schulthess, 1934, Arb. Morph. Tax. Ent., vol. 1, p. 70, ♂ ♀ (in subg. *Ancistrocerus* Wesm., div. *Hypancistrocerus* Sauss.) — "Formosa, Kosempo, Kaukan" (coll. Schulthess; Deutsch. Ent. Inst.).

?*Ancistrocerus heirinus* Sonan, 1939, Trans. Nat. Hist. Soc. Formosa, vol. 29, p. 134, ♀, fig. 5 — "Heirin, Bunzan-gun, Taihoku-shu, Formosa", June 1926, J. Sonan (type in coll. Sonan).

Sonan's description of *A. heirinus* suggests that it is based on a relatively dark specimen of this brightly coloured Formosan subspecies of *P. ornatum*.

F o r m o s a: 1 ♀ Kosempo, July 1908, H. Sauter (ML). — In 1957 I have compared this female with two specimens in coll. Schulthess (ETHZ): a ♂ from Kosempo, 1911 (lectotype by present designation) and a female from Hoozan, Sept. 1910 (labelled "type", but the locality is not mentioned in the original description); furthermore I have seen a syntype (♀) from Kosempo in coll. Giordani Soika.

Pararrhynchium sinense (Schulthess)

Odynerus (subg. *Ancistrocerus*, div. *Hypancistrocerus*) *sinensis* Schulthess, 1913, Ark. Zool., vol. 8, no. 17, p. 6, ♀, fig. 6 — "China, Canton" (1 ♀ coll. Schulthess, ETHZ).

Superficially, this species is very similar to *Orancistrocerus fukaianus* (Schulthess) and *Anterhynchium flavopunctatum* (Smith), but it is easily distinguished by a series of morphological characters.

P. sinense has the following characters in common with the type species of the genus, *P. ornatum* (Smith).

Mandibles moderately long, the teeth broad and truncate, separated by short and narrow incisions, the basal tooth more or less distinctly subdivided. Labrum with short pubescence and with two apical bristles. Third antennal segment only $1\frac{1}{3}$ to $1\frac{1}{2}$ times as long as the fourth. Anterior surface of pronotum smooth, laterally distinctly punctate, margined by a distinct carina; the sides of the dorsal part posteriorly with rather deep groove in front of the tubercle.

Mesoscutum with prescutal furrows (extending from the scutellum to near the middle of the mesoscutum); tegulae extending beyond the apex of the posttegulae. Postscutellum slightly sloping, forming part of the dorsal surface. Propodeum with horizontal portion, the posterior surface flattened, more or less concave, bordered by a pronounced carina which has a V-shaped incision in the middle above (thus forming two teeth behind the postscutellum); at a short distance from the apical valvula the carina is bent forwards, thus separating the larger upper part of the lateral areas of the propodeum from a narrow, slightly concave, strip above the apical valvula; here the carina may become rather indistinct anteriorly.

The anterior, vertical, surface of the first gastral tergite fits closely in the propodeal concavity, and is separated from the horizontal portion by a blunt and somewhat irregular carina, which laterally runs backwards to the posterior margin of the tergite, thus separating the narrow depressed and flattened lateral margin of the tergite from the disk; the posterior margin is narrowly discoloured, but not depressed; basal narrow part of the first gastral sternite smooth, the posterior part short, crescent-shaped, irregularly and superficially, but rather coarsely, rugose, bordered anteriorly by a distinct carina. Second segment rather long, not much wider than the first; basal groove of the sternite with about a dozen coarse ridges; apical margin of the tergite flattened, discoloured, and slightly raised.

In the fore wing the parastigma is less than half as long as the stigma, and shorter than half the anterior part of the basal vein (Rs); the junction of basal and discoidal veins is only slightly thickened (strongly thickened in *Orancistrocerus*!)

P. sinense differs from *P. ornatum* in the characters indicated by von Schulthess (1913, p. 7); moreover the apical margin of the third gastral tergite is raised like that of the second. The body is generally less slender

than in *P. ornatum*, and slightly less shiny; in both sexes the tegulae extend distinctly beyond the posttegulae; the horizontal portion of the propodeum in the middle very short, much shorter than in *P. ornatum*; the upper part of the declivity much less coarsely sculptured, almost smooth; first gastral segment relatively shorter, with more prominent transverse carina.

The male agrees with that of *P. ornatum* in the peculiar shape of the mandibles, perhaps a generic character; there are three teeth on the inner side (the apical tooth not included), the middle of which is smaller than the others, the first, basal tooth is longer and sharper than the third. Antennal hook rather large, slightly curved and flattened, in recurved position reaching a little beyond the middle of the tenth segment.

Coloration as in the female, yellow mark on mandibles larger, extending beyond their middle; mid and hind coxae partly yellow anteriorly, mid femora and fore and mid tibiae with some yellowish markings.

Length (h. + th. + t. 1 + 2): ♀ 16-17 mm, ♂ 14-15 mm.

C h i n a: 1 ♂ (allotype), 1 ♀ Fukien, Kuantun, 2300 m (27.40 N., 117.40 E.), 21 July 1938, J. Klapperich (MZAK).

Pararrhynchium paradoxum (Gussakovskij)

Odynerus paradoxus Gussakovskij, 1933, Ark. f. Zool., vol. 24A, no. 10, p. 56, ♀ — "Ussuri-Geb.: Sutshan" (NRS).

♂ — In general appearance similar to *P. sinense*, but smaller, the clypeus shorter and more deeply emarginate, the propodeum different, and the posterior margin of the third gastral tergite not raised.

Head subcircular; mandibles (fig. 8c) as in the males of *P. ornatum* and *sinense*; clypeus short, wider than long (31 : 28; the length measured from the base of the clypeus to the apex of the teeth), anterior margin almost half as wide as the clypeus (14 : 31), deeply emarginate (width: depth of emargination = 14 : 5), the apical teeth acute. Antennae as in *P. sinense*, all segments distinctly longer than wide. Tegulae not distinctly extending beyond the posttegulae. Horizontal portion of propodeum shorter than postscutellum, the declivity concave, wider than high, with slightly prominent blunt tooth on each side at lower lateral angle, arcuately striate, with median carina in lower two thirds, the upper margin strongly raised above the level of the horizontal part, here forming a sharp edge which is finely serrate and which has a narrow, but deep, incision in the middle. Transverse carina of first gastral tergite blunt, little conspicuous.

Parastigma of fore wing short, its length only about one fourth of that of the stigma.

Head and thorax densely and coarsely punctate; first and second gastral tergites sparsely punctate, the following tergites densely, but rather superficially punctate.

Black; the following parts yellow: clypeus, impressed triangular area at base of mandibles, a small inter-antennal spot, under side of antennal scape; orange yellow: a narrow, abbreviated band at anterior margin of dorsal surface of pronotum, interrupted in the middle, a pre-apical band on tergites 1 and 2 (the apical margins of these tergites narrowly discoloured), the first

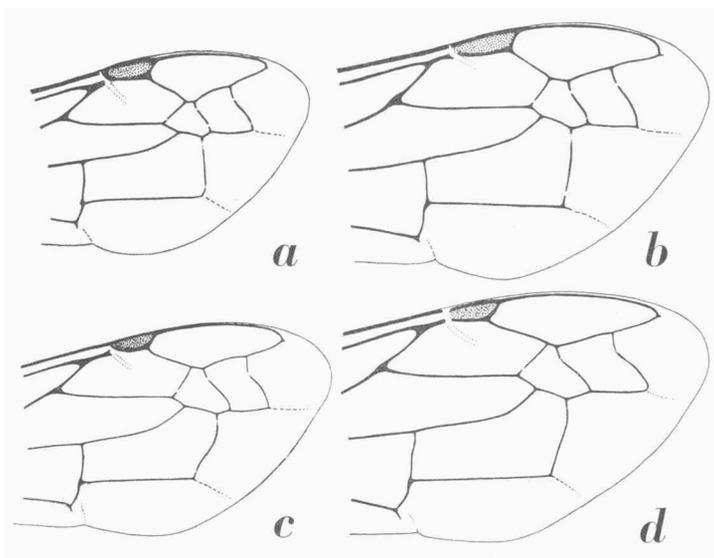


Fig. 7. Fore wing (base omitted) of

- a: *Pararrhynchium ornatum* (Sm.), ♂ (Chekiang, China)
- b: *Orancistrocerus drewseni drewseni* (Sauss.), ♂ (Foochow, China)
- c: *Rhynchium oculatum* (Fabr.), ♂ (Crete)
- d: *Xenorhynchium nitidulum* (Fabr.), ♂ (South India).

band dilated laterally, shallowly incised in the middle anteriorly, its width about half the length of the horizontal portion of the tergite, the second band slightly wider, weakly sinuate anteriorly. Legs dark brown, mid femora with yellow spot at apex, all tibiae with yellow mark at apex, tarsi pale yellowish, apical half of the fifth segment (including the claws) dark. Wings pale brown.

Length (h. + th. + t. 1 + 2): 10-11 mm.

China: Fukien, Kuatun, 2300 m (27.40 N., 117.40 E.), 17 June 1938, J. Klapperich (allotype, ZMAK).

After having drawn up the above description of the male, I was enabled

to compare this specimen with the type of *Odynerus paradoxus* Gussakovskij, kindly sent to me for study by the Stockholm Museum (♀, Vladivostok, Suchan, 22 July 1930, R. Malaise). The female is slightly larger than the male; mandibles regularly quadridentate, the teeth gradually increasing in size from base to apex of cutting edge; clypeus more strongly convex, hardly wider than long (42 : 40), with narrower anterior margin (only one third of the width of the clypeus, 14 : 42), its apical teeth more pronounced and slightly directed outwards, antennae stouter, third segment about $1\frac{1}{2}$ times as long as its width at the apex, the following segments wider than long; vertex with large, shallow, hairy postocellar fovea, which has a small pit on each side of the middle; declivity of propodeum wider (fig. 8b); clypeus black with yellow band at base; legs darker than in the male, only the anterior surface of the fore tibiae distinctly marked with yellow, knees and tarsi brownish.

Pararrhynchium smithii (Saussure)

Rhynchium smithii Saussure, 1855, Ét. Fam. Vesp., vol. 3, p. 174, ♂ (in division *Prorrhynchium*) — China, coll. F. Smith (BM, type no. 18.451). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 45 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 48 (cat.); 1904, Gen. Ins., vol. 19, p. 35 (cat., *smithi*). ?Bingham, 1905, Fasc. Malay., Zool., vol. 3, p. 48 (♀ ♂, Malaya). Sonan, 1927, Trans. Nat. Hist. Soc. Formosa, vol. 17, p. 130 (Formosa); 1937, Trans. Nat. Hist. Soc. Formosa, vol. 27, p. 107 (in key; common in Formosa).

The following notes are based on the type specimen, a male with round blue label "Shanghai", ex coll. F. Smith, 79-22 (BM): Head thick, as seen from above less than twice as wide as long (58 : 34), strongly produced behind the ocelli (distance from ocelli to posterior margin = 16); interocular distance at vertex = 27; occipital carina distinct; anterior margin of clypeus a little less than the greatest width of the clypeus, the emargination rather shallow (width : depth = 5 : 1). Horizontal area of propodeum shorter than the postscutellum (7 : 10), declivity mainly as in *ornatum*, with similar incision in the middle above; dorsal lateral areas of propodeum each with impunctate, partly finely rugose, area in the middle; the first gastral tergite not sharply rectangular as seen in profile, the transition from the anterior, vertical surface to the horizontal portion bluntly rounded.

Bingham's record refers almost certainly to a different species; Sonan's identification appears doubtful and should be confirmed by examination of his material.

Orancistrocerus gen. n.

Clypeus short, about as wide as long, moderately narrowed towards the

anterior margin, which is at least half as wide as the clypeus and which is shallowly emarginate in the female, more deeply so in the male. Mandibles of female not very long, with four teeth on inner side (the basal tooth subdivided), mandibles of male with only three short and wide teeth on inner

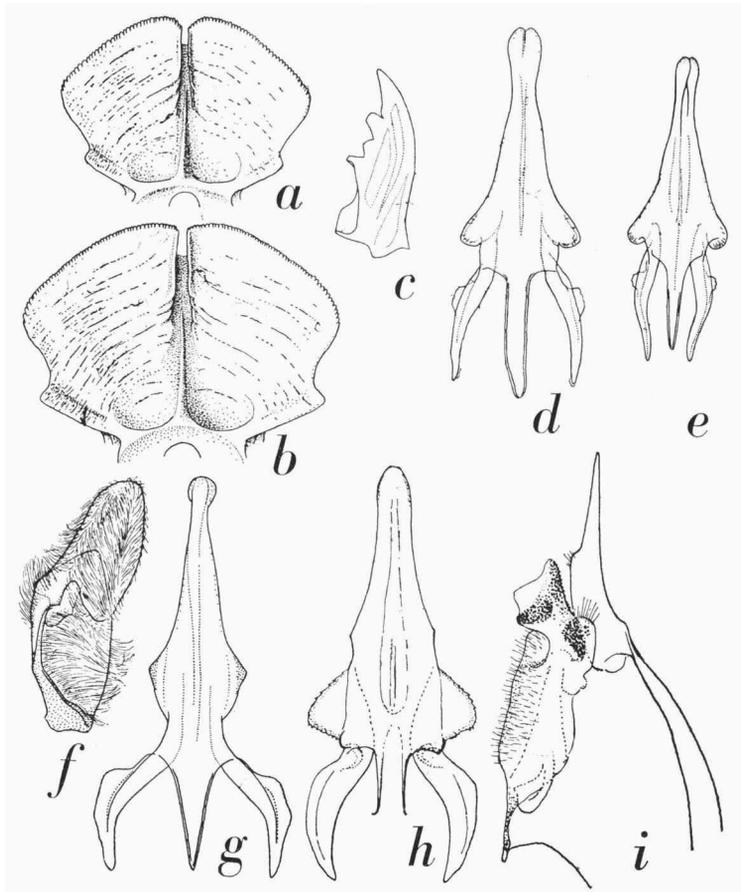


Fig. 8. a-d: *Pararrhynchium paradoxum* (Guss.), a: declivity of propodeum of ♂, Fukien; b: do. of ♀ (type), Vladivostok; c: mandible of ♂; d: aedeagus (flattened) of ♂. — e: aedeagus (flattened) of ♂ of *Pararrhynchium ornatum* (Sm.), Chekiang, China. — f and g: volsella and aedeagus (flattened) of *Orancistrocerus drewseni* (Sauss.), ♂, Foochow, China. — h and i: aedeagus (flattened) and apex of paramere with volsella of *Xenorhynchium nitidulum* (Fabr.), ♂, South India.

side, the basal tooth rounded and slightly more prominent than the others. Labrum of female rather densely covered with long pubescence; in the male the hairs shorter and sparser. Antennal hook of male finger-like, curved and rather long, in recurved position reaching back to the base of the tenth

segment. Vertex of female slightly raised above the level of the eyes, with distinct, but ill-defined fovea, which is shiny and almost impunctate; it has two pits from each of which arises a small tuft of short hairs; these pits are slightly more closely together than the posterior ocelli.

Pronotum gradually narrowed towards the anterior margin which bears a distinct, but not very prominent, transverse carina; the lateral angles not projecting. Mesoscutum with short prescutal furrows. Tegulae short, not extending beyond the apex of the posttegulae. The postscutellum forms part of the dorsal surface of the thorax, although it is distinctly sloping backwards. Propodeum short, dorsal and lateral areas not sharply separated; declivity only slightly concave, not sharply delimited, its outline dorsally more or less distinctly biarcuate, in the middle separated from the apex of the postscutellum by a very narrow, hardly visible, horizontal portion; basal third with median slit or narrow fovea, apical two thirds with median carina.

First gastral tergite angular as seen in profile, the anterior portion separated from the horizontal part by a more or less distinct transverse ridge; the horizontal portion slightly narrowed anteriorly, its width more than twice the length. Second segment larger and wider than all others, the basal groove of the sternite more or less distinctly costate. Male genitalia: see figs. 8, f and g.

Stigma of fore wing rather long and almost parallel-sided; the parastigma at least half as long as the stigma. Veins at proximal angle of first submarginal cell (junction of basal and cubital vein, or of M and Rs and Rs-M) conspicuously thickened.

Type species: *Odynerus drewseni* (Saussure, 1857).

The species of this genus inhabit Eastern Asia, from China and Japan to Borneo. The life history of "*Ancistrocerus fukaianus* (Schulthess)" has been studied by Iwata (1938a, p. 19) in Japan; the same author (1939, p. 72) also published some notes on the habits of "*Odynerus (Ancistrocerus) ingens* Schulthess" (= *Orancistrocerus drewseni ingens* (Schulthess)) in Formosa. The females build gourd-shaped nests of clay in cavities of trees, bamboo, rocks, buildings, etc.; they contain 1-4 cells and are provided with a long delicate chimney; the cells are provisioned with hairless caterpillars of the families Tortricidae, Pyralidae, and Noctuidae.

The available material of this genus is very incomplete and the following key is no more than a provisional attempt to arrange the known forms of this group.

1. Second gastral tergite finely and sparsely punctate, except at base and at apical margin the interspaces distinctly larger than the punctures. 2
- Second gastral tergite more coarsely punctate, in the middle the interspaces about

- as large as the elongate, usually ill-defined, punctures, at the sides and posteriorly much smaller (note that the puncturation may be hidden under a fine tomentum!). 3
2. Thorax black; at least in Chinese specimens the pronotal tubercles, the extreme posterior margin of the pronotum, and the tegulae more or less brownish. (Clypeus, a spot on the mandibles, an inter-antennal spot, the anterior surface of the antennal scape, and apical bands of tergites 1 and 2, or 1-3, orange-yellow; legs black, partly brownish). — Japan and China. *drewseni drewseni* (Saussure)
- Dorsal surface of pronotum, markings on mesoscutum, a spot on mesepisternum, scutellum and postscutellum, and apical bands of all tergites rather dull ferruginous-yellow; markings of head variable, but generally more extensive than in subsp. *fukaianus*. — Formosa. *drewseni ingens* (Schulthess)
(*Ancistrocerus nigricapitus* Sonan from Formosa is probably based on dark specimens of this subspecies: markings of head as in subsp. *drewseni*, but with additional reddish markings in eye-emarginations, on vertex and on temples; mesoscutum black).
- Similar to subsp. *drewseni*, but second gastral tergite with large lateral spots, fused with the apical band. — China. *drewseni opulentissimus* (Giordani Soika)
3. Wings brown with violaceous effulgence. 4
- Wings subhyaline or yellow, at most the apical half strongly infuscated. 5
4. Body black; a small spot on the mandibles, two small inter-antennal spots and a line at under side of antennal scape yellow; femora more or less reddish at apex. — China. *aterrimus aterrimus* (Saussure)
- Similar, but with base of wings clear hyaline. — Burma; Indo-China.
aterrimus erythropus (Bingham)
- Clypeus, mandibles, dorsal surface of pronotum, and the greater part of the legs, red, tarsi brownish; antennae ferruginous beneath; yellow markings as in subsp. *aterrimus*. — Assam. *aterrimus khasianus* (Cameron)
5. Wings yellowish or light cupreous brown, not conspicuously infuscated on apical half. Thorax extensively marked with red: a reversed W-shaped mark on the mesoscutum, two spots on scutellum, a vertical band on the mesepisternum, a band on the postscutellum, and the greater part of the propodeum. — Sikkim (?Tenasserim). *moelleri* (Bingham)
- Wings subhyaline or yellow, strongly infuscated at apex. Red markings of thorax, if present, less extensive 6
6. Inhabitant of Indo-China (known from a single male). Clypeus and antennal scape black; only a spot at base of mandibles ivory white. Basal part of wings rich golden hyaline, apical half (or a little more) fuscous with golden and violaceous reflections. *aterrimus nigriceps* subsp. n.
- Inhabitant of Borneo and Pulo Laut. Antennal scape yellow beneath; mandibles with irregular yellow spot at base; clypeus of ♂ with large yellow mark. Wings with less pronounced yellow tinge; the apical cloud covers the marginal cell, the second and third submarginal cells and the areas below and beyond these cells. *bicoloripennis* (Gribodo)

Orancistrocerus drewseni drewseni (Saussure)

Odynerus drewseni Saussure, 1857, Ann. Soc. Ent. France, ser. 3, vol. 5, p. 318, ♀ (?♂) — "La Nouvelle Hollande" [location of type unknown]; ?♂ from China. Dalla Torre, 1894, Cat. Hym., vol. 9, p. 65 (cat.; "*drewsenii*"); 1904, Gen. Insect., vol. 19, p. 44 (cat.). Giordani Soika, 1962, Boll. Mus. Civ. Stor. Nat. Venezia, vol. 14 (1961), p. 200 (original description; unidentified species).

Odynerus fukaianus Schulthess, 1913, Ark. Zool. Stockholm, vol. 8, no. 17, p. 4, ♀, fig. 8 (in subgenus *Ancistrocerus*, group *Euancistrocerus* Dalla Torre) — "Japan,

Harima, Konosu" (9 ♀; NRS; coll. von Schulthess, ETHZ); 1921, Ent. Mitt. Berlin, vol. 10, p. 200 (description of ♂; ♂ ♀ Tsingtau); 1934, Arb. Morph. Tax. Ent., vol. 1, p. 71 (in key; "*fukayanus*"!) [new synonymy].

Ancistrocerus fukaianus; Iwata, 1938, Tenthredo, vol. 2, pp. 19-27, figs. 1-5, 10 (bionomics in Japan). Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 238, ♀ (notes on types; Kyoto). Anon. 1952, Icon. Ins. Japon., p. 1457, fig. 4205.

The original description of *O. drewseni* is sufficiently complete to leave no doubt that it is based on an incorrectly labelled specimen of the species which since 1913 has been called *Odynerus* or *Ancistrocerus fukaianus*. The male from China, doubtfully regarded by de Saussure as identical with his *drewseni*, is recognizable as a transition to *O. drewseni opulentissimus*; it has apical bands on gastral tergites 2-5 and lateral spots on the second tergite

The correct type locality is probably China; a specimen from Fukien agrees better with de Saussure's description than one from Japan, in which the tegulae are less distinctly brownish and in which the apical bands of tergites 1 and 2 are slightly narrower. According to the original description the type has the "Écailles brunes" and "Segments premier et deuxième de l'abdomen ornés chacun d'une large bordure orangée". If the Japanese populations would prove to be constantly different from those inhabiting China, the former might be called *O. drewseni fukaianus* (Schulthess).

J a p a n: 1 ♀ Konosu, 28 May 1912, leg. Fukai, coll. Schulthess (ETHZ; lectotype of *O. fukaianus* by present designation); 1 ♀ Harima, June 1912, leg. Fukai, coll. Schulthess (ETHZ; syntype); 1 ♀ Kyoto, Arashiyama, Matsuo-Sh., 20 July 1958, K. Iwata (ML).

C h i n a: 1 ♀ 2 ♂ Tsingtau, leg. Prof. Hoffmann, coll. Schulthess (ETHZ); 1 ♀ 1 ♂ Chekiang, Chusan, 26 June 1931 and 1 Sept. 1931, resp., leg. O. Piel, ex coll. van der Vecht (ML); 1 ♂ Foochow, 1935-6, M. S. Yang (BM); 2 ♀ Fukien, Kuantun, 2300 m, 27.40 N., 117.40 E., June 1938, J. Klapperich (MZAK; ML); 1 ♀ Shanghai, ex coll. Smith (BM) (also tergite 3 with apical band).

***Orancistrocerus drewseni opulentissimus* (Giordani Soika)**

Ancistrocerus fukaianus var. *opulentissimus* Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 238, ♀ (in subgenus *Ancistrocerus*) — "Cina: Ngan Hoi" (2 ♀ coll. Giordani Soika).

This form appears to be connected by various transitions with the typical subspecies. A female from Kiangsu, leg. Kolthoff (NRS) has no orange markings on the thorax, but the second gastral tergite has large lateral spots, which are fused with the wide apical band; actually this band is somewhat dilated on each side in the neighbourhood of the spots; the first and third

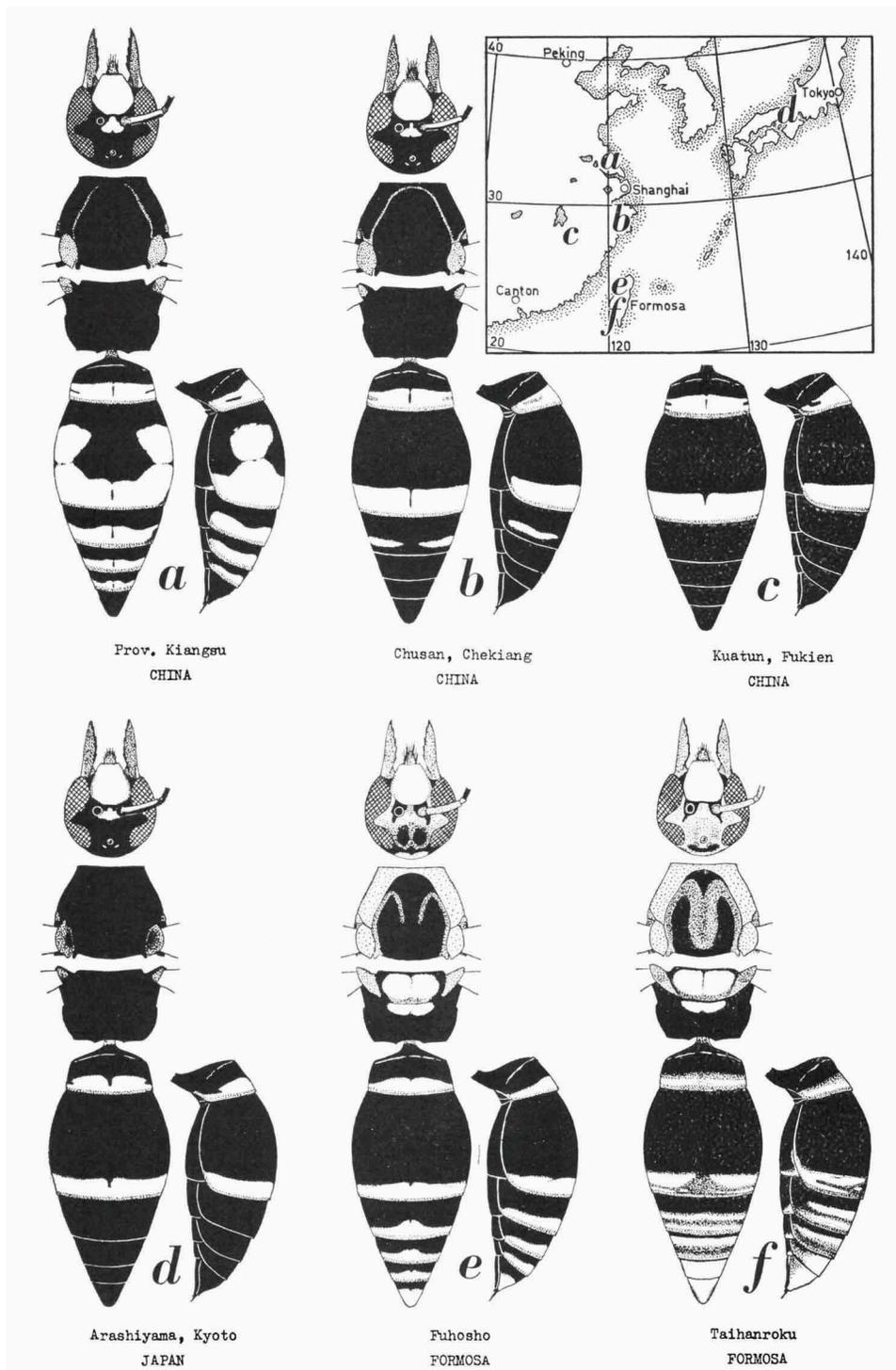


Fig. 9. Variation in colour pattern of *Orancistrocerus drewseni* (Saussure), ♀ (syn.: *Odynerus fukaianus* Schulthess). White parts indicate spots and bands of orange-yellow colour; dotted areas represent various tints from orange to dark brown. a: subsp. *opulentissimus* (Giordani Soika), b-d: subsp. *drewseni* (Saussure), e and f: subsp. *ingens* (Schulthess).

to fifth tergites also have a fairly wide apical band. Six males from Foochow, leg. M. S. Yang (BM; ML), have the spots on the second tergite much smaller and not or only narrowly connected with the apical band; in all these males the thorax is black and the gastral tergites 1 and 2 have a wide apical band; the tergites 3-5 have a narrow, orange-yellow, medially interrupted apical band in one specimen, no bands at all in another, whereas the remaining males vary between these extremes.

***Orancistrocerus drewseni ingens* (Schulthess)**

Odynerus ingens Schulthess, 1934, Arb. Morph. Tax. Ent., vol. 1, p. 71, ♀ (in subgenus *Ancistrocerus*, group *Euancistrocerus*) — "Formosa", five localities (coll. von Schulthess, ETHZ; DEI). Iwata, 1939, Trans. Nat. Hist. Soc. Formosa, vol. 29, p. 72 (bionomics in Formosa) (in Japanese).

?*Ancistrocerus nigricapitus* Sonan, 1939, Trans. Nat. Hist. Soc. Formosa, vol. 29, p. 136, ♀ ♂, fig. 8 (in subgenus *Euancistrocerus*) — Heirin, Bunzan-gun, Taihoku-shu, Formosa, June 1926, J. Sonan (type, ♀, ?coll. Sonan; allotype from Heirin and paratypes from Taiko and Kuraru, Formosa).

As stated above, I suspect that *A. nigricapitus* Sonan will prove to be based on dark specimens of subsp. *ingens*, and as the few specimens of *ingens* that I have seen show considerable variation in the extent of the reddish markings, Sonan's species is provisionally placed in the synonymy of the Formosan representative of *O. drewseni*.

F o r m o s a : 1 ♀ Taihorinsho, coll. Schulthess (ETHZ; lectotype by present designation), 1 ♀ Kosempo, coll. Schulthess (ETHZ); 1 ♀ Taihanroku, 19-26 April 1908, H. Sauter (ML) (frons, vertex and temples almost entirely yellowish brown; mesoscutum marked with complete reddish reversed W), 2 ♀ Fuhosho, July 1909, H. Sauter (ML) (frons and vertex partly black; mesoscutum black, dark reddish at lateral margins only); 1 ♀ Hoozan, Sept. 1910, H. Sauter (paratype, coll. Giordani Soika).

***Orancistrocerus aterrimus aterrimus* (Saussure)**

Odynerus aterrimus Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 121 (key), 128, ♀ — "La Chine" (MP) (in subgenus *Ancistrocerus*). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 62 (cat.). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 54 (cat.); 1904, Gen. Ins., vol. 19, p. 40 (cat.). Schulthess, 1934, Arb. Morph. Tax. Ent., vol. 1, p. 70 (in key; in subgenus *Ancistrocerus*, division *Euancistrocerus* Dalla Torre; China).

Ancistrocerus aterrimus; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 238 ("probabilmente varietà dell'*erythropus*", 2 ♀ Ngan Hoei).

The type of *O. aterrimus* Saussure is a female from China, "ex coll. M. Callery" in the Paris Museum; it agrees well with the description. In addition I have examined a female with label "Ngan Kin, 115°/31°, coll. J. Pérez" (MP), the two females from Ngan Hoei, mentioned by Giordani Soika, 1941

(coll. Giordani Soika), 1 ♀ 2 ♂ from Foochow (BM, 1 ♂ ML), and 1 ♀ North China, 55/21 (BM).

Orancistrocerus aterrimus erythropus (Bingham)

Rhynchium erythropus Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 353, ♀ — Tenasserim (BM, type no. 18.460, Thaugyin Valley, May 1893). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 33 (cat.). Dover, 1925, Jl. Proc. As. Soc. Bengal, new series, vol. 20 (1924), p. 298; 1931, Jl. Fed. Mal. St. Mus., vol. 16, p. 254 (Peninsular Siam).

Ancistrocerus erythropus; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 237 (notes on type; Burma; varieties: *khasianus* Cameron, *cameroni* Schulthess and *aterrimus* Saussure).

The relation of *erythropus* to the nominate subspecies deserves further study; for the moment I place here the specimens from Burma and Indo-China; they appear to be distinguished mainly by the less strongly infuscated wings, which have a more purplish effulgence; the base is more or less distinctly hyaline. In addition to the type I have seen the following specimens:

Burma: 1 ♀ Carin Chebà, 900-1100 m, Sept. 1888, L. Fea, coll. Schulthess (ETHZ); 1 ♀ Palon, Pegu, 1 ♀ Schwego Myo, 1 ♀ Carin Chebà, all leg. L. Fea (coll. Giordani Soika).

Indo-China: Luang Prabang, 1 ♀ (coll. Giordani Soika), 1 ♀ Pang Bo, 29 March 1920, 1 ♀ Ban Salouéun, 9 March 1920, R. Vitalis de Salvaza (BM); 1 ♀ Laos, Vientiane, 4 July 1919, 1 ♀ Laos, Hat-Sampong, 27 Dec. 1918, R. Vitalis de Salvaza (BM).

Siam: 1 ♂ Chiangmai, 18 June 1961, Hoi Keo, "from subsocial nest on rocky cliff", K. Iwata (Hyogo Agric. Univ., Sasayama, Japan). — The wings of this female are only very slightly infuscated, but probably the specimen had emerged from the nest and was killed before the wings had obtained their normal appearance.

Orancistrocerus aterrimus nigriceps subsp. n.

♂ — Agrees in structure and sculpture with typical *aterrimus*, but the colour pattern is different and reminds of the Javanese group of *Allorhynchium concolor* m., *A. snelleni imitator* m., *A. vollenhoveni* (Saussure) and *Anterhynchium flavomarginatum flavonigrans* m.

Black; a small spot at base of mandibles ivory white; apex of antennae ferruginous beneath; tibial spurs and tarsi brownish; wings rich golden hyaline, infuscated in apical third (or slightly more) and here with golden and (particularly in the marginal cell) violaceous reflections.

Length (h. + th. + t. 1 + 2): 12 mm.

Indo-China: 1 ♀ Cochinchine, Phuquoc, 11 Sept. 1924, R. Vitalis de Salvaza (holotype, IRSNB).

Orancistrocerus aterrimus khasianus (Cameron)

Rhynchium khasianum Cameron, 1900, Ann. Mag. Nat. Hist., ser. 7, vol. 6, p. 530, ♀ — Khasia Hills, Assam (BM, type no. 18.453). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 34 (cat.). Dover, 1925, Jl. Proc. As. Soc. Bengal, new series, vol. 20 (1924), p. 298 (an intermediate between *R. erythropus* Bingham and its var. *moelleri* Bingham).

Ancistrocerus erythropus var. *khasianus*; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 237 (notes on type).

Odynerus cameroni Schulthess, 1913, Ark. Zool. Stockholm, vol. 8, no. 17, p. 8, fig. 7, ♀ — Khasia Hills, Assam (coll. Schulthess, ETHZ) (in subgenus *Euancistrocerus* Dalla Torre) [new synonymy].

Ancistrocerus erythropus var. *cameroni*; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 237 (notes on type).

In addition to the type of *Rh. khasianum* Cameron I have seen two syntypes of *Od. cameroni* Schulthess, both females, from the Khasia Hills, in the Schulthess collection (ETHZ; the lectotype by present designation is the specimen with opened mandibles figured by von Schulthess) and one from the same locality in the Rothney collection (OUM). I noted some years ago that a male in the Schulthess collection (Khasia, Assam; *carbonarium* det. von Schulthess) is darker than the females.

Orancistrocerus moelleri (Bingham)

Rhynchium mölleri Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 354, ♀, pl. 2 fig. 11 — Sikkim (BM, type no. 18.458). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 34 (cat.).

Rhynchium erythropus var. *molleri*; Dover, 1925, Jl. Proc. As. Soc. Bengal, new series, vol. 20 (1924), p. 298 (notes).

Bingham described and figured this species as having the mesoscutum brownish red with a broad irregular U-shaped mark on its disk (= mesoscutum black with reversed red W on disk) and gave Sikkim as the type locality. This raises a problem, for although the specimen marked as type in the British Museum agrees well with description and figure, it bears a label "Thaungyin Valley, Tenasserim, 7-'93, coll. Bingham". This was already noted by Dover (1925), who, however, failed to perceive the discrepancy between the original record and the label. A second specimen in the British Museum collection, not mentioned in Bingham's work, bears a label "Runjit Valley, Sikkim, 1000 ft., 4-'94, leg. Bingham" and is apparently the "example of *molleri* from the Rungeet Valley" mentioned by Dover. As this specimen does not agree with the original description, having only small red spots on the mesoscutum, I have been wondering whether perhaps the labels of these two specimens might have got switched. If Bingham's record is regarded as correct, *R. mölleri* may be considered to represent the Sikkim subspecies of *O. aterrimus*, and in that case the second specimen

which now bears the Sikkim label could belong to the darker Tenasserim form *erythropus* Bingham.

According to Dr. Yarrow, however, this may not be the correct solution of the puzzle. In a recent letter he informed me that both specimens of *R. mölleri* differ from *erythropus* in having conspicuous microsculpture (punctures) on tergites 1 and 2 between the large punctures, and that these segments appear dull, not shining as in *erythropus*. Evidently the problem requires further study and for the moment the possibility that *R. mölleri* is a separate species, represented in Tenasserim as well as in Sikkim, must be left open.

Orancistrocerus bicoloripennis (Gribodo)

Rygchium bicoloripenne Gribodo, 1892, Boll. Soc. Ent. Ital., vol. 23 (1891), p. 286 — Pulo Laut, Borneo (type MCG).

Rhynchium bicoloripenne; Dalla Torre, 1894, Cat. Hym., vol. 9, p. 43 (cat.; "Paulo Lant"!); 1904, Gen. Insect., vol. 19, p. 33 (cat.).

Odynerus moultoni Meade-Waldo, 1910, Ann. Mag. Nat. Hist., ser. 8, vol. 6, p. 101, ♂ (in subgenus *Leionotus*) — Kuching, Sarawak, Borneo (BM, type no. 18.284).

Ancistrocerus matangensis var. *moultoni*; Giordani Soika, 1941, Boll. Soc. Venez. Stor. Nat., vol. 2, p. 237 (notes on type; in subgenus *Ancistrocerus*).

The following notes on Gribodo's type were made during my visit to the Genoa Museum in 1957. "Mandibles with irregular yellow spot at base, scape of antennae yellow beneath. Clypeus wider than long (36 : 31), the width of the anterior margin = 18; surface coarsely rugose-punctate, the punctures running into longitudinal striae. Vertex with shallow fovea, consisting of a transverse oval impression surrounded by a slightly flattened area (the whole wider than the ocellar triangle!), which is less densely punctate than the rest of the vertex; ocelli in a flat triangle, posterior ocelli slightly farther from the eyes than from each other (POL : OOL = 9 : 11); distance from ocelli to hind margin of head = 27; temples wide above (23), strongly narrowed towards the mandibles. Thorax entirely densely and coarsely punctate, the punctures most coarse on the mesepisternum. The second gastral sternite of the type is deformed, it consists of two parts which meet in the middle at the hind margin of the first tergite; the gastral segments densely punctate.

Wings with pronounced yellow tinge, and with apical cloud covering the marginal cell, the second and third submarginal cells and the areas below and beyond these cells; abscissae of marginal vein 16 : 5 : 18 : 14."

The type of *Odynerus moultoni* agrees in structure and sculpture with *Rhynchium matangense* Cameron; it differs in having the propodeum black and the first gastral tergite black with an irregular and narrow reddish apical band. Its coloration is therefore practically similar to that of *O. bico-*

loripennis, and for the moment I regard *O. matangensis* (Cameron) as a colour variety which in Sarawak occurs together with the typical form.

Giordani Soika (1941) has correctly remarked that *O. moultoni* M. W. is not specifically different from "*Ancistrocerus matangensis*", but he referred erroneously to *Odynerus matangensis* Cameron, 1905, which is not the same as *Rhynchium matangense* Cameron, 1903.

Orancistrocerus bicoloripennis, var. matangensis (Cameron)

Rhynchium matangense Cameron, 1903, Jl. Straits Br. As. Soc. vol. 39, p. 170, ♂ — Mt. Matang, Sarawak, Borneo (BM, type no. 18.461).

The type bears a label "Matang, Aug. 1899, ex P. Cameron coll. 1914-110"; there are two males from the type locality (Matang, 3200 ft., April 1902) in the British Museum and two males (Matang, 1899, and April 1902) in the Leiden Museum.

It would be interesting to obtain further information on the variability and the distribution of this form, which is characterized by the dark red colour of the propodeum and the first gastral segment.

Rhynchium Spinola, 1806 (emend.)

Rygchium Spinola, 1806, Ins. Ligur., vol. 1, p. 84 (genus).

Type species: *Rygchium europaeum* Spinola, 1806 (by monotypy) [= *Vespa oculata* Fabricius, 1781] = *R. oculatum* (Fabricius, 1781).

Rhynchium Billberg, 1820, Enum. Ins., p. 109 (= *Rychium* (!) Spinola, emendation).

The name *Rhynchium* is used here for a group of wasps occurring in the tropics and the subtropics of the old world.

There has been considerable diversity in the spelling of the name of this genus. In addition to the spellings noted above one may find the name written as *Rynchium*, *Rhygchium*, and even as *Ryghchium* (Atti Soc. Ital. Sci. Nat. & Mus. Civ. Stor. Nat. Milano, vol. 99, p. 378). Since *Rhynchium* is the most commonly used spelling, from which a number of generic names have been derived, I have requested the International Commission on Zoological Nomenclature to validate this name and to place *Rygchium* Spinola, 1806, on the Official Index of Rejected and Invalid Generic Names in Zoology.

The Indo-Australian species of this genus will be revised in a future paper; here I only give the description of a new subspecies which is of special interest because it closely resembles in general appearance the sympatric subspecies of *Anterhynchium* (*Epiodynerus*) *fulvipenne*, described in this paper (p. 90).

Rhynchium haemorrhoidale bathyxanthum subsp. n.

♀ — Black; extensively marked with ferruginous and yellow.

Mandibles ferruginous, brownish at apex; clypeus ferruginous, with yellow spot on each side; antennae ferruginous, scape yellow anteriorly; a line at inner orbits (from clypeus to top of eye-emargination) and an inter-antennal spot yellow; a stripe on the temples yellow with orange margin; vertex with some orange markings between the ocelli, near the top of the eyes, and in the post-ocellar fovea.

Pronotum orange, yellowish anteriorly in the middle, more or less extensively black on anterior surface, and along lateral and posterior margins. Mesoscutum black with two orange-yellow lines which are narrowed anteriorly, in some specimens distinctly curved back along the lateral margin. Mesepisternum with ferruginous spot (upper part more or less yellowish) below tegulae; tegulae and posttegular processes ferruginous-yellow; disk of scutellum ferruginous, black at base, more or less distinctly yellowish at sides and apex; postscutellum almost entirely ferruginous; propodeum with a large ferruginous spot on each side, the spots almost touching in the middle near the base.

Gastral tergites 1-5 with wide, yellow, apical bands, the band on tergite 1 covers the posterior half of the horizontal part of the tergite, the band on 2 covers the posterior third of the tergite, but it is rather abruptly dilated on each side to twice its width; sternites 2-5 with narrow apical bands, the band on sternite 2 produced along the lateral margin, the following bands more or less indistinct or interrupted in the middle; segment 6 ferruginous; the yellow colour of the gastral bands somewhat suffused with orange, particularly on the sternites and the posterior tergites.

Legs ferruginous; coxae, trochanters, and base of femora II and III, partly black. Wings russet-yellow, fore wings darkened along anterior margin and very slightly fuscous at tip.

♂ — Clypeus entirely yellow; mesoscutum often entirely black.

Length (h. + th. + t. 1 + 2): ♀ 13-17 mm, rarely only 11 mm, ♂ 9-14 mm.

The holotype is a female from Sumba, Mau Marru, 500 m, July 18-23, Swiss Sumba Expedition (NMB); all other specimens recorded below are paratypes.

S u m b a: West Sumba, 12 ♀ 7 ♂ Rara, Waimangura, and Pogobina, Aug.-Sept. 1949; Central Sumba, 3 ♀ 8 ♂ Lokojengo, Lindiwatju, and Langgaliru, Sept.-Oct. 1949; East Sumba, 29 ♀ 13 ♂ Waingapu, Baing, Laluku, Mau Marru, Melolo, and Prai Jawang, May-June 1949; sea level — 600 m; Swiss Sumba Expedition (NMB; MZB; ML).

4. A NEW GENUS FOR *RHYNCHIUM NITIDULUM* (FABRICIUS)Genus **Xenorhynchium** gen. n.

Mandibles long and slender, without teeth on the inner side, in the female the inner margin with a few minute incisions. Clypeus longer than wide, emarginate anteriorly. Vertex without post-ocellar fovea. Antennal hook of male long and curved, somewhat dilated and flattened in apical half, with rounded apex; in recurved position it almost reaches the apex of the ninth antennal segment.

Pronotum angular at the shoulders, anterior surface smooth and short, without median impressions, separated from the posterior part by a carina which is prominent at the sides, but rather indistinct in the middle. Mesoscutum without prescutal furrows. Impunctate epicnemium of mesepisternum sharply separated from the coarsely punctate areas behind it. Tegulae large, extending beyond the apex of the posttegulae. Median part of scutellum long, about three fourths as long as wide; median part of postscutellum very strongly raised above the level of the adjoining areas of the propodeum, the flattened dorsal surface is approximately rectangular and about as long as the vertically sloping, or even slightly overhanging, posterior surface. Propodeum with prominent lateral angles, the concave declivity rather sharply separated from the dorsal and lateral areas; the apical valvulae very peculiar: strongly chitinized, black, thickened, and not distinctly separated from the lateral areas of the propodeum.

First gastral tergite without transverse carina; the dilated part of the first sternite short and wide, bordered anteriorly by an arcuate carina; second gastral sternite broadly concave, the concavity bordered on each side by a blunt ridge which runs close to the lateral margin and which is most pronounced at a short distance from the base; transverse groove at base of second sternite with 10 to 12 short longitudinal ridges which are partly hidden by the overhanging and pubescent base of the sternite. Seventh sternite of male rather strongly excavated, the concave area finely, granulately, punctate and bordered by an arcuate and blunt ridge. Genitalia of male characteristic and much different from those of other Oriental wasps with a *Rhynchium*-like habitus (see fig. 8, h and i).

Fore wing: fig. 7d; stigma small, about twice as long as the parastigma, third submarginal cell separated from the apex of the marginal cell by a distance equal to its own width.

Type species: *Vespa nitidula* Fabricius, 1798.

In the Oriental fauna this genus is represented by a single species, which has perhaps as its closest relative the African *Odynerus* (*Rhynchium*)

masariformis Giordani Soika (Ann. Mus. Civ. Stor. Nat. Genova, vol. 57, 1934, pp. 79-83, fig. 12).

Xenorhynchium nitidulum (Fabricius)

Vespa nitidula Fabricius, 1798, Suppl. Ent. Syst., p. 262 — India Orientalis, leg. Daldorff [type in coll. Fabricius, Zool. Mus. Univ. Kiel]; 1804, Syst. Piez., p. 260.

Rhynchium nitidulum; Saussure, 1852, Ét. Fam. Vesp., vol. 1, p. 105, ♀ ♂, pl. 14 fig. 6 (“*Rygchium*”; Indes Orientales; Bengal; coll. MP). Smith, 1857, Cat. Hym. Brit. Mus., vol. 5, p. 43 (cat., “India”). Horne, 1870, Trans. Zool. Soc., vol. 7, p. 168, ♀, pl. 20 figs. 1 and 1a. Smith, 1871, Jl. Proc. Linn. Soc. Zool., vol. 11, p. 374 (cat.). Maindron, 1882, Ann. Soc. Ent. France, ser. 6, vol. 2, p. 276 (cat., “*Rynchium*”). Wroughton, 1889, Jl. Bombay Nat. Hist. Soc., vol. 4, p. 35 (notes on nest; India). Dalla Torre, 1894, Cat. Hym., vol. 9, p. 47 (cat.). Bingham, 1897, Fauna Brit. India, Hym., vol. 1, p. 357, ♀ ♂ (Barrackpore, Bengal; Burma). Rothney, 1903, Trans. Ent. Soc. Lond. 1903, p. 106 (Barrackpore; common). Dalla Torre, 1904, Gen. Ins., vol. 19, p. 34 (cat.). Dutt, 1912, Mem. Dept. Agric. India, Ent. Ser., vol. 4, p. 241, fig. 14 (bionomics at Pusa).

Odynerus nitidulum; Dover & Rao, 1922, Jl. Proc. As. Soc. Bengal, new series, vol. 18, p. 239 (in subgenus *Rygchium*; recorded from Calcutta; Pusa; Bangalore; Lucknow; Kashmir; Lahore, Punjab).

Concerning the type of this species, I noted in 1959 during a visit to the Zoological Museum of the University at Copenhagen, where the Fabricius collection is temporarily preserved, that there is a single specimen, consisting only of the thorax with remains of the legs and the wings; although very incomplete this specimen supplies sufficient evidence to conclude that the species has been interpreted correctly by de Saussure and subsequent authors.

X. nitidulum is apparently not rare in various parts of India; its occurrence in Burma deserves confirmation. According to Horne, the female constructs clay cells which are coated with a gummy substance, obtained from *Ficus religiosa* and *Acacia catechu* and which are stored with caterpillars. Dutt (1912) confirms this information and states that the nest may contain up to 25 cells.

India: South India, 1 ♀ 3 ♂ Madura Dt., Alagar Kovil, 17 March 1936, BM-CM Exp. (BM; 1 ♂ ML); 1 ♀ Anamalai Hills, Cinchona, 3500 ft., May 1960, P. Susai Nathan (ML). Bengal, 1 ♀ 1 ♂ “Bengal”, leg. Raye (old specimens; ML); 1 ♂ Barrackpore, coll. Rothney (OUM).

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