CHALCIDOID AND PROCTOTRUPOID PARASITES OF PESTS OF THE COCONUT PALM

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THE species mentioned in this paper have been reared by Mr. R. W. Paine and Mr. T. H. C. Taylor mainly from the two coconut tree pests *Tirathaba* spp. (PYRALIDAE) and *Promecotheca* spp. (HISPIDAE). Mr. Paine and Mr. Taylor have bred and studied these parasites during the last few years in Java and the Fiji Islands in order to introduce the most important into other islands; they intend to publish biological notes on them, and the following paper contains therefore only systematic information with descriptions of new species. I have also included here a few species received from Dr. S. Leefmans from Java, from Mr. J. L. Froggatt from New Guinea, and from Mr. R. J. A. W. Lever from the Solomon Islands.

The species thus obtained are :

(*a*) Parasites and hyperparasites of *Tirathaba* spp.

Antrocephalus renalis, Waterst.
Irichohaltichella tirathabae, sp. n.
Anacryptus impulsator, Walk.
Eurytoma sp.
Perilampus microgastris, Ferr.
Elasmus fumipennis, Cam.
Trichospilus pupivora, Ferr.
Syntomosphyrum javanicum, sp. n.
Trichogrammatoidea nana, Zehnt.
Trichopria tachinidarum, sp. n.
Calliceras manilae, Ashm.
Calliceras fijiensis, sp. n.
Telenomus tirathabae, sp. n.

(*b*) Parasites and hyperparasites of *Promecotheca* spp.

Elasmus hispidarum, sp. n.
Dimmockia javanica, sp. n.
Pleurotropis detrimentosus, Gahan.
Pleurotropis painei, sp. n.
Pleurotropis parvulus, sp. n.
Achrysocharis promecothecae, Ferr.
Achrysocharella orientalis, sp. n.
Closterocerus splendens, Kow.
Tetrastichus taylori, sp. n.
Oligosita utilis, Kow.

(*c*) Other species included :

Anastatus axiagasti, sp. n.
Tetrastichodes plesispae, sp. n.
Tetrastichodes brontispae, sp. n.
Melittobia hawaiiensis, Perk.
Syntomosphyrum zygaenarum, sp. n.
Microphanurus painei, sp. n.

Fam. CHALCIDIDAE.

Antrocephalus renalis, Waterst.

Antrocephalus renalis, Waterston, 1922, Ind. For. Rec., 9 : (II), 19, fig. 11–13.

JAVA : Buitenzorg, viii.1929 & iii.1931 (*R. W. Paine*).
FIJI ISL. : ii.1931 (*R. A. Lever*); xi.1931 (*R. W. Paine*).
Host. Pupa of *Tirathaba* spp.

This species seems to be widely distributed throughout the Indo-Malayan countries. The type specimens were bred in India from pupae of *Hypsipyla robusta*, Moore, and I have seen also specimens from the Philippine Islands. It is recognisable, among other characters, by the broad furrow along the middle of the scutellum and the entirely dark legs. As can be seen by the large series from Java, it varies greatly in size, the smallest female being only 4·5 mm. long, whereas the largest reaches 8 mm.; in the male the size varies from 4 to 6 mm.

Irichohaltichella tirathabae, sp. n.

♀♂. Body entirely black; only the anterior knees, the end of tibiae and the tarsi brownish.

♀. Head transverse, reticulate, dull; occiput excavate but not marginate; frons slightly concave above the antennae. Ocelli forming a low triangle, the lateral ocelli a little nearer to the margin of the eyes than their own diameter. Eyes short, oval; cheeks almost as long as the breadth of the eye. Antennae inserted just above the clypeus; scape narrow, elongate, but not reaching to the front ocellus; pedicel pear-shaped, about twice as long as broad; flagellum with 9 joints, the 1st small, as long as broad, narrower than the pedicel, the 2nd a little longer and broader than the 1st, the following joints cylindrical, scarcely

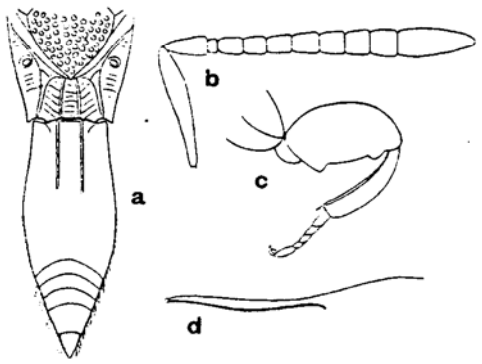

FIG. 1.—*Irichohaltichella tirathabae*, sp. n. (*a*) Propodeon and abdomen; (*b*) antenna; (*c*) hind leg; (*d*) wing nervature.

longer than broad, the 7th and 8th subquadrate; last joint not divided, pointed at apex and as long as the three preceding joints together. Thorax elongate, irregularly punctate; pronotum covered with large points; mesonotum not much longer than the pronotum, with smaller punctation, the interstices shining; parapsidal furrows entire and rather deep; scutellum pointed at apex; metanotum hidden under the sides of the scutellum; propodeon large, horizontal, almost flat above, with 2 median and 2 lateral carinae, joined by weak transversal carinae; sides of propodeon with a small tooth; spiracles large, rounded or short oval. Propleurae and mesopleurae excavate, finely rugulose; metapleurae convex,

strongly reticulate. Wings relatively small, not reaching the end of the abdomen; marginal ciliation obsolete; discal ciliae short and scarcely visible. Marginal vein distant from the margin of the wing, not distinct from the submarginal vein and slightly curved to a short stigmal vein. Legs short, strong, the anterior and median femora somewhat thickened; hind femora oval with two broadly separated teeth below, between which is a series of very small teeth. Abdomen oval, elongate, as long but narrower than the thorax, a little compressed on the sides, entirely smooth. 1st segment truncate in front, in contact with the propodeon, with two strong longitudinal carinae on the anterior half; these carinae form with the front margin an elongate rectangle, open behind; the following segments short, transverse, together shorter than the 1st, with long white ciliae on the sides. Ovipositor scarcely protruding.

♂. Quite similar; antennae with 10 joints; pedicel short, not longer than broad, the funicle joints a little longer than broad, broadening slightly towards the last joint; club not divided, pointed, as long as the two preceding joints together.

Length: ♀ 2·6–2·8 mm.; ♂ 2·2 mm.

JAVA: Buitenzorg, 2 ♀♀, 1 ♂, viii.1929 (*R. W. Paine*).

Host. The females are labelled: "Dissected from dead pupa of *Tirathaba rufivena*"; the male bears the label: "Bred from cocoon of *Apanteles tirathabae*."

In the nervulation of the wing and the form of the hind femora, this species is closely related to the group of *Euchalcis*, Dufour. The genus *Trichohaltichella*, Cam., differs particularly in the form of the 2nd abdominal segment, which is elevated at the base and carinate longitudinally. All known species of that genus are from Australia. *I. pilosella*, Cam., the type species, is in the collection of the British Museum; the holotype is a male, which differs from the Javanese species specially by its larger size (it is 4·5 mm. long), its red legs, broader propodeon and the numerous longitudinal carinae extending over the entire length of the 2nd tergite; two stronger carinae on the anterior half of the tergite are similar to those of *I. tirathabae*.

Girault (1927, *Rec. S. Austr. Mus.*, **3**: 328) has described three other species and has given a key of the four known Australian species based mainly on the relative length of the 2nd and 3rd abdominal segments and on the coloration. Girault's species are distinguished by their smoky or dark wings.

Hockeria dexius, Walker, the type of which is in the British Museum, is also from Australia and seems to belong to that genus. It agrees with Girault's group of species where the 3rd tergite is over half the 2nd; its 2nd tergite is smooth and has two short basal carinae; legs and tegulae are red.

Anacryptus impulsator, Walk.

Anacryptus impulsator, Walker, 1862, Trans. Ent. Soc. Lond., **1862**: 348.

EAST JAVA: Banjoewangi, 2 ♀, 2 ♂, x.1929 (*R. W. Paine*).

Host. Pupa of *Tirathaba* sp.

These specimens are exactly similar to Walker's species, the type of which, in the British Museum, is from Celebes.

Fam. EURYTOMIDAE.

Eurytoma sp.

JAVA: Buitenzorg, 1 ♀, viii.1929 (*R. W. Paine*).

Host. Pupa of *Tirathaba mundella*, containing dead adults of *Trichospilus pupivora*, Ferr.

A single female with the head broken.

Fam. PERILAMPIDAE.

Perilampus microgastris, Ferr.

Perilampus microgastris, Ferrière, 1930, Bull. Ent. Res., **21** : 353.

JAVA : Buitenzorg, 9 ♀, 3 ♂ (*R. W. Paine*).

Host. *Apanteles* sp., parasite of *Tirathaba* sp.

This species, easily recognisable by its small size and black body, has been found also in India and the Malay Peninsula. It was, in each case, a parasite of MICROGASTERINAE.

Fam. EUPELMIDAE.

Anastatus axiagasti, sp. n.

♀♂. Body dark green, with purplish reflections on face, frons and, more or less, mesonotum. Cheeks light green. Apex of mesonotum more bluish or violaceous. Sides of pronotum and tegulae yellowish. Abdomen aeneous, with the end of the 1st and the 2nd segment white. Tip of ovipositor white. Male more shining green, without white spot on the abdomen. Antennae dark brown, with scape and apex of pedicel yellowish. Legs of female with the coxae concolorous to the body, the femora and tibiae black, with knees, sides of hind femora, more or less, and tarsi yellow, or sometimes orange-yellow with broad black stripes on each femora and tibiae. Legs of male yellow, with femora and apical end of

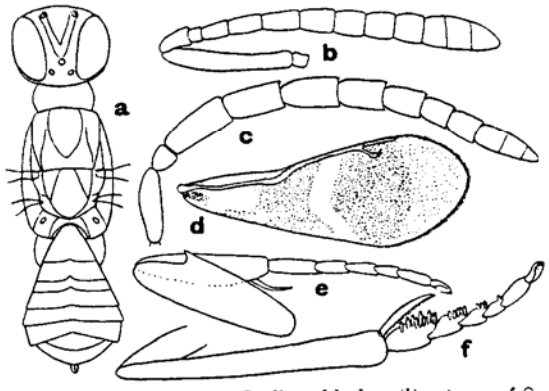

FIG. 2.—*Anastatus axiagasti*, sp. n. (*a*) Outline of body; (*b*) antenna of ♀; (*c*) antenna of ♂; (*d*) forewing of ♀; (*e*) fore-leg; (*f*) middle tibia and tarsus.

hind tibiae brown. Wings of female slightly infuscate in the middle below the stigma and covered with black discal ciliae except at base of wing and on a transversal arcuate band below the marginal vein, which is hyaline and glabrous. Wings of male entirely hyaline.

♀. Head transverse, very narrow behind the eyes. Ocelli forming a regular triangle, the lateral ocelli very near the eye-margin, but not touching it; eyes large broadly oval. Vertex with a few black ciliae. Seen from in front, the head is rounded, the internal margins of the eyes diverging towards the cheeks; these are about as long as half the breadth of an eye, with a furrow between base of eye and mandible. Antennal furrows narrow, shallow, converging to the front ocellus. Frons and face finely shagreened, dull; face covered with fine white ciliae. Antennae inserted level with the base of the eyes, 4 times closer to the eyes than to each other. Scape narrow, reaching almost to the front ocellus; pedicel slightly longer than broad, as long as $\frac{1}{4}$ of the scape; annellus small, subquadrate; 1st

funicle joint twice as long as broad, but a little shorter and narrower than the pedicel; 2nd as long as the pedicel; 3rd a little longer than the 2nd; the following joints gradually broader and shorter; 7th subquadrate, as long but twice as broad as the 1st; club with 3 joints, slightly broader than the last funicle joints and not quite as long as the 3 preceding joints together.

Thorax with the pronotum large, narrowed in front, almost smooth; mesonotum granulated, dull, except in the posterior concave portion which is smooth and shining. Scutellum and axillae covered with a fine and small reticulation, dull. Propodeon very short, with a small median carina; the sides rounded and smooth; spiracles short oval. Mesopleurae very finely striate, almost smooth. Wings reaching far beyond the tip of the abdomen; submarginal vein slightly curved before bending over to the marginal vein, and there a little thickened; marginal vein shorter than the submarginal and about 3½ times longer than the stigmal; postmarginal vein almost twice as long as the stigmal. Marginal ciliation short and thin; discal ciliation close and thick, the glabrous transverse band on the average as broad as the length of the stigmal vein. Legs strong and elongate; anterior legs with the femora and, in a less degree, the tibiae broadened, the femora with a strong tooth before the apex, below; median legs much elongated, the tibial spur longer than the 1st tarsal joint; the 3 first tarsal joints with rather strong black teeth below; hind legs long and narrow, the tarsi as long as the tibiae.

Abdomen small, triangular, shorter than the thorax, almost smooth, very finely transversely striate. All segments short, transverse, with the hind margins more or less excised in the middle. Ovipositor scarcely protruding.

♂ a little shorter than the female; thorax normal, almost smooth and shining. Antennae longer; scape short, slightly broadened, 3 times longer than broad; pedicel short, rounded; 1st funicle joint elongate, broader than the pedicel, almost as long as the scape; 2nd as long as ¾ of the 1st; the 3rd–6th gradually shorter, but with the same breadth; the 7th still a little longer than broad; club narrower than the funicle, with 3 joints, a little longer than the 2 preceding joints together. Legs shorter and stronger, the anterior femora with a thickening but without tooth; median tibiae with a shorter spur. Abdomen smaller than the thorax.

Length: ♀ 2–2·3 mm.; ♂ 1·3–1·7 mm.

Solomon Isl.: Marau I. and Cape Marsh, 6 ♀, 14 ♂, ix.1928 (*R. W. Paine*); Ruavatu, Guadalcanal, 1 ♀, ix.1931; Russell Isl. and Guadalcanal, 7 ♀, vi.1932 (*R. A. Lever*).

Host. Eggs of *Axiagastus cambelli*, Dist.

Other specimens, morphologically quite similar, differ very much in coloration. To distinguish them from the type specimens I give them the name of

rufithorax, var. n. ♀. Head green, with purple reflections. Thorax with the pronotum, mesonotum and mesopleurae reddish, the mesonotum sometimes more or less greenish in the middle. Scutellum, propodeon and abdomen as in the type, the abdomen more distinctly white above near the base. Antennae reddish-yellow, only the 2 last funicle joints and the club black. Legs orange-yellow with black stripes only on the upperside on the median and hind femora. Wings with the discal ciliation thinner and less dark, the portion before the transverse glabrous band with short and light brown ciliae.

Solomon Isl.: Marau & Cape Marsh, 13 ♀; Guadalcanal, 4 ♀.

There are intermediates between these forms, a few specimens having a reddish thorax with dark flagellum of antennae, other having a darkened (greenish) thorax above and yellowish antennae except at apex. But the var. *rufithorax* is nearly always recognisable by its clearer legs and wings and at least reddish mesopleurae.

It is curious to have such widely different colour varieties emerging from the same eggs in the same conditions, and it would be interesting to know if they are the offspring of a single female. The males are all alike. I have already observed a similar case where the females vary in the same degree and occur in two different varieties, in *Anastatus menzeli*, Ferr., a parasite of the eggs of *Attacus atlas* in Java.

In the key of Australian species given by Girault (1915, *Mem. Queensl. Mus.*, **4** : 26), the typical form of this species would run near *racinei*, Gir., of which only one female is known, caught in the forest. Judging by the very short description, Girault's species differs by its larger size (2·75 mm.), the regularly finely scaly-punctate thorax and the pubescent anterior part of the mesopleurae. *A. axiagasti* seems to be more nearly related to *A. pentatomidivora*, Gir., another egg parasite of Pentatomids in Australia, especially in its swollen anterior femora. But the Australian species is quite different in its larger size, the dark wings with only two oblique eye-spots, the teeth on the middle tibiae and the relative length of antennal joints.

Fam. ELASMIDAE.

Elasmus fumipennis, Cam.

Cyclopleura fumipennis, Cameron, 1913, Ind. For. Rec., **4** : 97.
Elasmus fumipennis, Ferrière, 1930, Bull. Ent. Res., **20** : 416.

JAVA : Buitenzorg, 29 ♀, 6 ♂, ix.1929 (*R. W. Paine*).

Host. Bred from prepupae of *Tirathaba* spp.

Cameron's type, of which I have given a redescription, is from Borneo. This species can be distinguished from related species by its wings, which are hyaline at the base and strongly infumate on the apical half.

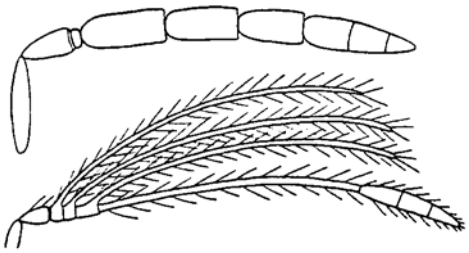

FIG. 3.—*Elasmus hispidarum*, sp. n. Antennae of female (above) and male (below).

Elasmus hispidarum, sp. n.

♀♂. Black, with violaceous reflections on head and thorax; postscutellum white; propodeon and 1st abdominal segment shining green; segments 2 to 4 reddish; tip of abdomen black with bluish reflections. Antennae brown, scape and pedicel yellow. Anterior legs clear yellow, only the base of coxae and a line along the femora and tibiae black; median and hind legs with the coxae black, except on the third terminal; the trochanters yellow and the femora black; more than the basal third of the hind femora are clear; tibiae and tarsi yellow with the ordinary black ciliae.

♀. Head as broad as the thorax, rounded in front. Punctation rather strong and close

on the front, more sparse on the face, the interstices smooth. Antennae inserted near the clypeus; scape short, as long as the pedicel with half the 1st funicle joint; pedicel twice as long as broad; funicle joints elongate, the 1st almost twice as long as the pedicel, the two others a little shorter; club with 3 joints not broader than the funicle and longer than the preceding joint.

Thorax finely shagreened, almost smooth; mesonotum as long as its apical breadth, covered with small black ciliae; scutellum more finely shagreened than the mesonotum; postscutellum triangular, covering the base of the propodeon, which is smooth and shining. Wings long and narrow, slightly infuscate; marginal vein long, stigmal vein punctiform. Legs with the coxae smooth, the femora finely striate; hind tibiae with the ciliae arranged in lozenges.

Abdomen smooth, narrower than the thorax, pointed behind and about as long as head and thorax together. Ovipositor scarcely protruding.

♂ similar, but with much shorter abdomen, not longer than the thorax; antennae with the two first funicle joints very short, the 3rd a little longer than broad, the 4th much elongate; the 3 branches long and narrow reaching almost to the apex of the club. Hind legs much elongate, the tarsi almost twice as long as the tibiae.

Length: ♀ 1·5–2·3 mm.; ♂ 1–2 mm.

Fiji: 7 ♀, 8 ♂, 1929 (*T. H. C. Taylor*).

Host. Larva of *Promecotheca reichei*.

This species is specially related to *E. elegans*, Crawf., from the Philippine Islands, from which it can be distinguished by the relative length of the antennal joints: in *elegans* the 1st funicle joint is about as long as the pedicel and the 3rd joint is twice as long as broad, whereas in *hispidarum* the 1st joint is almost twice as long as the pedicel and the 3rd is more than twice as long as broad. Moreover the hind coxae in *elegans* have the basal half black, in *hispidarum* about $\frac{2}{3}$ of the surface is black and the hind femora are also more broadly black.

Fam. Eulophidae.

Trichospilus pupivora, Ferr.

Trichospilus pupivora, Ferrière, 1930, Bull. Ent. Res., **21** : 358.

Java: Buitenzorg (*R. W. Paine*). Malaya: Sepang (*G. H. Corbett*). New Guinea: Papua, Port Moresby (*R. W. Paine*).

Host. Pupae of *Tirathaba* spp.

This species, which seems to be widely distributed in the East, and is often bred in great numbers, has also been received from India and Ceylon, where it was parasitic upon pupae of *Nephantis serinopa*, Meyr., *Thosea cervina*, Walk., *Spodoptera mauritia*, Boisd., and a puparium of a Tachinid fly parasite of *Nacoleia* sp.

Dimmockia javanica, sp. n.

♀♂. Body black or dark bluish-green, more shining green on the sides of the vertex, the end of the pronotum, the propodeon and the base of the abdomen; the rest of the abdomen aeneous. The male has a yellow stripe on the 2nd abdominal segment. Antennae dark brown, pedicel clearer; scape and under part of pedicel and 1st funicle joint yellowish. Wings hyaline, the veins pale. Legs with the coxae concolorous to the body, the trochanters clear, the femora dark brown, yellowish at apex, the knees, tibiae and tarsi yellow.

♀. Head transverse; vertex much broader than long, the three ocelli on a slight curve; the lateral ocelli at about the same distance from the eyes as from the anterior ocellus. Frons finely punctate, dull, the face more shining; cheeks as long as half the width of an

eye. Mandibles short and broad, with 4 teeth, the upper tooth longer and more pointed, the others short and rounded. Antennae inserted on the level of the base of the eyes; scape short and narrow, scarcely reaching to the front ocellus; pedicel small, a little longer than broad; two small ocelli; 1st funicle joint the longest, twice as long as broad, the 3 following joints shorter, but all longer than broad; club with two joints, the 2nd small and triangular. The relative length of the funicle and club joints is : 27.22.20.20.16.10.

Thorax coarsely reticulated; the scutellum more finely than the mesonotum; pronotum short, narrowed in front; mesonotum as long as broad, with six rather long ciliae in two series and others shorter on the sides; scutellum with four white ciliae, two on each side at the base and two near the end; propodeon smooth and shining, slightly striated on the sides, with a median carina and lateral rounded furrows on the sides above the hind coxae; lateral carinae only indicated at base. Wings large, reaching beyond the tip of the abdomen; marginal vein longer than the submarginal, and about five times longer than the stigmal vein; postmarginal vein scarcely longer than the stigmal. Legs relatively short, thin; tarsi with four joints subequal in length.

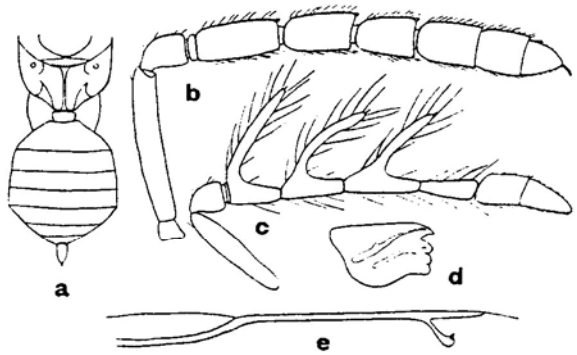

FIG. 4.—*Dimmockia javanica*, sp. n. (*a*) Propodeon and abdomen; (*b*) antenna of ♀; (*c*) antenna of ♂; (*d*) mandible; (*e*) wing nervature.

Abdomen rounded or short oval, shorter than the thorax, smooth. Petiole very short, not easily seen; 2nd segment the longest, but much broader than long, the following shorter and subequal in length. Ovipositor slightly protruding.

♂. Similar, but smaller. Antennae with three short ramelli on the three first funicle joints; the first ramellus the longest but only twice as long as the length of the joint, the two others shorter, the 3rd about as long as the 3rd joint; 4th joint shorter than the 3rd, slightly longer than the 1st; club with two joints, broader than the funicle and a little shorter than the scape; the funicle bears some long scattered ciliae, which are longer on the ramelli than on the joints. Abdomen small, shorter than the thorax, slightly longer than broad, rounded behind.

Length : ♀ 1·2–1·7 mm.; ♂ 1·1–1·3 mm.

JAVA : Poerwaredjo, 5 ♀, 3 ♂, iii.1930 (*R. W. Paine*).

Host. Promecotheca sp., an external parasite of larva.

The genus *Dimmockia*, Ashmead, is related through the length of the marginal vein to *Sympiesis*, Forst., but has a different form of antennae. Waterston *

* 1925, *Bull. Ent. Res.*, **15** : 385.

has completed the description of the genus, which may be distinguished by the long marginal vein, about five times longer than the stigmal vein, by the short more or less rounded abdomen and by the short ramelli on the antennae of the male. *D. pallipes*, Mues., has a little longer and more slender antennal branches but Dr. Gahan, of the U.S. National Museum, tells me that it is of the same type as those of *D. incongrua*, Ashmead, and *D. aburiana*, Watrst. *D. marylandica*, Gir., the type of which could not be located, must, judging by the description, belong to some other genus.

The American species seem all to be parasites of *Apanteles* spp. and other Braconids, whereas *D. aburiana*, Watrst., of Africa is, like *D. javanica*, a parasite of Hispid beetles. These two last species are very similar and may be distinguished by the following characters :

D. aburiana. Thorax blackish; antennae with the 3rd and 4th funicle joints of the female scarcely longer than broad, of the male also short, the ramelli with large and thick sensoria; propodeon with the lateral carinae well developed.

D. javanica. Thorax dark bluish-green; 3rd and 4th funicle joint of the female distinctly longer than broad, of the male narrow and elongate, the ramelli with long and thin ciliae; propodeon with the lateral carinae obsolete.

Pleurotropis detrimentosus, Gahan.

Pleurotropis detrimentosus, Gahan, 1930, Proc. U.S. Nat. Mus., **77** : (Art. 8) : 9.

JAVA : Poerwaredjo, 5 ♀, 5 ♂, iii.1930 (*R. W. Paine*); Buitenzorg, 3 ♀, 7 ♂, 1930 (*S. Leefmans*).

Host. Hyperparasite of *Promecotheca* sp., on *Dimmockia javanica* (Paine); larva of *Plesispa reichei*, Sharp (Leefmans).

The type of this species had been reared in India from cocoons of the Bethylid *Perisierola* attacking *Nephantis serinopa*, Meyr. The Javanese specimens agree exactly with the description.

Pleurotropis painei, sp. n.

♀♂. General coloration bluish-green, with purple and violaceous reflections. Face purplish-red, shining, frons violet, vertex bluish, depressions behind the ocelli violaceous,

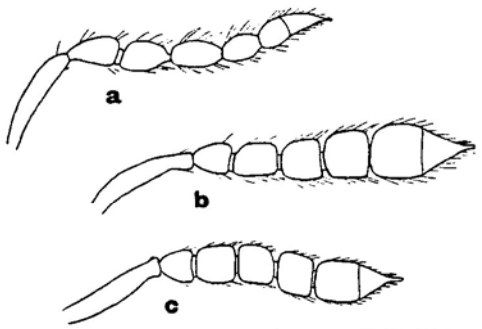

FIG. 5.—Antennae of : (*a*) *Pleurotropis painei*, sp. n.; (*b*) *P. detrimentosus*, Gahan; (*c*) *P. parvulus*, sp. n.

occiput black. Thorax entirely bluish-green, only the depressions before the scutellum violaceous. Abdomen greenish at the base, then aeneous; petiole black. Antennae and

legs entirely black with greenish reflections, the 3 first joints of tarsi white. Wings hyaline. Male more golden and purple on the thorax.

♀. Head a little broader than the thorax; face and frons smooth, as are also two shallow depressions situated obliquely behind the ocelli, between the eyes and the hind margin of the vertex. The area between the three ocelli and these depressions is very finely reticulated. Antennal furrow not deep. Antennae with the scape short and narrow, pedicel a little broader than the scape, twice as long as broad; the 3 funicle joints longer than broad, the 2 first as long as the pedicel, the 3rd a little shorter; club with 2 joints, not quite as long as the two preceding joints together.

Thorax with the pronotum short, narrower than the thorax and with a transverse carina. Mesonotum finely reticulated, parapsidal furrows very oblique at first, then sharply incurvate to the posterior margin and there forming two large shallow depressions that are broader than the space between them, shining and smooth. Scutellum smooth in the middle and in front, finely reticulated on the sides and behind; on the sides the reticulation is more elongate and like thin striation. Propodeon smooth with the two median carinae parallel at base then diverging strongly; lateral carinae as strong as the median carinae. Wings large the basal half without ciliation; marginal vein longer than the

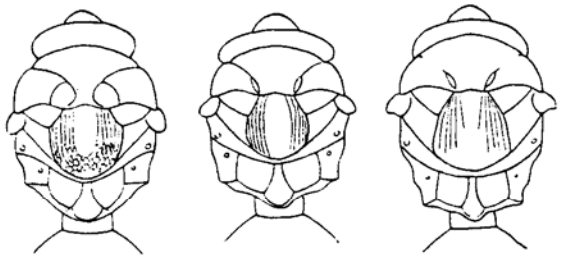

FIG. 6.—Thorax of: (*a*) *Pleurotropis painei*, sp. n.; (*b*) *P. detrimentosus*, Gahan; (*c*) *P. parvulus*, sp. n.

submarginal, stigmal and postmarginal veins very short, subequal in length. Legs with the hind coxae smooth; tibial spurs not longer than the first tarsal joint.

Abdomen not much longer than the thorax; petiole short, transverse, punctate; the rest of the abdomen smooth, 2nd segment longer than the following segments together. Ovipositor not exserted.

♂. Quite similar, smaller. Abdominal petiole as long as broad and as long as the propodeon; the rest of abdomen small, rounded, smooth.

Length: ♀ 1·3–1·5 mm.; ♂ 1–1·1 mm.

JAVA: Poerwaredjo, 9 ♀, 3 ♂, iii.1930 (*R. W. Paine*).

Host. *Promecotheca* sp., internal parasite of pupa.

This species is specially characterised by the scutellum, smooth in the middle and finely reticulate-striate on the sides and behind and by the four subquadrate depressions, which are smooth and shining and situated in pairs before the scutellum and behind the ocelli.

Pleurotropis parvulus, sp. n.

♀♂. Aeneous-black, with greenish reflections only on the face and the propodeon. Antennae and legs dark greenish, the three first tarsal joints white.

♀. Face and vertex smooth, without punctuation. Antennae inserted in the middle of the face, scape short, not reaching to the front ocellus, pedicel rounded, scarcely longer than broad; funicle joints a little broader, but not longer than the pedicel, rounded or subquadrate, the 3rd slightly broader than long; club with two joints, a little longer than the two preceding joints together, the last joint pointed.

Thorax with the pronotum narrower than the mesonotum, which is broader than long; parapsidal furrows obsolete, indicated only by two small and narrow depressions near the hind margin. Scutellum smooth with only a few very fine striae on each side. Propodeum smooth, short, with the two median carinae diverging gradually from the base; lateral carinae very fine. Wings reaching much beyond the tip of the abdomen; marginal vein narrow and long stigmal and postmarginal veins very short. Legs, hind coxae included, smooth; hind tibial spurs as long as the 1st tarsal joint with half the 2nd.

Abdomen a little shorter than the thorax, smooth, except the petiole finely punctate; 2nd segment about as long as two-thirds the length of the abdomen. Ovipositor slightly protruding.

♂. Quite similar. Abdominal petiole slightly longer than broad, the rest of the abdomen short, truncate behind.

Length: ♀ 1–1·1 mm.; ♂ 1 mm.

JAVA: Poerwaredjo, 7 ♀, 1 ♂, iii.1930 (*R. W. Paine*).

Host. *Promecotheca* sp., internal parasite of larva and pupa.

The species of *Pleurotropis* may be either primary or secondary parasites and are widely distributed. Many are still unidentified, especially from the Indo-malayan region. In order to facilitate their study, I give here a provisional key to those species actually known from that region.

South Asiatic species.

1. Mesonotum with a straight, deep, transverse fold across the middle connecting the parapsidal furrows; behind this fold and extending to the posterior margin is a deep, broad, rectangular depression divided by a median longitudinal ridge . . . . . *P. anomala*, Gahan (Philippines).
–. Mesonotum without transverse fold . . . . . 2.
2. Parapsidal furrows very oblique, reaching large rectangular depressions, before the scutellum, which are much broader than the space between them; two other similar depressions on the vertex behind the lateral ocelli . . . . . *P. painei*, sp. n. (Java).
–. The two shallow foveae near posterior end of mesonotum weaker and smaller 3.
3. Scutellum smooth in the middle . . . . . 4.
–. Scutellum not smooth in the middle . . . . . 5.
4. Lateral striation on the scutellum strong subparallel; funicle joints subquadrate. Length 1·3–1·6 mm. . *P. detrimentosus*, Gahan (India, Java).
. Lateral striation of scutellum very weak, less parallel; at least 3rd funicle joint broader than long. Length 1–1·2 mm. . *P. parvulus*, sp. n. (Java).
5. Scutellum with a broad bluish stripe along the middle. *P. lividiscutum*, Gahan (Sumatra).
–. Scutellum without such stripe . . . . . 6.
6. Mesonotum finely reticulated; scutellum with the base longitudinally rugulose, the posterior half with large reticulations. Coloration purplish aeneous . . . . . *P. foveolatus*, Crawford (India).
–. Mesonotum more strongly reticulated; scutellum with coarse raised irregular lines which curve and unite towards the apex, giving the appearance of U-shaped striae, medially with umbilicate punctures. Coloration dark green . . . . . *P. epilachnae*, Rohwer (India).

CHALCIDOID AND PROCTOTRUPOID PARASITES OF PESTS OF THE COCONUT PALM

By Ch. Ferrière, D.Sc.

Fam. Eulophidae (continued).

Achrysocharis promecothecae, Ferr.

Achrysocharis promecothecae, Ferrière, 1931, Bull. Ent. Res., **22** : 289, fig. 3.

Java : Poerwaredjo, 5 ♀, 1 ♂, iii.1930 (*R. W. Paine*).

Host. Eggs of *Promecotheca* sp.

This species, which may prove to belong to another genus, is closely related to *A. leptocerus*, Waterston, an egg parasite of another Hispid beetle in West Africa.

Achrysocharella orientalis, sp. n.

♀♂. Shining green with some bluish and reddish reflections; head more bluish, face reddish-violaceous. Antennae black, funicle sometimes with metallic shine. Legs shining black, with the trochanters partly, the knees slightly, the apex of tibiae and the three basal tarsal joints white. Male with a broad white spot near base of abdomen.

♀. Head transverse, as broad as the thorax; vertex broad, smooth, frons very finely reticulated; face punctate, dull. Eyes large, oval; cheeks narrower than one quarter of the length of an eye; ocelli forming a regular triangle, the lateral ocelli at the same distance from the eye-margin as from the front ocellus. Antennae inserted at the level of the base of the eyes; scape short, a little thickened, not reaching to the front ocellus; pedicel slightly longer than broad, scarcely as long as $\frac{2}{5}$ of the scape; one very small annellus; funicle with 2 joints subequal in length, about $1\frac{1}{2}$ times longer than broad; club with 3 joints, the 1st a little longer than broad, shorter than the 2nd funicle joint, the 2nd subquadrate, the last triangular, pointed at apex.

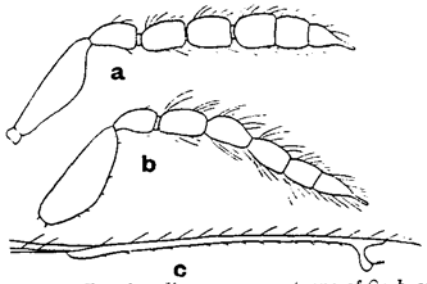

Fig. 7.—*Achrysocharella orientalis*, sp. n., *a*, antenna of ♀; *b*, antenna of ♂; *c*, wing nervature.

Thorax with the pronotum very narrow, transverse; mesonotum broader than long, very finely punctate-reticulated; parapsidal furrows well marked, specially near hind margin of mesonotum; scutellum quite smooth and shining; propodeon smooth, without median or lateral carinae, spiracles large, rounded. Wings broad, not, or scarcely, reaching the apex of abdomen; discal ciliation very small; base of wing without ciliation, but with a row of fine ciliae along the posterior margin. Marginal vein much longer than the submarginal; stigmal vein very short, punctiform; postmarginal vein as long as stigmal. Legs relatively short, shining, except the hind coxae which are granulated and dull.

Abdomen longer than the thorax, oval, pointed at apex; the tergites subequal in length. Ovipositor not protruding.

♂ similar; antennae with short and thicker scape, and thinner flagellum covered with white ciliae. Abdomen shorter and narrower than the thorax.

Length: ♀ 1·2–1·4 mm.; ♂ 1–1·1 mm.

JAVA: Poerwaredjo, 16 ♀, 4 ♂, iii.1930 (*R. W. Paine*).

Host. *Promecotheca* sp., probably a hyperparasite.

The genus *Achrysocharella*, Girault, is closely related to *Achrysocharis*, Gir. and is difficult to distinguish from Girault's descriptions. The present species is generically quite different from *Achrysocharis promecothecae* mentioned above and among the numerous related genera proposed by Girault agrees best with the species described in *Achrysocharella*. Only Australian species were previously known in this genus, which will probably be found to be widely distributed when better known.

Closterocerus splendens, Kow.

Closterocerus splendens, Kowalski (1915), 1917, Ann. d. Epiphyties, 4 : 307.

NEW GUINEA: Manus Distr., 4 ♀, vi. 1932 (*J. L. Froggatt*).

Host. *Promecotheca* sp.

The type was described from the New Hebrides, as a parasite of *Promecotheca opacicollis*, Gestro. The author gives also some biological data, showing the oviposition and the development of the parasite in the larvae of the beetle.

The specimens which I have examined differ somewhat from the description and drawings of Kowalski, specially in the form of the antennae. The scape is broader at apex, the pedicel much more enlarged, rounded, about as broad as long, the two first funicle joints are a little broader than long. As the description and figures of *P. splendens* have been made from specimens mounted in Canada balsam, it is probable that the antennae are seen more or less from above, so that the flattened joints appear narrower than they are when seen from the side. This species is also characterised by the very fine reticulation of the scutellum, which is almost smooth, in contrast with the more strong and more dull reticulation of the mesonotum; in most related species, *C. trifasciatus*, Walk., from Europe, *C. insignis*, Watrst., from Ceylon and *C. africanus*, Watrst., from West-Africa, the reticulation is the same on mesonotum and scutellum.

The last-named African species is also a parasite of a Hispid beetle but has been bred from the eggs.

Tetrastichus taylori, sp. n.

♀♂. Shining green on head, sides of thorax and base of abdomen; mesonotum and scutellum more or less purplish-red; propodeon black; abdomen, except base, aeneous. Antennae dark brown, scape yellow. Legs with the coxae green, the femora brown with metallic reflections, the trochanters, apex of femora, the entire tibiae and tarsi, orange-yellow.

♀. Head transverse, as broad as the thorax, very short behind the eyes. Ocelli forming a low triangle, the lateral ocelli at the same distance from the eye-margin as from the front ocellus; stemmaticum convex, surrounded by a fine furrow, which forms a transverse oval and is united to the eye-margins by short furrows. Frons with a fine and sparse punctation; antennal furrows broad, shallow, smooth. Cheeks a little longer than half the length of the eyes, with a fine furrow extending from the eye to the mandible. Antennae with the scape narrow, reaching to the front ocellus; pedicel about twice as long as broad; two very small annelli; the 3 funicle joints longer than broad, the 1st and 2nd subequal in length, a little longer than the pedicel, the 3rd shorter and broader, but still as long as the pedicel; club with 3 joints, as long as the 2 preceding joints together.

Thorax finely shagreened. Parapsidal furrows well marked; the median furrow on the mesonotum fine and more or less obsolete in front; the longitudinal furrows on the scutellum

strong. Propodeon more strongly shagreened, dull, with a median and lateral carinae; spiracles small and oval. Mesopleurae smooth. Wings large, reaching beyond the apex of abdomen; submarginal vein with a single bristle; marginal vein as long as the submarginal, narrow; stigmal vein as long as a ¼ of the marginal, a little thicker at apex. Legs with the anterior and posterior coxae granulate.

Abdomen short, not or little longer than the thorax, pointed behind; ovipositor slightly protruding.

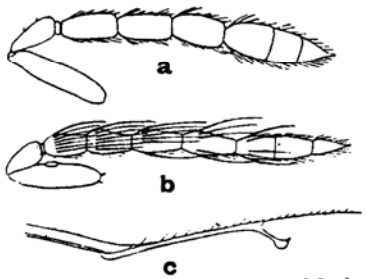

FIG. 8.—*Tetrastichus taylori*, sp. n., *a*, antenna of ♀; *b*, antenna of ♂; *c*, wing nervature.

♂. Smaller; differs only through the form of the antennae. Scape short with a rounded sensorial organ; all the funicle joints longer than broad and longer than the pedicel, the 1st slightly shorter than the others; club elongate, longer than the 2 preceding joints together; each funicle joint and the 1st club joint bear a half ring of long ciliae, which are longer than the joints. Abdomen oval, depressed, a little shorter than the thorax.

Length: ♀ 1·4–1·9 mm.; ♂ 1·1–1·4 mm.

FIJI ISL.: 5 ♀, 3 ♂, 1929 (*T. H. C. Taylor*); Nabavatu, 1 ♀, ii.1932, Suva, 2 ♀, iii.1932 (*R. W. Paine*).

Host. "Hyperparasite of *Promecotheca reichei*, ex *Elasmus*." The specimens from Suva are labelled "Ex *Promecotheca bicolor*."

This is a typical *Tetrastichus*, Hal., belonging to the group in which the males have whorls of long hairs on the funicle joints and a rounded sensorial organ on the scape. I have compared it with the descriptions of Asiatic and Australian species but cannot identify it with any of them.

Tetrastichodes plesispae, sp. n.

♀♂. Body dark aeneous-green, mesonotum almost black with dark bluish reflection; base of abdomen shining green, the rest aeneous. Antennae brown, scape and pedicel yellow. Legs with dark coxae, concolorous to the thorax, the femora brown, the trochanters, knees, tibiae and tarsi light yellow.

♀. Head very transverse; ocelli in a very low triangle, the lateral ocelli nearer to the eye-margin than to the front ocellus. Vertex and frons covered with rather long and coarse ciliae. Antennae with the scape narrow and short, not reaching to the front ocellus; pedicel elongate, 2½ times longer than broad; one small annellus; the 3 funicle joints shorter than the pedicel, the 1st 1½ times longer than broad, the 2nd only slightly longer than broad, the 3rd subquadrate, a little broader than the others; club with 3 joints, broader than the funicle and slightly longer than the two preceding joints together; ciliation very fine, almost as long as the breadth of the joints.

Thorax very finely shagreened, almost smooth. Mesonotum without median furrow, but the parapsidal furrows strong and the longitudinal furrows on the scutellum well marked. Propodeon finely reticulated with a median carina and lateral carinae; spiracles rounded.

Wings large, reaching beyond the apex of the abdomen; marginal vein about as long as t submarginal, stigmal vein narrow, almost as long as half the length of the marginal. Su marginal vein with only one bristle; discal ciliation obsolete at base, strong on apical h

Abdomen shorter and narrower than the thorax, somewhat compressed at apex, wi the hypopygium protruding below but not reaching beyond the tip of the abdome Ovipositor not protruding.

♂. Differs only by its smaller size, especially the shorter abdomen, and by the form o the antennae. The scape is shorter and somewhat broader, with an elongate sensoria organ; pedicel as long as half the scape; one small annellus; the 4 funicle joints subequa in length, the 1st slightly shorter than the others, almost quadrate, the 2nd to 4th a littl longer than broad; club not broader than the funicle, pointed, longer than the two pre ceding joints together; ciliae about as long as the breadth of a joint, evenly distributed.

Length: ♀ 1·1–1·4 mm.; ♂ 0·9–1·2 mm.

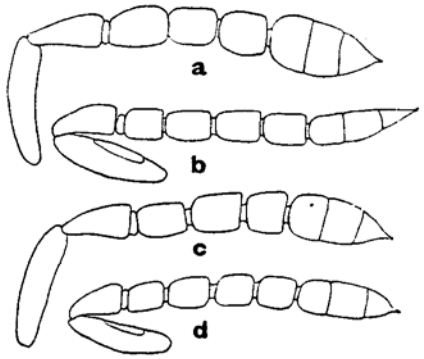

FIG. 9.—*Tetrastichodes plesispae*, sp. n., *a*, antenna of ♀; *b*, antenna of ♂. *T. brontispae* sp. n., *c*, antenna of ♀; *d*, antenna of ♂.

JAVA: Poerwaredjo, 9 ♀, 1 ♂, iii.1930 (*R. W. Paine*); Buitenzorg, 3 ♀, 1♂, viii.1929, 5 ♀, 3 ♂, 1930 (*Dr. S. Leefmans*).

Host. Larvae of *Plesispa reichei*, Sharp.

Tetrastichodes brontispae, sp. n.

♀♂. Black, with some faint greenish reflections on face, propodeon and base of abdomen. Antennae yellow, with the funicle joints more or less, sometimes only the last, and the club brownish. Legs with coxae concolorous to the body, trochanters yellow, femora dark brown except at apex, knees, tibiae and tarsi yellow. Wing nervulation brown.

♀. Head much transverse, the ocelli forming a curve on the narrow vertex; laterali ocelli at equal distance from the eye-margin and the front ocellus. Vertex finely shagreened, covered with short black ciliae. Frons and face smooth. Mandibles with two teeth. Antennae with the scape short, not reaching to the front ocellus; pedicel slightly longer than half the scape, twice as long as broad; one short and transverse annellus; 1st funicle joint shorter than the pedicel, only a little longer than broad; 2nd joint of the same length as the 1st, but slightly broader; 3rd shorter than the 2nd, a little broader than long; club with 3 joints, pointed, about as long as the two preceding joints together.

Thorax a little flattened above, finely shagreened on the mesonotum and scutellum. Parapsidal furrows deep; middle furrow on the mesonotum missing; longitudinal furrows on the scutellum fine but clearly marked. Mesopleurae finely punctate. Propodeon rugulose, dull; median carina very fine; spiracles small, rounded. Wings large, reaching far beyond the apex of the abdomen; submarginal vein with one bristle; marginal vein

as long as the submarginal; stigmal vein narrow, ¼ as long as the marginal; marginal ciliation very short; discal ciliation short and close.

Abdomen small, rounded, shorter and broader than the thorax depressed above, flat below. Ovipositor scarcely protruding.

♂. Antennae a little longer; scape short with an elongate sensorial organ; pedicel longer than broad; annellus small; 4 funicle joints subequal in length, more or less quadrate or rounded; club a little shorter than the 3 preceding joints together. Abdomen depressed, generally more oval, not much shorter than the thorax, but sometimes also short and rounded.

Length: ♀ 0·8–1·2 mm.; ♂ 0·9–1·1 mm.

JAVA: East, 24 ♀, 7 ♂, 1930 (*Dr. S. Leefmans*); DUTCH NEW GUINEA, North Coast, 1 ♀, 1931 (*Dr. A. Reyne*).

Host. Larva and pupa of *Brontispa longissima* (Java) and of *B. froggatti* (New Guinea).

This species differs from *T. plesispae* by its smaller size, its almost quite black body, its shorter and more rounded abdomen and the respective length of antennal joints. No other species of *Tetrastichodes* is known to me from the Indo-Malayan region, except *T. asthenogmus*, Watrst., bred from the ootheca of a cockroach in Ceylon, which is quite different, being related to *T. hagenowi*, Ratz.; *T. browni*, Ashm., from the Philippines, of which only one specimen has been found, is described too shortly to be recognisable.

Syntomosphyrum javanicum, sp. n.

♀♂. Body aeneous-black. Antennae dark brown; scape and pedicel yellowish. Clypeus and mandibles reddish. Legs entirely yellow, except anterior coxae black and anterior femora mainly brownish. Abdominal petiole yellow. Tegulae and nervature yellowish-brown.

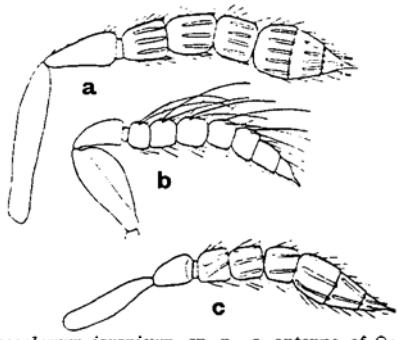

FIG. 10.—*Syntomosphyrum javanicum*, sp. n., *a*, antenna of ♀; *b*, antenna of ♂. *S. zygaenarum*, sp. n., *c*, antenna of ♀.

♀. Head transverse. Vertex smooth, finely rugulose between the ocelli, covered with small black ciliae. Ocelli forming a low triangle, the lateral ocelli nearer to the eye-margin than to the front ocellus. Face depressed (only after death?), finely shagreened; cheeks with a distinct furrow between eye and mandible. Antennae inserted at the level of the base of the eyes; scape narrow, reaching not quite to the front ocellus; pedicel narrow, as long as half the scape and about 2½ times longer than broad; 2 very small annelli; the 3 funicle joints a little broader than the pedicel, short, the 1st and 2nd slightly longer than broad, the 3rd subquadrate; club with 3 joints, not longer than the two preceding joints together, the last joint pointed.

Thorax very finely reticulated, dull. Mesonotum covered with a dense ciliation without median furrow, but with the parapsidal furrows well marked and straight. Scutellum without inner longitudinal furrows, with two long ciliae on each side near the outer furrows. Mesopleurae smooth and shining, only finely punctate in front. Propodeon short, finely shagreened, with a median carina, spiracles rounded, relatively large. Wings large, with a very short marginal ciliation and short and dense discal ciliation; base of wing without ciliation; submarginal vein with 4 bristles; marginal vein as long as the submarginal; stigmal vein not longer than ¼ of the marginal.

Abdomen oval, slightly longer than the thorax. Petiole very short; tergites subequal in length. Ovipositor very slightly protruding.

♂. Differs from the female by smaller size, depressed abdomen, shorter and stronger legs, specially the anterior and median legs, where the tibiae are a little thicker and the tarsi much shorter, the joints being scarcely longer than broad, except the last. Antennae with the scape short and slightly foliaceous ventrally; pedicel not quite twice as long as broad; the two annelli very small; the 4 funicle joints rounded, the 1st and 4th somewhat broader than long, the 2nd and 3rd as long as broad; club with 2 joints, pointed, longer than the two preceding joints together. Each funicle joint bears a whorl of long bristles, which are about 3 times longer than the joints.

Length: ♀ 1·2–1·7 mm.; ♂ 1–1·3 mm.

JAVA: Banjoewangi, 23 ♀, 5 ♂, x.1929 (*R. W. Paine*).

Host. Hyperparasite of *Tirathaba* sp. on *Anacryptus impulsator* and on *Erycia basifulva*.

Syntomosphyrum zygaenarum, sp. n.

♀. Shining dark green, with purple reflections more or less marked on vertex, scutellum and middle of abdomen. Antennae brown, scape and pedicel yellow. Mandibles yellow at base, reddish-brown at apex. Legs, including the coxae, entirely light yellow. Tegulae and nervature of wings yellowish. Abdominal petiole yellow.

Head transverse; vertex very finely rugulose, almost smooth with scattered ciliae. Ocelli forming a low triangle, the lateral ocelli nearer to the eye-margin than to the front ocellus. Face concave; cheeks broad with a fine furrow from eye to mandible. Antennae short; scape not reaching to the front ocellus; pedicel about as long as ¼ of the scape, scarcely longer than broad; two very small annelli; the 3 funicle joints short, subequal in length, subquadrate or slightly broader than long; club with 3 joints, much pointed and as long as the funicle.

Thorax almost smooth, shining. Mesonotum with scattered white ciliation; parapsidal furrows well marked, straight. Scutellum without inner longitudinal furrows, with two long ciliae on each side. Propodeon smooth, without median carina. Wings broad, reaching beyond the tip of abdomen; submarginal vein with 3 bristles; marginal vein a little longer than the submarginal; stigmal vein about as long as ¼ of the marginal; marginal ciliation very short, discal ciliation dense on apical half of wing, more scattered and a little longer below marginal vein. Legs with femora slightly thickened and the 4 tarsal joints subequal in length, except the 3rd a little shorter.

Abdomen not much longer than the thorax but narrower; petiole very short, scarcely visible, the following tergites subequal in length. Ovipositor slightly protruding.

Length: 0·9–1·2 mm.

SOLOMON ISL.: Cape Marsh, Kaylan, 19 ♀, 29.ix.1928 (*R. W. Paine*).

Host. Tachinid fly parasite of Zygaenids.

Specimens bred in JAVA (*T. H. C. Taylor*) as primary and secondary parasites of *Artona catoxantha* seem to agree with the specimens from the Solomon Islands. The male is similar to the females and has the antennae as the male of *S. javanicum*, from which it differs by smaller size, green coloration and entirely clear legs.

The following key to Indo-Malayan species will help to recognise these two new species.

1. Antennae elongate, at least two funicle joints longer than broad . . . 2.
–. Antennae short, funicle joints transverse, at least the third joint distinctly broader than long . . . . . 3.
2. Pedicel as long as $\frac{1}{3}$ of the scape, not longer than the 1st funicle joint. Legs dark, coxae and femora black, tibiae and tarsi fuscous. Hind tarsi with joint 1 shorter than 2 . . . . . *S. taprobanes*, Waterston.
–. Pedicel as long as half the scape, longer than the 1st funicle joint. Legs entirely pale, except anterior coxae and femora. Hind tarsi with joint 1 longer than 2 . . . . . *S. javanicum*, sp. n.
3. Body shining black. Legs with the coxae blackish, the femora brownish and the tibiae and tarsi ferrugineous. Length of body 1·5–2 mm. *S. indicum*, Silvestri.
–. Body shining green. Legs entirely clear yellow. Length of body 0·9–1·2 mm. . . . . *S. zygaenarum*, sp. n.

Melittobia hawaiiensis, Perk.

Melittobia hawaiiensis, Perkins, 1907, Proc. Haw. Ent. Soc., **1907** : 124.

MALAYA : Utan Melintang, 16 ♀, vi.1924 (*G. H. Corbett*).

Host. Tachinid parasitic on *Artona catoxantha*.

SOLOMON ISL. : Malanlalo, 47 ♀, ix.1928 (*R. W. Paine*).

Host. Chalcid (*Brachymeria salamonis*, Cam.) and Tachinid parasites of larvae of the coconut bagworm.

This species is probably widely distributed in the Malayan and Australian regions. Originally described from Hawaii, it has since been found by Masi as far west as the Seychelles. The series from the Solomons and Malaya agree with the original description.

M. hawaiiensis is specially a parasite of wasps and bees, *Megachile*, *Sceliphron*, *Pison*, *Odynerus*, and I have seen specimens sent from Malaya by Mr. H. T. Pagden, as parasites of *Megachile disjuncta*, F., and *Pison argentatum*, Sh. Like *M. acasta*, Walk., it has probably many hosts. Swezey (1909) obtained it in Hawaii from the bud worm, *Ereunetis flavistriata*, Wlsm.; the specimens studied here are mostly hyperparasites in Tachinid pupae.

The females of *Melittobia* offer few specific characters, and it is probable that several of the described species are synonyms either of *M. acasta*, Walk., or *M. hawaiiensis*, Perk. These two species can be most easily distinguished by the form of the antennae of the male; in *M. acasta* the 1st funicle joint is large, followed by three small rounded joints; in *M. hawaiiensis* the 1st funicle joint is small, the 2nd and 3rd large, the 4th small and transverse; the scape is in this last species also broader and more curved, the pedicel being almost hidden inside it.

Philopison clavicornis, Cameron, which is a *Melittobia*, reared in Borneo from *Pison sarawakensis* and *Pelopoeus madraspatanum*, is related and perhaps only a variety of *M. acasta*, Walk.

Fam. TRICHOGRAMMATIDAE.

Trichogrammatoidea nana, Zehnt.

Chaetostricha nana, Zehntner, 1896, Meded. v.h. Proefstation Oost-Java (n.s.), **23** : 14–16, Pl. I.
Trichogrammatoidea nana, Girault, 1911, Trans. Amer. Ent. Soc., **37** : 13.

The following specimens, sent to the Imperial Institute of Entomology, I consider to belong to this species :

Fiji: 1929 (*T. H. C. Taylor*); ex *Tirathaba* sp. and Tineids on coconut.

Fiji: Suva, vii.1932 (*H. W. Simmonds*); ex eggs of *Nacoleia octasema*, Meyr.

Solomon Isl.: Lingatu (*R. W. Paine*); ex eggs of *Brontispa froggatti*, Shp.

This species can be readily distinguished from the true species of *Trichogramma* by the jointed antennal funicle of the male, the dark cloud at the base of the wing in the female and the longer marginal ciliation of the wing. It seems to be widely distributed, but everywhere rare.

Dr. van der Goot, who has given me valuable information about the oriental *Trichogramma*, for which I am greatly obliged, tells me that *T. nana*, Zehnt., has been bred in Java and Sumatra from the eggs of the following hosts: *Diatraea striatalis* and *Grapholitha schistaceana* on sugar-cane, *Deiopeia pulchella* on *Crotalaria*, *Rhodoneura myrtacea* on *Palaquium*, *Nephopteryx robusta* on *Citrus*, *Heliothis obsoleta* on *Physalis*.

Oligosita utilis, Kow.

Oligosita utilis, Kowalski (1915), 1917. Ann. d. Epiphyties. **4**: 302.
Chaetostricha cratitia, Waterston, 1922, Bull. Ent. Res., **13**: 184 (*new syn.*).

Fiji: Futuna, 1 ♀, vi.1922; Labesu, 2 ♀, 2 ♂, x.1923 (*H. W. Simmonds*); Suva, 1 ♂, i.1927 (*R. W. Paine*); Nabavatu, 2 ♀, 1 ♂, x.1929 (*T. H. C. Taylor*); 8 ♀, 3 ♂, vii.1930 (*R. W. Paine*).

Host. Eggs of *Promecotheca reichei* and *P. bicolor*.

This species was first described by Kowalski from specimens bred in the New Hebrides from eggs of *Promecotheca opacicollis*, Gestro. The specimens (2 ♀) studied by Waterston had been sent from Fiji as parasites of *Promecotheca reichei*.

The specimens received by the Imperial Institute of Entomology (13 ♀, 7 ♂), all from Fiji, show clearly that *C. cratitia*, Watrst., the type of which could be compared, and *O. utilis*, Kow., are the same species. The descriptions and figures given by both authors agree exactly. Waterston could not have been aware of the existence of Kowalski's species.

There is some doubt whether this species belongs to the genus *Chaetostricha*, Walk., or *Oligosita*, Hal. Waterston, following Kryger's monograph of European Trichogrammidae (1918, Ent. Medd., **12**: 257), has described it in *Chaetostricha*. Masi, who had seen Kowalski's species, referred it to *Oligosita*. I believe that it is in this later genus that it is best placed in view of the fact that the description of the genotype of *Chaetostricha*, *C. dimidiata*, Walk., is too short to form an opinion about that genus, for which Kryger and Girault have different interpretations, and that in the form of the antennae and wings, this egg-parasite of *Promecotheca* agrees very well with other species of *Oligosita*.

Fam. Diapriidae.

Trichopria tachinidarum, sp. n.

♀♂. Body shining black. Antennae of female with the scape reddish-brown, joints 2 to 7 orange-yellow and the 5 last joints black. Antennae of male brown, with the scape reddish and the pedicel orange-yellow. Legs entirely orange-yellow.

♀. Head globulose, entirely smooth; ocelli forming a small regular triangle; eyes oval, small; cheeks as long as the eyes; vertex with a few scattered long bristles. Antennae with 12 joints; the scape thicker than the funicle, about as long as the 4 following joints together; pedicel narrow, about twice as long as thick; 3rd joint as long as the pedicel, but narrower; the following joints gradually shorter, the 6th and 7th scarcely longer than broad; 8th thicker than the 7th, rounded; 9th to 12th still broader, forming a club.

Thorax smooth, with tufts of ciliae on the sides of the prothorax and, shorter and more scattered, on the sides of the propodeon. Mesonotum broader behind than in front, but always narrower than the head. Scutellum with a rounded fovea in the middle near the anterior margin. Propodeon with a conspicuous median carina. Wings hyalin, large, reaching beyond the apex of the abdomen by almost $\frac{1}{3}$ of their length; marginal ciliation rather long; marginal vein situated before the third of the length of the wing. Legs normal, with the femora and tibiae club-like, the hind tibiae narrow at base, thickened on the apical third.

Abdomen oval, as long as the thorax, quite smooth. Petiole a little rugulose, covered with white ciliae, a little longer than the hind coxae; the 2nd segment covers almost all the

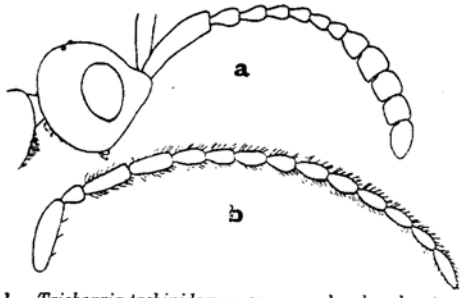

FIG. 11.—*Trichopria tachinidarum*, sp. n., *a*, head and antenna of ♀; *b*, antenna of ♂.

rest of the abdomen; the following segments very short, transverse, forming together a short triangle.

♂. Similar to the female, from which it differs only by the form of the antennae and the shorter and broader abdomen. Antennae longer than the body, covered with short ciliae; scape somewhat curved; pedicel small, rounded; 3rd joint elongate, narrower than the pedicel, about 4 times as long as broad; 4th a little shorter, curved and broadened at apex; the following joints oval, about twice as long as broad, the last joint a little longer.

Length: ♀♂ 1·3–1·5 mm.

JAVA: Buitenzorg, 6 ♀, 3 ♂, xi.1930 (*R. W. Paine*).

Host. Tachinid fly parasitic on *Tirathaba* sp.

This species is closely related to *T. indica*, Kieff., from which it can be distinguished by the entirely black thorax (in *indica* the propodeon is red), the slightly longer antennal joints and the smaller size.

Fam. CALLICERATIDAE.

Calliceras manilae, Ashm.

Ceraphron manilae, Ashmead, 1904, Proc. U.S. Nat. Mus., **28**: 135.

JAVA: Buitenzorg, 18 ♀, 3 ♂, ix.1929 (*R. W. Paine*).

Host. From cocoons of *Apanteles tirathabae*, Wilk.

Ashmead's description of *manilae*, from the Philippine islands, is very short, so that it is difficult to form a clear opinion about this species. But the specimens from Java agree exactly with that description, and I have little doubt that they really belong to this species, which is probably widely distributed in the Oriental region. Other specimens which I ascribe also to *C. manilae*, Ashm., were received from Dehra Dun, India, as parasites of *Apanteles machaeralis*, Wilk.

Calliceras fijiensis, sp. n.

♀♂. Body black. Antennae with scape and pedicel reddish-yellow, funicle more or less brown, the 3 or 4 last joints black in the female, brown as the funicle in the male. Legs orange-yellow, only middle coxae brownish. In the male abdomen reddish below at base.

♀. Head finely granulose, dull, a little broader than the thorax. Frons not much impressed above the antennae. Ocelli very small, the lateral ones nearer to each other than to the eye-margin. Eyes large, oval; cheeks half as long as the transversal diameter of an eye. Antennae inserted at the base of the face, with 10 joints; scape narrow at apex, a little thickened at base, as long as the 4 following joints together; pedicel narrow, elongate, about 4 times as long as thick; 3rd joint shorter than the pedicel, but still 3 times as long as thick, 4th to 7th joints gradually shorter, the 7th as long as broad; 8th to 10th joints broader, forming a club, the 8th and 9th not quite twice as long as broad, the 10th more elongate; the 3-jointed club is almost as long as the 5-jointed funicle.

Thorax finely punctate, narrow, about twice as long as broad; pronotum very short, partly hidden by the mesonotum when seen from above; mesonotum with a fine but distinct median furrow; scutellum longer than broad and a little longer than the mesonotum; the furrows of the frenum finely crenulated, meeting in the middle a little before reaching the posterior margin of the mesonotum; postscutellum with a relatively strong median tooth, which is darker at base than at apex; propodeon very short, with small lateral teeth; pleurae smooth and shining, the mesopleurae very finely striate on the upper part. Wings large, but reaching only a little beyond the apex of the abdomen; radial nerve curved, not quite twice as long as the marginal vein. Legs short, the hind femora slightly swollen.

Abdomen a little longer than the thorax, truncate in front, pointed at apex; the 2nd tergite covers about the $\frac{3}{4}$ of the length of the abdomen; following segments short and transverse. Tergites smooth, the 2nd with a few short striae in front. Pygidium large, reaching to or a little beyond the tip of the abdomen. Ovipositor slightly protruding.

♂. Similar, but smaller. Antennae longer, the scape thicker, all funicle joints longer than broad; 3rd antennal joint as long as the pedicel; 4th to 6th a little shorter; 7th to 10th as long as the 3rd but slightly broader; last joint longer than the 10th. Abdomen not longer than the thorax.

Length: ♀ 1–1·3 mm.; ♂ 0·8–0·9 mm.

Fiji Isl.: Taveuni, 10 ♀, 2 ♂, xi.1931 (*R. W. Paine*); Solomon Isl., 3 ♀, 1 ♂, xi–xii.1931 (*R. J. A. Lever*).

Host. Apanteles tirathabae, Wilk.

The specimens from the Solomon Islands are a little larger, but identical with the specimens from Fiji. They differ from the specimens of *C. manilae*, Ashm., bred in Java from the same host, in the following main characters: Body more slender and more elongate, head and thorax more finely punctate, antennae longer, all the joints more elongate, but specially the two first club joints about twice longer than broad (in *manilae* subquadrate), base of 2nd abdominal segment more finely striate, hypopygium more developed.

Fam. Scelionidae.

Telenomus tirathabae, sp. n.

♀♂. Black; antennae light brown, scape yellowish, club black; legs brownish-yellow; wings hyaline.

♀. Head transverse, rounded in front; frons and vertex with small scattered punctures, smooth between the points; ocelli wide apart, the lateral ocelli touching almost the margin

of the eyes; eyes shortly oval, very finely ciliate; cheeks broad. Antennae inserted above the clypeus, with 11 joints; scape almost as long as the 6 following joints together; pedicel pyriform, about twice as long as broad; 3rd joint a little broader than the pedicel, but shorter, as long as broad; joints 4 to 7 small, rounded, the 7th a little broader than the 6th; joints 8 to 10 much broader and thicker, a little broader than long; 11th joint slightly longer than the preceding.

Thorax with the mesonotum broader than long, finely punctate like the head, but a little more closely. Scutellum smooth, rounded at apex. Wings large, reaching far beyond the tip of the abdomen, about 2·7 times longer than their largest breadth; the longest marginal ciliae about as long as $\frac{1}{4}$ of the breadth of the wing. Marginal vein slightly thickened; stigmal vein twice as long as the marginal, with a thick, rounded knob; post-marginal vein more than twice longer than the stigmal.

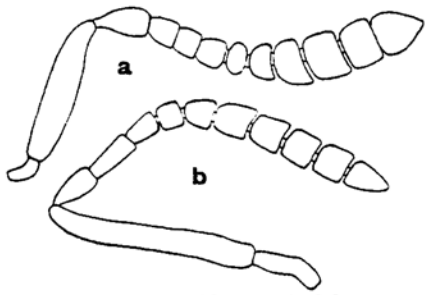

FIG. 12.—Antenna of ♀ of: *a*, *Telenomus tirathabae*, sp. n.; *b*, *Microphanurus painei*, sp. n.

Abdomen smooth and shining, with the 1st tergite and only the extreme base of the 2nd striate; 1st tergite short, transverse; 2nd covering nearly all the remainder of the abdomen, slightly broadening towards apex; following segments very short and transverse. Ovipositor slightly protruding.

♂. Antennae longer, with 12 joints; pedicel not much longer than broad; all flagellum joints short, rounded, the first ones slightly longer than broad, the last ones slightly broader than long, except the 12th which is twice as long as the preceding; 5th joint sometimes more or less excavate and curved. Abdomen short, more or less rounded, not longer than the thorax. For the rest similar to the female.

Length: ♀♂ 0·5 mm.

JAVA: Buitenzorg, 18 ♀, 23 ♂, 1930 (*R. W. Paine*).

Host. Eggs of *Tirathaba* sp.

Other specimens, on a microscope slide, received from FIJI as parasites of *Tirathaba*, labelled "From vulu," are similar but a little larger, and are believed to belong to the same species.

Three other *Telenomus* spp. are already known from Java, described by Dodd (1914, Arch. Naturg., 80 (A) 5: 163), all bred from eggs of small moths in relation with sugar-cane.

T. javensis, Dodd, is larger (0·9 mm.) with darker antennae and legs; antennae with joints 4–6 small, transverse, club with 5 joints.

T. vandergooti, Dodd, has golden-yellow legs and scape, 3rd antennal joint longer than broad, the following gradually decreasing in length, and the thorax and abdomen more elongate.

T. spodopterae, Dodd, has the antennal joints 3–6 very small and much

narrower than the 2nd, the wings narrower with the marginal ciliae about half as long as the breadth of the wing and the abdomen more elongate.

Microphanurus painei, sp. n.

♀♂. Body black. Antennae of female with the radicle black, the scape and joints 2 to 4 yellow, 5 and 6 brown, 7 to 11 (club) black. Antennae of male yellow, 4 or 5 last joints brown. Legs clear yellow, coxae black. Wing nervature pale yellow.

♀. Head much transverse, very little broader than the thorax, finely rugulose, dull. Vertex broad, the ocelli forming a large and low triangle; lateral ocelli situated very near the eye-margin, but without touching them; front ocellus at the upper part of a small, rounded excavation. Eyes almost rounded, glabrous. Face irregularly transversely carinate. Antennal furrows not developed. Cheeks a little longer than half the diameter of an eye, with a curved furrow between the eye and the mandibles; behind this furrow and the base of the eye is a row of oblique striae. Mandibles large, curved, with 3 strong and pointed teeth. Antennae inserted near the mouth, with 11 joints; radicel narrow and long, as long as $\frac{1}{3}$ of the scape; scape elongate, reaching the level of the front ocellus; pedicel narrower than the scape, twice as long as its apical breadth; 3rd joint a little longer than the pedicel; 4th shorter, as long as $\frac{3}{4}$ of the 3rd; 5th shorter and a little broader, subquadrate; 6th still slightly broader, a little transverse, cupuliform; 7th to 10th thick, $1\frac{1}{2}$ broader than the 3rd, subquadrate; 11th triangular; the club has thus 6 joints.

Thorax short, rounded, a little broader than long and, seen from the side, as high as long. Pronotum very short, scarcely visible except near the sides. Mesonotum and scutellum reticulated, dull. Postscutellum with a row of punctation. Propodeon concave in the middle, hidden beneath the postscutellum; convex on the sides with longitudinal and smaller transversal carinae. Mesopleurae with strong longitudinal furrows. Legs relatively short, weak, the tarsi narrow and longer than the tibiae. Wings hyaline, with the stigmal vein narrow and long, thrice or more longer than the marginal; postmarginal vein longer than the stigmal.

Abdomen small, shorter and narrower than the thorax, depressed, rounded, quite smooth, with striae at the base of the 1st tergite, a row of points between the 1st and the 2nd tergites, and some weak striae on the middle base of the 2nd tergite; 2nd segment the longest, although broader than long, the following joints very short and transverse. Ovipositor sometimes a little protruding.

♂. Quite similar to the female, from which it differs only by the form of the antennae. They have 12 joints, a long radicle, the scape shorter than in the female, pedicel narrower than the scape, about twice as long as broad; 3rd joint almost $1\frac{1}{2}$ longer than the pedicel; 4th a little shorter than the 3rd; 5th still a little shorter, as long as the pedicel; the following joints gradually narrower, slightly longer than broad, the last joint more elongate, narrow.

Length: ♀♂ 1·2–1·3 mm.

Solomon Isl.: Gavutu, 15 ♀, 7 ♂, ix.1928 (*R. W. Paine*); Guadalcanal, 2 ♀, ix.1931 (*R. J. A. Lever*).

Host. Eggs of *Axiagaster cambelli*, Dist.

This species seems to be related to *M. giraulti*, Dodd, from the Fiji Islands; but Dodd's species is smaller (0·8 mm.), has the head and thorax more finely sculptured, the antennae brown, the legs entirely clear yellow, with only the anterior coxae black and the abdomen brownish, a little longer than the thorax. *M. catacanthae*, Ashmead, from the Philippine Islands, another parasite of a Pentatomid, differs specially by the sculpture of the thorax, where the mesonotum is very finely punctate and the scutellum quite smooth.