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W. L. BROWN

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BY

WILLIAM MORTON WHEELER.

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THE ANTS OF THE GENUS METAPONE FOREL.*

By WILLIAM MORTON WHEELER.

The singular genus *Metapone* was established by Forel, in 1911†, for an ant from Ceylon, *M. greeni*, characterized by a peculiar Ponerine habitus (resemblance to *Cylindromyrmex* and *Simopone*), scrobed head, supposedly 11-jointed antennæ in the male as well as in the worker and female, one-jointed maxillary and three-jointed labial palpi, terminally spinose or dentate middle and hind tibiæ and metatarsi and what he regarded as an unusually slender, strongly segmented, non-tuberculate larva, with long sparse hairs, and stout mandibles, and pupating without spinning a cocoon. He says of this genus, which he made the type of a new tribe, Metaponini: "I regard it as constituting a special section, which I place *provisionally* among the Ponerinæ and which I call Promyrmicinæ. Perhaps later it will be necessary to transfer it to the Myrmicinæ. I reserve my opinion in regard to this matter," etc.

A year later, Emery‡ examined *M. greeni* and its larva more critically and found that alcoholic specimens of the latter when properly softened and expanded had the usual shape of body, head and mouthparts of the Myrmicine larva and were furnished with long, serially arranged, hooked, dorsal hairs unlike any known Ponerine larvæ, but like many larval Myrmicinæ. He concluded that *Metapone* is a true Myrmicine ant and says: "It seems to me that the comparison of *Metapone* with *Cylindromyrmex* and *Simopone* on the one hand and *Sima* on the other,

* Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University. No. 159.

† Sur le genre *Metapone* n. g. nouveau groupe des Formicidés et sur quelques autres formes nouvelles. Rev. Suisse Zool. 19, 1911, pp. 445-451, 1 Pl.

‡ Etudes sur les Myrmicinae. Ann. Soc. Ent. Belg. 56, 1912, pp. 94-105, 5 Figs.

as formulated by Forel should be reversed, that *Metapone* should be regarded as belonging to the subfamily Myrmicinae and that the resemblance of the genus to *Pseudomyrma* and *Sima* is due to genetic relationship and not merely to convergent adaptation. I nevertheless accept Forel's section Promyrmicinae but as a division of the Myrmicinae and extend its scope to include two tribes, the Metaponini and Pseudomyrmicini." Apparently Emery reached this conclusion as a result of regarding *Metapone* as closely related to the African *Pachysima aethiops* Smith and especially to *P. latifrons* Emery.

As Forel's knowledge of the male and female of *M. greeni* was restricted to a study of pupal specimens, he could give no account of the venation of the anterior wings. In 1913, however, he described a second species, *M. sauteri*, from a female specimen taken in Formosa* and figured the fore wing, which has an open radial cell and a single cubital cell. This led him to incline to Emery's view and to suggest a resemblance between *Metapone* and the Myrmicine genus *Liomyrmex*.

In 1915 Forel described a third species of *Metapone* from Queensland, *M. mjobergi*†, and I have since described two species, *M. bakeri*, from a female specimen taken in the Philippines‡ and *M. hewitti*, from male specimens taken in Borneo§. The latter species showed that the male *Metapone* really has 12-jointed antennae and that Forel had evidently overlooked the second funicular joint in the male of *greeni*. Still more recently I have found two undescribed species, one from New South Wales and one from Queensland, among material sent me for study by the Museum of South Australia. Thus the genus *Metapone*, as at present known, comprises seven species.

Concerning the habits of these ants very little has been recorded. Mr. E. E. Green took the specimens of the type species "from galleries in a decayed branch, which was also infested by two species of termites." And Forel adds: "It lives, therefore, like *Cylindromyrmex*, in wood, with termites.

* H. Sauter's Formosa-Ausbeute. Formicidae II. Arch. f. Naturg. 79, 1913, pp. 183-202, 1 Fig.

† Results of Dr. E. Mjöberg's Swedish Scientific Expeditions in Australia 1910-1913, Ark. f. Zool. 9, 1915, pp. 1-119, 3 Pls. and 6 text Figs.

‡ Four New and Interesting Ants from the Mountains of Borneo and Luzon. Proc. New Eng. Zool. Club 6, 1916, pp. 9-18, 4 Figs.

§ The Ants of Borneo. Bull. Mus. Comp. Zool. 1919, 63, pp 43-147

We cannot deduce from this either that it is or is not a termitophagous species, but that it is seems very probable. At any rate, it inhabits dead branches like many termites and numerous tropical ants (*Leptogenys mucronata*, *Pseudomyrma künckeli*, etc.)”

Although none of the specimens of *Metapone*, except those of *M. greeni*, was accompanied by notes on their habits, I deem it very probable that all of the species form small colonies and live in the dead twigs and branches of trees near or actually in the galleries of termites, presumably of the genus *Calotermes* and prey on these insects or their young. That this is the case is indicated by the cylindrical shape of the body and the fact that the workers of some of the species (*greeni*, *mjöbergi* and *tillyardi*) are colored much like the termitophagous ants of the genera *Aëromyrma* and *Paedalgus*, while the females of others (*sauteri* and *leæ*), in having the head and thorax black and the gaster red, strikingly resemble the females of the termitophagous genera *Carebara* and *Ephedromyrma*.

Returning to the question of the affinities of *Metapone*, I may say that I am unable to accept Forel's original view and that I find Emery's in part unacceptable. Forel's view is precisely stated in the two following quotations.

At page 448 he says: “The general form of the three sexes (of *Metapone greeni*) is cylindrical and altogether recalls the facies of the species of *Cylindromyrmex*. The analogy with *C. meinerti* Forel is very striking, notwithstanding the clypeus, which is absolutely different, and the postpetiole. The clypeus has a certain resemblance to that of *Simopone* in which it also terminates behind with an arcuate suture, but much less transverse and passing more posteriorly. In *Simopone* the frontal carinæ are also less separated. A certain distant resemblance to the species of *Sima* and *Pseudomyrma* is probably due to the convergence of an arboricolous life in cylindrical vegetable cavities. The relationship with the Ponerine genus *Cylindromyrmex* (*C. meinerti*) is certainly real and not due solely to the phenomena of convergence (mandibles, flat eyes placed behind the scrobes, antennæ, legs, petiole, sculpture, etc.)” And at page 452 he says: “In my opinion they (the *Metaponini*) should be placed directly between the *Cylindromyrmicini* and the *Melissotarsini*.” The *Cylindromyrmicini*

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are now placed by Emery with the Cerapachyi among the primitive Ponerinæ, whereas the *Melissotarsus* and *Rhopalomastix* are now regarded by both Emery and Forel as Myrmicinæ, and Forel would place them at the head of this subfamily "as being the most closely allied to the Ponerinæ."

I admit that *Metapone* closely resembles the Ponerine genus *Cylindromyrmex*, especially in the cylindrical shape of the body and head and the scrobes for the accommodation of the antennæ. Moreover, the habits of *Cylindromyrmex* and of the allied genus *Simopone* seem to be much the same as those of *Metapone*. According to Mayr*, *Cylindromyrmex striatus* Mayr (*C. brasiliensis* Emery) was collected by Hetschko in Santa Catharina, Brazil, "in wood in the galleries of a termite," and Arnold† recently described *Simopone marleyi* from three specimens taken by Marley at Durban "in hollow stems of the castor oil plant." A closer comparison of *Metapone* with *Cylindromyrmex* and *Simopone*, however, shows that the resemblances are merely superficial or convergently adaptive to this very peculiarity of habitat. The long, cylindrical body in various genera of wood-inhabiting ants is no more an indication of genetic affinities than is the similar shape so frequently and strikingly exhibited by various families of wood-boring Coleoptera (Ipidæ, Cleridæ, Bostrichidæ, Lymexylonidæ, some Erotylidæ, Trogositidæ, Buprestidæ, Cerambycidæ, Lucanidæ, etc.) As long ago as 1891 Forel seems to have been deceived by these superficial characters when he was writing his original account of the genus *Simopone*.‡ He there stated that "the resemblance of the genera *Cylindromyrmex* and *Simopone* to the genus *Sima* Roger, which belongs to the Myrmicidæ, is not a fact of convergence or of mimicry, but seems to me to be due to real affinities, notwithstanding the difference in the form of the pedicel. The genus *Simopone*, especially, with its very pronounced abdominal constriction, seems almost to form a transition to the Myrmicidæ, notwithstanding its Ponerid sting and pygidium." Here, again, the resemblance of *Cylindromyrmex* and *Simopone* to *Tetraponera* (*Sima* auct.) is manifestly due merely to similarity of habit, for the species of

* Südamerikanische Formiciden. Verh. zool. bot. Ges. Wien 37, 1887, p. 546.

† A Monograph of the Formicidæ of South Africa I. Ponerinæ and Dorylinæ Ann. S. Afr. Mus. 14, 1915, p. 21.

‡ In Grandidier's Histoire Phys. Nat. Polit. Madagascar 20, 1891, p. 141.

Tetraponera and of the allied genus *Pseudomyrma* live in cylindrical cavities or galleries in the branches or twigs of plants.

While I am of Emery's opinion that the species of *Metapone* are true Myrmicine ants and show no particular relationship to the Ponerinæ, I do not agree with Emery in accepting Forel's unfortunate term "Promyrmicinæ" or in associating the Metaponini as the first tribe of the Myrmicinæ with the Pseudomyrmicini in a section under that name. It seems to me that Emery is too much influenced by Forel's prepossessions. There is, in fact, little or nothing that is primitive or ancestral about *Metapone*, but much that is highly specialized and secondary, e. g., the shape of the antennæ and especially the reduction of the number of antennal joints in the male and female phases, the peculiar reduction of the palpal joints, the simplified venation of the fore wings, the peculiar structure of the petiole, postpetiole and legs, the vestigial condition of the eyes in the worker, etc. The larva is not only purely Myrmicine, but quite unlike that of *Pseudomyrma*, *Tetraponera* and *Pachysima*, as may be seen by comparison of Emery's figure (here reproduced as Fig. 2) with those in one of my recent papers.* Such study as I have been able to make of four species of the genus *Metapone* convinces me that it is an aberrant and highly specialized, though probably ancient genus of Myrmicinæ, neither primitive nor ancestral, without special affinities to the tribe *Cylindromyrmicini* or other Ponerinæ and moreover not even closely related to the tribes *Pseudomyrmicini*. It should, of course, constitute an independent tribe, *Metaponini*, as Forel and Emery maintain, but its position among the other tribes of the Myrmicinæ is not easily determined. It might be placed provisionally between Emery's *Melissotarsini* and his *Stereomyrmicini*, which have 11-jointed antennæ in both male and female phases.

The following key will help in separating the six *Metapone* species of which the worker or female is known. *M. hewitti*, known only from the male, is redescribed below.

* A Study of Some Ant Larvae, with a Consideration of the Origin and Meaning of the Social Habit Among Insects. Proc. Amer. Phil. Soc. 57, 1918, pp. 295-343, 12 Figs.

KEY TO METAPONE SPECIES.

1. Clypeus with a narrow, projecting, rectangular anterior lobe, transversely truncated in front, concave at the sides, with acute tooth-like corners. 2.
Clypeus scarcely projecting anteriorly, without distinct lobe, bluntly or obscurely bidentate. 5.
2. Petiole broader than long, its posterior corners blunt, flattened and lobular; postpetiole transversely elliptical or sub-elliptical; color brown. 3.
Petiole much longer than broad, its posterior corners produced as somewhat diverging teeth which are longer than broad at their bases; postpetiole subrectangular; color black, with red or brown gaster. 4
3. Mandibles 4-toothed; mesoëpinotal suture very distinct and impressed; posterior corners of epinotum not swollen; sculpture of head and thorax rather coarse; brownish red, with castaneous gaster, female darker; length 5.9-8.9 mm. *greeni* Forel.
Mandibles 5-toothed; mesoëpinotal suture indistinct; posterior corners of epinotum swollen; sculpture of head and thorax finer; pale brown, head darker; length, 7.6 mm. *mjöbergi* Forel.
4. Body not greatly flattened; length 10.5-11.1 mm.; petiole and postpetiole longitudinally striate; black, with dark brown gaster. *sauteri* Forel.
Body much flattened; length 6.5-7 mm.; petiole transversely striate, postpetiole smooth; apical mandibular teeth smaller than the basal; brown black, with ferruginous red gaster. *leæ* sp. nov.
5. Mandibles 5-toothed; posterior clypeal suture distinct; head and thorax longitudinally striate; petiole broadly and feebly excised behind; legs short, femora very broad; head and thorax castaneous; gaster and legs ferruginous; length 5.5-6 mm. *tillyardi* sp. nov.
Mandibles 4-toothed; posterior clypeal suture obsolete; body very smooth and shining; petiole longer, deeply and angularly excised behind; legs longer, with narrower femora; black, with dark reddish brown legs; length 6.4 mm. *bakeri* Wheeler.

1. *Metapone greeni* Forel.

Forel, Rev. Suisse Zool. 19, 1911, p. 449, Pl. 14, ♀ ♂ and larva; Emery, Ann. Soc. Ent. Belg. 56, 1912, p. 95, Fig. 1, larva.

(Figs. 1 and 2.)

Worker. Length 5.9–8.9 mm.

Head subrectangular, nearly one and one-half times as long as broad, with subparallel sides and moderately concave posterior border. Eyes small, elongate, in the largest individuals with about 15 ommatidia in their longest and about 10 ommatidia in their shortest diameter.

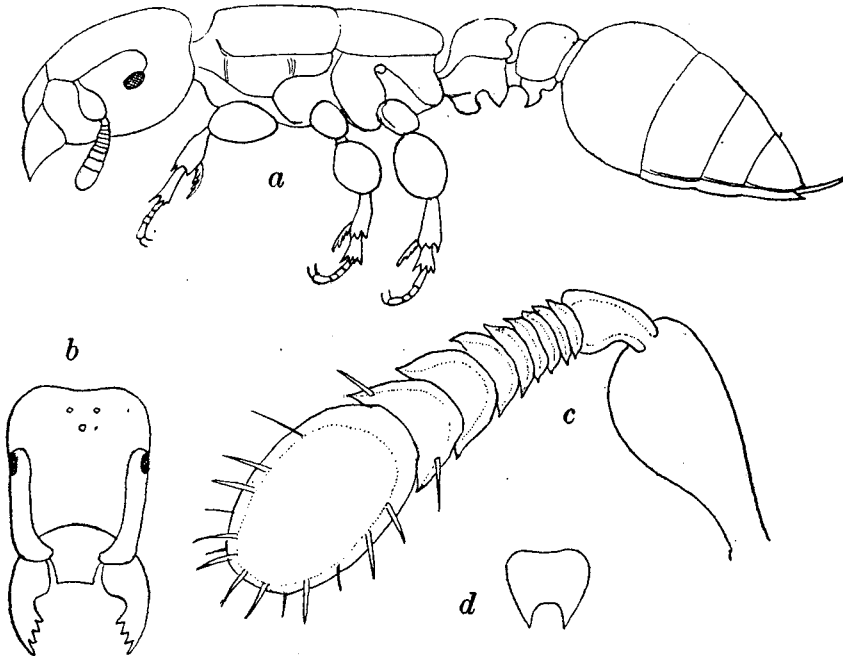


Fig. 1. *Metapone greeni* Forel (after Forel). *a*, worker; *b*, head of same from above; *c*, antenna of same; *d*, scutellum of male from above.

There are three ocellar pits, but no ocelli in the largest workers. Mandibles 4-toothed, with large basal lobe. Clypeus large, with subrectangular anterior lobe. Scape slightly surpassing the middle transverse diameter of the head, flattened and apically much dilated; funiculus much dilated and flattened at the tip, joints 2-6 at least three times as broad as long, 8 and 9 decidedly broader than long, the apical joint longer than broad and much longer than 8 and 9 together. Thoracic dorsum oblong, scarcely broader in front than behind, somewhat flattened above, submarginate on the sides. Promesonotal suture very indistinct, mesoepinotal suture distinct and impressed. Pro- and mesonotum subequal, each one and one-half times as broad as long,

together one and one-fourth times as long as broad; base of epinotum rather longer than broad, passing through an abrupt curve into the short, subvertical declivity. Petiole subcuboidal, rather flat above, widened behind, a little broader than long, its posterior border above deeply and broadly excised, its anterior and posterior surfaces truncate, the dorsal somewhat thicker than the ventral portion. Anteriorly it has a short peduncle and its ventral surface has in front a large, longitudinal rectangular, translucent lobe, followed by a strong tooth. Postpetiole broader and shorter than the petiole, one and three-fourths times as broad as long, rounded cuboidal, bearing on its ventral side a large tooth, followed by a welt. Gaster oval; sting long and stout. Femora greatly dilated, the posterior pairs scarcely one-third longer than broad; tibiae and metatarsi short and broad.

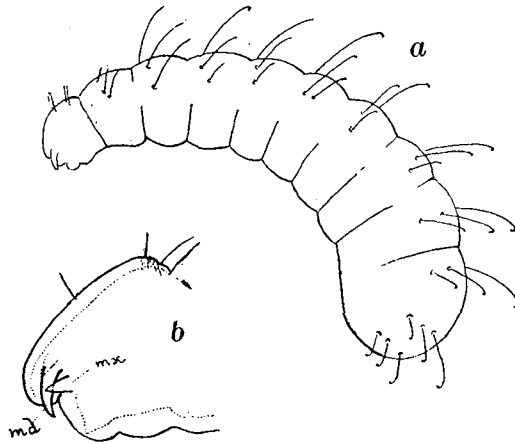


Fig. 2. *Metapone greeni* Forel. Larva (after Emery). *a*, lateral view; *b*, head of same; *md*, mandible; *mx*, maxilla.

Shining; head and thorax regularly and not coarsely longitudinally striated, with scattered, effaced punctures; the remainder of the body smooth, with fine, scattered, piligerous punctures.

Erect hairs yellowish red, short, very sparse on the body, almost lacking on the thorax, more abundant on the tibiae and scapes. Pubescence reddish, sparse, very distinct on the gaster and pedicel, but scarce elsewhere.

Deep brownish red; gaster deep chestnut brown, sometimes blackish, with red tip. Small workers sometimes paler (immature?).

Female (mature pupa). Length 9.5 mm.

Eyes very large, occupying nearly one-half the sides of the head, moderately convex. Mesonotum and scutellum flat, small, together forming scarcely half the thoracic dorsum. In other respects like the worker, but with the head a little longer. Dark brown, nearly black.

Male (mature pupa). Length 7 mm.

Mandibles small, tridentate. Clypeus very large, convex in front, flattened behind. Head slightly longer than broad; eyes occupying more than half its sides. Frontal carinae parallel, as far apart as they are from the lateral borders of the head. Front truncated anteriorly and separated from the preocellar space by a transverse carina connecting the frontal carinae. Antennal scrobes small, marginate behind and laterally. Antennal scape very short, scarcely longer than broad; first funicular joint very small, globular, broader than long, the remaining joints cylindrical, the more basal a little broader than long, but increasing gradually in length, the last twice as long as broad. Thorax as broad as the head, rather flat. Mesonotum with Mayrian furrows; scutellum behind with two short, flat, horizontal teeth. Epinotum subcuboidal, its base longer than its declivity. Petiole and postpetiole as in the worker, but the former much broader than long, more rounded and not emarginate behind, with a small anteroventral tooth, the postpetiole unarmed below. Gaster elongate. Legs of the ordinary form, not dilated.

Head and thorax opaque or subopaque; longitudinally rugose, with reticulate interrugal spaces; sides of thorax striated. Clypeus coarsely and transversely rugose. Pedicel and anterior half of gaster densely reticulate-punctate and opaque or subopaque; posterior half of gaster becoming more shining. Postpetiole longitudinally rugose above and coarsely rugose on the sides like the posterior portion of the epinotum.

Erect hairs very oblique on the appendages, nearly appressed, almost absent and very short on the scapes. Pubescence somewhat more abundant than in the worker.

Black; margins of gastric segments, genital valves, tarsi, tibiae and scapes sordid yellow or reddish; funiculi brown.

Type-locality: Peradenyia, Ceylon (E. E. Green).

2. *Metapone mjoebergi* Forel.

Forel, Ark. f. Zool. 9, 1915, p. 36 ♂ ♀.

Worker. Length 7.6 mm.

Somewhat smaller than *greeni*. Mandibles 5-toothed, their outer margin feebly convex and their basal lobe smaller. Anterior lobe of clypeus much shorter than in *greeni* and *sauteri*, but also rather rectangular. Head rectangular, about one-third longer than broad, not broader behind than at the base of the frontal carinae, only anteriorly somewhat narrower, with nearly straight sides and feebly concave posterior border (in *greeni* broader behind and more convex laterally, longer in *sauteri*). Scape and funiculus more slender than in *greeni*, about as in *sauteri*. The very small, perfectly flat eyes have only a few indistinct ommatidia and lie as in *greeni* below the hind end of the scrobes, but are much smaller. Whole head in profile appearing as if very obliquely truncated anteriorly, i. e., with the anterior half of the clypeus much more abruptly declivous than in *greeni* and *sauteri* so

that the clypeus does not seem to stand away from the mandibles. Thorax very feebly convex, two and one-fourth times as long as broad, with parallel sides. Anterior corners of pronotum obtuse; posterior corners of the concavely emarginate epinotum protruding and swollen, a condition not seen in *greeni*. Promesonotal suture absent, mesoëpinotal suture feebly indicated (deeply impressed in *greeni*). Petiole much broader and shorter than in *greeni*, as broad as the epinotum, not quite twice as broad as long, its anterior border feebly, its posterior border deeply concave, narrower in front than behind, where its angles extend out as flat, lobular projections. It is truncated anteriorly and posteriorly and even somewhat concave in front, and bears ventrally only one strong longitudinal lobe. Postpetiole not broader than the posterior border of the petiole, scarcely one and one-half times broader than long, rounded on all sides, only about half as broad as the gaster, with two teeth below. Legs of the same shape and quite as broad as in *greeni*, the tibiæ shorter and stouter than in *sauteri*.

Sculpture of body, especially of the head, somewhat weaker and more finely longitudinally striate than in *greeni*; petiole and gaster distinctly more densely punctate. Mandibles nearly smooth, feebly striate and sparsely punctate.

The gaster and thorax exhibit a very short, fine, rather abundant, erect pilosity, which partly passes over into the pubescence and is sparser on the posterior portion of the head. There are only a few long hairs.

Pale brown, head dark brown; appendages brownish yellow.

Female (dealated). Length 7.9 mm.

Scarcely distinguishable from the worker, only much darker, brownish black, and with more distinct sutures outlining the mesonotum and scutellum. Hind corners of epinotum less protuberant, eyes large, ocelli present. Postpetiole somewhat broader than in the worker.

Type-locality: Malanda, Queensland (E. Mjöberg).

3. *Metapone sauteri* Forel.

Forel, Arch. f. Naturg. 79, 1913, p. 189, Fig. ♀.

Female. Length 10.5–11.1 mm.

Head rectangular, at least one and one-half times as long as broad, with straight sides and feebly concave posterior border. Eyes much as in *greeni*. Mandibles much longer and broader, with straight 5-6-toothed terminal border and longer and broader basal lobe. Clypeus with more distinct posterior suture, its anterior rectangular lobe much longer than in *greeni*, with perfectly straight anterior border, concave sides and acute corners. Frontal groove distinct. Antennæ very similar to those of *greeni*, but somewhat longer and narrower, especially the scape. Thorax decidedly narrower than the head, but otherwise as in *greeni*, the epinotum, however, much longer, nearly one and one-half times as long as broad, more strongly convex and less strongly marginate on the sides. Petiole also longer, much longer than broad, posteriorly with

two longer and more slender teeth, which are longer than broad at their bases. Postpetiole more rectangular than in *greeni*, nearly as long as broad. Gaster much broader, nearly twice as broad as the postpetiole, first segment nearly three times as long as the postpetiole. Lobes and teeth on the ventral surface of the petiole and postpetiole precisely as in *greeni*, also the teeth on the posterior tibiae and metatarsi, but the femora, especially the anterior pair, twice as long as broad. Wings with a single cubital cell, a discoidal and a long radial cell, the latter slightly open at the tip; radial and cubital veins separating at the tip of the cubital cell.

Longitudinal striation of the head and thorax much as in *greeni*, but somewhat coarser, the head less punctate. Petiole and postpetiole not only punctate as in *greeni*, but also sharply longitudinally striate; the striae on the petiole arcuate behind. Gaster shining, sparsely punctate and feebly and finely coriaceous.

Hairs sparse, reddish yellow, both erect and appressed on the body; appressed hairs on the head and thorax very scarce.

Black; antennae and gaster dark reddish brown; tibiae and tarsi reddish; femora and coxae brownish. Wings brownish, with brown veins and pterostigma.

Type-locality: Sokutsu, Banshoryo District, Formosa (Hans Sauter).

4. *Metapone leæ* sp. nov.

(Figs. 3 and 4.)

Female. Length 6.5–7 mm.

Head one and one-half times as long as broad, distinctly narrower at the anterior corners than behind, the sides feebly convex and the posterior border nearly straight; the upper surface very flat, in profile about two and one-half times as long as high. Mandibles convex, their basal lobes large, their terminal borders with a series of five teeth, smallest apically and largest basally. Clypeus flat, with a long projecting median lobe, which has a straight, transverse anterior border, concave sides and acute corners. Eyes rather large, but evidently smaller than in *greeni* and *sauteri*. Ocelli small, near the occipital border. There is a longitudinal, impressed line, bordered on each side by a ruga, representing the frontal groove, extending from the posterior border of the clypeus to the anterior ocellus and growing deeper posteriorly. Antennae rather stout, flattened; scape elliptical, somewhat more than twice as long as broad; funiculus with 3-jointed club, first joint as long as broad, joints 2-7 transverse, broader than long, terminal joint about as long as the two preceding joints together. Thorax elongate, subhexagonal, fully two and one-half times longer than broad, very flat above, four times as long as high, broader through the wing insertions where it is as broad as the head. Humeri of pronotum bluntly angular; mesonotum slightly concave behind, as broad as long, with the scutellum on the same level as the base of the epinotum, which is longer than broad, narrower behind than in front,

with straight sides and broadly and feebly excised posterior border. In profile the declivity is vertical and only about one-third as long as the base into which it passes through an abrupt curve. Petiole shaped like a mammalian vertebra, seen from above only half as broad as the epinotum at its base, one and one-third times as long as broad, with convex rounded anterior and slightly concave lateral and posterior borders, the posterior corners produced as two long blunt, diverging teeth and the middle of the posterior border above elevated as a low

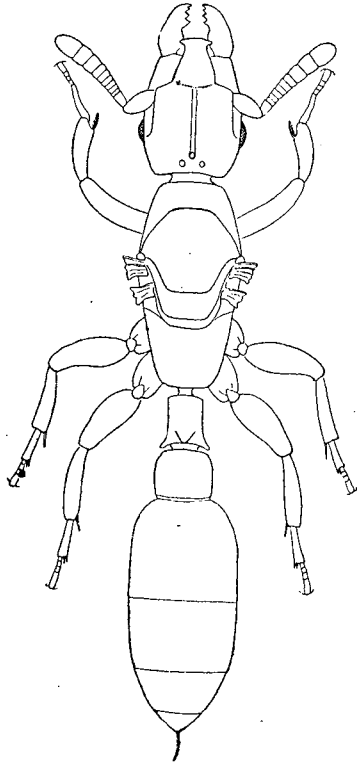


Fig. 3. *Metapone leæ* sp. nov. Female from above, with wings removed.

angular tubercle. In profile the anterior and posterior surfaces are truncated, the anterior and lateral surfaces concave, the ventral surface with two small angular, widely separated projections. Postpetiole from above nearly square, a little broader than long, a little broader than the petiole through its posterior teeth, feebly convex above, sharply truncated anteriorly, ventrally with a stout angular projection followed by a prominent transverse welt. Gaster narrow, twice as broad as the postpetiole, two and one-half times as long as broad, flattened dorsoventrally, the first segment as long as broad. Legs short, shaped much as in *greeni*, with apically dentate posterior tibiae

and metatarsi. Wings short (5 mm. long), with the same venation as in *bakeri*, the radial cell being slightly open at its tip and the radial and cubital veins fused for a short distance beyond the tip of the cubital cell.

Shining; mandibles smooth, finely and sparsely punctate. Clypeus, head and thorax longitudinally striate; the striæ on the clypeus fine, on the upper surface of the head separated by smooth areas, especially on the sides of the front. On the sides of the head, however, and in the scrobal cavities the striæ are very sharp and regular, and curve around the antennal insertions. Neck transversely reticulate-rugulose. Rugæ

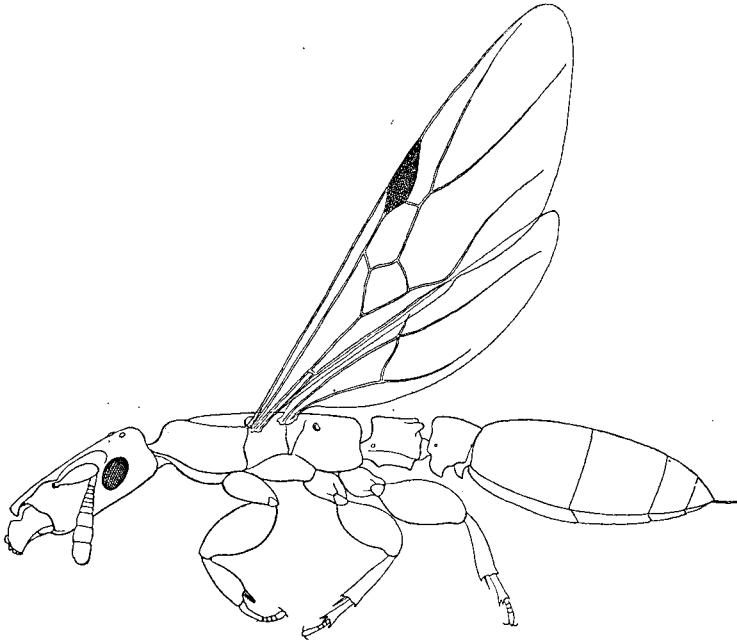


Fig. 4. *Metapone lea* sp. nov. Female, lateral view.

on the pro- and mesonotum and scutellum sharp and regular, interspersed with a few punctures, rugæ on the base of the epinotum very fine, diverging behind, the surface also with coarse scattered punctures. Sides of thorax obliquely and finely striate. Petiole very finely and densely transversely striate above and also with a few coarse, scattered punctures. Postpetiole and gaster smooth and shining, with very fine, sparse, piligerous punctures. Legs shining.

Hairs yellowish, short, sparse, bristly, erect or suberect, of uneven length, longest on the postpetiole and gaster; pubescence coarse, very sparse on the thorax, more distinct on the gaster. Hairs on the legs short and sparse, more or less oblique.

Brownish black; mandibles, antennæ, clypeus and anterior lobes of frontal carinæ deep red; gaster and legs paler, ferruginous red; sides of thorax and lower surface of petiole and postpetiole somewhat castaneous. Wings brownish hyaline, with black pterostigma and brown veins.

Described from 22 specimens taken by Mr. A. M. Lea on Mt. Tambourine, Queensland. (Museum of South Australia).

This species is most closely related to *sauteri*, but is much smaller and is very distinct in the extremely flat, narrow body, differently sculptured petiole and postpetiole, paler gaster, etc.

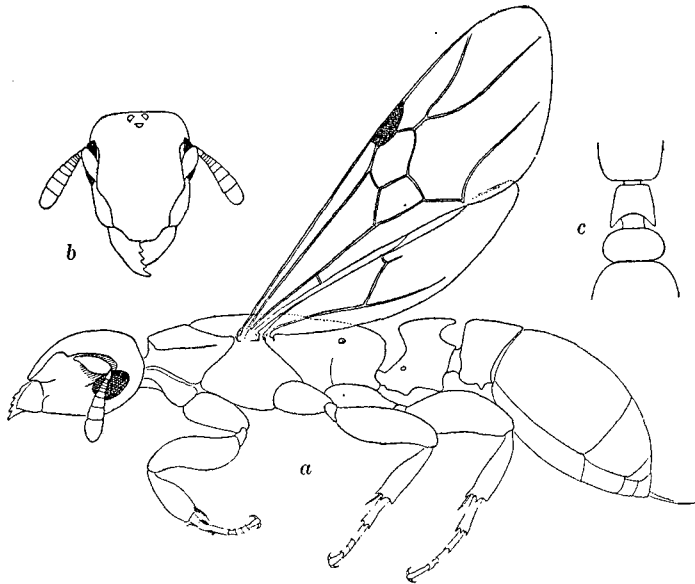


Fig. 5. *Metapone bakeri* Wheeler. Female.
a, lateral view; b, head, dorsal view; c, petiole and postpetiole.

5. *Metapone bakeri* Wheeler.

Wheeler, Proc. New Eng. Zool. Club 6, 1916, p. 10, Fig. 1. ♀.

(Fig. 5.)

Female. Length 6.4 mm.

Head less than one and one-fourth times as long as broad. Mandibles short and convex, 4-toothed, with small basal lobe. Clypeus convex, not marked off by a suture behind, its median lobe short and broad, with a blunt, tooth-like projection on each side. Antennæ with very distinct 3-jointed club, the two basal joints of which together equal the terminal joint. Thorax narrower than the head, nearly three times as long as high, its sides submarginate above; pronotum with subangular humeri, mesonotum feebly convex, together with the scutel-

lum broadly elliptical, longer than broad. Petiole from above a little longer than broad, broader behind than in front, marginate on all sides; with straight anterior and lateral borders, the posterior border deeply and somewhat angularly excised; in profile anvil-shaped, fully one and one-half times as high as long, its ventral surface with two large blunt angular projections. Postpetiole transversely elliptical, nearly twice as broad as long, ventrally with a blunt projection in front and a small tooth behind. Gaster small, suboblong. Legs short, but the femora much narrower than in the other species. Wings rather short, the radial cell narrowly open at the tip, the radial and cubital veins fused for a short distance beyond the apex of the cubital cell.

Extremely smooth and shining throughout, with sparse, very inconspicuous, piligerous punctures on the dorsal surface; posterior portion of antennal scrobes densely, longitudinally striate.

Hairs whitish, short, sparse, erect, nearly lacking on the pleuræ, most conspicuous on the gaster and legs.

Black; mandibles tinged with red; antennæ, fore legs, tibiæ, tarsi, tips and bases of middle and hind tibiæ reddish castaneous. Wings feebly infuscated, especially along the anteroapical margin; veins resin-colored; pterostigma dark brown.

Type-locality: Mt. Banahao, Luzon Island, Philippines (Prof. C. F. Baker).

This species differs from all the others in its highly polished, non-striate head and thorax, dark color, more slender legs, smaller size, etc. In my original description and figure the radial cell of the fore wing is represented as closed at the tip. It is really narrowly open. I have corrected the error in the figure as here reproduced.

6. *Metapone tillyardi* sp. nov.

(Fig. 6.)

Worker. Length 5.5-6 mm.

Head subrectangular, about one and one-fourth times as long as broad, a little broader behind than in front, with straight sides and very feebly concave posterior border. Eyes very small and indistinct, flat, at the lower posterior border of the scrobes. Clypeus rectangular, evenly convex anteroposteriorly, continuing the feeble convexity of the head, a little narrower in front than behind, with straight sides, separated behind from the head by a distinct suture, its anterior border scarcely produced as a lobe, bluntly bidentate in the middle. Each side of the clypeus overarches a cavity confluent with the scrobe and becomes continuous with the frontal carina which as in the other species extends to about the posterior fourth of the head. There is a distinct impressed line representing the frontal groove and extending to the posterior fifth of the head. Mandibles stout, their external borders rather straight, the apical border oblique, with five teeth, those at the apex largest,

the basal lobe small. Antennæ short, flattened, the scape elliptical, scarcely more than twice as long as broad; funiculus with distinct 3-jointed club, first joint longer than broad, joints 2-7 small, transverse, terminal joint a little longer than the two preceding joints together. Thorax regularly oblong, two and one-half times as long as broad, a little narrower than the head, with straight parallel sides, blunt anterior corners and concave posterior border, representing the boundary between the base and declivity of the epinotum which is square. The dorsal surface is flattened, bluntly submarginate on the sides, the pleuræ

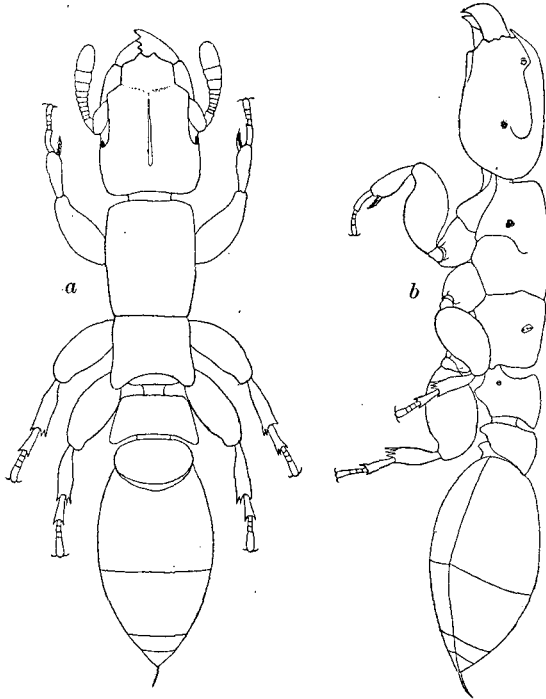


Fig. 6. *Metapone tillyardi* sp. nov. Worker. *a*, dorsal; *b*, lateral view.

concave. There is an extremely faint trace of a promesonotal suture; mesoepinotal suture distinct, rather sharply impressed, especially on the sides. In profile the thorax is about two and one-half times as long as high, vertically truncated anteriorly and posteriorly, the latter truncation being the epinotal declivity, the sides of which are marginate but not swollen above. Petiole from above as broad as the epinotum and twice as broad as long, narrower in front than behind, with straight anterior and lateral borders and broadly excised posterior border, the posterior corners flattened and lobe-like; in profile the segment is truncated anteriorly and posteriorly, with the anterior and lateral surfaces strongly concave, the ventral surface bearing a single stout, triangular

projection. Postpetiole a little narrower than the petiole, transversely elliptical, twice as broad as long and more than half as broad as the first gastric segment, ventrally with two blunt transverse projections. Gaster short, one and two-thirds as long as broad, first segment somewhat shorter than broad. Legs very short, flattened; femora very broad, elliptical, tips of middle and hind tibiae and metatarsi dentate as in the other species.

Shining; mandibles striato-punctate, basally smoother and sparsely punctate. Clypeus, head and thorax regularly and rather finely longitudinally striate; the posterior fourth of the head smooth and very shining. Interspersed with the striæ on the head are a few coarse punctures, arranged in rows, but becoming sparse on the occiput. The striæ on the pro- and mesonotum are somewhat finer and more regular than those on the head, on the base of the epinotum they are still finer and merge posteriorly into lines of punctures diverging to the posterior corners and into scattered punctures on the declivity. Sides of thorax obliquely striate. Petiole, post-petiole and gaster punctate, the gaster more finely. Legs smooth and shining, with very fine, sparse punctures.

Hairs yellow, in the form of sparse pubescence on the head and thorax, becoming conspicuously longer, more abundant and suberect on the gaster and especially on the sides of the petiole and postpetiole. There are also a few short erect hairs on the head and thorax. Legs with very short, rather bristly hairs, oblique on the tibiae.

Rich castaneous brown; mandibular teeth and lateral borders of clypeus and anterior border of head black; antennæ a little paler brown; gaster and legs ferruginous.

Described from 10 workers taken at Dorrigo, New South Wales (Museum of South Australia).

This species, which I dedicate to my friend, the eminent Australian entomologist, Dr. R. J. Tillyard, resembles *bakeri* most closely in the structure of the head and clypeus, but in color and sculpture it is more like *greeni* and *mjöbergi*, though sufficiently distinct from either.

7. *Metapone hewitti* Wheeler.

Wheeler, Bull. Mus. Comp. Zool. 1919, 63 p. 62♂.

(Fig. 7.)

Male. Length 6-7 mm.

Body long and slender. Head as broad as long, evenly convex and rounded behind, without posterior corners; cheeks very short; eyes moderately large, but not very convex; ocelli rather small. Mandibles small, but well developed, their external borders slightly sinuate basally, convex at the tips, apical and basal borders distinct, subequal, the former with four subequal teeth. Clypeus large, convex, somewhat broader than long, slightly depressed or flattened posteriorly. Front

truncated anteriorly, with a transverse crest or carina separating it from the preocellar space and connecting the frontal carinae, which are prominent, nearly straight, subparallel and as far apart as they are from the lateral borders of the head. Posteriorly each carina curves forward medially of the eye as a distinct ridge and terminates opposite its anterior end, thus enclosing a small, shallow, elliptical scrobe about the base of the antenna. Antennae 12-jointed; scape very small, about twice as long as broad; first funicular joint also very small, broader than long, subglobular; second joint considerably larger but also broader than long, the remaining nine joints stout, cylindrical, distinctly longer than broad, increasing somewhat in length distally, terminal joint nearly as long as the two preceding joints together, with tapering tip. Thorax long, narrower than the head through the eyes.

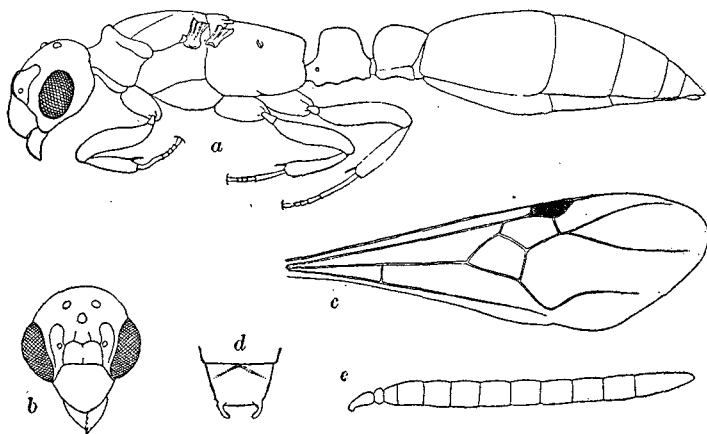


Fig. 7. *Metapone hewitti* Wheeler. *a*, male in profile; *b*, head, dorsal view; *c*, forewing; *d*, scutellum, dorsal view; *e*, antenna.

Pronotum well-developed, truncated in front; mesonotum and scutellum somewhat flattened above, the former with distinct Mayrian furrows, the latter on each side near its posterior border with a peculiar blunt, spatulate spine, slightly curved inward at the tip. Epinotum longer than broad; subrectangular from above, its base horizontal and twice as long as the vertical declivity into which it passes through an abrupt curve, the sides of the base and of the declivity above coarsely and rather irregularly marginate. Petiole with a short, stout peduncle anteriorly, and a thick cuboidal node, which is a little longer than broad and slightly higher in front than behind, with truncated anterior and posterior and rounded dorsal and lateral surfaces. Seen in profile its ventral margin is slightly bisinuate, with a small triangular tooth at the anterior end of the peduncle. Postpetiole distinctly broader than the petiole and broader than long, transversely elliptical, in profile truncated anteriorly, convex and rounded above, its ventral border unarmed, nearly straight. Gaster elongate elliptical, with straight anterior

border and tapering tip. Genitalia completely retracted; cerci apparently absent; pygidium and hypopygium short and pointed. Legs short, of the usual simple form, without the tibial and metatarsal teeth or spines of the worker and female; spurs of the middle and hind tibiae simple, blunt at the tip. Tarsal claws very small, strongly curved, nonpectinated. Wings very short (4.5 mm.), with a well-developed discoidal cell, a single cubital cell and the radial cell slightly open at the tip. Pterostigma large and conspicuous.

Subopaque; mandibles opaque, longitudinally rugose and very finely punctate. Head reticulate-rugose, the clypeus more coarsely, though not transversely as in *greeni*. Front behind its anterior truncation with regular longitudinal rugae converging to the anterior ocellus. Antennal scrobes less distinctly longitudinally rugose. Upper surface of mesonotum and scutellum and sides of thorax sharply and regularly longitudinally rugose, on the mesonotum with elongate, shallow foveolae in the narrow interrugal spaces. Dorsal surface of epinotum, including the upper portion of the declivity with extremely coarse reticulate rugae, some of which are clearly transverse. Petiole above less coarsely and even more irregularly rugose. Postpetiole and gaster very finely and densely punctate, with superimposed small, sparse and very regular piligerous punctures.

Hairs grayish brown, rather abundant, erect on the head, thorax and petiole, mostly subappressed or oblique on the postpetiole, gaster and legs. Antennal funiculi with very short fine hairs, or pubescence. Wings minutely hairy.

Black; mandibles, antennae, legs and tip of gaster reddish brown, the tarsi slightly paler. Wings grayish hyaline with slightly infuscated tips and anterior margin; veins sharply defined, brown; pterostigma dark brown.

Type-locality: Kuching, Borneo (John Hewitt).

The four males from which this species was described were taken by Mr. Hewitt in 1908 and though they have been in my collection ever since, I was unable to assign them to any genus till Forel published his description and figures of *Metapone greeni*. Though closely related to the male of this species, *hewitti* differs nevertheless in having 4-toothed mandibles, a different sculpture, especially on the clypeus, and very different spines on the scutellum. The antennae are certainly 12-jointed as shown in the accompanying figure. Forel evidently overlooked the second funicular joint in the mature pupal males of *greeni* which he examined. There is a possibility, of course, that *hewitti* may be the male of *sauteri* or *bakeri*, though it seems to be too small to be the male of the former and too opaque to belong to the latter species.