

the point of attachment of the muscle and the ventral tube is less than the length of the tentacle; but this difficulty is at once avoided by the presence of a second muscle, which throws the retracted tentacle into a curve. Moreover, the muscles are already greatly extended when the tentacle is protruded to its full length, but must have been much more so if there had only been a single muscle.

2. "On the Geographical Relations of the *Coleoptera* of Old Calabar;" by Andrew Murray, Esq., F.L.S., Assist. Sec. R. Hort. Soc.—(See 'Zoological Proceedings,' vol. vi.)

Catalogue of Hymenopterous Insects collected by Mr. A. R. Wallace in the Islands of Ceram, Celebes, Ternate, and Gilolo. By FREDERICK SMITH, Esq., Assistant in the Zoological Department, British Museum. Communicated by W. W. SAUNDERS, Esq., V.P.L.S., &c.

[Read June 6, 1861.]

OF the extensive and valuable additions which Mr. Wallace has made to our knowledge of the geographical distribution of the various genera of Aculeate Hymenoptera, none are perhaps more interesting than those contained in the present paper. Two fine new species of the parasitic genus *Thynnus*, from Gilolo, are especially interesting; this being the extreme limit of the known northern range of that genus from its metropolis, Australia. I would also particularly direct attention to a second species of the genus *Methoca* from Celebes. This genus, long represented by a single European species, was supposed to be confined to that quarter; but during the last few years it has been discovered in North America, two species being described by Say, and one by myself, from that country, one species from Cuba, another from India, and two by Mr. Wallace from the Island of Celebes.

Many fine additions to the Formicidæ, as well as to the fossorial division of the Aculeata, are contained in the present collections, which are the property of William Wilson Saunders, Esq.

Fam. FORMICIDÆ, *Leach*.

Gen. FORMICA, *Linn*.

1. *Formica lactaria*, *Smith*, *Proc. Linn. Soc.* Supp. v. 95. 6.

Hab. Gilolo, Bachian.

2. *Formica quadriceps*, *Proc. Linn. Soc.* iv. 137. 9.

Hab. Ceram, Aru.

3. FORMICA CONSANGUINEA. *F.* capite abdomineque nigro-fuscis; antennis, thorace, abdomine, squamula pedibusque ferrugineis.

Worker. Length 3 lines. Head black, with a slight ferruginous tinge and a prismatic lustre in various lights; before the insertion of the antennæ it is red as well as the mandibles and antennæ; the latter slender and a little longer than the thorax. The thorax narrow, and much compressed behind; and, as well as the legs, of a bright pale ferruginous. Abdomen ovate, fuscous and thinly sprinkled with pale hairs; the scale of the peduncle ferruginous, small, narrow, upright, with the superior margin rounded.

Hab. Celebes (Tondano).

This is probably the worker minor of *F. virulens*.

From D. K. 11
(vide Bolton 1917)
2nd from
Sapporo (1877)

4. *FORMICA CIRCUMSPECTA*. *F. rufo-picea*, antennis pedibusque pallide ferrugineis; squamula subquadrata, supra emarginata (*fœmina*).
F. pallide ferruginea, elongata et gracilis; abdomine rufo-fusco (*operaria*).

Female. Length $6\frac{1}{2}$ lines. Rufo-piceous, smooth and shining, the anterior part of the head, its anterior margin, the scutellum and base of the abdominal segments of a brighter colour; the antennæ, legs, and scale of the peduncle pale rufo-testaceous; the head oblong, narrowed anteriorly, transverse behind, and slightly emarginate in the middle; the mandibles stout, punctured, and with a row of black acute teeth on their inner margin; the head slightly punctured in front; the scale of the peduncle subquadrate, slightly emarginate above.

Worker major. $3\frac{1}{4}$ lines. Of a pale ferruginous, with the posterior portion of the abdomen fuscous; head oblong, narrowed behind the eyes; thorax oblong, narrow, compressed behind; the scale of the peduncle small, narrow, with the superior margin rounded above; the thorax narrowed anteriorly, forming a sort of neck.

The *worker minor* is 2 lines in length, more slender than the larger worker, with the antennæ and legs much more elongate, the head narrowed behind, and the thorax prolonged into a sort of neck when viewed sideways.

Hab. Celebes (Tondano).

5. *FORMICA LEUCOPHÆA*. *F. nigra*, dense cinerea, pilosa; thorace postice attenuato; squama oblongo-ovata.

Worker. Length 3 lines. Black and densely covered with a fine silky cinereous pile; antennæ nearly as long as the body, slender, and filiform, the flagellum scarcely thickened towards the apex; eyes rather large and prominent, and situated high on the sides of the head; head oblong, narrowed behind the eyes. Thorax oblong, narrowed and of equal width behind the prothorax; legs very obscurely reddish, with the apical joints of the tarsi rufo-testaceous. Abdomen ovate, the apical margins of the segments testaceous; the scale of the peduncle narrow, small, and pointed above.

Hab. Celebes (Tondano).

6. *FORMICA TROPICA*. *F. nigerrima*, nitida, lævissima; thorace pubescente, postice compresso; pedibus rufo-nigris.

Worker. Length $3\frac{1}{4}$ lines. Jet black, smooth, shining, and having a faint prismatic lustre, particularly on the head, which is oblong, or subquadrate; the tips of the mandibles ferruginous. The prothorax rounded at the sides and in front; a deep constriction at the base of the metathorax, which is elevated and rounded above; the thorax has a loose long pale scanty pubescence, probably much more dense in specimens in fine condition; the legs very obscurely ferruginous, nearly black; the legs, particularly the tibiæ, have a thin long loose

pale pubescence. Abdomen thinly sprinkled with pale hairs; the scale of the peduncle rounded and blunt above, not much elevated.

Hab. Gilolo.

7. *FORMICA VIRULENS*. *F.* capite, thorace pedibusque rufo-ferrugineis; abdomine nigro; squama oblongo-ovata.

Worker. Length 4 lines. Head, antennæ, thorax, and legs rufo-ferruginous; the head very large, much wider than the abdomen, emarginate behind, and rounding at the sides to the tips of the mandibles; the latter triangular, stout, and longitudinally striated, their inner margin dentate. The thorax compressed behind. Abdomen shining, black, with the margins of the segments ciliated with pale hairs; the scale of the petiole oblong-ovate.

Hab. Celebes (Tondano).

8. *FORMICA (TAPINOMA) GIBBA*. *F.* castaneo-rufa; antennis, tibiis tarsisque fuscis; metathorace supra rotundato, postice truncato.

Worker. Length $1\frac{3}{4}$ line. Dull chestnut red; the head rounded behind the eyes, the latter ovate, and situated rather more inwards than is usual, the eyes are also rather large; the antennæ, tibiæ, and tarsi fuscous; the antennæ inserted rather wide apart, nearly in a line with the inner margins of the eyes. Thorax, sub-rugose above, narrowed posteriorly, and deeply constricted between the meso- and metathorax; the latter elevated, rounded above, and truncate behind, the truncation obliquely concave. Abdomen ovate, produced anteriorly over the node of the peduncle, which is oblique, and falls into the truncation of the metathorax.

Hab. Celebes (Tondano).

This species belongs to Foerster's genus *Tapinoma*.

9. *FORMICA (TAPINOMA) ALBIPES*. *F.* nigra, subnitida, glabra; metathorace dorso abbreviato; squama oblongo-depressa; pedum articulis tarsisque albis.

Worker. Length $1\frac{1}{4}$ line. Black, slightly shining; the antennæ inserted widely apart on the front of the head; the metathorax oblique behind; the scale of the peduncle decumbent and hidden beneath the base of the abdomen, which projects forwards; the tarsi white.

Hab. Celebes (Tondano).

Gen. *POLYRHACHIS*, *Smith* *.

1. *Polyrhachis hastatus*, *Latr. Hist. Nat. Fourm.* p. 129, pl. 4. fig. 23, ♀.

Hab. Celebes; India.

The specimen from Celebes has the metathoracic spines shorter than Indian specimens which I have seen, and those on the node of the peduncle are also rather shorter; however, in its opaque blackness and in every other particular the insect is identical.

* A figure of the scale of the peduncle of each of the new species described will be found on Plate I., illustrative of this paper.

2. *Polyrhachis bihamatus*, *Drury, Ins. ii. pl. 38. f. 8, ♂*.
Hab. Celebes; Bachian; Sumatra; Borneo; India; Ceram.
3. *Polyrhachis Merops*, *Smith, Proc. Linn. Soc. Supp. v. 98. 9*.
Hab. Celebes; Bachian.
4. *Polyrhachis Busiris*, *Smith, Proc. Linn. Soc. Supp. v. 98. 7, ♀*.
Hab. Celebes; Bachian.
5. *Polyrhachis bicolor*, *Smith, Cat. Hym. Ins. pl. 6 (Formicidæ), p. 65. 25*.
Hab. Ternati; Burmah.
6. *Polyrhachis rugifrons*, *Smith, Proc. Linn. Soc. Supp. v. 70. 3*.
Hab. Ceram; Makassar.
7. *Polyrhachis rufofemoratus*, *Smith, Proc. Linn. Soc. iii. 142. 14*.
Hab. Ceram; Aru.
8. **POLYRHACHIS ORSYLLUS.** *P. niger*, cinereo-sericeo vestitus; thorace supra deplanato; spinis duabus acutis antice armato; squama integra; tibiis ferrugineis.
Worker. Length 3 lines. Black and thinly clothed with silky cinereous pile; the extreme apex of the flagellum and the palpi pale rufo-testaceous. The head and thorax above longitudinally and delicately striated; the margins of the thorax acute and slightly raised; the spines on the prothorax short, stout, and acute; the tibiæ ferruginous, the posterior pair rather dusky. Abdomen globose, the node of the peduncle broad, with its superior margin rounded, not spined. (Pl. I. fig. 6.)
Hab. Celebes (Tondano).
9. **POLYRHACHIS MUTILÆ.** *P. niger*; capite thoraceque cinereo-sericeo vestitis; abdomine pallide-aureo tectis; thorace spinis acutis duabus antice et postice armato; squama spinis duabus longis curvatis.
Worker. Length 2½ lines. Black, the head and thorax with a thin silky cinereous pile, that on the abdomen of a pale golden hue, the antennæ and legs black without pile, and slightly shining. Thorax convex above, the anterior spines short, slender and acute; the meta-thoracic spines rather longer but equally slender and acute; the node of the peduncle with two long spines which are curved to the shape of the base of the abdomen; the latter globose. The thorax flattened transversely, but curved longitudinally. (Pl. I. fig. 7, and fig. 15 var. ?)
Hab. Celebes (Tondano).
10. **POLYRHACHIS OLENUS.** *P. niger*; thorace supra deplanato, spinis duabus acutis anterioribus; squama spinis duabus longis armata; corpore aureo-sericeo vestito.
Worker. Length 3 lines. Black and clothed with ashy silky pile; the palpi pale rufo-testaceous. Thorax flattened above, with the lateral

margins raised, armed in front with two divergent flattened acute spines; the metathorax truncate, and with the margin at the verge of the truncation acute and slightly raised; the node of the peduncle armed with two long acute divergent spines which curve backwards over the base of the abdomen; the latter globose. (Pl. I. fig. 8.)

Hab. Celebes (Tondano).

11. **POLYRHACHIS DEMOCLES.** *P. niger, aureo-sericeo vestitus; thorace ovato, metathorace spinis duabus brevibus obtusis; squama spinis duabus acutis armata.*

Female. Length $3\frac{1}{2}$ lines. Black, covered with golden pubescent pile, the head and thorax thinly so. The thorax ovate; the verge of the truncation of the metathorax notched, the lateral angles forming short blunt spines; the node of the peduncle with two acute short spines, and in the middle of its upper margin with a notch, the angles of which are slightly elevated, forming two minute teeth or spines; the abdomen globose; the legs black and shining. (Pl. I. fig. 9.)

Hab. Celebes (Tondano).

12. **POLYRHACHIS VALERUS.** *P. capite abdomineque nigris; thorace, squama femoribusque rufis; thorace quadrispinoso; petioli squamula bispinosa.*

Worker. Length $3\frac{1}{4}$ lines. Black, with the thorax, scale of the petiole, the coxæ, trochanters and femora ferruginous; the head opaque, the face with short cinereous pubescence. The thorax with a thin shining cinereous pile; the spines on the thorax in front short, stout, and acute; the metathorax with two long slightly divergent spines directed backwards and tipped with black; the node of the peduncle with two long acute spines directed backwards over the base of the abdomen, their apex black. Abdomen globose and covered with silky pile, the extreme base, ferruginous. (Pl. I. fig. 10.)

Hab. Celebes (Tondano).

13. **POLYRHACHIS TRISPINOSUS.** *P. niger, lævis nitidusque; thorace inermi; petioli squama trispinosa.*

Female. Length 4 lines. Jet black, smooth and shining; the antennæ long and slender with the apical half ferruginous; the front of the head very convex. Thorax ovate, very delicately striated, the striæ, short and irregular, may be called a faint scratching; wings wanting; the node of the peduncle with three short acute spines above; the claws of the tarsi rufo-testaceous. Abdomen ovate and very smooth and shining. (Pl. I. fig. 11.)

Hab. Celebes (Tondano).

14. **POLYRHACHIS DIAPHANTUS.** *P. niger et vestitus pube argentea; thorace quadrispinoso; petioli squamula bispinosa.*

Worker. Length $2\frac{1}{2}$ lines. Black, and densely clothed with silky silvery pile; the flagellum has the tips of the basal joints, and six or

seven of the apical joints entirely ferruginous; the thorax convex above, the anterior spines short, stout, and acute; the metathorax with two very stout, acute divergent spines; the node of the petiole with two long spines very stout, acute, and curving round the base of the abdomen; the abdomen globose. The anterior tibiæ obscurely ferruginous, their base black. (Pl. I. fig. 12.)

Hab. Celebes (Tondano).

15. *POLYRHACHIS AMANUS*. *P. niger*, lævis, nitidus; thorace antice et postice spinis duabus longis acutis armato; squama spinis duabus longis curvatis; femoribus basi pallide ferrugineis.

Worker. Length 3 lines. Jet black, smooth and shining, the thorax finely roughened and sub-opaque; head very prominent in front, tips of the mandibles and of the joints of the flagellum, as well as the palpi, rufo-testaceous, five or six of the apical joints of the flagellum entirely so. Thorax, the spines in front short, stout, acute, and curved inwards; those on the metathorax elongate, extending over the base of the abdomen and very acute; the spines on the node of the peduncle slender, very acute, and curved to the shape of the base of the abdomen; legs elongate, obscurely ferruginous, with the coxæ, trochanters, and base of the femora pale testaceous, the claws of the tarsi testaceous. Abdomen globose, highly polished and impunctate. (Pl. I. fig. 13.)

Hab. Celebes (Tondano).

16. *POLYRHACHIS CLEOPHANES*. *P. niger*, pube argentea vestitus; capite thoraceque rude punctatis, spinis acutis antice et postice armatis; petioli squamula bispinosa; femoribus basi ferrugineis.

Worker. Length $3\frac{1}{4}$ lines. Black, the abdomen shining; head and thorax coarsely and closely punctured, rugose, and covered with silvery pubescent pile; the prominence on the front of the head, under the sides of which the antennæ are inserted, very much elevated; the eyes very prominent; the spines on the thorax in front short, divergent, stout, and acute; those on the metathorax more slender, acute, and curved backwards; the node of the peduncle with acute spines, which curve backwards over the base of the abdomen; the base of the femora more or less ferruginous, sometimes totally black. (Pl. I. fig. 14.)

Hab. Celebes (Tondano).

This is very probably the worker of *P. Vibidia*.

17. *POLYRHACHIS EXASPERATUS*. *P. niger*, capite thoraceque rude punctatis, abdomine nitido; thorace antice et postice spinis duabus longis acutis armato; squama spinis duabus longis curvatis acutis armata; pedibus obscure ferrugineis.

Worker. Length $2\frac{3}{4}$ lines. Black; the head anteriorly, the mandibles and flagellum obscure ferruginous; the head, thorax, and node of the

peduncle very coarsely and closely punctured, producing a rugged surface. The thorax, with two short stout acute spines bent inwards, the metathorax with two long divergent acute spines; the peduncle with two long acute spines, which curve to the shape of the base of the abdomen; the legs ferruginous, more or less obscurely so. The abdomen globose, smooth, and shining. (Pl. I. fig. 15, and 16 var.)

Hab. Celebes (Tondano).

18. *POLYRHACHIS VIBIDIA*. *P. niger*, capite thoraceque rude punctatis; thorace ovato, antice posticeque abdominisque squama spinis duabus acutis armatis; abdomine ovato.

Female. Length $3\frac{1}{2}$ lines. Black; the head and thorax with large deep punctures; the head with a large prominence in front, the lateral margins of which are expanded into elevated flat scales, beneath which the antennæ are inserted, the extreme tip of the latter pale rufo-testaceous; the eyes very prominent. Thorax ovate, with a short stout spine on each side in front; the metathorax with two stout acute spines, rather longer than the front ones; the node of the peduncle with two short divergent acute spines; the tibiæ and femora ferruginous, the apex of the latter and base of the former dusky or black; the claws of the tarsi rufo-testaceous. Abdomen globose, smooth and shining; the entire insect thinly covered with cinereous pubescent pile. (Pl. I. fig. 17.)

Hab. Celebes (Tondano).

19. *POLYRHACHIS CHAONIA*. *P. niger*, pube pallide aurea vestitus; thorace bidentato; petioli squamula bidentata; femoribus tibiisque ferrugineis; alis fusco-hyalinis.

Female. Length 4 lines. Black, and clothed with a cinereous pubescence, which has a pale golden lustre, particularly on the head and thorax; that on the abdomen is more inclining to grey, but has a golden tint in some lights; the mandibles black. Thorax armed in front with two short acute spines; the legs ferruginous, with the tarsi black; wings fusco-hyaline, nervures testaceous. Abdomen globose; the scale of the peduncle with two short stout spines. (Pl. I. fig. 18.)

Hab. Gilolo.

20. *POLYRHACHIS NUMERIA*. *P. niger*; thorace supra deplanato, spinis duabus anterioribus; abdominis squamula spinis duabus erectis acutis, utraque ad basin minute unispinulosa.

Worker. Length 3 lines. Black, and covered with silky cinereous pile; the thorax flattened above, and slightly curved longitudinally to the verge of the truncation of the metathorax, the spines on the prothorax stout, short and acute; the margins of the thorax slightly raised. Abdomen globose, truncate at the base; the node of the peduncle broad, transverse above with an erect spine at each lateral

angle, and a shorter acute spine outside at their base. (Pl. I. fig. 19.)

Hab. Celebes (Tondano).

21. *POLYRHACHIS HIPPOMANES*. *P. niger*; capite thoraceque opacis; abdomine nitido; thorace spinis duabus longis acutis postice armato; squama spinis duabus longis curvatis armata.

Worker. Length $2\frac{1}{4}$ lines. Black, the head and thorax opaque, and obscurely tinged with blue. Thorax rounded above, the anterior margin unarmed; the metathorax with two long divergent spines; the node of the peduncle with two similar spines, which are curved and extend over the base of the abdomen; the trochanters and the intermediate and posterior coxæ pale rufo-testaceous; the legs elongate. The abdomen globose. (Pl. I. fig. 20.)

Hab. Celebes (Tondano).

22. *POLYRHACHIS LYCIDAS*. *P. niger*, pubescens; thorace supra depianato, spinis duabus anterioribus; petioli squamula quadrispinosa.

Worker. Length 4 lines. Black with a thin silky cinereous pile, and sprinkled over with erect pale pubescence, which covers the antennæ and legs also; the extreme tip of the antennæ pale rufo-testaceous, the palpi of the same colour; the head and thorax longitudinally striated; the prothorax with two stout acute spines; the margins of the thorax slightly elevated and extremely acute at the angles of the truncation of the metathorax, sub-dentate; the node of the peduncle with four acute spines. Abdomen globose, with the base truncate. (Pl. I. fig. 21.)

Hab. Celebes (Tondano).

23. *POLYRHACHIS ZOPYRUS*. *P. niger*; prothorace bispinoso; petioli squamula quadrispinosa.

Worker. Length $2\frac{3}{4}$ lines. Black, with a thin cinereous silky pile. Thorax, the anterior margin transverse, with the lateral angles very acute, and slightly produced into short acute spines; the sides of the thorax flat, the disk slightly convex, with the margins acute and slightly raised; the metathorax truncate, the angles of the truncation slightly produced, forming short acute spines; the anterior tibiæ more or less ferruginous within. Abdomen globose, the node of the peduncle with the superior margin transverse, the lateral angles raised into short acute teeth or spines; the sides of the node oblique outwardly, then abruptly inclined inwards to its base; at the angle thus produced is a short acute spine. (Pl. I. fig. 22.)

Hab. Celebes (Tondano).

24. *POLYRHACHIS EURYTUS*. *P. niger* cinereo-sericeo vestitus; thorace subovato, spinis duabus antice armato; squama emarginata.

Female. Length $3\frac{1}{4}$ lines. Black, and covered with silvery grey pile, which is most dense on the face, metathorax, and abdomen. Thorax

sub-ovate, the metathorax truncate with the margin of the truncation acute; the prothorax with two short acute spines. Abdomen globose; the node of the peduncle widely emarginate above and subdentate at the angles. (Pl. I. fig. 23.)

Hab. Celebes (Tondano).

Gen. ODONTOMACHUS, *Latr.*

1. *Odontomachus rixosus*, *Smith, Proc. Linn. Soc.* ii. 64. 1.

Hab. Ternati; Singapore.

2. *Odontomachus savissimus*, *Smith, Proc. Linn. Soc. Supp.* v. 102. 1.

Hab. Menado; Bachian; Ceram.

3. ODONTOMACHUS TYRANNICUS. *O. ferrugineus*, *lavis nitidus*; thorace oblongo, metathorace transversim striato; abdominis pedunculo unispinoso.

Worker. Length 4 lines to the tips of the mandibles. Ferruginous, very smooth and shining; the head widest at the insertion of the eyes, more than usually so; the usual deep depressions between the eyes and the prominence at the sides of which the antennæ are inserted very smooth without the faintest striation, the prominence slightly striated longitudinally; the head deeply emarginate behind; the mandibles finely serrated on their inner margins, and terminating in two stout teeth, which form a fork abruptly bent inwards. The antennæ and legs of a paler colour than the body; the metathorax transversely striated, the mesothorax above longitudinally so; the spine on the node of the peduncle of the abdomen short and acute. (Pl. I. fig. 4.)

Hab. Celebes.

Fam. PONERIDÆ, *Smith.*

Gen. PONERA, *Latr.*

1. *Ponera rugosa*, *Smith, Proc. Linn. Soc.* ii. 66. 5.

Hab. Celebes; Borneo.

2. *Ponera parallela*, *Smith, Proc. Linn. Soc.* iv. 143. 3.

Hab. Celebes; Aru.

3. *Ponera læviceps*, *Smith, Proc. Linn. Soc.* ii. 69. 13 ♀.

Hab. Celebes; Bachian; Borneo.

4. PONERA MALIGNA. *P. capite subquadrato*, margine posteriore transverso; thorace abdomineque lævigatis, nitidis; mandibulis, antennis tarsisque pallide ferrugineis.

Female. Length $5\frac{1}{2}$ lines. Jet-black, smooth and shining; the posterior margin of the head transverse, with the lateral angles acute; the clypeus elevated; the head is sprinkled with distant punctures; its anterior margin, the mandibles, and antennæ ferruginous; the mandibles porrect, with two or three teeth at their apex and a larger one on their inner margin about one-third of their length from their apex.

Thorax oblong-ovate, with a few large scattered shallow punctures; the articulations of the legs and the tarsi ferruginous. Abdomen deeply constricted between the first and second segment, the apex rufo-testaceous; the node of the peduncle incrassate, subquadrate, rather widest behind; the entire insect is sprinkled with pale hairs, which are most dense on the abdomen, particularly at its apex.

Worker. This sex is rather smaller than the female, is less pubescent, and with fewer punctures; the metathorax narrower than the prothorax, and obtuse behind; the eyes are smaller, and, like those of the female, placed forwards at the sides of the head; the mandibles are similarly toothed; the colouring does not differ.

Hab. Celebes; Menado.

5. *PONERA NITIDA.* *P. pallide ferruginea, lævis et nitida; margine mandibularum bidentato.*

Worker. Length $2\frac{1}{2}$ lines. Pale ferruginous, very smooth and shining; the eyes small, round, and placed forwards at the sides of the head; the mandibles porrect, with two stout short teeth on their inner margin. Thorax, with the sides flattened, above slightly convex; the metathorax oblong-quadrate above. The node of the peduncle quadrate and incrassate, as wide as the metathorax; the abdomen is constricted between the first and second segments, and has a few pale scattered hairs.

Hab. Celebes (Tondano).

6. *PONERA MUTABILIS.* *P. ferruginea, lævis, nitida, chalybea, viridescens; abdomine rufo-fusco.*

Worker. Length $3\frac{1}{4}$ lines. Ferruginous; the head and thorax with tints of blue in certain lights; the mandibles longitudinally and finely striated, armed with three teeth at their apex, and a fourth on their inner margin a little way within; the eyes ovate and placed forwards at the sides of the head. Thorax compressed posteriorly; the scale of the peduncle flattened, rather thick, with its superior margin rounded. Abdomen slightly fuscous; the apical margin of the basal segment slightly constricted.

Hab. Celebes (Tondano).

This species resembles the *P. viridescens* from Sarawak, but is at once distinguished from it by its much shorter and thicker antennæ.

Gen. ECTATOMMA, *Smith.*

1. *Ectatomma rugosa, Smith, Proc. Linn. Soc. iii. 143. 1.*

Hab. Ceram; Aru.

Fam. MYRMICIDÆ, *Smith.*

Gen. MYRMICA, *Latr.*

1. *Myrmica molesta, Say, Bost. Journ. Nat. Hist. i. 293. 6. (Myrmica domestica, Shuck. Mag. Nat. Hist. p. 268.)*

Hab. Menado; Celebes; Britain; France; Brazil; North America.

2. *MYRMICA PEDESTRIS*. *M. fusco-nigra*; capite thoraceque longitudinaliter striatis; antennis pedibusque ferrugineis; abdomine lævi, nitidissimo.

Female. Length 3 lines. Nigro-fuscous; the head and thorax longitudinally striated, the striæ formed of rows of confluent punctures, the punctures finer on the head than on the thorax; the antennæ, anterior margin of the head and the mandibles ferruginous, the legs ferruginous. The thorax transverse anteriorly; a narrow smooth shining impunctate line runs down the middle; the metathorax unarmed. Abdomen oblong-ovate, smooth, shining, and delicately punctured; the nodes of the peduncle smooth and impunctate, the first oblong, the second globose.

Hab. Celebes (Tondano).

3. *MYRMICA RUFICEPS*. *M. fusco-nigra*; capite ferrugineo et longitudinaliter striato, thorace supra striato; abdomine lævi, nitidissimo.

Female. Length 4 lines. Black, the head red with a space behind the insertion of the antennæ regularly striated longitudinally, extending to the posterior margin; on each side of the striation the head is rugose; the mandibles stout, smooth and shining, with their inner margin black, smooth, and edentate; flagellum 12-jointed, the club 3-jointed. Thorax, the disk longitudinally striated, the scutellum smooth and shining, with a few transverse striæ behind; the metathorax with two short stout teeth; the tarsi and articulations of the legs pale rufo-testaceous. The petiole of the abdomen ferruginous, the nodes black, the first globose, the second transverse. Abdomen ovate, black, smooth, and shining.

Hab. Celebes (Tondano).

4. *MYRMICA FUSCIPENNIS*. *M. ferruginea*; capite thoraceque profunde punctatis; alis nigro-fuscis.

Female. Length 3 lines. Ferruginous, the head and thorax covered with large oblong punctures, the punctures occasionally confluent; the mandibles finely striated longitudinally, their inner margin furnished with a row of small black teeth; the joints of the antennæ, except the three apical ones, transverse; the apical joint longest, but not forming a club. Thorax, the metathorax with two short acute teeth; wings dark fuscous. Abdomen very smooth and shining, and much paler than the head and thorax.

Hab. Celebes (Tondano).

5. *MYRMICA PERTINAX*. *M. rufo-fusca*, nitida, sparse pilosa; capite longitudinaliter striato; metathorace mutico.

Worker. Length $1\frac{1}{2}$ -2 lines. Rufo-fuscous, the head darker than the body; the anterior portion of the head and the antennæ bright rufo-ferruginous. The thorax smooth and shining, with a few fine punctures, the base and apex of the femora pale in some of the larger and darker examples; the abdomen pale at the base, the ex-

treme apex pale and pubescent. Smaller specimens are usually paler than large ones.

Hab. Celebes (Tondano).

6. *MYRMICA VEXATOR*. *M.* pallide flavo-testacea, lævis, nitidissima; abdomine apice fusco-nigro.

Worker. Length 1 line. Honey-yellow, very smooth and shining; the flagellum slightly fuscous towards the apex; the eyes small and placed forwards at the sides of the head; the metathorax not spined; the abdomen fuscous with the base pale.

Hab. Ternati.

This species resembles the House-ant, *M. molesta*; but it differs in several particulars from that species; its head is much larger, and it is entirely smooth and shining.

7. *MYRMICA INSOLENS*. *M.* testaceo-ferruginea, sparse pilosa; capite thoraceque longitudinaliter striatim rugosis; metathorace spinis parvis acutis armato.

Worker. Length $1\frac{3}{4}$ line. Pale ferruginous; the head and thorax longitudinally, irregularly and roughly striated; the eyes and ocelli black; the antennæ with three joints in the club; the metathorax with two straight acute spines, which are situated at the sides of the truncation of the metathorax; the abdomen smooth and shining.

Hab. Menado.

8. *MYRMICA OPACA*. *M.* nigra, opaca, delicatule scabrosa; pedibus rufo-fuscis, tarsis pallide testaceis.

Worker. Length 2 lines. Opake-black, the head, thorax and nodes of the peduncle finely scabrous, on the head having a tendency to run into lines; behind the eyes is a longitudinal groove, apparently for the reception of the scape of the antennæ; the antennæ obscurely ferruginous with the tip pale; the mandibles ferruginous, striated and with several black teeth on their inner margin. Thorax armed posteriorly with two stout curved spines; the tarsi pale rufo-testaceous. The nodes of the peduncle large and globose; the abdomen thinly sprinkled with erect white setæ.

Hab. Celebes (Tondano).

Gen. CERAPACHYS, *Smith*.

1. *Cerapachys antennatus*, *Smith*, *Proc. Linn. Soc.* ii. 74. 1.

Hab. Celebes; Borneo.

Gen. CREMATOGASTER, *Lund*.

1. *CREMATOGASTER AMPULLARIS*. *C.* rufo-niger; capite thorace multum latiore; parte postica thoracis dilatata; abdomine cordato.

Worker. Length 2 lines. Obscure fusco-ferruginous; the antennæ, sides of the head, the nodes of the petiole, and the legs of a brighter

red; the head much wider than the thorax and more shining; the metathorax much swollen and wider than the prothorax, swelling out on each side. Abdomen heart-shaped, palest at the base and shining.

Hab. Celebes (Tondano).

The swollen metathorax in this species, I apprehend, is a receptacle for saccharine fluid; on each side is a small orifice, and beneath it, adhering to the thorax, are particles of crystallized masses, apparently formed of the fluid which has exuded from the receptacle. Two species from Sarawak, having similar formations, are described in the second volume of the 'Proceedings of the Linnean Society.'

Fam. ATTIDÆ, *Smith.*

Gen. SOLENOPSIS, *Westw.*

1. *Solenopsis cephalotes*, *Smith, Proc. Linn. Soc.* iii. 149. 1.

Hab. Celebes; Aru.

The *worker major* of this species has the head greatly enlarged, that of the *worker minor* being of the ordinary size.

2. *SOLENOPSIS LABORIOSA*. *S. ferruginea*; capite maximo, longitudinaliter striato, postice transverso-striato; spinis metathoracis minutissimis.

Worker major. Length 3 lines. Dark ferruginous, with the legs pale; rufo-testaceous; the head very large, twice as wide as the abdomen, in front and at the sides roughly striated, posteriorly delicately striated; the sides of the head very slightly rounded, emarginate behind with a central impressed line running forwards and terminating opposite the eyes; the eyes very small and placed at the sides a little beyond the middle; the vertex smooth and shining, with a few scattered fine punctures. Thorax sub-rugose, convex anteriorly and shining, behind constricted and narrowed; the metathorax with two short, erect, acute spines. Abdomen smooth, shining and slightly pubescent. The mandibles have a single tooth at their apex.

Worker minor. Length 1-2 lines. This form is of a much paler colour, the larger individuals having the abdomen fuscous, except at the extreme base; in the smaller examples it is only fuscous at the apex; in large individuals the head is slightly striated in front, in small ones it is entirely smooth and shining; the head much smaller in proportion than in the *worker major*; the mandibles with two or three teeth on their inner margin.

Hab. Celebes (Tondano).

The different-sized workers were taken from the nest by Mr. Wallace.

3. *SOLENOPSIS PUNGENS*. *S. ferruginea*; capite maxime longitudinaliter striato; abdomine fusco (*operaria major*): rufo-testacea, lævis, tota nitidissima nuda flagellis pedibusque pallescentibus (*operaria minor*).

Worker. Length 2 lines. Ferruginous, the flagellum and legs pale ferruginous; the mandibles stout, finely punctured and with two

OF CERAM, CELEBES, TERNATE, AND GILOLO.

49

teeth at their apex; the head very large, longitudinally striated, and with a longitudinal channel behind the scape of the antennæ apparently for their reception; the eyes small, inserted forwards at the sides of the head. The metathorax, with two minute spines; the legs pale rufo-testaceous. Abdomen fuscous, smooth and shining.

Worker minor. Length 1 line. Rufo-testaceous, the antennæ, thorax, and legs pale testaceous; the head of the ordinary size; entirely smooth and shining.

Hab. Menado.

Gen. PHEIDOLE, *Westw.*

1. *Pheidole megacephala*, *Smith, Proc. Linn. Soc. Supp.* v. 112. 5.

Mr. Wallace has sent a series of workers of this species collected from the nest. These contain, as it were, three modifications of the enormously large-headed individuals; all of these have heads similar in form, subquadrate, longitudinally striated anteriorly, and transversely so behind; these I should call varieties of the *worker major*; the *worker minor* has the head subovate in form, smooth, polished and shining; not striated behind, and very faintly so anteriorly. The links which would unite these two distinct forms of the working ants are wanting. I am therefore still of opinion that societies of ants generally possess two distinct sets of workers whose functions are totally different; this is known to be the case in slave-making communities, and also in the remarkable genus *Eciton*, of which only the workers are known.

2. *Pheidole plagiaria* (*Smith, Proc. Linn. Soc. Supp.* v. 112. 3).

Hab. Celebes; Bachian.

The specimens from Celebes are of a darker hue than those received from Bachian; this is the ant which Mr. Wallace saw carrying off white ants to its formicarium.

Gen. TYPHLATA, *Smith.*

1. *Typhlatta læviceps*, *Smith, Proc. Linn. Soc.* ii. 79. 1.

This remarkable genus of ants, the workers of which are destitute of eyes, is in my opinion closely allied to the genus *Eciton*, one or two species of which are also blind; the present species is very like the *Eciton pachycerus* of my Catalogue of Formicidæ, which is also blind. That species was collected by General Hardwick, and formed part of his collection, which he presented to the British Museum; I have little doubt it was captured in India, although South America (?) is given as its probable habitat. This genus differs from *Eciton* in having only two joints to the labral palpi; the maxillary palpi I have not succeeded in extracting.

Fam. CRYPTO CERIDÆ, *Smith.*

Gen. CATAULACUS.

1. *CATAULACUS FLAGITIOSUS.* *C. niger*; capite striato, angulis posticis

spinosis; thorace spinis duabus acutis elongatis armato; abdomine cordato.

Worker. Length $2\frac{1}{2}$ lines. Opaque-black; the head and thorax above, with a coarse irregular striation, intermixed with a rough granulation, the margins of the head crenulated, the posterior angles acute and slightly produced. Thorax armed posteriorly with two stout diverging spines. Abdomen oblong-cordate, finely and irregularly striated; sprinkled with distant short white erect setæ; the nodes of the peduncle rugose.

Hab. Celebes (Tondano).

Gen. ECHINOPLA, *Smith.*

1. *Echinopla striata*, *Smith, Proc. Linn. Soc.* ii. 80. 3.

Hab. Celebes; Malacca.

2. *Echinopla pallipes*, *Smith, Proc. Linn. Soc.* ii. 80. 2.

Hab. Celebes; Borneo.

3. ECHINOPLA DUBITATA. *E. nigra*; capite thoraceque rugosis; abdomine ovato lævi nitido; squama in utroque latere spina horizontali; femoribus pallide testaceis.

Worker. Length 2 lines. Black, and thinly covered with erect black hairs; the head and thorax rather finely rugose; the antennæ pubescent, with the extreme tip pale testaceous; the eyes round and very prominent. The anterior margin of the prothorax arched with a short acute spine at the lateral angles; the thorax is deeply constricted in the middle, the metathorax rounded behind; the roughness of the thorax gives its margins a crenulated appearance; the coxæ, trochanters, and base of the femora pale rufo-testaceous; the claw-joint of the tarsi rufo-testaceous. Abdomen globose, shining, and very finely punctured.

Hab. Celebes (Tondano).

Fam. MUTILLIDÆ, *Leach.*

Gen. MUTILLA.

1. *Mutilla Merops*, *Smith, Supp. Journ. Proc. Linn. Soc.* v. 115. 2.

Hab. Gilolo; Bachian.

2. *Mutilla anthylla*, *Smith, Supp. Journ. Proc. Linn. Soc.* v. 115. 4.

Hab. Gilolo; Bachian.

3. *Mutilla Ianthea*, *Smith, Proc. Linn. Soc. Supp.* v. 115. 3.

Hab. Amboyna; Bachian.

Gen. METHOCA, *Latr.*

1. METHOCA THORACICA. *M. rufo-ferruginea*; capite abdominisque fasciis tribus nigris.

Female. Length 4 lines. Rufo-ferruginous; the head black, the abdomen with three black fasciæ, very smooth and shining; the mandibles, clypeus, and antennæ ferruginous. (Pl. I. fig. 5. ♀.)

Hab. Celebes (Tondano).

This very beautiful insect may probably be a very large, highly coloured form of *M. insularis*, described in a previous paper; but not having any intermediate in size, I have thought it advisable to describe it as a distinct species.

Fam. THYNNIDÆ, *Erich.*

Gen. THYNNUS.

1. THYNNUS ATRATUS. *T. niger*, punctulatus; alis anticis fusco-nigris, apice hyalinis, posticis hyalinis, basi late fusco-nigris.

Female. Length 12 lines. Black and closely punctured; the head and thorax slightly shining, the thorax very shining, and not so strongly and closely punctured as the thorax; the anterior margin of the clypeus widely and slightly emarginate. The wings very dark brown, shining, and with their apical margins, and the posterior margin of the hind wings hyaline; the legs black with short cinereous pubescence within.

Hab. Gilolo.

This fine species of *Thynnus* is of the same form, and about the same size, as Guérin's *T. Shuckardi*; it is the second species that has to my knowledge been captured in the Eastern Archipelago; the first species was described in the paper descriptive of the insects of Bachian, &c., published in the supplement to the fifth volume of the 'Proceedings.'

2. THYNNUS (AGRIOMYIA) VAGANS. *T. niger*, capite thoraceque flavo variegatus, abdominis segmentis maculis duabus flavis; alis subhyalinis.

Male. Length $6\frac{1}{2}$ lines. Black, the head and thorax subopaque, the abdomen shining; the mandibles, clypeus and a V-shaped mark above yellow; the base of the clypeus and an anchor-shaped mark in the middle black. Thorax, the collar, posterior margin of the prothorax, a spot on the tegulæ, two beneath the wings, a minute one on the mesothorax, three on the scutellum, and one on each side of the metathorax yellow; the anterior tibiæ and the intermediate pair in front ferruginous; the wings subhyaline, the nervures black. The abdomen has an oblong yellow spot at the sides of all the segments except the two apical ones.

Female. Length 4 lines. Apterous; black, the head small, transverse in front, much narrowed behind, with a deep longitudinal sulcation on each side close to the margin of the eyes. The thorax narrow and oblong. Abdomen oblong-ovate, very large, with four deep transverse grooves on the second segment. (Pl. I. fig. 1 ♂, 2 ♀.)

Hab. Gilolo.

2. AGATHIS STRIATA. *A. flavo-rufa*, antennis nigris, abdomine nitido, longitudinaliter striato; alis flavo-hyalinis, dimidio apicali fusco. *Female*. Length 7 lines. Reddish yellow; the head triangular; the face pale; the antennæ black, with the scape yellow; the basal joints of the flagellum obscurely fulvous beneath; thorax smooth and shining; the basal half of the wings yellow hyaline, the apical half dark brown, with a minute hyaline spot below the stigma in the middle of the wing. Abdomen: the three basal segments and the base of the fourth evenly striated longitudinally.

Hab. Gilolo.

Gen. CENOCELIUS, *Holiday*.

1. *Cenocelius cephalotes*, *Smith, Proc. Linn. Soc.* v. 65. 1.

Hab. Gilolo; Celebes.

Fam. TENTHREDINIDÆ, *Leach*.

Gen. CLADOMACRA, *Smith*.

1. *Cladomacra macropus*, *Smith, Ann. & Mag. Nat. Hist.* 1860, vi. 257.

Hab. Celebes (Tondano).

ERRATA.

Several changes in the numbering of the objects that illustrate this paper having been made since the first sheet was printed, the following corrections of the references must be attended to. The numbers refer to figures of the scale of the abdomen of the different species.

Figs. 6 and 7, *Polyrhachis Orsyllus*.

Figs. 12 and 12a, *P. Diaphantus*.

Figs. 15 and 20, *P. Mutilæ*.

Fig. 16, *P. exasperatus*.

Fig. 21, *P. Hippomanes*.

Fig. 23, *P. Lycidas*.

Fig. 24, *P. Eurytus*.

Fig. 25, *P. Numeria*.

On the Cranial Characters of the Snake-Rat, new to the British Fauna. By S. JAMES A. SALTER, M.B., F.L.S., F.G.S.

[Read April 7th, 1859.]

THE Society will doubtless recollect that last year* I exhibited at one of our meetings two living rats, one of which I believed to be new to the British Fauna—at least, new so far as that till then it had been unrecognized and undescribed as distinct. The other was a specimen of the old English Black Rat (*Mus rattus*); and this was shown, not on its own account, but for contrast and comparison. And I selected the Black Rat for this comparison because it so much more closely resembles the new one than does the

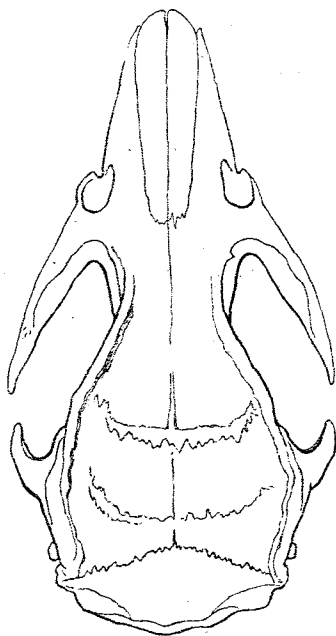
* May 6th, 1858.

Brown Rat (*Mus decumanus*), which is quite different. If therefore the new rat is a mere variety of either of the two species which have been long known as members of the British mammalian fauna, and which have always been considered specifically distinct, it must be deemed a variety of *Mus rattus*; but I claim for it distinctive characters separating it from that rat, quite as marked as those which distinguish the Brown from the old English Black Rat. Indeed *Mus decumanus* more nearly resembles *Mus rattus* than does the new rat. It was suggested to me, at the time I exhibited the living specimens, that an appeal must be made to the cranial characters of each, before the distinctness and the degree of distinctness between the two could be established. The result of this investigation I now give to the Society.

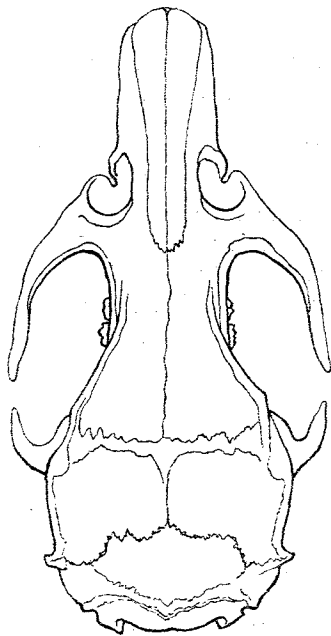
On the table are the skulls of the identical rats that were formerly exhibited—two adult males; and I have also some enlarged outline drawings (from which the accompanying woodcuts were taken) showing the salient peculiarities of each cranium. The

Fig. 1.

Fig. 2.



Top view of Cranium of Snake-Rat.
Enlarged two diameters.



Top view of Cranium of *Mus rattus*.
Enlarged two diameters.

