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REPORT ON A COLLECTION OF ANTS IN THE INDIAN MUSEUM,
CALCUTTA. BY DURGADAS MUKERJEE. (*With one plate and six text-
figures*).

REPORT ON A COLLECTION OF ANTS IN THE INDIAN
MUSEUM, CALCUTTA¹

BY

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(With a plate and 6 text-figures)

This report is based on a collection of ants received through the courtesy of Lieut.-Colonel R. B. Seymour Sewell, Director of the Zoological Survey of India, to whom my best thanks are due. The collection consists of 42 species representing five different sub-families. The majority of the collection is from the Himalayas, but there are a few specimens from the Palni Hills, South India, and from Calcutta. In the report besides recording several of the well-known older species I have included descriptions of six new species.

I have followed here Bingham's nomenclature as used in his volume on Hymenoptera in the Fauna of British India Series, and have given only a few of the synonyms for the purpose of reference. The arrangement into different sub-families and tribes, however, is based on Emery's recent classification as expounded in the *Genera Insectorum*.

Sub-family : DORYLINÆ Leach.

Dorylus orientalis Westw.

1835. *Dorylus orientalis*, Westwood, *Proc. Zool. Soc. London*, v, p. 72.

1903. *Dorylus orientalis*, Bingham, *Faun. Brit. Ind., Hymenoptera*, ii, p. 4, fig. 7.

1910. *Dorylus (Alaopone) orientalis*, Emery, *Genera Insectorum, Hymenoptera*, p. 10.

This species, as was pointed out by Lefroy,² is subterranean in habits and attacks plants at their bases or roots. Workers of this species were found by Lancaster on Dahlias and on a fungoid pest of Larkspur in the Agri-Horticulture Garden, Alipore, Calcutta, while their nests in the earth under bricks and stones, were noted by Rothney³ in Barrackpore. Wheeler⁴ recorded many workers from Lobo (alt. 400 ft.) in rotten wood. The species has a wide distribution in India, Burma, and has also been recorded from the Malay Peninsula, Borneo, Sumatra and Java.

Sub-family : PONERINÆ Lepeletier.

TRIBE : ODONTOMACHINI Mayr.

Odontomachus punctulatus Forel.

1900. *Odontomachus monticola*, race *punctulatus*, Forel, *Journ. Bombay Nat. Hist. Soc.*, xii, p. 58.

1903. *Odontomachus punctulatus*, Bingham, *op. cit.*, p. 49, fig. 28.

The collection includes a single specimen of this species which was collected by Dr. F. H. Gravely at Kalimpong (alt. 4,500 ft.), Darjeeling district, Eastern Himalayas. The species occurs also in Sikkim and Upper Burma.

¹ Read before the Fifteenth Session of the Indian Science Congress held at Calcutta, 1928.

² Lefroy, H. M., *Indian Insect Life*, p. 227 (1909).

³ Rothney, G. A., *Trans. Ent. Soc. London*, i, p. 109 (1903).

⁴ Wheeler, W. M., *Rec. Ind. Mus.*, viii, p. 233 (1913).

Lobopelta diminuta Smith.1857. *Ponera diminuta*, Smith, *Journ. Linn. Soc., London*, ii, p. 69.1903. *Lobopelta diminuta*, Bingham, *op. cit.*, p. 61.1911. *Lobopelta diminuta*, Emery, *op. cit.*, p. 103.

A nest of this species, containing eggs, larvæ, cocoons, males and workers, was found below the grasses in the College compound at Ballygunge, Calcutta. The eggs are minute and oval in shape. The larvæ are elongated and possess a long narrow and curved neck terminating in a head provided with mouth parts. The larvæ are enclosed within a thin chitinous integument bearing a number of tubercles and minute hairs. The cocoons are torpedo-shaped and covered with a tough, brown membrane.

The ants of this species have the habit of moving their camps from place to place. At the time of changing the nests the workers seize the larvæ and the cocoons in their mouth and remove them; while the males follow the workers to their new home. The eggs owing to their minute size, cannot be carried like the larvæ from place to place, but owing to their sticking to the body of the larvæ, they are carried along with them.

The adult is black, while the colouration of the callows varies from yellowish brown to reddish brown. These ants, as has been pointed out by Rothney, march in long lines, two deep.

Several examples of the species were collected by the late Lord Carmichael from Singla, (alt. 1500 ft.), Darjeeling district. The species is common in Bengal and occurs throughout India with the exception of the Punjab and the dry desert portions of Central India; it has also been recorded from the Malayan region.

Lobopelta pequeti Er. André.1887. *Lobopelta pequeti* E. Andréa, *Rev. d'Ent.*, vi, p. 292.1903. *Lobopelta pequeti*, Bingham, *op. cit.*, p. 71, fig. 37.1911. *Leptogenys (Lobopelta) pequeti*, Emery, *op. cit.*, p. 104.

These ants travel in files, two abreast. Wroughton¹ records that the species makes stridulatory sounds which are audible when the ear is placed close to them. Aitken observes also that sounds produced by the ants of this species are loud enough to be audible to the human ear. Bingham, however, doubts their ability to make any sounds, but I have observed that the sound is actually produced by the rubbing one against the other of the anterior and posterior portions of the gaster near its constriction.

TRIBE: PONERINI Forel.

Diacamma scalpratrum (Smith).1858. *Ponera scalpratrum*, Smith, *Brit. Mus. Cat.*, vi, p. 84.1903. *Diacamma scalpratrum*, Bingham, *op. cit.*, p. 77, fig. 40.1911. *Diacamma scalpratrum*, Emery, *op. cit.*, p. 65.

Bingham records the species from Burma and Tenasserim; Long and Jewett found it in Assam, and Forel reports it from Sikkim. Examples of species were collected by the late Lord Carmichael at Sukna (alt. 100 ft.), Darjeeling district.

Diacamma vagans (Smith).1861. *Ponera vagans*, Smith, *Journ. Linn. Soc. Zool. London*, v, p. 103.1903. *Diacamma vagans*, Bingham, *op. cit.*, p. 81, fig. 43.1911. *Diacamma vagans*, Emery, *op. cit.*, p. 67.

A colony of about 20 workers and a male was obtained during the month of July 1927 from a nest beneath a mango tree at Calcutta. The nest was composed of loose moist earth and was four or five inches deep. It is interesting to note that, although the nest contained larvæ and cocoons, no females were found in it. A few workers of *Platythyrea victoriz* Forel, were, however found within the nest associated with the inmates, it is possible that they might have been 'thieve-ants'.

The species is very common in Bengal and is found throughout India, Burma, and Ceylon; it has also been recorded from the Malayan sub-region.

¹ Wroughton, R. C., *Journ. Bombay Nat. Hist. Soc.*, vii, p. 27 (1892).

Brachyponera luteipes (Mayr).

1862. *Ponera luteipes*, Mayr, *Verh. Zool.-bot. Ges. Wien*, xii ; p. 722.

1903. *Brachyponera luteipes*, Bingham, *op. cit.*, p. 101.

The species is widely distributed in India. Specimens were collected by Dr. B.N. Chopra from Eagles Crag, Kurseong (alt. 5,000 ft.), Eastern Himalayas.

Sub-family : MYRMCINÆ Lepeletier.

TRIBE : PSEUDOMYRMINI Forel.

Sima rufonigra (Jerdon).

1851. *Eciton rufonigra*, Jerdon, *Madras Journ. Lit. Sci.*, xvli ; p. 111.

1903. *Sima rufonigra*, Bingham, *op. cit.*, p. 108.

1921. *Sima rufonigra*, Emery, *op. cit.*, p. 23.

The workers of this species differ from those of other Indian species of the genus in possessing ocelli and in having the 2nd node of the pedicel, the abdomen and the head black ; the thorax and the 1st joint of the pedicel vary in colour from light orange-yellow or orange-red to brick-red. A few specimens, however, collected in Calcutta with the typical workers were found to possess a second node that was concolorous with the first node and the thorax, the colouration being yellowish orange. In other individuals both the nodes are black like the abdomen, and in all other respects these examples resemble the typical form. On measuring those forms, which exhibited variation in the colour of the nodes, it was found that they were more or less of the same length. They occupied different nests, and it is, therefore, improbable that the difference in colour was due to age. I consider these forms to be simply varieties of the species. The species, including the varieties noted above, inhabits tree-trunks and tends Coccids. Their sting is severe and the pain caused by it lasts for several hours. In Calcutta they are always mimicked by the spider, *Sallicus pataleoides* Camb. Sometimes they come into houses and attack honey, of which they are very fond.

S. rufonigra is distributed throughout the limits of India and the late Lord Carmichael obtained it at an altitude of 1,000 ft. at Sukna, Darjeeling district. It has also been reported from North-East Assam at Kobo (alt. 400 ft.).

TRIBE : PHEIDOLINI Emery.

Sub-tribe : Stenammini Ashmead emend Emery.

Aphænogaster smythiesi Forel.

1902. *Stenammina* (*Aphænogaster*) *smythiesi* Forel, *Rev. Suisse. Zool.*, x, p. 222.

1903. *Aphænogaster smythiesi*, Bingham, *op. cit.*, p. 276.

1921. *Aphænogaster* (*Attomyrma*) *smythiesi*, Emery, *op. cit.*, p. 59.

A. smythiesi has been recorded from the North-West Himalayas and from the East Himalayas area. I found specimens of it in the Indian Museum collection from Senchal (alt. 8,000 ft.) Darjeeling district.

Aphænogaster (*Attomyrma*) *annandalei*, sp. nov.

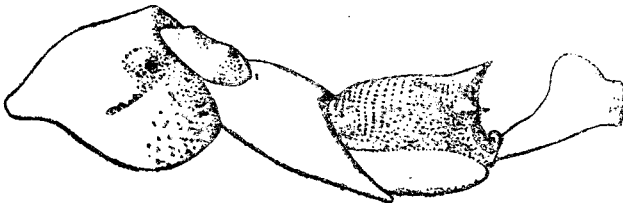


FIG. 1. *Aphænogaster* (*Attomyrma*) *annandalei*, sp. nov. × 30. Side view of the thorax and the first node.

WORKER.

Length, 8 mm., head oval, longer than broad, convex at the occiput, sides anteriorly straight, gradually narrowing posteriorly but not forming a neck; eyes small, round, placed a little in front of the middle of the sides of the head; mandibles triangular, with two apical teeth and masticatory border dentate; antennal carinæ convergent posteriorly; antennal and clypeal hollows deep and confluent; frontal area small, depressed; clypeus posteriorly produced between the bases of the antennæ, convex in the middle, its anterior border rounded; antennæ slender, the scape passing beyond the top of the head by about one-fourth of its length, joints of the flagellum longer than broad. Pronotum rounded on sides, convex above, anteriorly produced into a very short neck; pro-mesonotal suture distinct; mesonotum long, narrow, its anterior portion raised into an oval area as in *A. smythiesi* Forel, the posterior portion sloping back; meso-metanotal suture well marked; thorax emarginate at the latter suture; basal portion of the metanotum elongate anteriorly convex from side to side, the portion between the metanotal spines and just in front of them longitudinally excavated, apical portion slightly concave; metanotal spines short, acute and directed upwards; the first node petiolate, rounded above; the second node sub-conical and higher than the first; abdomen oval.

Mandibles punctate and longitudinally striate; the head feebly reticulate-rugose, anteriorly longitudinally striate; anterior basal portion of the metanotum distinctly striate transversely; nodes and abdomen smooth and shining.

A few erect hairs scattered on head and thorax; hairs more abundant on abdomen and nodes; pubescence absent.

Head and thorax dark reddish brown, mandibles yellowish brown, antennæ brownish yellow, legs pale yellow.

REMARKS.—The species is allied to *A. cristata* Forel, but is sharply marked off from the latter in having transverse striations on the metanotum and in the absence of a transverse medial impression in the mesonotum. Further, the head in this species is not constricted behind the eyes as in *A. cristata*. It differs from *A. smythiesi* in the outline of the head.

Types collected by the late Dr. N. Annandale from Simla (alt. 7,000 ft.) Western Himalayas, in the collection of the Zoological Survey of India, Indian Museum, Calcutta.

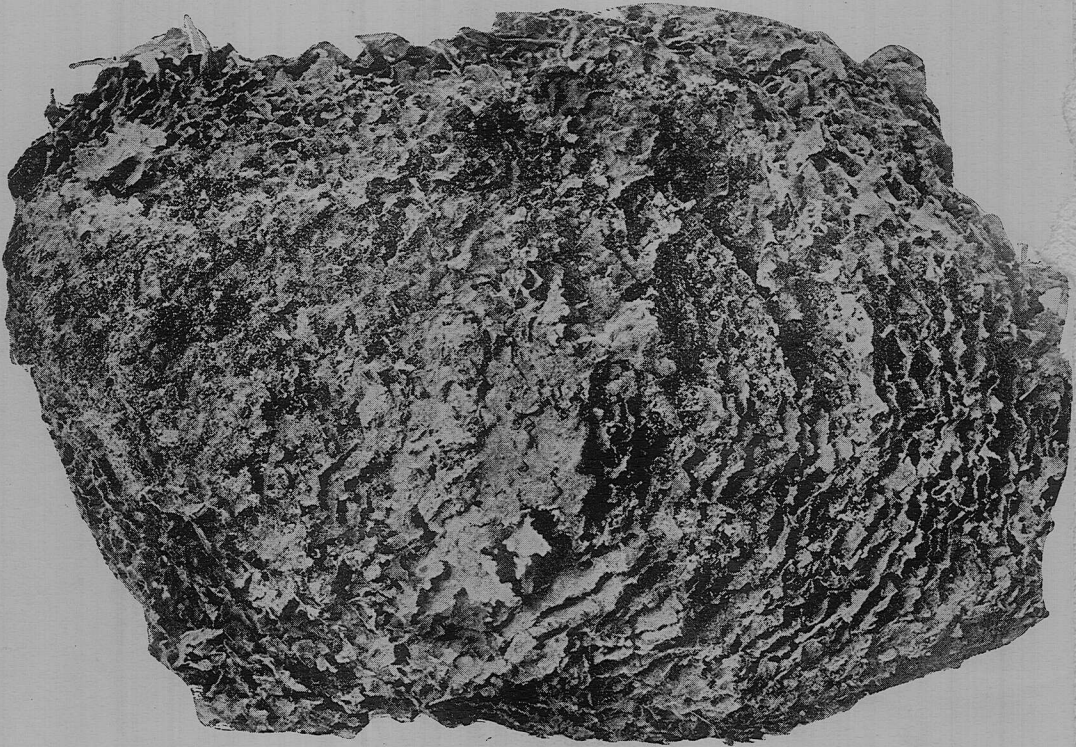
TRIBE : MYRMICARIINI Forel.*Myrmicaria brunnea* Saunders.

1841. *Myrmicaria brunnea*, Saunders, *Trans. Ent. Soc. London*, iii, p. 57.

1903. *Myrmicaria brunnea*, Bingham, *op. cit.*, p. 118.

1922. *Myrmicaria brunnea*, Emery, *op. cit.*, p. 122.

Three nests of this species were found in the College compound, Ballygunge, Calcutta. The nests were situated at the bases of trees a few yards off a tank. The ground was soft, moist and shaded from the direct rays of the sun by the trees. The nests were tenanted by populous colonies including males, females and many hundreds of workers, and must have been in existence on the same spot for several years. Rothney noted a colony occupying a spot for twenty years. In the year 1927 during the rains I excavated a nest which occupied an area of approximately four square feet and was two feet in depth. The nest had a single outlet but had several galleries inside. In the furthest recesses of the nest, very near the chamber containing the ant larvæ, were located a few termites' nests. Each termite's nest contained a few termite workers and had a fungus garden in it. The galleries of the nests of these two distinct species were in communication with one another. The close proximity of the termites' nest to the larval chamber of the ants suggests the possibility that the ant-larvæ enjoyed the benefit of having food, in the form of termites, within easy access, and the termites, in their turn, enjoyed protection from other enemies owing to their being placed within the ants' nest. On the other hand, the possibility that the ant-larvæ derived benefit from the fungus garden cannot be ignored. As, however, the termitophagus habits of *M. brunnea* have not been observed and the fungus garden has not been found in other nests, it is not possible to lay down the exact relationships between these two species.



Nest of *Cremastogaster sorror* Forel.

An incident, which strongly bears out the termitophagus and predatory habits of *Lobopelta pequeti* and their behaviour towards *M. brunnea* may, however, be mentioned in this connection. A few days after the excavation had been carried out, I observed that the nest, with the exception of a few workers, who vainly tried to rebuild it, had been deserted. In the meanwhile very near this nest a small colony of *Lobopelta pequeti* was seen to build a temporary nest, which was superficially covered over by grasses and contained their eggs, larvæ and cocoons. Some of the workers of *L. pequeti* had made their way into the demolished nest of *M. brunnea* and were found escaping from the nest with termites and larvæ of *M. brunnea* in their mouths. The workers of *L. pequeti* in this way carried out systematic depredations into the nests of *M. brunnea*. The peculiarity was that the latter apparently tolerated the presence of *L. pequeti*, and neither offered any resistance to them, nor made any counter reprisals on their enemies' nests, of the existence of which they were fully aware. It is clear from the behaviour of *M. brunnea* that this species is naturally timid and is not fond of termites as food, as otherwise they would have eaten them up long before the workers of *L. pequeti* made their appearance on the scene.

The species occurs in Bengal, Burma and Ceylon, and has been recorded from Borneo and Sumatra.

TRIBE : CREMATOGASTRINI Forel.

Cremastogaster subnuda Mayr.

1878. *Cremastogaster subnuda*, Mayr, *Verh. Zool-bot. Ges. Wien*, xxviii, pp. 680, 682.
 1903. *Cremastogaster subnuda*, Bingham, *op. cit.*, p. 129.
 1922. *Cremastogaster (Acrococelia) brunnea* subsp. *subnuda*, Emery, *op. cit.*, p. 149.

Cremastogaster subnuda has been reported from different parts of India (except in the dry desert parts), Assam, Burma, Tenasserim and Ceylon. In the Indian Museum collection the species is represented by two specimens from Neutral Saddle (alt. 5,000 ft.), Palni Hills, South India, collected by Dr. S. W. Kemp on September 13, 1922.

Cremastogaster politula (Mayr.).

1902. *Cremastogaster subnuda* race *politula* Forel, *Rev. Suisse Zool.*, x, p. 207.
 1903. *Cremastogaster politula*, Bingham, *op. cit.*, p. 131.
 1922. *Cremastogaster (Acrococelia) politula*, Emery, *op. cit.*, p. 150.

The species was found living in association with aphids on the plant *Lousinia alba* at Ballygunge.

The distribution of the species is Bengal, Assam and Upper Burma.

Cremastogaster soror Forel.

1902. *Cremastogaster soror*, Forel, *Rev. Suisse Zool.*, x, p. 200.
 1903. *Cremastogaster soror*, Bingham, *op. cit.*, p. 134.
 1922. *Cremastogaster (Oxygyne) soror*, Emery, *op. cit.*, p. 157.

A big nest of this species was found on the trunk of the tree, *Grevillea robusta*, Cunn, at Ballygunge in the month of July, 1927. The nest was situated nearly 12 feet above the ground and was attached to one side of the stem. Its colour resembled so closely that of the tree that it was at first mistaken for the stump of a branch of the tree and it was only by following the ants that the nest was detected. The nest was made of a papery substance intermixed with vegetable fibres, clay and sand debris (Plate). Prof. Hans Molisch of Vienna, to whom I had the pleasure of sending a portion of the dried nest, kindly informed me that the nest was chiefly composed of a fungus. It contained an enormous number of galleries and had numerous exits in the form of pores on the side facing the tree trunk. Although the nest was exposed to the rain, the interior of the nest was perfectly dry and contained thousands of larvæ, nymphs and workers. It is of interest to note the difference in colouration between individuals of different ages. The callows are generally grey, while the adults are dark in colour. The workers were seen tending Coccids on the same tree, a little distance from the nest.

The distribution of the species is Western India, Poona, Bombay, Upper Burma and Northern Shan States. The species is also recorded from Calcutta.

TRIBE: SOLENOPSISINI Forel emend Emery.

Subtribe: Monomorini Emery.

Monomorium (Parholocomyrmex) kempii, sp. nov.

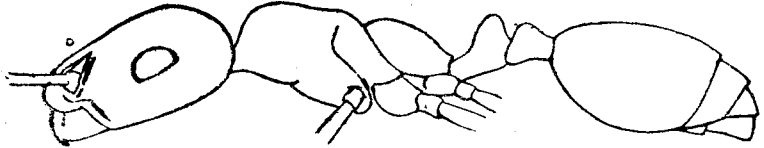


FIG. 2. *Monomorium (Parholocomyrmex) kempii*, sp. nov. × 30. Side view.

WORKER MAJOR.

Length, 3.5 mm., head rectangular, longer than broad, slightly emarginate at the occiput; eyes prominent, placed laterally at about the middle of the sides of the head, antennal carinae short; clypeus bicarinate, anteriorly truncate, posteriorly produced between the bases of the antennae; antennal and clypeal hollows confluent; mandibles toothed; antennae 12-jointed, with a three-jointed club nearly as long as the rest of the flagellum; 1st and 2nd joints of the flagellum subequal, joints 2-7 smaller than the rest. Scape clavate extending beyond the top of the head. Thorax narrower than head; pronotum convex above, its angles rounded; promesonotal suture distinct; thorax emarginate at the meso-metanotal suture; metanotum slightly gibbous and without any teeth or spines. First node petiolate, sub-conical and raised higher than the second node; second node cuboid; abdomen elongate oval. Legs moderately long. Head punctate, a few obsolete striae at its anterior end, rest of the body smooth, without any sculpture; body devoid of pubescence and hairs.

Head and nodes reddish brown; thorax yellowish brown; abdomen shining black with a metallic tint.

Worker Minor—smaller than the major worker, otherwise resembling it in all respects.

Described from several specimens collected by the late Dr. N. Annandale and Dr. S. W. Kemp from Seistan desert, Labi Baring at the bases of tamarish bushes.

Types in the collection of the Zoological Survey of India, Indian Museum, Calcutta.

Subtribe: Solenopsisini (Forel) emend Emery.

Solenopsis geminata (Fabr.)

1804. *Atta geminata*, Fabricius, *Syst. Piez.*, p. 423.

1903. *Solenopsis geminata*, Bingham, *op. cit.*, p. 158., fig. 64.

1922. *Solenopsis geminata*, Emery, *op. cit.*, p. 197.

The species is very common in India. It nests in the earth in the open fields, and swarms several times from March to October.

Phidologiton diversus (Jerdon.).

1851. *Ocodoma diversus*, Jerdon, *Madras Journ. Lit. Sci.*, xvii, p. 109.

1903. *Phidologiton diversus*, Bingham, *op. cit.*, p. 162.

1922. *Phidologiton diversus*, Emery, *op. cit.*, p. 212.

The species has a wide distribution in India and Burma and extends as far as the Malayan region. A few specimens of it were collected by Dr. S.W. Kemp at the foot of Palni Hills, South India.

TRIBE: MERANOPLINI Emery.

Meranoplus bicolor (Guérin.).

1838. *Cryptocerus bicolor*, Guérin *Cuv. Iconogr. Règn. Anim. Ins.*, iii, p. 425.

1875. *Meranoplus bicolor*, Smith, *Trans. Ent. Soc. London*, i, p. 34

1903. *Meranoplus bicolor*, Bingham, *op. cit.*, p. 168, fig. 66.

1922. *Meranoplus bicolor*, Emery, *op. cit.*, p. 228.

It is a common species in Bengal and nests in the earth. It is distributed throughout India and Burma and extends to the Malayan sub-region, but is absent from the dry plains of the North-Western Provinces, Punjab and Central India; a single worker has also been recorded from Sadiya, North-East Assam.

TRIBE : CATAULACINI Emery.

Cataulacus taprobane (Smith.)

1853. *Cataulacus taprobane*, Smith, *op. cit.*, p. 225.

1903. *Cataulacus taprobane*, Bingham, *op. cit.*, p. 123.

1922. *Cataulacus taprobane*, Emery, *op. cit.*, p. 299.

Two specimens of this species were obtained by Dr. B.N. Chopra from the bank of Mahanada River near Siliguri. This species has also been reported from Colombo, Kandy and Ceylon.

Sub-family DOLICHODERINÆ.

TRIBE : TAPINOMINI Emery.

Technomyrmex elatior (Mayr).

1902. *Technomyrmex modigliani*, Emery, race *elatior*, Forel, *Ann. Soc. Ent. Belg.*, xlv, p. 293.

1903. *Technomyrmex elatior*, Bingham, *op. cit.*, p. 302.

1912. *Technomyrmex modiglianii*, Emery, *op. cit.*, p. 44.

Examples of the species were obtained from the base of leaf-fronds of Sago plants in Calcutta. It is also found in Assam, Bhamo, Upper Burma and Southern Shan States.

Engramma Forel.¹

Engramma incisum, sp. nov.

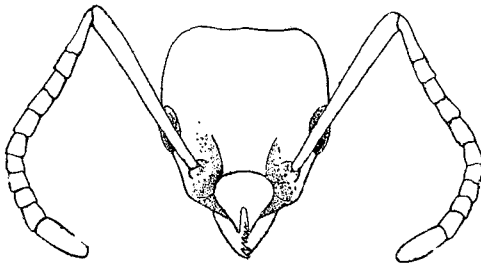


FIG. 3(a). Front view of its head.

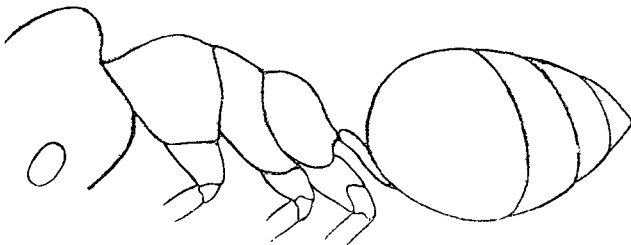


FIG. 3(b). *Engramma incisum*, sp. nov. × 30. Side view.

¹ Wheeler, W.M., *Bull. Americ. Mus. Nat. Hist.*, xlv, p. 201 (1922).

Head quadrate, nearly as broad as long, slightly emarginate behind, with the posterior end wider than the anterior. Eyes placed at about the middle of the head, round; anterior border of the clypeus distinctly incised in the middle.

Thorax arched, pronotum convex, elliptical in outline. Pro-mesonotal and meso-metanotal sutures distinct; thorax slightly emarginate at the meso-metanotal suture; basal portion of metanotum small, convex and passing by a gentle curve into the slanting apical portion. Abdomen overhanging the pedicel, punctured; pedicel without nodes.

Head, thorax and abdomen black. Legs dark reddish brown.

Types in the collection of the Zoological Survey of India, Indian Museum, Calcutta, collected by the late Dr. N. Annandale and Dr. S. W. Kemp in the Consulate Garden, Nasartabad, Seistan, in the months of November and December, 1918.

Sub-family: CAMPONOTINÆ Forel.

(*Formicinæ* Mayr in part; *Formicinæ* Lepeletier).

TRIBE: PLAGIOLEPIDINI Forel.

Acantholepis annandalei, sp. nov.



FIG. 4. *Acantholepis annandalei*, sp. nov. × 30. Its side view.

WORKER.

Length, 2 mm. Head sub-quadrate, nearly as long as broad; occiput not emarginate; antennal and clypeal hollows confluent; antennal carinae sub-parallel, short; clypeus triangular, convex, carinate in the middle; antennae 11-jointed, the scapes extending beyond the posterior corners of the head by one-half their length; maxillary palpi 6-jointed; labial palpi 4-jointed; eyes prominent, about the middle of the head; ocelli present. Pronotum convex, circular in outline when viewed from above, pro-mesonotum viewed dorsally obvate; pro-mesonotal suture distinct; mesonotum convex from side to side, wider than long. Thorax deeply emarginate at the meso-metanotal suture. Scutellar region distinct and dorsally provided with two blunt tubercles. Basal portion of the metanotum with two short, stout, conical and blunt spines thick at the base and directed backwards and upwards; apical portion with small lateral blunt tubercles; node squamiform, shallowly emarginate at its upper surface and with two minute straight spines. Gaster broadly oval. Body black, abdomen shining, pubescence absent, with a few scattered erect hairs on the head and the posterior end of abdomen.

Types in the collection of the Zoological Survey of India, Indian Museum, Calcutta, collected by the late Dr. N. Annandale from Simla (alt. 7,000 ft.), Western Himalayas, on May 12 and 13, 1923.

Acantholepis frauenfeldi (Mayr).

1855. *Hypoclinea frauenfeldi*, Mayr, *op. cit.*, p. 378.

1894. *Acantholepis frauenfeldi*, Forel, *Journ. Bombay Nat. Hist. Soc.*, viii, pp. 411, 413.

1903. *Acantholepis frauenfeldi*, Bingham, *op. cit.*, p. 316.

1925. *Acantholepis frauenfeldi*, Emery, *op. cit.*, p. 25.

This species is chiefly confined to the hills but has also been found at Barrackpore, near Calcutta. The specimens under report are from Simla (alt. 7,000 ft.), Western Himalayas.

Plagiolepis longipes (Jerdon).

1851. *Formica longipes*, Jerdon, *op. cit.*, p. 122.
 1894. *Plagiolepis longipes*, Forel, *op. cit.*, p. 414.
 1903. *Plagiolepis longipes*, Bingham, *op. cit.*, p. 320, fig. 97.
 1925. *Plagiolepis (Anoplolepsis) longipes*, Emery, *op. cit.*, p. 17.

The species is cosmopolitan in its distribution. It is believed that it has been disseminated by commerce throughout the tropical regions of the old world. It lives in nests tunnelled under stones, and is common in all parts of India except in the dry portions of the North-Western Provinces, Punjab and Central India. A single worker from Misty Hill, east side of Dawna Hills, was recorded in the results of the Abor expedition by Wheeler.

TRIBE: PRENOLEPIDINI Forel.

Prenolepis longicornis (Latr).

- 1802 *Formica longicornis*, Latreille, *Hist. Nat. Fourm.*, p. 113.
 1894. *Prenolepis longicornis*, Forel, *op. cit.*, pp. 406, 407.
 1903. *Prenolepis longicornis*, Bingham, *op. cit.*, p. 326.
 1925. *Prenolepis (Paratrechina) longicornis*, Emery, *op. cit.*, p. 217.

The species is the common ant of Calcutta and lives in the crevices of the buildings. The workers may be found throughout the day prowling round food material and carrying away food to their nests. They generally change their nests following any sudden changes of weather, especially during the rains. When changing the nest, they move in columns with pupæ in their mouths and accompanied by the Gryllide *Myrmecophila prenolepidis*, a species of small beetle and the big female ants who have cast off their wings. This Myrmecophilous gryllid was observed by Assmuth at Bombay; but the Myrmecophilous beetle mentioned here has not been noted before in their company; unfortunately I have not been able to identify it. It is interesting to note that the beetle does not accompany the ants when they go out foraging. It lives within the nest of the ant but follows them spontaneously when the latter change their nest. Several beetles and *M. prenolepidis* occur in any colony of the ants.

The species is cosmopolitan in distribution and is quite common in Bengal and in other parts of India.

TRIBE: ECOPHYLLINI Forel.

Ecophylla smaragdina (Fabr).

1775. *Formica smaragdina*, Fabricius, *Syst. Ent.*, p. 828.
 1894. *Ecophylla smaragdina*, Forel, *op. cit.*, p. 400.
 1903. *Ecophylla smaragdina*, Bingham, *op. cit.*, p. 311.
 1925. *Ecophylla smaragdina*, Emery, *op. cit.*, p. 52.

The ants of this species are very common on trees and shrubs in Bengal and also occur in other parts of India. They build nests of leaves fastened together by silk spun by their larvæ. They are gregarious in their habits, and often several colonies, each having a separate nest, may be found living amicably together on the same tree. The species is peculiar in having the females of the same nest differently coloured. The colourations vary from emerald-green to pale yellow.

They are partial to insect-food and the workers may be seen carrying living grubs and dead insects to their nests. A number of larvæ of moths and butterflies have also been found living in their nests. Often a group of both the mature and immature forms of the insect *Hilda bengalensis* Dist. (family *Fulgoridæ*), lives in association with these ants on the shoots of plants. The ants lick up the cellular secretion on the bodies of these insects and in return protect them. The ants of this species are much feared for their bites. In Calcutta it is mimicked by the spider *Amyciea forticeps* (Cambr.), which was first observed by Ridley in Malaya in its company. The spiders have two prominent black spots on their abdomen and being of yellow colour simulate the appearance of the ants. The nature of the mimicry is also mentioned by Hingston.¹ Both male and female spiders occur on trees inhabited by the ants.

¹ Hingston, R. W. G., *Proc. Zool. Soc. London*, ii, pp. 844-848 (1927).

They move singly along, parallel with the marching column of the ants, but keeping a little off their lines, possibly with the object of waylaying a solitary ant. While watching them, I observed a female spider with an ant caught between its limbs descending from a tree by hanging a line. When I put an ant and a spider together in a small collecting tube, the ant attacked the spider and caught it by its leg. The spider, however, warded off the attack with the help of its chelicerae and ultimately entrapped its opponent by spinning a web round it.

The genus is confined to the tropical region of the old world and ranges over the Indo-Malayan, Papuan and Ethiopian regions but does not occur in Madagascar. *O. smaragdina* is widely distributed in India. Lord Carmichael's collection contains specimens from Singla (alt. 1,500 ft.), Darjeeling district. Wheeler (1913) also records three workers from Dibrugarh, North-East Assam, and Kobo (alt. 400 ft.) in the Abor country.

TRIBE: CAMPONOTINI Forel.

Group: TORVUS—EXTENSUS.

Camponotus angusticollis (Jerdon).

1851. *Formica angusticollis*, Jerdon, *Madr. Journ. Lit. Sci.*, xvii, p. 120.

1892. *Camponotus angusticollis*, Forel, *op. cit.*, pp. 226, 235.

1903. *Camponotus angusticollis*, Bingham, *op. cit.*, p. 366, figs. 115, 116.

1925. *Camponotus angusticollis*, Emery, *op. cit.*, p. 89.

The species is black in colour and is known from Western and Central India, Assam and Burma. An example of this species was collected at Parambikulam (alt. 1,700-3,200 ft.), Cochin State, by Dr. F. H. Gravely in September 1914.

The species is a variable one, and the variety *sanguinolentus* Forel with yellowish red head and yellowish red thorax and black abdomen is recorded from Assam and Burma by Bingham. This variety is, however, not uncommon in other parts of India; specimens of this variety were collected at Kalimpong (alt. 600-4,500 ft.), Darjeeling district, Eastern Himalayas, by Dr. F. H. Gravely during the months of April and May, 1925.

Camponotus nicobarensis Mayr.

1865. *Camponotus nicobarensis*, Mayr, *Novara Reise. Formicid.*, p. 31.

1903. *Camponotus nicobarensis*, Bingham, *op. cit.*, p. 364.

1925. *Camponotus (Tanaemyrmex) nicobarensis*, Emery, *op. cit.*, p. 95.

The distribution of the species is Nicobars, Cochin-China, Burma and Assam. Lord Carmichael's collection includes specimens from Singla (alt. 1,500 ft.), Darjeeling district and Dr. F. H. Gravely obtained others from Kalimpong (alt. 500-4,500 ft.), Darjeeling district, Eastern Himalayas. Wheeler (1913) records many workers and a single dealated female from Kobo (alt. 400 ft.) under bark, Rotung (alt. 1,400 ft.) in dead bamboo and Dibrugarh, North-East Assam.

Camponotus mitis (Smith).

1858. *Formica mitis*, Smith, *Brit. Mus. Cat.*, vi, p. 20.

1892. *Camponotus maculatus* race *mitis*, Forel, *op. cit.*, pp. 230, 242.

1903. *Camponotus mitis*, Bingham, *op. cit.*, p. 355, figs. 112, 113.

1925. *Camponotus (Tanaemyrmex) variegatus*, Emery, *op. cit.*, p. 95.

The species has been recorded from different parts of India and Burma, and extends through the Indo-Malayan region to New Guinea. Several specimens were collected by the late Lord Carmichael at Simla (alt. 1,500 ft.) in 1913.

Group: COMPRESSUS—SYLVATICUS.

Camponotus compressus (Fabr).

1787. *Formica compressus*, Fabricius, *Mant. Ins.*, i, p. 307.

1903. *Camponotus compressus*, Bingham, *op. cit.*, p. 351, Fig. 109.

1925. *Camponotus (Tanaemyrmex) compressus*, Emery, *op. cit.*, p. 98.

The species occurs plentifully in Bengal and is also reported from other parts of India, Burma and Ceylon. It ranges from plains to mountains to an

altitude of about 7,000 feet. Like most of the widely distributed ants, it exhibits remarkable variations in colour and size and several sub-species and races have been recognised. The race *compressus* is black in colour, and is the common house ant in Calcutta. It dwells in the crevices of our buildings and lives upon our food. The same race may be found on trees feeding upon the products of ant-cattle, such as Coccids, Fulgorids and Membracids.

The individuals inhabiting trees generally nest in the soil round the roots of the tree, and form, like those living in our houses, big colonies. They swarm generally towards the evening in the months of June and July.

Two females of the species with enlarged abdomens were found living together in a common nest at the base of a palm tree. The nest contained also a few cocoons, but there was no food stored in it. The nest was situated a few inches below the ground and had no outlet. Apparently the ants together with the cocoons were living buried in the ground. The presence of the cocoons in the same nest is interesting, as it suggests the particular method adopted by the queen in founding a colony. It is probable that the queen would first rear a set of workers that hatch out of these cocoons, and these workers in turn would rear the following broods laid by the queen and help her in founding the colony. The association of two queens at the time of founding new colonies, in the same nest, is of special interest as such occurrence is seldom noticed.

A race which I cannot refer to any previously described form was found at the foot of Palni Hills (alt. 500-800 ft.), South India, by Dr. S. W. Kemp in 1922. I refrain from giving it a name as I am not definite of its being a distinct and undescribed race. I, however, give a description of it below :—

Camponotus compressus, a new race.

The head of the worker 18 mm. long, of this race differs from *Camponotus compressus* Fabr. in being rectangular in shape and in the absence of prominent occipital lobes. The scape extends greatly beyond the top of the head and is black in colouration except at its point of insertion to the head. The flagellum is long and castaneous. In other respects the head resembles that of *C. compressus*. The thorax is yellowish-brown and forms a regular arch as in *C. compressus*.

The abdomen differs from that of *C. compressus* in not having a shining appearance; it is reddish-brown in colour, and each of its segments is shaded transversely with a fuscous tinge. The posterior margin of the abdominal segments is testaceous. The legs are long, prismatic and spined beneath. They are characterised by having the longitudinal edges of their dorsal surface raised above so as to form a longitudinal channel along the dorsal surface of each leg. The femur is honey yellow and tibiæ and tarsi yellowish brown.

Camponotus rufoglaucus (Jerdon).

1851. *Formica rufoglaucus*, Jerdon, *op. cit.*, p. 124.

1892. *Camponotus rufoglaucus*, Forel, *op. cit.*, pp. 226, 237.

1903. *Camponotus rufoglaucus*, Bingham, *op. cit.*, p. 363.

1925. *Camponotus (Myrmoseris) rufoglaucus*, Emery *op. cit.*, p. 105.

Camponotus rufoglaucus exhibits great variation in colour. In most forms the head is blood-red; in a few, however, it is black. In all the forms the abdomen is pilose.

The species nests in ground and the workers forage singly on small shrubs.

The distribution of the species is Calcutta, Assam, Burma, Central India, Travancore and Ceylon.

Camponotus singularis (Smith). *Brit. Mus. Cat.*,

Hymenoptera, vi, p. 27.

The ant described as *C. singularis* (Smith) is, as Bingham has shown, only a variety of *C. camelinus* (Smith). The head of the variety is blood-red in colour. Examples of this variety were collected from Kalimpong at altitudes varying from 600 to 4,500 feet, Eastern Himalayas and from Singla (alt. 1,500 ft.), Darjeeling district, by Dr. F. H. Gravely and the late Lord Carmichael respectively.

Camponotus sericeus (Fabr.).

1798. *Formica sericeus*, Fabricius, *Ent. Syst. Suppl.*, p. 279.
 1892. *Camponotus sericeus*, Forel, *op. cit.*, pp. 223, 231.
 1903. *Camponotus sericeus*, Bingham, *op. cit.*, p. 376.
 1925. *Camponotus (Orthonotomyrmex) sericeus*, Emery, *op. cit.*, p. 125.

The workers, having black sericeous bodies, are generally found in Calcutta during the rains. They nest in hard soil and form large, well populated colonies. The nest opens to the outside by a small circular aperture, the opening being flush with the ground. The interior of the nest could not be explored as earth loosened during digging choked up the hole of the nest and obliterated its view. The foraging habit of the workers is similar to that of *Prenelopsis (Nylanderia) imparis* (Say), and their abdomen also becomes distended as in *P. imparis* owing to storage of honey in their crops.

A row of nests was discovered by the side of a road at Ballygunge, Calcutta. On the opposite side of the road nearly 30 feet from the nests, stood a *Ficus religiosa* with new leaves blossoming out. The workers coming out of the nests crossed the road and went up the tree trunk and its branches in search of food. On their return journey they made their way to their respective nests with all possible speed. Their abdomens were considerably distended, the sclerites of the abdomen being separated and the white intersegmental membranes exposed. During the return journey, if the head of a worker with the distended abdomen is gently pressed or their mandibles are drawn apart in an attempt to bite, a big drop of a clear transparent fluid with a sweet taste and smell runs out of their mouth. It is apparent that the liquid collected by them from the tree was meant for feeding others within the nest.

Two different forms of the species are found in Calcutta. In one the whole body is black and the abdomen is provided with a silky pubescence. In the second form, which is considered as a variety of the first, the head is blood-red in colour and the rest of the body black. Further, in this variety the posterior portion of the head and the pronotum are granular and the abdomen is devoid of the silky pubescence. The excavation of the posterior face of the metanotum of the variety is also slightly different from the type. The tibiae and the antennæ of this variety are castaneous red. The rest of the characters are similar. Bingham reports the variety with the blood-red head from Burma and Ceylon. The species is fairly widely distributed over India and Burma.

Polyrachis thrinax Roger.

1863. *Polyrachis thrinax*, Roger, *Berlin. Ent. Zeit.*, vii, p. 152.
 1893. *Polyrachis thrinax* Forel, *op. cit.*, pp. 18, 28.
 1903. *Polyrachis thrinax*, Bingham, *op. cit.*, p. 410, fig. 143.
 1925. *Polyrachis (Myrmothrinax) thrinax*, Emery, *op. cit.*, p. 183.
 In the Indian Museum collection this species is represented from Calcutta.

Polyrachis armata (Le Guill.).

1841. *Formica armata*, Le Guill., *Ann. Soc. Ent. France*, x, p. 313.
 1903. *Polyrachis armata*, Bingham, *op. cit.*, p. 393, fig. 132.
 1925. *Polyrachis (Myrmhopla) armata*, Emery, *op. cit.*, pp. 190, 192.
 The distribution of the species is Assam, Burma extending to Borneo, Java and the Philippines. Individuals of this species is recorded from Singla (alt. 1,500 ft.), Darjeeling district, collected by the late Lord Carmichael.

Polyrachis simplex Mayr.

1862. *Polyrachis simplex*, Mayr, *op. cit.*, p. 682.
 1903. *Polyrachis simplex*, Bingham, *op. cit.*, p. 394.
 1925. *Polyrachis (Myrmhopla) simplex*, Emery, *op. cit.*, p. 196.
 Several specimens and a nest, containing Coccids inside it were collected by Dr. F. H. Gravely from Durgapur Salt Lake in the vicinity of Calcutta. The nest consisting of a single chamber and made up of silky threads woven together was suspended on a tree. The species is widely distributed in India.

Polyrachis rastrata Emery.

1889. *Polyrachis rastrata*, Emery, *Ann. Mus.-Civ. Stor. Nat. Genova*, xxvii, p. 517.

1903. *Polyrachis rastrata*, Bingham, *op. cit.*, p. 412.

1925. *Polyrachis (Cunpomyrma) rastrata*, Emery, *op. cit.*, p. 179.

The species is known from Tenasserim, Dr. S. W. Kemp during the Abor expedition in 1911 obtained several workers of the species in association with Aphids from Dibrugarh.

Polyrachis mayri Roger.

1863. *Polyrachis mayri*, Roger, *Berlin Ent. Zeit.*, vi, p. 7.

1903. *Polyrachis mayri*, Bingham, *op. cit.*, p. 404, fig. 140.

1925. *Polyrachis (Myrma) mayri*, Emery, *op. cit.*, p. 29.

The distribution of the species is Bengal, Sikkim, Kanara, Travancore, Ceylon, Tenasserim and Burma. Lord Carmichael collected this species from Singla (alt. 1,500 ft.) Darjeeling district, and Wheeler in 1913 recorded several workers from Upper Rotung (alt. 2,000 ft.).

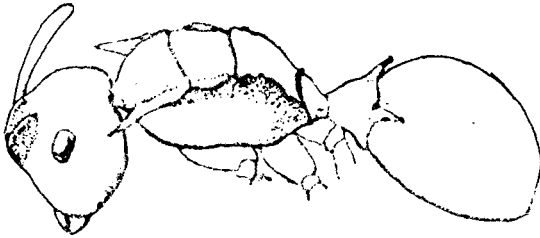
Polyrachis (Myrma) hemiopticoides, sp. nov.

FIG. 5. *Polyrachis (Myrma) hemiopticoides*, sp. nov. $\times 11$. Its side view.

WORKER.

Length 7 mm., head oval, convex above in the posterior region and wider behind; antennal carinae prominent, long and sinuate; eyes prominent protruding, posteriorly slightly truncate, placed at the posterior third of the side of the head. The scape extending beyond the top of the head and nearly reaching the pro-mesonotal suture.

Lateral margins of the thorax sharply marginate, the sides of the thorax vertical. Thorax seen from the side forming a continuous flat arch. Pronotum wide, convex above and round, and on each side is provided with a long and acute spine lamelliform at its base, directed forward and outward and continuous behind with the lateral carinae. The lateral carinae projecting and notched at the pro-mesonotal and meso-metanotal sutures. Pro-mesonotal and meso-metanotal sutures distinct, mesonotum broader than long and unarmed with either spines or teeth. Basal portion of the metanotum convex, gently sloping down posteriorly, its postero lateral corners with very small blunt tubercles; apical portion of metanotum concave.

The node of the pedicel trapeziform when viewed from above, its posterior lateral angles surmounted by spines, two very small teeth at the base of these spines on the outerwards.

Body jet-black, polished, highly shining; sparse hairs on the body. Gaster very minutely punctate, mandibles feebly striate. Femurs, trochanters, tibiae, castaneous; whole of the tarsi and the extremities of the tibiae and the femurs fuscous; flagella fuscous.

REMARKS:—The species closely resembles *Hemioptica aculeata* (Mayr.). It differs from the latter in having tarsi black and in the form of spines on the pronotum and in the absence of sericeous pubescence on the body.

Types in the collection of the Zoological Survey of India, Indian Museum, Calcutta, collected in Calcutta by the late Mr. C. A. Paiva, Entomological Assistant, Zoological section of the Indian Museum.

TRIBE: LASIINI Ashmead emend Emery.

Myrmecocystus setipes (Forel.).

1894 *Myrmecocystus viaticus* Fabr race *setipes*, Forel, *op. cit.*, p. 401.

1905. *Myrmecocystus setipes*, Bingham, *op. cit.*, p. 312, fig. 94.

1925. *Myrmecocystus* (*Cataglyphus*) *viaticus*, Emery, *op. cit.*, p. 266.

The American representatives of the genus are known as honey ants; the workers which store up honey in their crops and act in this way as living store-houses of the colony, have their abdomens inflated and are known as repletes. The Indian species is so far not known to form any replete workers and they generally feed upon vegetable seeds and dead insects. The distribution of the species in India is interesting. The species is reported by Rothney¹ as not occurring in Bengal but is found in Bihar, the United Provinces and the Punjab. The species though rare in Bengal is not altogether absent. I have collected it at Krishnagar, Bengal. It extends westwards from the Punjab into Persia; a few specimens were collected in Seistan by the late Dr. N. Annandale and Dr. S. W. Kemp. In Bengal, however, as pointed out by Rothney, *Camponotus compressus* is the prevailing form, but in Bihar and Oudh this species becomes rare and is replaced by *M. setipes*. The crater nests of the species are found in hard soil and extend deep down in the ground. Two of such nests were observed in Madhupur to be situated very near one another.

TRIBE: FORMICINI Forel.

Formica graveleyi, sp. nov.,

Polychodrus?

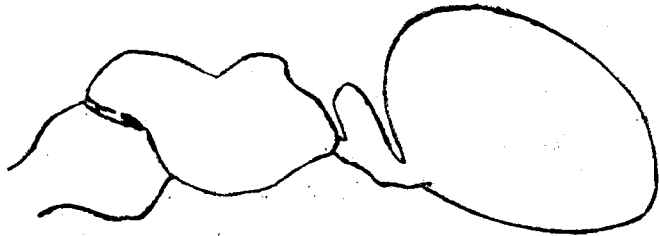


FIG. 6 a. *Formica graveleyi*, sp. nov. × 30. The side view of its thorax and abdomen.

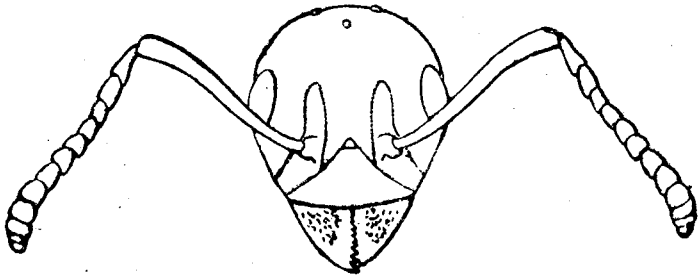


FIG. 6 b. Front view of its head.

WORKER.

Length, 4 mm. Head a little longer than broad, somewhat convex above, slightly emarginate behind; eyes placed at about the middle of the sides of the head, ocelli, present; clypeus triangular, convex in the middle and its anterior margin transverse; antennal carinae short and parallel; antennal and clypeal hollows confluent; antennae 12-jointed, first and second joints subequal, and larger than the rest, the scapes slightly sinuately curved and

¹ Rothney, G., *Trans. Ent. Soc. London*, iii, p. 347 (1889).

extending just beyond the top of the head, flagella longer than the scapes ; maxillary palpi 6-jointed, the 4th joint a little longer than the 5th ; labial palpi with four joints ; mandibles triangular, masticatory margin serrated, apical teeth very small. Pronotum broad and flat above, a little narrower than the head, anteriorly produced into a short flat neck. Pro-mesonotal suture distinct. Mesonotum convex and a little raised above the rest of the thorax and circular in outline ; scuteller region distinct but depressed ; thorax emarginate at the meso-metanotal suture ; basal portion of metanotum slightly convex, apical portion slightly concave in the middle. Node flattened and inclined forwards. Abdomen sub-globose.

Head faintly punctate, neck minutely transversely striated, body smooth and glabrous. Thorax, antennæ yellowish brown, head a shade darker. Abdomen dark brown and covered with silky pubescence ; sparse erect hairs on the body, pilosity abundant on flagella.

Types in the collection of the Zoological Survey of India, Indian Museum, Calcutta, collected by Dr. F. H. Gravely on a tree in the Zoological Garden, Calcutta. As the species is rare in Calcutta, I think the specimens described above were probably imported into Calcutta.