

V. *A Catalogue of the Species of Ants found in Southern India.*

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I have been induced to pen the following brief account of the Ants I have met with in Southern India, more with the view of stimulating others to record their observations on any species they may meet with, than under a sense of the value or completeness of the remarks that are to be found here. But no one, as yet, having taken the initiative, I trust that any errors in the accompanying paper will be pardoned by the scientific Entomologist at home, and that the meagre details I have given will be improved on and rendered more faithful and complete by observers in this country.

To enable any observers in this country, who may be able and willing to aid science on this subject, I shall here present them with a view of the classification of these interesting Insects by modern Entomologists, so that they may be able, in describing one which is deemed a novelty, to refer it to its place in the system, even if its real genus be not satisfactorily made out, which I fear will be too often the case, as I have experienced in my attempts at naming those described in the following pages.

Latreille in the *Regne Animal* of Cuvier places Ants as part of the family of the Heterogynes, of the section *Aculbata* of the order Hymenoptera, and divides them as follows :

1st, *Formica*, without sting, the antennæ inserted near the forehead, and with triangular jaws ; abdominal pedicle of only one knot or scale.

2d, *Polyergus*, also without a sting, but with the antennæ inserted near the mouth, and the jaws narrow, arched or bent ; abdominal pedicle also of one knot.

3d, *Ponera*, neuters and females with a sting ; abdominal pedicle of one knot ; antennæ thicker towards the end, jaws triangular, head somewhat triangular.

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\* Much difficulty has been met with in reading the manuscript of this and the following papers, which may account for any errata that may be detected in these two papers from their very accurate and able author.—ED.

4th, *Odontomachus*, differs from the last in the one abdominal pedicle ending superiorly in a spine; antennæ very slender and filiform in the neuters; head oblong, much notched posteriorly jaws long, narrow, parallel, three toothed.

5th, *Myrmica*, with sting—abdominal pedicle with 2 knots, jaws triangular, maxillary palpi long.

6th, *Atta*, differ from the last only in its short palpi, head of neuters usually very large.

7th, *Cryptocerus*, also with a sting, 2 knots in the abdominal pedicle, head very large and flattened, with a cleft on each side to lodge part of the antennæ. (Peculiar to South America.)

St. Fargeau in the 1st volume on the Hymenopteres in the Suites a Buffon divides the Ants thus:

1st Tribe, Les Myrmicites, females with a sting, 1st sigment of abdomen of 2 knots. This includes the following genera:

1st *Cryptocerus*. 2d *Atta*. 3d *Ocodoma*. Differing from *Atta* in its larger head, and the presence of spines. 5th *Myrmica*.

2d Tribe, Les Ponerites.

Females with sting, 1st sigment of abdomen of one knot only. It includes the genera *Odontomachus* and *Ponera*.

3d Tribe, Les Formicites.

Females without a sting. 1st sigment of the abdomen of one knot only, and it contains the genera *Polyergus* and *Formica*.

It will be, shortly, seen that many of our Ants cannot be well referred to any of these genera, but as it is probable that some new genera have been formed by recent writers, I shall in general content myself with referring most of my species to one or other of those here characterized.

Following the arrangement of St. Fargeau, we have first the tribe of *Myrmicites* and the first genus mentioned by him *Cryptocerus* being American exclusively, we come to the genus *Atta* of the Latreille from which St. Fargeau has separated *Ocodoma*, the chief distinction being the spines which exist either on the head or thorax of the latter, which moreover is said to have the head of variable size, whilst in *Atta* it is said to be usually not of a large size. We have in India species belonging apparently to both groups which I shall now endeavour to describe.

## Gen. ATTA.

I possess 6 species of Ants, all of small size, which appear to belong to this genus, having a sting, two knots in the first sgment of the abdomen, antennæ not concealed in a cleft, thorax without spines, and short palpi.

## 1. ATTA MINUTA, N. S.

Worker barely 1-12th of an inch long, head oblong, eyes minute, advanced; thorax narrow; abdominal pedicles long, narrow, the first much more raised than the 2d; antennæ gradually thickening of a rufous colour, with the abdomen somewhat darker or fuscous. Female about  $\frac{1}{3}$ d of an inch long, similar in form to the Worker, abdomen larger proportionally, and head smaller.

This minute species makes a temporary nest in various situations, in an empty box, between the back of a book and its leaves, even among the loose pages of a book, in an empty shell, &c. &c. Nothing is used in its construction, a shelter from the light merely being sought for. It is perhaps not very numerous in individuals, the wingless female is generally found in the nest. It is very common in the Carnatic and most of India, but I have not seen it in Malabar. It appears to prefer dead animal matter to saccharine or vegetable products.

## 2. ATTA DESTRUCTOR, N. S.

Worker about 5-48th of an inch long, head oblong, not so long in proportion as in the last; eyes small, more medial than in the last, antennæ short; thorax narrow, slightly grooved, abdominal pedicles long, narrow, first higher than the second, abdomen oval colour rufous, abdomen glossy brown. I have not seen the female. They live in holes in the ground, or in walls, &c., and are very numerous in individuals. They prefer animal to vegetable substances, destroying dead insects, bird skins, &c. &c., but also feed greedily on sugar. They are common in all parts of India, and often prove very troublesome and destructive to the Naturalist.

## 3. ATTA DOMICOLA, N. S.

Worker about 1-6th of an inch long; head oblong, eyes moderate size, medial; antennæ rather long, jaws strongly 4 toothed, thorax

very slightly notched, abdominal pedicles narrow, first much raised, second slightly so, abdomen ovate, legs longish, head thorax and legs deep red brown, abdomen blackish. This species of Ant does not seem to be common. I have only hitherto procured it at Nellore in a hole in a house, and I only saw one kind of individual.

#### 4. ATTA RUFA, N. S.

Worker 1-8th to 1-6th of an inch long, head short, oblong, eyes rather small, medial, antennæ rather short, with the two last joints much enlarged; jaws linear oblong, strongly toothed; thorax slightly grooved, first abdominal pedicle lengthened, narrow in point, wide behind and much raised, second broader, not so high—of an uniform glossy rufous colour, with the end of the abdomen somewhat darker.

Warrior variable, about  $\frac{1}{4}$ th inch long, head large, very square, slightly notched behind, smooth; eyes advanced, lateral; jaws oblong, quite entire, blunt; antennæ short, otherwise as in the ordinary Worker. Female about 7-24th of an inch long, head small, diamond shaped, eyes very large, 3 large ocelli on the top of the head, antennæ *not* geniculate, short; all the joints nearly equal; thorax thick in front, depressed behind, abdomen long; oval wings reach beyond abdomen.

This Ant is the only one of the true *Atta* that has two kinds of neuter individuals, and in its form and general habits it approaches much to the next genus, *Ocodoma*; but as it wants the spines on the thorax I have referred it to *Atta*. It is very common in Malabar, but is also found in the Carnatic: it is found in holes under ground, about gravel walks, mud walls, and often appears in houses, coming through a hole or crevice in the floor, or wall. There is a colony of them in my bathing room, and every now and then vast numbers of the winged females (and males) issue forth just before sunset attended as far as the window by swarms of the neuters of both kinds. Its favorite food is dead insects and other matter, but it also carries off seeds like the *Ocodoma*, as I know to my cost, chaff, &c. &c. It stings very severely, leaving a burning pain that lasts for several minutes.

## 5. ATTA DISSIMILIS, N. S.

About 1-10th of an inch long, head oblong, rounded; eyes moderate, antennæ suddenly thickening at the last joint, thorax very slightly grooved, abdominal pedicles narrow above, both equally raised, first rather more conic than the second; abdomen long oval, colour blackish throughout. I have only found this Ant in small numbers on trees in Malabar.

## 6. ATTA FLORICOLA, N. S.

Worker not 1-17th inch long; head oblong square, eyes small advanced; jaws linear, pointed, antennæ very short, last joint suddenly enlarged; thorax very slightly grooved, abdominal pedicles about equal, narrow, raised, abdomen long oval; thorax and legs dark rufous, head and abdomen glossy dark brown. I have obtained this very small Ant, of which I have only seen one kind of individual, in small numbers on flowers and leaves at Tellicherry, and it appears to feed solely on vegetable secretions.

## Gen. OCODOMA.

We now come to a set of Ants extremely numerous over all India, and comprising several species very nearly alike and probably confounded together by those who have not examined them thoroughly. Almost all the species that I have seen have two kinds of neuters, one of them of very large size compared with the ordinary Workers, and which are usually called Warriors. Some points in the history of the economy of these Ants have caused much interest among Naturalists at home with regard to the food of these little creatures. The chief distinction of *Ocodoma* from *Atta* consists in the former having some small spines on the thorax.

## 7. OCODOMA MALABARICA, N. S.

Worker  $\frac{1}{2}$ th of an inch long, head oval, eyes moderate, jaws rounded, triangular, pointed, and finely serrated; antennæ long and slender; thorax doubly notched and with some small tubercles especially two in the usual situation of the thoracic spines; first abdominal pedicle small and conic, second large, rounded; head, thorax and legs, rufous, abdomen blackish; legs long.

Warrior  $\frac{1}{4}$ th of an inch long ; head enormous, rugose, striated, deeply notched behind ; eyes minute, advanced, lateral ; jaws triangular bluntly toothed, and with an appendage at thin base ; thorax very rough, tubercled, with two minute rudimentary spines ; first abdominal pedicle small, narrow, barely raised ; second large, broad, raised, rounded ; antennæ short ; antennæ, legs, and abdominal pedicles rufous, the rest of the body blackish.

This species of Ant appears to form a link between the two Genera *Atta* and *Ocodoma*, as shown by the rudimentary state of the thoracic spines. I have found it chiefly about houses, it runs rapidly, lives both on insects and other animal matter, and on sugar, bread, &c. At first sight I mistook it for a small species of *Formica*, mentioned hereafter, *Formica vagans*.

#### 8. OCODOMA PROVIDENS. (SYKES) ?

Worker about  $\frac{1}{4}$ th of an inch long ; head somewhat *ovate bulging* slightly at the sides, and narrowed behind, notched posteriorly and with two points, rough and granulous ; eyes moderate, central, thorax slightly grooved with two small spines on its posterior angles ; first abdominal pedicle pointed, second longer, broader and rounded ; Warrior with jaws pointed and finely toothed ; thorax very rough ; length  $\frac{1}{4}$  inch, head large, otherwise similar.

I am by no means certain if this be Sykes' species or not, and, indeed, without actual comparison, it would be very difficult to decide, so similar are the general features of these small Ants, of which I possess four very closely allied species from Southern India, and have only collected these from two or three localities, so that many other allied species may still exist.

The habits and manners of all are very similar. They live underground, making for their size a large series of excavations. Their common food I suspect to be animal matter, dead insects, &c. &c., which at all events they take readily, but they also carry off large quantities of seeds of various kinds, especially the small grass seeds and, as every gardener knows to his cost, more especially garden seeds. They will take off cabbage, celery, radish, carrot and tomato seeds, but are particularly partial to the light lettuce seeds, and in some gardens, unless the pots in which they are sown

be suspended, or otherwise protected, the whole of the seeds sown will be removed in one night. I have also had many packets of seeds (especially lettuce) in my room completely emptied before I was aware that the Ants had discovered them. I do not know, however, if they eat them or feed their larvæ on them, though for what other purpose they carry them off I could not divine. I have often observed them bring the seeds outside their holes, as recorded by Col. Sykes, and this I think generally at the close of the rainy season, but in some cases I had reason to believe that it was merely the husks, of which I have seen quite heaps, and that the Ants did not take them back to their nests. If any of the forementioned seeds be sown out at once in a bed, most likely in the morning you will find the surface of the whole spot covered over with little ridges, the works of these creatures, and the few seeds that perhaps remain, dug all round, and being carried off, sometimes above ground, at other times under ground. Their galleries and subterranean passages are often very extensive, and it is no easy matter to dig down to their nest to see what becomes of the seeds. I have not procured the male or female of this species.

#### 9. *Ocódoma DIFFUSA*, N. S.

Worker about  $\frac{1}{8}$ th of an inch long; head somewhat oval, nearly smooth, with a few scattered graundes, slightly emarginate behind; eyes moderate size; thorax deeply grooved, with two small spines posteriorly: first abdominal pedicle very pointed, conic; second rounded of equal height: head, thorax and legs rufous; abdomen brown.

Warrior  $\frac{1}{4}$ th inch long, jaw strongly toothed, head large, much striated, deeply notched behind; thorax more deeply grooved and tubercled; otherwise as in the Worker. This species appears to be spread over most of India, and has similar habits to the last.

#### 10. *Ocódoma DIVERSA*, N. S.

Worker about  $\frac{7-8}{100}$ th of an inch long, head oblong, nearly smooth, emarginate behind; eyes small; jaws triangular, toothed; thorax but slightly grooved and with two longish spines posteriorly; first abdominal pedicle broadly conic, second rounded; head thorax and legs dark maroon, abdomen blackish.

Warrior nearly  $\frac{1}{2}$  inch long, head very large, nearly smoothed, slightly striated; jaws lancet, shaped, entire; eyes small, somewhat advanced, antennæ short, otherwise as in the Worker.

I procured this Ant in the Wynaad where it is not uncommon. The difference between the Worker and the Warrior is greater than in any other Indian species.

#### 11. OCODOMA AFFINIS, N. S.

Worker  $\frac{1}{8}$ th of an inch long; head nearly square, almost smooth, with only a few striæ; eyes nearly medial, smallish; jaws triangular, with two strong teeth at the external angle of the jaw, and two smaller at the internal angle; thorax very slightly grooved, with two curved spines posteriorly, first abdominal pedicle very narrow, long, conic posteriorly, not much raised; second rounded, of equal height, broader; head, legs and thorax rufous; abdomen dusky.

Warrior nearly 7-16th of an inch long; head and jaws striated, eyes very minute, head notched anteriorly; antennæ inverted in a deep groove; metathorax elevated; no palpi apparently.

This Ant is very common in Malabar; is nearly allied to, but differs from, *O. Diversa* in the toothed jaws of the Warrior, &c. &c.

#### 12. OCODOMA MINOR, N. S.

Worker, length about 5-48th of an inch, entirely rufous, head oblong, smooth; eyes small; jaws long, somewhat triangular, toothed, last tooth prolonged; thorax slightly grooved, with two small spines in its posterior extremity; abdominal pedicles slightly raised, first long, conic; second rounded; both narrow above.

Female 5-8th of an inch long, head nearly square, slightly notched behind, three ocelli on top of head; eyes large medial, head striated with a hollow for the base of the antennæ; jaws triangular, bluntly toothed at the two angles; antennæ short; thorax much raised anteriorly, and with two small posterior spines; abdomen long, oval, large.

I, on one occasion, only, found a single individual which I presume to be the female (which had lost her wings) under a stone in my garden at Tellicherry, surrounded by numerous workers who

were busy tending her, and removing some eggs or larvæ. It is the only female I have seen of this genus, and is well characterized by its large eyes, and ocelli.

### 13. *OCODOMA QUADRISPINOSA*, N. S.

Worker nearly 1-8th of an inch long, head smooth; eyes small; thorax with two small spines anteriorly, and two large carved spines posteriorly; first abdominal pedicle long, raised, rounded behind; second also rounded, blunter, of equal height; head, legs, and thorax dark rufous; abdomen blackish brown. I have not seen the Warrior (if any) of this race, which I found during the monsoon forming a small temporary mud abode round the head of flowers of a species of *Leucas*, abundant in Malabar. It appeared to be feeding on the vegetable secretions surrounding the seeds.

Of these seven species of *Ocodoma* the first and last are very distinct from all the others, the first by having only rudimentary spines, and the last by having four spines instead of two. *Ocodoma* minor is readily distinguished by its smaller size; and the other four are most readily distinguished inter se, by the jaws of the warriors, which in No. 10 is entire, in 11 with two teeth at each angle; in 9 with moderately strong teeth throughout its extent; and in 8 with the jaw very finely toothed.

### Gen. ECITON.

The characters of this genus are thus given by St. Fargeau. "Antennæ entirely free, head elongated, and the thorax without spines; maxillary palpi long, of 6 joints; jaws linear; wings "unknown." I have got four species of Ant which perhaps may be ranged under this genus, of which only one species is described, and that from South America, but it is more than probable that they will form a new genus to which however I will not attempt to impose a name. My species have a long slender body, oblong head, large eyes, short antennæ, inserted very near the mouth, linear or oblong jaws, and sting very severely.

### 14. *ECITON ? RUFONIGRUM*, N. S.

Worker, length about 11-24th of an inch; head square; antennæ short, first joint thickened; very long palpi, eyes large, lateral,

posterior ; jaws somewhat linear, oblong, with two strong teeth at the external angle, and bluntly toothed in the rest of its extent ; thorax slightly grooved ; abdominal pedicles very little elevated, first very long ; abdomen long, ovoid ; thorax, legs, abdominal pedicles and antennæ rufous, head and abdomen black. This ant is very common in the Carnatic, less so in Malabar. It makes its nests in holes of trees, old palings, bamboo rafters and such like ; it does not care for sweets, is never seen on flowers, but devours dead animal matter. I have not seen the female. It stings very severely.

#### 15. ECITON NIGRUM, N. S.

Worker, length 9-24th of an inch, head long, eyes large, medial ; antennæ short, the first joint not being so long as the head ; jaws somewhat square, bluntly toothed ; thorax low, barely grooved ; both abdominal pedicles long, rounded, low ; abdomen long, oval ; stinging very large. Colour uniform black. Female, length 11-24th of an inch, differs from the Worker only in having wings.

This Ant like the last is rare in Malabar, but tolerably common in parts of the Carnatic ; it has the same habits as the last, living in holes of trees, &c., and feeds on the same manner. I have found on cutting open a dead branch on which they had formed their nest many winged females, and larvæ and pupæ in different states of development.

#### 16. ECITON RUFIPES, N. S.

Worker, length 11-48th of an inch ; head oblong ; eyes very large, slightly advanced ; thorax considerably grooved, abdominal pedicles long, low ; abdomen long, ovate, black with rufous legs.

I have only found this species on one occasion under a stone in the Salem district, and know not if it has the dendrophilous habits of the two last.

#### 17. ECITON MINUTUM, N. S.

Worker about 1-6th of an inch long, black throughout, very slender ; legs rather thick ; palpi much exposed. I regret that I have not at present a specimen of this little Ant to describe from more fully. Its general structure however is exceedingly similar to

that of its congeners, from which its small size sufficiently distinguishes it. I have found it both in the Carnatic and in Malabar, almost always on trees, but do not know if it has its nest in holes of the wood or otherwise.

Though scarce in individuals, it is by no means rare, and I hope to be able to describe it more fully hereafter.

#### Gen. MYRMICA.

Gen: Char: Antennæ sufficiently exposed; head triangular, without spines; maxillary, palpi long, of six joints; jaws triangular; three cubital cells in the upper wings, the third incomplete, &c. Such are the characters assigned to this genus by modern authors. Whether the following species all belong to it or not I cannot decide, but judging from their differences I imagine that they form at least three groups.

In the first group I shall place two or three nearly allied species, one of which has already been described by Col. Sykes as a *Myrmica*, so that this may be considered the typical group. Of this I have what I imagine to be three species, but all very closely allied to each other.

#### 18. MYRMICA DIFFUSA, N. S.

Worker rather more than 1.9th inch long; head wider than thorax, oblong, triangular, striated; antennæ rather short, basal joint barely longer than the head, inserted near the mouth; eyes large; thorax notched, with two small spines on the posterior angles, curving backwards; first abdominal pedicle longish, somewhat heart shaped, excavated, second obovate; both very slightly raised: abdomen triangular; head and body rufous; abdomen dark glossy brown.

Female—head not wider than the thorax, which is not spined; length 5-12th of an inch; wings not so long as abdomen.

Male—head very small, eyes large; antennæ with the first joint not elongated; no spines on thorax, which is much raised; wings reach beyond abdomen—length 1.7th of an inch.

This is a well known and widely diffused species, being found throughout India. It makes its nest in holes in branches of trees,

runs with its abdomen turned upwards almost over its head especially when excited, and feeds on honey and other vegetable secretions. Occasionally they appear to join their nest among the roots of Moss, Orchideæ, and various Epiphytic plants, at least this is the case in Malabar, and I cannot detect any marked difference of species, although it is possible that the two races may be distinct. It is very pugnacious, and bites very severely, not appearing to use its sting much.

#### 19. MYRMICA RUFA.

Worker, length 9-48th of an inch, head shorter, proportionally, and eyes larger; thoracic spines longer, straighter; 1st abdominal pedicle longer and less raised than in the last; entirely of a rufous colour. This is a very closely allied species and is found in the same localities as the last. Had I found it in a different tract of country I would have perhaps considered it as a climatal variety, but its large size, and the few points enumerated above lead me to view it as distinct. Its habits are similar.

#### 20. MYRMICA KIRBZII SYKES?

I regret that I have mislaid my copy of the Entomological Transactions in which this Ant and several others were described, but the similarity of the nest and its general description led me to conclude that the species procured by me is identical with Colonel Sykes' one.

Is very closely allied to the two last, has its thorax larger, rough, and much ridged; its thoracic spines larger; first abdominal pedicle somewhat diamond shaped, second heart shaped; the abdomen strongly ridged longitudinally; head thorax and legs dark maroon; abdomen dark brown. Length 7-48th of an inch.

I have found this species chiefly in the elevated forests of the Wynaad. I cannot say that I have met it below the ghauts. It forms a considerable nest of some papyraceous materials, usually of an oval form, and placed round a small branch which supports it. It is very numerous in individuals, countless swarms issuing from it on being disturbed and boldly attacking the assailant both with teeth and sting. It feeds on honey of flowers and other vegetable secretions.

## 21. MYRMICA FODICUS, N. S.

Worker, length 4-12th of an inch; head rounded, triangular striated; eyes large, posterior; jaws somewhat linear, four toothed; thorax raised in front, depressed posteriorly with two small spines on each side in front, and two tubercles above these, and two large nearly horizontal spines at the posterior extremity of thorax; first abdominal pedicle long, narrow, raised behind, second raised, rounded; abdomen somewhat triangular; head, thorax, legs and abdominal pedicles maroon colour, abdomen shining brown. Female, head rather smaller proportionally, finely striated; eyes larger, three ocelli; jaws blunt without teeth; antennæ scarcely longer than the head; thoracic spines less developed; abdomen larger.

This is one of the most common and abundant Ants in Malabar. I do not remember to have seen it in the Carnatic. It seldom enters houses, but otherwise appears to take the place of *Formica rufescens*, which is not found in Malabar. It feeds chiefly on honey and other vegetable secretions, but also will take dead animal matter. It also occasionally feeds on the secretions of the..... and is also found in the train of Caterpillars feeding on leaves. It makes large excavations under ground, generally having the entrance round the trunk of a tree, and it forms considerable heaps of fine earth round the mouth of the nest. It runs, unlike the last species, with its abdomen turned downwards under the abdominal pedicles. It appears to form the type of a very distinct group from the last.

## 22. MYRMICA ? TARDA, N. S.

Worker, length 1-6th of an inch; head somewhat triangular, square behind, of same width as thorax; eyes rather small, quite lateral, somewhat posterior; antennæ short, thick, inserted near the mouth; thorax short, square, ending in two spines on each side; it and the head rough and shagreened; abdominal pedicles much raised, long, narrow; abdomen triangular, also shagreened; head, thorax, legs, abdominal pedicles brick red; abdomen dusky, dark blue. This is a very curious looking Ant. It lives in holes in the ground in small societies, and feeds on vegetable secretions. It moves very slowly. It is found both in the Carnatic and Malabar.

## 23. MYRMICA ? CÆCA, N. S. OCODOMA ?

Worker, length 1-5th of an inch ; head somewhat oval, rather small ; no eyes ; antennæ short, thick, inserted near the mouth ; an oblique groove on each side of forehead for the laying of the antennæ ; jaws triangular, hooked at the tip, and finely serrated ; thorax narrow, of uniform width, granulose, with an elevation posteriorly ending in two small spines ; abdominal pedicles raised, rounded, pointed backwards, the first the highest ; abdomen long, oval ; head thorax and legs reddish brown ; abdomen glossy brown.

I found this curious Ant only once, under a stone in the Wynaad.

## 2nd Tribe. Ponerites.

The single species of Ant which I place under this head appears to correspond pretty well with the characters of the genus which have already been given.

## ✓✓ 24. ODONTOMACHUS RUFUS, N. S.

Worker, length 1-4th of an inch ; head bulging at the sides, narrowed in front ; eyes of moderate size ; anterior antennæ rather long, slender ; jaws closely approached at their base, long, linear, with three strong pointed teeth at the end ; thorax narrow ; abdominal pedicle raised, pointed and conic ; abdomen long, oval ; head, thorax and legs rufous ; abdomen dark brown.

I obtained this Ant under stones in a jungle in the Salem district, and know nothing of its habits.

I have since obtained one individual also in the Wynaad which may be the Warrior of this species—if the society consist of different individuals. It is 11-24th of an inch long, and appears only to differ, besides its larger size, in having the eyes smaller, and more advanced, the teeth of the jaw blunt, and the thorax finely striated.

## ✓✓ HARPEGNATHOS, New Genus.

Gen : Char : Jaws scythe shaped, pointed, and finely serrated ; head oblong, notched behind ; eyes very large situated at the anterior extremity of the head ; antennæ rising between the eyes ; abdominal pedicle slightly raised.

I cannot class this remarkable ant as an *Odontomachus*, and have therefore been compelled to institute a new genus for its

reception; some of the characters given may not be generic, but till other species are discovered it is difficult to say which are, and which are not of generic value.

25. HARPEGNATHOS SALTATOR, N. S. ✓✓

Worker, head long, granulated; jaws with a strong tooth near the base pointing downwards and inwards, and thence gradually tapering to the tip, and finely serrated, 1-6th of an inch long; thorax barely grooved; abdominal pedicle small, low, ovate; abdomen very long; sting large; head and abdomen blackish brown, thorax and legs rufous.—Length  $\frac{1}{2}$  of an inch.

I have not seen this remarkable Ant in the Carnatic. I first saw it at Tellicherry, and subsequently in other parts of Malabar. It is also found in the Mysore country as I learn from Mr. Hamilton, a most talented and industrious Amateur Entomologist.

I have given it the name of *Saltator* from its power of making most surprising jumps which it does when alarmed or disturbed. It is very pugnacious, and bites, and stings very severely. It makes its nest under ground, generally about the roots of some plant. Its society does not consist of many individuals. It appears to feed on insects, which it often seizes alive.

Gen. PONERA, LAT.

Its generic characters have been given above.

26. PONERA SCULPTA, N. S.

Worker, length from 5-17th of an inch to nearly  $\frac{1}{2}$  an inch; head oblong, pointed in front and rounded behind; jaws large, triangular, armed with alternately a large and a small tooth; eyes very large, nearly medial; antennæ inserted on a line just in front of the eyes, rather long; thorax nearly uniform in width and height; abdominal pedicle raised, pointing forwards, with two small spines; abdomen long, cylindrical; legs long; the whole body curiously sculptured, being channeled and grooved in different directions, longitudinally, circularly, obliquely, giving a peculiar dull appearance; colour blackish green.

This is one of the commonest species of Ant in Malabar, extending from the level of the sea up to the top of the Neilgherries. It

lives in the ground in small societies, often making its nest in a flower pot, occasionally under a large stone. It does not work in concert, being generally seen solitary. It lives on animal substances, but apparently will also take vegetable matter. I have seen two fighting for a ripe seed of the Lantana.

I have not met with the female of this species.

✓✓ 27. *PONERA STENOCHÉLOS*, N. S.

Worker, length 3-8th of an inch; head large square behind, pointed and advancing anteriorly, widest in front of the eyes which are large; antennæ long; jaws very long, linear, ending in a strong tooth externally and a smaller one at the internal angle; thorax narrow; abdominal pedicle raised, rounded, pointing backwards; abdomen very long; sting large; legs long; colour dingy greenish brown.

I have found this Ant very rarely in Malabar, and know nothing of its habits.

✓✓ 28. *PONERA PROCESSIONALIS*, N. S.

Worker, length 1-3rd of an inch; head oblong, advanced anteriorly; eyes medial, large; antennæ moderately long, thickened at the end; jaws triangular, strongly four toothed; thorax wide, not grooved; abdominal pedicle of equal width with the thorax, square truncated; colour shining black.

I have met this species over most of India. It lives in the ground in very numerous societies, is most frequent in jungly district, occasionally a vast column of them, 3 or 4 deep, may be seen crossing a road, and I have traced the column for 40 and 50 yards. It stings very severely.

✓✓ 29. *PONERA AFFINIS*, N. S.

Worker, length 1-3rd of an inch; head oblong, notched behind, advanced anteriorly; jaws triangular, strongly toothed; antennæ thickened at the tip; eyes somewhat anterior, moderately large; thorax slightly grooved; abdominal pedicle pointed, thin; abdomen oval colour dingy black.

I have only procured this Ant once in Malabar and know nothing of its habits.

30. *PONERA RUFIPES*, N. S.

Worker, length 9-16th of an inch; head oblong; eyes anterior, small; antennæ short and thick; jaws triangular, finely toothed; thorax not furrowed, truncated posteriorly; abdominal pedicle wide, thick, truncated, and excavated posteriorly; abdomen long, the division of the joints strongly marked; body ridged, furrowed, and channeled throughout; antennæ, legs, and end of abdomen dark rufous; rest of the body dull black.

I have procured this Ant only on one occasion, hitherto, in Malabar.

31. *PONERA PUMILA*, N. S.

Worker, length about 1-5th of an inch; head oblong; eyes rather small, advanced; jaws triangular, strongly toothed; antennæ thickened; thorax smooth; abdominal pedicle long, square; abdomen long, cylindric; dull black, with rufous legs and antennæ.

I found this Ant in Malabar where it is rare.

## FOREMICITES.

We now come to the last family containing those Ants that have no sting, and the abdominal pedicle of one knot only. It comprises two Genera *Polyergus* and *Formica*, but I do not think we possess any species of the former genus.

Gen. *FORMICA*.

This genus comprises two distinct forms, the one with spines on the thorax, the other unarmed, which certainly ought to form two genera, inasmuch as this distinction is made to separate *Atta* from *Ocodoma*.

1st, without spines on the thorax.

32. *FORMICA COMPRESSA*, FABR. ?

Syn. *F. Indefessa*, Sykes.

Worker, length 4-10th to  $\frac{1}{2}$  an inch; head oblong, notched behind; eyes medial, of moderate size; jaws triangular, toothed; antennæ long; thorax widened anteriorly; abdominal pedicles somewhat diamond shaped above, much raised and thin as seen laterally; legs rufous, the rest of the body black.

Warrior, 6-10th of an inch long ; differs from the ordinary Worker in the head being proportionally much larger, and the jaws having blunt teeth.

Male, length 4-10th of an inch ; has a small triangular head, lateral eyes, three ocelli, the thorax raised in front, and the abdominal pedicle broader ; wings do not reach to end of abdomen.

Female 5-8th of an inch long ; very similar to the male, has the jaws strongly toothed, somewhat oblong ; and the abdomen proportionally large.

This species well known in India, as the black Ant is found throughout every part of this country which I have traversed, except the Western Coast where I have never seen it. It appears to me that it is most probably the species described by Fabricius whose name I have accordingly adopted.

It lives in very numerous societies in the ground, the entrance to the nest being often round the trunk of a tree, or close to some building. The Warriors are very numerous. Their food is chiefly vegetable secretions, sugar, &c., and Colonel Sykes has given an interesting account of the devastations committed by them on preserves, sugar, &c., which I regret that I cannot transcribe having mislaid the volume of the transactions of the Entomological Journal in which it appeared. They bite rather severely, but the pain is quite momentary. At certain times great numbers of the winged males and females are seen at the mouth of the nest, and they remain there for several days. When they take wing, they do so in vast numbers, and always at night.

### 33. *FORMICA ANGUSTICOLLIS*, N. S.

Worker  $\frac{1}{2}$  an inch long ; head long, oblong, ending posteriorly in a narrow neck ; eyes posterior, of moderate size ; jaws triangular, strongly toothed ; antennæ long ; thorax low, narrow, uniform ; abdominal pedicle conical, high, narrow ; abdomen oval ; colour dull black, with antennæ and legs rufous.

Warrior, 8-12th of an inch long ; head very large, notched posteriorly ; eyes much smaller ; otherwise similar.

I have only found this Ant in forests in Malabar and always singly.

### 34. FORMICA SMARAGDINA.

Worker, length about 4-10th of an inch; head long, triangular; antennæ long; eyes large, medial; jaws triangular, pointed, with sharp teeth; thorax not furrowed; abdominal pedicle, long, low, narrow, linear; legs long; colour of an uniform pale rufous.

Male 7-24th of an inch long; head diamond shaped; eyes lateral, small; thorax raised in front; abdomen small; wings reaching beyond the abdomen; of a rufous colour.

Female 7-8th of an inch long; head short, triangular; eyes lateral; three ocelli; thorax very large, wide; abdominal pedicle wide in the middle as viewed from above, very thin laterally; abdomen large; wings reaching beyond abdomen; entirely of a pale shining green colour.

This Ant is well known in Malabar, and the wooded parts of the Carnatic, but is rare in the Carnatic, where I have only seen it in one or two large Mango groves.

It forms a nest of living leaves which it draws together without detaching from the branch, and unites with a fine white web; sometimes this nest is above a foot in diameter but usually smaller. The society consists of a vast number of individuals, and in large nests we find many females and males, both with and without their wings at all times of the year. They are very bold and pugnacious, and bite very severely. They live chiefly on vegetable secretions and are very partial to the flowers and buds of some of the Loranthi, which abound so on the Western Coast, they often form a temporary web round the flowers or sometimes round the fruit of various trees, viz. the *Eugenia Malaccensis*, *Artabothrys odorotissima*, &c. apparently only for the purpose of feeding undisturbed they will however also sometimes feed on decaying animal matter. It is said that the web they form is occasionally used for writing on in the N. W. Provinces of India, and that the Ants are made use of to destroy a nest of wasps that may have established themselves in a house. In this case they are said to destroy all the wasps but become so infuriated, that their own indiscriminate attacks are

nearly as bad as those of their foes. In gardens they are most partial to mango trees, and also to the large leaves of the Jaméi Malae, (*Eugenia Malaccensis*), but in the jungles they select a vast number of trees, or rather make no selection at all.

### 35. FORMICA LONGIPES, N. S.

Worker, length 1.5th of an inch ; in form exceedingly similar to the last ; head more oblong than triangular ; eyes more posterior ; antennæ very long ; abdominal pedicle shorter, proportionally ; abdomen a longer oval ; legs very long of a pale rufous colour throughout, tinged with dusky on the abdomen.

This Ant is found in all the forests of India living in holes in the ground, in tolerable numerous societies, and feeding on vegetable secretions. I have not seen it at any distance from the jungles. At Tellicherry for example, I have never seen it, but as soon as you go a little inland and get into the jungle you meet with it. It is often found about bungalows and out-houses.

### 36. FORMICA TIMIDA, N. S.

Worker, length 9.24th of an inch long ; head oblong, oval ; eyes large, posterior ; jaws triangular, strongly toothed ; thorax smooth ; abdominal pedicle raised, conical ; colour dingy rufous, darkest on the head, and tinged with dusky on the abdomen. All the body covered with long scattered hairs.

Warrior,  $\frac{1}{2}$  an inch long ; differs from the ordinary Worker in the head being much larger proportionally, and notched posteriorly ; thorax thicker ; and the abdomen shorter.

Female, like Worker, but somewhat larger, with wings, and 3 ocelli. Male, 7.24th of an inch long ; thorax much elevated ; eyes large ; head small ; 3 ocelli ; wings reach beyond the abdomen.

I have only found this Ant on the Malabar Coast where it is very common, living chiefly on vegetable secretions. It has its nest under ground. It is very different in habit from the other large red Ant (*F. Smaragdina*) being most timid, and if approached or touched, dropping to the ground at once and hiding itself. It does not always confine itself to vegetable matter. On one occasion I

had a box of pigeons containing some squabs placed in a room on the floor. I next morning found several of the squabs dead covered with these Ants chiefly however the warriors.

### 37. FORMICA STRICTA, N. S.

Worker, length 7-20th of an inch ; head nearly square, slightly narrowed anteriorly ; jaws rough, triangular, strongly toothed ; eyes large, posterior ; prothorax wide, metathorax narrowed ; post thorax in the form of a rounded raised narrow platform, ending in two points, and truncated ; abdominal pedicle blunt, rounded, raised ; abdomen short, oval ; antennæ rufous, head and thorax dull greenish black, shagreened ; abdomen shining glaucous green ; legs shining black.

I have found this Ant on flowers in Malabar, but have not seen its nest ; it is not a very common species.

### 38. FORMICA CINEBASCENS, Fabr. ?

Worker, length 3-8th of an inch ; head large, eyes rather small posterior ; jaws strongly toothed ; thorax wide in front, narrowed behind with 2 glands on each side above ; abdominal pedicle elevated, conic ; abdomen oval ; colour dull black, except the abdomen, which is glaucous green, and somewhat pubescent.

Female  $\frac{1}{2}$  inch long nearly ; head smaller, thorax not so wide ; abdomen long, oval ; wings not reaching to the end of abdomen.

Male 3-12th inch long ; similar in form to the female, but with much narrower abdomen, and head still smaller proportionally. Warrior, 5-12th of an inch long ; head large ; antennæ short ; eyes minute.

This species lives in the ground in small societies. I have only seen it in the Carnatic. It is described as having the head fulvous, and a triangular spot on the abdomen, but as it is said by Fabricius to have been sent from Tranquebar, in the vicinity of which I have seen our present species, I think they are probably identical, and that the difference of colour is accidental, especially as there are only two species common in the Carnatic with glaucous abdomen, this and our *F. rufoglauca*.

## 39. FORMICA VELOX, N. S.

Worker, length 5-24th inch to 6-24th head long, oblong; eyes posterior, large; jaws strongly toothed; antennæ long; thorax smooth; abdominal pedicle raised, somewhat rounded, wide above; abdomen with the divisions of the segments strongly marked; legs long, colour dull blackish, with the abdomen greenish pubescent.

This Ant is very common in Malabar and I think is also found in the Carnatic. It frequents flowers, especially delighting in those that have great quantities of pollen, such as the Cucurbitaceæ, Hibisci, &c. It runs very speedily, and is very easily alarmed, dropping to the ground on being touched. I have not succeeded in finding its nest.

## 40. FORMICA RUFO-GLAUCA, N. S.

Worker, 7-24th inch long, head long, oblong; eyes large, posterior; jaws strongly toothed; thorax not grooved; abdominal pedicle raised, conic, wide above; abdomen fine silky glaucous green; head, thorax and legs bright rufous.

Warrior, 9-24th inch long, head large; eyes much smaller; antennæ shorter; abdominal pedicle flattened posteriorly; abdomen short and triangular; colour similar.

I have found this Ant only in the Carnatic in small societies living in holes in the ground.

It is possible that this may turn out to be Fabricius species *Cinerascens*.

## 41. FORMICA VAGANS, N. S.

Worker, 3-24th inch long, eyes large, medial; antennæ long; abdominal pedicle raised rounded; legs very long.

Female, 3-12th inch long; the thorax shorter and wider, and abdomen very large, wings reaching beyond the abdomen.

This little Ant is exceedingly common in the Carnatic, but I have not yet seen it on the Malabar Coast. It takes up its quarters in any sheltered spot in a house, under a box, a stone, a hole in the wall, or such like places, and when disturbed flits with great speed to another suitable spot. Its society is very numerous in individuals and there are many females and males, sometimes with, at

other times without wings. It feeds both on vegetable and animal substances preferring the former like all the true Formica.

#### 42. FORMICA ASSIMILIS, N. S.

Worker, exceedingly similar to the last.

Length, 3-24th of an inch, differs in its colour chiefly being of a shining reddish black, in its eyes being apparently large, the thorax narrower, and in being covered all over with scattered white hairs.

I have found it frequenting flowers in Malabar, but not abundant.

#### 43. FORMICA PHYLLOPHILA, N. S.

Worker, length 7-48th of an inch, eyes small, anterior, jaws triangular; thorax slightly furrowed posteriorly; abdominal pedicle thin, low, linear; abdomen large triangular; legs antennæ rather short: colour shining brown black.

This little species forms a temporary nest between two leaves usually, or sometimes in a head of flowers; it lives in small societies, and feeds entirely on vegetable secretions.

#### 44. FORMICA NANA, N. S.

Worker, length not 1-12th inch; eyes anterior, thorax wide; abdomen long, elliptical; head and thorax brown; antennæ, legs, and abdomen pale whitish brown.

This very minute species is found in all parts of India and is very abundant in Mysore; from its very small size is noticed with difficulty. It feeds on flowers and vegetable secretion.

2ndly. With spines on the thorax.

#### 45. FORMICA INDIFICANS, N. S.

Worker, 5-24th of an inch long; head triangularly ovate, elevated; eyes moderate; jaws strongly 3 toothed; thorax wide anteriorly, narrowed behind, with two small spines anteriorly pointing forwards, and two large ones behind, pointing upwards and backwards, and two rudimentary spines or points behind and beneath these latter; abdominal pedicle square, raised with two large upright spines, and a smaller one on each side; abdomen short; head and abdomen rufous, thorax dark glossy brown.

Female 1-3d inch long, similar to the worker; 3 ocelli on top of head; wingless.

This Ant makes a small nest about  $\frac{1}{2}$  inch, or rather more, in diameter, of some papyraceous material, which it fixes on a leaf. I have opened two, each of which contained one female and 8 or 10 workers. It is very rare, and I have only seen it in Malabar.

#### 46. FORMICA SYLOICOLA, N. S.

Worker, 3-12th inch long; head narrowed in front, and rounded behind; eyes posterior, salient; antennæ inserted in front of the eyes, with a strong crest bordering their insertion internally; jaws short, with 5 teeth, the upper one much the longest and bent; thorax, wide; with two spines on its anterior angles, and two stronger ones posteriorly pointing backwards and upwards; abdominal pedicle large square ending behind in two large carved spines pointing backwards and outwards, and two points or tubercles behind and between them; abdomen short, oval, colour dull black, abdomen shining glaucous green.

Female, 9-24th inch long, differs in the anterior thoracic spines being apparently shorter, and in having 3 ocelli; wingless.

This Ant has the same habits as the last, but is not found except in the jungles. It appears very closely allied to *F. Nastata* of Latreille from India, and to several other species said to be from Southern Asia; and as some of these may be found in India, I add here a brief description of them taken from St. Fargeau's work on Hymenoptera.

"*Formica Scæspinosa*, Latr. Body black, covered with a fine silky yellowish down, especially on the abdomen; head oblong; narrowed posteriorly; antennæ long; posterior angles of the head salient; jaws large triangular, with 3 or 4 teeth, eyes small globular, salient, thorax with two spines anteriorly on its lateral angles, and two on the posterior extremity pointing backwards; abdominal pedicle thick, rounder in front, truncated posteriorly with 2 spines almost as large as those on the posterior extremity of thorax length 7 2-3d lines (french); from Southern Asia.

"*Formica Nastata*, Latr. Black, finely shagreened and slightly hairy; head short; antennæ long; jaws short with small teeth, and a larger curved one at the end; space between the antennæ elevated with an arched crest on each side; eyes small, round; thorax cubical, compressed, its surface flat and the ridge on each side sharp, anteriorly wide and square with a spine on each side at the

numeral angles strong, sharp, straight, and reaching to the head; its posterior part truncated with a strong spine at each angle pointing obliquely upwards; abdominal pedicle large triangular, with its upper edge concave a small tooth in the middle, and a strong arched spine on its lateral angles directed backwards, with a little tooth beneath each.

Length 4 lines. Hab. India.

"*Formica relucens*, Latr. Exceedingly like the last. (*F. Nustata*,) differs in the following points—body covered with silky, golden, shining down, with a few larger hairs; thorax with two spines anteriorly and none posteriorly; abdominal pedicle with 4 spines, the upper ones nearly straight; length 4 lines. From Southern Asia.

"*Formica Ammon*, Latr. Very like the two last, body black, striated, with a few hairs; thorax ashy; anterior angles advanced; posteriorly the lateral angles prolonged into a large, straight spine, pointing backwards; abdominal pedicle large, triangular; with the upper angles prolonged into a very long curved spine, directed backwards; abdomen covered with a silky golden down—length 2 1/5th lines. From Southern Asia.

"*Formica carinata*, Fabr. Head rounded, black; thorax black, divided into three by two deep transverse lines; the anterior portion with a spine on each side directed forwards; and the posterior part with two small straight spines; abdominal pedicle large, square with two raised sharp bent spines. Length of medium size. Southern Asia."

I have very little doubt but that many more species of Ants will be discovered even in the Southern portion of the Peninsula, and I hope myself to add others to the present list, and more especially to gain additional information on their habits. If any of the readers of this Journal are inclined to assist me in this undertaking and are able to furnish me with any details on the economy of any species, I shall be very glad to receive all information and record it in a Supplement, which I will publish as soon as I can collect sufficient materials; and as there may be some difficulty in making out the species, especially if the observer has no microscope, 3 or 4 specimens inclosed in a quill and sent by letter will suffice to determine if the species be one of those described here, or a new kind.