

Family HESPERIIDÆ.

96. *Chapra prominens*, Moore.
Bwetet, 8-2-90 ; Yokwa, 3-2-90, 5-3-90.
97. *Chapra mathias*, Fabricius.
Bwetet, 8-2-90.
98. *Udaspes folus*, Cramer.
Laivar, 31-3-90 ; Haka, 22-2-90.
99. *Padraona mæsa*, Moore.
Laivar, 31-3-90.
100. *Parnara berani*, Moore.
Bwetet, 11-2-90.
101. *Antigonus sura*, Moore.
Choungkwa, 25-3-90.
102. *Astictopterus salsala*, Moore.

ÆNICTUS (TYPHILATTA) AND SOME NEW GENERA OF FORMICIDÆ.

BY AUGUSTE FOREL, Professor at the Zürich University.

(Translated by R. C. Wroughton, Poona, from the Proceedings of the Société Entomologique de Belgique, 7th June, 1890.)

SHUCKARD first advanced the theory that the supposed family of *Dorylidæ* contained the males only of certain ants. Shuckard argued most truly, and divined the truth in spite of the opposition of Westwood and others. The discoveries of Gerstaecker, Trimen and others have confirmed the fact that the *Typhlopone* (West.) are only the ♂ (workers) of *Dorylus*. Further, the remarkable observations of Wilhelm Müller at Itajahy, and the discovery of Hetschk's have confirmed the analogous hypothesis of Sumichrast and Smith, and have shown that the *Labidus* of America are only the ♂ (males) of *Eciton*, even though the *Labidus* have only one knot in the pedicel, and that the *Eciton* with their pedicel of two knots had till then been classed as *Myrmecidæ*. There remain the genera *Ænictus* and *Rhognus* of the *Dorylidæ*, of which the ♂ has so far remained unknown. By analogy it could be surmised that the genus *Typhlatta*

(Smith) must represent the ♀ of *Ænictus*. *Ænictus* and *Typhlatta* inhabit tropical Asia, and have affinities analogous to those between *Labidus* and *Eciton*.

Emery (*Bulletin de la Soc. entom. ital.*, 1887) advanced this hypothesis, which for that matter was self-evident once the ♀ of *Dorylus* and *Labidus* were known.

Mr. R. C. Wroughton, Divisional Forest Officer, Poona, having sent me last year *Ænictus ambiguus* (Shuck.) and a new *Ænictus*, I called his attention to the interesting problem of the ♀ of *Ænictus*.

I have just received from Mr. Wroughton a third species of *Ænictus*, in company with a new species of *Typhlatta* taken together. The problem is therefore solved, and the honour belongs to Mr. Wroughton, who writes laconically and prudently:—"There are some, what seem to me to be, *Ænictus*, n. sp., taken by Mr. Gleadow in Thana. Had I been there I might have settled the question of the ♀ and ♂, but I have failed to find a nest so far."

The result of this important discovery is that the genus *Typhlatta*, Smith, (1858, *Proc. Linn. Soc. Zool.* II.) must be dropped as a synonym of the genus *Ænictus*, Shuckard (*Ann. and Mag. Nat. Hist.*, vol. V., 1840, p. 266).

The capture of the *Ænictus Wroughtonii*, with its ♀ was made on 31st March, 1890. This date is most important as giving the time of the year at which there is a likelihood of finding the winged ♂ in the nest. As in the genus *Eciton* the ♂ has one knot and the ♀ two knots in the pedicel (*i.e.* of the abdomen).

GENUS *ÆNICTUS*, Shuckard (*Ann and Mag. Nat. Hist.*)

=*TYPHLATTA*, Smith (*Proc. Linn. Soc., Zool.*, 1858).

Ænictus Wroughtonii, n. sp.

♂ Length 2.5 mm. Narrow and rather elongate. Head narrow, elongate, the sides rather convex, and the posterior edge short and rather rounded as in *Æ. levicaps*; but the head is much narrower and longer than in that species. Anterior edge of epistome crenulate or denticulate, not entirely hidden by the frontal ridges. No distinct frontal groove. Terminal edge of mandibles rather long, microscopically denticulate, with one stout tooth at the extremity.

Mandibles smooth, shining, with some hair-bearing pits. The antennæ are rather long; the joints of the funiculum are all longer than broad, as in *Æ. leviceps* (joints 3 and 4 twice as long as broad). Thorax long, narrow, strongly, and, for some distance, constricted in the posterior portion of the mesonotum; its dorsal profile is strongly hollowed; the depression is markedly long, and divides the thorax exactly in two parts. Pro-mesonotal suture obsolete. Basal area of the metanotum convex, very narrow, compressed; the small sloping area entirely surrounded by a ridge. First knot of pedicle compressed, rounded, higher behind than in front, nearly three times as long as broad, slightly convex beneath but not toothed. Second knot rounded, scarcely longer than broad, with a very small tooth beneath, in front. Pygidium rather overhung by the penultimate abdominal segment.

Whole insect smooth and very shiny, except the sloping area of the metanotum, which has some very fine transverse wrinkles. Half-erect, rather oblique, pale yellow, short, pointed hairs abundant on the legs and antennæ, less so on the body; almost no pubescence.

Whole insect a shining yellow, somewhat transparent; faintly reddish or brownish.

♂ Length 5.3 mm. The joints of the funiculum of the antennæ are all cylindrical and much longer than broad, except the 1st scapes, thighs, and femoral rings depressed (flattened), but nevertheless somewhat elongate; the scapes are triangular as in *Æ. Fææ* (very broad at the tip, narrow at the base); tibiae are similarly shaped, but are only slightly flattened and less enlarged at the tip. The thighs are as broad and flattened at the base as at the tip (in *Æ. Fææ* they are only flattened at the tip). The mandibles are rather long and broad, nearly as broad near the tip as at the base, terminating in a blunt point, smooth, shining, hairy, evenly and moderately curved. The head is not much broader than long; the eyes only occupy the anterior two-third of its sides. The head is narrowed behind the eyes, but its lateral edge is there distinct from the occipital edge. Frontal ridges rather close together, rather closer together than the inner edge of the mandibles. The ocelli are not very large, and are not placed on a special eminence. The face between the eyes seen from above shows as a very feeble transverse concavity. The mesonotum

does not overhang the pronotum, but is strongly convex and reaches to the anterior limit of the thorax. Pedicle with only one knot, much broader than long, concave beneath, anterior and posterior edges concave, the latter much broader than the former; sides convex, converging anteriorly. The two halves of the pedicle form as it were two wings as in the other species of the genus. Beneath, the pedicle is armed with a large tooth, very long, and very thick, and ending in a blunt point; the anterior face of this tooth is oblique, its posterior vertical (very slightly curved backwards).

The whole body smooth and shining, with very fine, scattered hair-bearing pits, wanting in places.

Pubescence greyish-yellow, rather long, more or less all over the body. On the pedicle it forms a greyish nap, on the thorax the pubescence is much less close and permits the sculpture to be seen. On the abdomen the pubescence is shorter and very sparse, while on the head and on the sloping area of the metanotum it is almost absent. On the face, and the underside of the body (especially of the pedicle) and on the thighs are long curved hairs. There are some few somewhat scattered erect hairs on the legs, otherwise there are no erect hairs.

Black tinged with brown. Extremity and underside of the abdomen, tooth of the pedicle and antennæ of a reddish- or yellowish-brown. Legs and periferal half of mandibles yellow-testaceous.

Wings faintly tinged with brown, finely pubescent, with the marginal spot and the nervures blackish-brown. The radial cell closed. The transverse nervure is long, and joins the outer cubital branch close to its starting point.

Thana, 31st March, 1890, ♀ and ♂ taken together.

This species is distinguished by the hollowed thorax, slender and very elongate form, and smooth and shining metanotum of its ♀. The ♂ is also very distinct from the species already described.

Genus TRIGONOGASTER, n. gen.

General aspect of a *Pheidole* ♀. Antennæ 11-jointed; club three jointed, the club is as long as the rest of the funiculum; the last joint is if anything longer than the two preceding combined, the penultimate is thicker, but barely longer than the antepenultimate,

which is twice as long as the 7th joint. Maxillary palpi 5-jointed, labial 3-jointed. Mandibles armed with 4 stout teeth. Epistome strongly vaulted, furnished with 2 longitudinal ridges, it forms posteriorly a boss between the frontal ridges, which are short, but fairly high. Frontal area narrow and deep; frontal groove short. Eyes placed rather in front of the sides of the head. Thorax constricted behind the mesonotum; pronotum and mesonotum moderately vaulted, the latter rather the more so; the former more flattened and narrower than in *Pheidole*. Metanotum armed with 2 stout spines, elegantly curved forward. The first knot of pedicle with a rather long and anteriorly broad petiole; this petiole, somewhat concave above and convex beneath, is furnished beneath, anteriorly, with a small tooth, and posteriorly with a somewhat small, conical, squami-form protuberance. The second knot is very low, broader than long, rounded anteriorly, and broadly attached posteriorly to the abdomen. Abdomen small; seen from above it is narrow in front, and feebly enlarged to the end of the first segment. The other segments appear only as a small cone projecting beyond the first segment. Side view, the abdomen is triangular, the sides of the triangle are somewhat convex. The profile forms an isosceles triangle, of which the base, formed by the flattened upper surface of the abdomen, is longer than the two sides. The summit of the triangle (more properly of the cone), is almost in the middle of the underside of the first segment, which of itself constitutes nearly the whole ventral (as it does the dorsal) surface. Erect hairs of the body toothed and blunt as in the genus *Leptothorax*.

This singular ant is closely allied to the genus *Pheidole*, but there was no "soldier" among the specimens sent me by Mr. Wroughton. Otherwise the head is smaller, and the club of the antennæ recalls only that of certain aberrant species. The species of *Pheidole* have 12-jointed antennæ, except *Ph. quadrispinosa*, which has 11. However, the singular form of the abdomen, the form of the epistome, and the low and narrow pronotum isolate this insect sufficiently to found on it a genus. All the ♂ seem to be the same size.

Trigonogaster recurispinosus, n. sp.

♂ Length about 2 mm. Characters of the genus. Head nearly square, slightly longer than broad, hollowed posteriorly, the sides

faintly convex. The scape does not quite reach the posterior edge of the head. Mandibles narrow, crossed, the terminal edge short, armed with 4 stout teeth. Epistome truncate anteriorly, very high and vaulted posteriorly. The eyes have rather straight lateral edges, and the anterior extremity almost pointed. Mesonotum small. Pro-mesonotal suture faint; meso-metathoracic constriction considerable. Basal area of the metanotum horizontal, narrow, much longer than broad, longer than the sloping area. Knot of first joint of pedicle attenuate at its summit.

Mandibles rugose, rather shiny. The whole body, from one end to the other, including the sloping area of the metanotum, densely and finely reticulate-punctate, and lustreless or almost sub-opaque. Legs and scapes reticulate. Some coarser longitudinal wrinkles on the cheeks.

Pubescence sparse, short on the whole body, slightly more abundant on the legs and scape; the recumbent hairs are curved. The erect hairs very sparse, stiff, blunt, rather short; the erect hairs (except about the mouth and under the abdomen) are very distinctly denticulate under the microscope, which gives them a somewhat ragged look under a magnifying glass; they are identical with those of the genus *Leptothorax*.

Reddish yellow; legs, mandibles, antennæ, pedicle, and abdomen a paler yellow. A brownish band very indistinct and interrupted in the middle of the abdomen.

Poona (India), collected by Mr. R. C. Wroughton.

Genus EMERYIA, n. gen.

♂ Mandibles very long, very narrow, without a terminal edge, nearly straight for the basal half, curved beyond, terminating in a long sharp point, slightly broadened and flattened about the middle, narrowed near the base, without any trace of teeth. They leave between them a large empty space, and resemble those of the "soldier" of *Myrmecocystus bombycinus*. Epistome furnished with two keels, hollowed and deeply grooved between. This groove is produced between the frontal ridges, and as a frontal groove as far as the middle of the vertex. No ocelli. Head broadened and rounded posteriorly, narrowed anteriorly; it has however a posterior edge; eyes

rather small, situated in the anterior one-third of the head. Frontal ridges rather short. Antennæ 11-jointed; the last joint, very large and very thick, alone forms the club. The scape is far from reaching the posterior edge of the head. The pronotum has two distinct shoulders, and forms anteriorly near its articulation distinct steps. The mesonotum is short and very broad; its lateral edge forms on each side a triangular protuberance like a large festoon. Metanotum armed with two short spines. Pedicle as in the genus *Cardiocondyla*. The first joint is petiolate anteriorly, and has a flattened knot, longer than broad. The second joint is broad, broader than long, narrowed and concave anteriorly, slightly less narrowed and concave posteriorly, rounded at the sides, flattened above, furnished beneath with a blunt tooth. Abdomen truncate anteriorly.

By its mandibles this genus, otherwise closely allied to *Cardiocondyla*, differs from all other *Myrmecidae*. It differs also from *Cardiocondyla* by its 11-jointed antennæ and its mesonotum.

Emergia Wroughtonii, n. sp.

♂ Length 1·7 mm. Characters of the genus. Mandibles smooth and shining. Head, for the most part, smooth and shining, with some large, sparse, hair-bearing pits, somewhat effaced and somewhat rough at the bottom. These pits are more abundant on the forehead, and are accompanied by a few very short and fine striations. Back of thorax bounded by a faint rim. Pro-mesonotal suture nearly obsolete; meso-metanotal suture very deep, but without any constriction between the meso and meta-thorax. Basal area of metanotum more or less horizontal, much longer than broad. Spines rather short and rather blunt. Thorax irregularly reticulate, punctate, and nearly lustreless, the lateral expansions of the mesonotum give it a peculiar aspect. Abdomen and pedicle rather smooth, shining, very finely and very sparsely punctate.

The whole body, the legs, and the antennæ rather abundantly furnished with pale yellowish, rather long, pubescence, which, however, does not form a nap. Erect hairs almost absolutely absent.

Pale testaceous-yellow; mandibles reddish; abdomen brownish-yellow.

This curious ant (a single ♂) was found by Mr. R. C. Wroughton,

at Poona, with a new species of *Cardiocondyla*, which lives in blisters on the leaves of *Eugenia jambolana* (blisters probably caused by small grubs). Is it, as I am led to believe, a case of symbiosis, analogous to that of *Strongylognathus*? Is it a *lusus naturæ*? Or is it possible that *Emergia* is the 'soldier' of *Cardiocondyla*? This last supposition seems to me most improbable; the other species of *Cardiocondyla* have no 'soldiers,' and antennæ in that genus are 12-jointed.

Genus TRIGLYPHOTHRIX, n. gen.

♂ short, stoutly built. Antennæ 12-jointed; club composed of three unequal joints. Epistome as in the genus *Tetramorium*; its posterior edge raised and curved backwards forms anteriorly, as a ridge, the boundary of the antennal groove. Frontal ridges wide apart, nearer the outer edge than the median line of the head; they are produced backwards almost to the posterior angle of the head. Between the eyes is a wide and deep double groove, which serves to lodge both the scape and funiculum of the antennæ; to this end, this groove is bounded laterally by a ridge which, commencing from the anterior angle of the head, touches the interior edge of the eye, and going backwards in a curve is lost in the posterior extremity of the produced frontal ridge. The double groove is moreover divided longitudinally for the anterior three-fourths or four-fifths of its length by a ridge which separates the grooves in which are lodged the scape and funiculum respectively; anteriorly this dividing ridge terminates a little to one side of the posterior recurved edge of the epistome. The back of the thorax broad, bounded by a faint ridge. Sutures obsolescent. Metanotum two-spined. Meta-sternum bi-dentate. Knots of the pedicle very broad; the first shortly petiolate. Abdomen truncate and notched anteriorly, almost entirely covered by its 1st segment, which is bounded by a very faint ridge, especially anteriorly.

The hairs with which the body and extremities are abundantly covered have a peculiar structure; from the bottom of each hair bearing pit starts the stem of a hair which almost immediately divides into three diverging branches, rarely more or less. This multiplicity of trifid hairs gives a general woolly aspect to the insect.

Otherwise resembles the genus *Tetramorium*, though not without a certain likeness to the genus *Meranoplus*. The genus *Triglyphothrix*

is thus to some extent a connecting link between the *Myrmecine* and the *Cryptocerine*. The workers have a tendency to roll themselves into a ball. From this fact, it seems to me, that *Meranopius* is descended from the *Myrmecine* through the type *Tetramorium*. The genus *Triglyphothrix* also resembles the genus *Calypatomyrmex* (Emery).

♀ like the ♂, and only slightly larger than it. Wings with a single open radial cell. The transverse nervure joins the cubital nervure at the point where it forks.

Triglyphothrix *Walsh*, n. sp.

♂ Length 1.9 to 2.4 mm. The mandibles armed anteriorly with three distinct teeth and posteriorly with three others, small and indistinct, shining, with some coarse punctures and a few short, coarse striures. Frontal area and groove absent. Epistome coarsely wrinkled. The whole head lustreless, very coarsely and deeply reticulate (at the sides and beneath) or longitudinally rugose-reticulate, except the bottom of the double antennal groove, which is shining and finely rugose-reticulate. The head is in shape a trapeze, with only slightly diverging sides, broader behind than in front, broadly and feebly notched posteriorly, slightly longer than broad. Thorax very short and very stout, rather shorter than the head, its back very faintly edged, but with two well-marked "shoulders" anteriorly, feebly convex. Basal area of the metanotum somewhat sloping. The pronotum is as broad as two-thirds the length of the thorax. Metanotal spines three-cornered, broad at the base, shorter than the distance between them. The sloping area of the metanotum shining, with two or three marked transverse wrinkles, bounded by small ridges anteriorly and laterally. The two small lamelliform metasternal teeth are continuations of this ridge. All the rest of the thorax and the pedicel (except the petiole of the first knot) deeply and coarsely reticulated and lustreless. The two knots of the pedicel are of the same length, breadth, and rounded form; they are twice as broad as long; the first is a trifle higher than the second. Abdomen a short oval; the anterior half of first segment is lustreless, densely striate longitudinally. The striures are frequently crossed by short transverse ridges, which extend from one side to the other, and which represent a hair-bearing reticulation, of which the posterior side has disappeared. The remainder of the abdomen and the feet are smooth and shining; the

scapes are rugose-reticulate. The bottom of the coarse reticulations on the head, thorax, and pedicle contain a small elevation, from which starts a trifid hair.

The characteristic trifid hairs are somewhat short, yellowish-white, fairly evenly and abundantly scattered, not only over the whole body but also on the thighs and tibiæ. The tarsi and antennæ have scarcely any but simple, semi-recumbent hairs.

Brown. Abdomen dark brown, somewhat blackish. Feet, antennæ and mandibles yellowish-brown.

♀ Length 2·7 to 3·0 mm. Basal area of metanotum nearly vertical, shining, longitudinally wrinkled. Mesonotum rugose, reticulate longitudinally. Striate portion of abdomen shorter than in ♂, the remainder of the abdomen is covered with a fine, sparse hair-bearing punctuation, more distinct than in the ♂. Thorax a little narrower than the head, short. Abdomen small. Wings almost hyaline, faintly tinted with yellow, finely pubescent. Nervures and marginal spot very pale. Otherwise exactly like the ♂.

Poori, Bengal, by Dr. Jul. Walsh.

Poona, Bombay, by Mr. R. C. Wroughton.

Nests underground. Winged ♀ taken by Dr. Walsh in second half of June.

This species is not wanting in affinity to *Tetramorium obesum* (André), but notwithstanding the absence of mesonotal spines, it is almost as closely connected with *Meranoplus bicolor*. Among the evidences of this relationship must not be omitted the tendency of the basal area of the metanotum to assume a sloping position, nor the form of the pedicle of the abdomen.

BOMBAY GARDENS.

By G. CARSTENSEN, Superintendent of Municipal Gardens, Bombay ;
Gr. Hort. R. D. Agr. Coll. (Copenhagen).

(Read at the Bombay Natural History Society's Meeting on
3rd December, 1890.)

THE object of the present paper is to give a general outline of gardens in Bombay, to point out the features by which they are