

XXVII ON SOME CAVERNICOLOUS DER-  
MAPTERA AND ORTHOPTERA  
FROM ASSAM

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(Plates XXI—XXIII.)

In a previous paper (*Mem. As. Soc. Beng.* VI [1910], pp. 339–396) I described a *Diestrammena* from Cherrapunji which was the first cavernicolous Orthopteron collected in that region of India. Since then, Dr. N. Annandale has had the kindness to send me another collection of Orthoptera from caves in Assam, containing the following species:—

*Forcipula trispinosa*, Dohrn, Siju Cave.

*Chelisoche morio*, F, Siju Cave.

*Spelaeoblatta* (?) *caeca*, sp. nov., Rupmath Cave.

*Rhaphidophora rufobrunnea*, sp. nov., cave near Yawnghwe.

*Diestrammena brevifrons*, Chop., Rupmath Cave.

*Diestrammena indica*, sp. nov., cave near Yawnghwe.

*Tachycines adelungi*, sp. nov., Ngot bat Cave.

*Arachnomimus* sp., Siju Cave.

It may be seen from this short enumeration how little known this cavernicolous fauna is. The Blattid hereafter described is particularly of great interest, being completely blind and showing remarkable characters of adaptation to cavernicolous life.

DERMAPTERA.

The two species of Dermaptera here referred to, as well as the other few species of this group recorded from caves in various parts of the world, are common lucicolous species. They do not show any character of adaptation to cavernicolous life but seem nevertheless quite well accustomed to this special habitat. In fact both of them are represented by a certain number of individuals of both sexes and by immature stages which proves that they live completely and reproduce themselves inside the caves.

Fam. FORFICULIDAE.

Subfam. LABIDURINAE.

Gen. *Forcipula*, Bolivar.

*Forcipula trispinosa*, Dohrn.

Siju Cave, Garo Hills (R. Friel, Nov. 1917); 2 ♂, 4 ♀, 2 young individuals.

This species is found outside of caves in the north of India.

Subfam. *CHELISOCHINAE*.Gen. *Chelisoches*, Scudder.*Chelisoches morio*, F.

Siju Cave, Garo Hills (R. Friel, Nov. 1917); 4 ♂, 3 ♀, 4 young individuals.

This species is very common in India. I reported it previously from Batu and Jalor Caves (*loc. cit.*, p. 342).

## ORTHOPTERA.

## Fam. BLATTIDAE.

Subfam. *BLATTINAE*.Gen. *Spelaeoblatta*, Bolivar.*Spelaeoblatta* (?) *caeca*, sp. nov.

(Pl. xxi, figs. 1 to 11; pl. xxii, figs. 12 to 14.)

*Type*.—One immature male from Rupmath Cave, north of Jaintiapur, Jaintia Hills, Sylhet District [alt. *ca.* 1000–1500 ft.], (R. Friel and W. Ballantine, iii-18).

Apterous, size medium; coloration rather bright yellow, becoming almost orange about the middle of the body, lighter, rather greyish and translucent on the sides. Legs and antennae concolorous. Body shining, glabrous; legs with scarce pubescence.

Head narrow; occiput convex, exposed, face straw-yellow, with scarce pubescence; forehead broad, little convex, united with the facial shield without limit; clypeus twice as long as broad, almost rectangular, labrum as long as broad, subacute at the apex. Eyes, ocellae and ocelliform spots absent. Antennae a little longer than the body, yellow, pubescent; 1st joint large and thick, almost glabrous; 2nd short, cylindrical; 3rd almost thrice as long as broad, smooth, almost glabrous; the following joints are very short, with scarce pubescence; little by little they become longer and about the middle of the antennae they are thrice as long as broad, with an abundant hairy clothing. Maxillary palpi rather short, the 1st and 2nd joints very short; 3rd longer, dilated at the apex; 4th equal to 3rd in length, more strongly dilated; 5th a little longer than the preceding joints, subtriangular. Labial palpi with 1st and 2nd joints short, subequal to length, 3rd almost equal to them united, rather slender, not dilated at the apex.

Pronotum a little broader than long, with anterior margin widely rounded, posterior one weakly convex, posterior angles almost right angles, a little rounded; disk of a dark yellow, with a very fine longitudinal median keel; surface little convex, smooth, glabrous; anterior margin a little thickened, a rather long bristle on each posterior angle. Meso- and metanotum rather short, their

posterior margin a little sinuated, the angles prominent, provided with a bristle. Inferior part of the thorax whitish with a short rufous pubescence.

Abdomen rather narrow, depressed, yellow above, whitish beneath, glabrous, with a bristle at the posterior angle of each tergite. First tergite very short, the following regular, their posterior margin straight, to the 6th; 7th, 8th and 9th very short. 10th forming a small triangular supraanal plate, with sinuated margins and rounded apex. Sternites with their posterior margin a little concave, the 9th forming a short (incompletely developed) subgenital plate with posterior margin convex; style very short, bearing a few bristles. Cerci rather long, slender, composed of 8 joints, the first 3 of which are broader than long, the 4th almost square, 5th and following ones longer and longer, 8th slender, almost cylindrical; pubescence rather scarce, composed of long bristles.

Legs of the same colour as the body, with a short and scarce pubescence. Front femora compressed, armed beneath, at the external margin with a single apical spine, the internal margin bearing, near the base, 4 rather strong spines, then a series of about 10 spinuliform hairs, 1 strong enough spine and the apical one rather long, above this is a long, curved spur, inserted almost in the middle of the apical margin. Tibiae almost as long as the femora, cylindrical, with scarce pubescence, armed with 5 apical spurs, 1 external inferior and 3 superior spines (2 int., 1 ext.). Tarsi rather long, the 1st joint longer than the three following united, these equaling together the 5th; pubescence scarce, almost spinuliform. No arolia between the claws. Intermediate femora compressed, armed with a long, curved, apical spine on the superior external margin; inferior internal margin bearing 4 small spines, external margin with 4 or 5 weak spines separated by spinuliform hairs, one of which is apical. Tibiae rather long and strong, armed with 5 apical spurs, 7 superior (2 int., 2 med., 3 sup.) and 4 inferior spines (3 ext., 1 int.). Tarsi rather short, the metatarsus equaling the other joints together. Posterior legs similar to the intermediate ones, femora armed with a long, superior, internal apical spine, their inferior margins bearing 4 to 5 weak, irregular spines and 1 apical, a little stronger one. Tibiae armed with 5 apical spurs, 12 superior (5 int., 3 med., 4 ext.) and 8 inferior spines (4 int., 4 ext.), the external longer than the internal ones. Tarsi similar to the intermediate ones.

Length of body 11.5 mm., length of pronot. 2.6 mm., width of pronot. 3.5 mm.; ant. fem. 1.9 mm.; ant. tib. 1.5 mm., interm. fem. 2.4 mm.; interm. tib. 2.3 mm.; post. fem. 3 mm.; post. tib. 3.5 mm.; post. tarsi 3.6 mm.; cerci 3 mm.

Although represented by a single immature specimen, this species is very distinct from all the known cavernicolous Blattids and I do not hesitate to describe it. A careful examination of the genitalia allows me to suppose that this insect had two moults to make before being adult, very likely the imaginal stage would

not be much larger (about 15 mm.) and, as it shows absolutely no trace of elytra or wings, it would be apterous. If correct, this feature would need the creation of a new genus, the female of *Spelaeoblatta gestroi*, Bol., showing rudimentary elytra, and considering that an apterous male could not enter the same genus as a female provided with elytra. Yet, the male of *S. gestroi* being unknown, it seems better to leave the present species in the same genus till more abundant material is obtained.

It would be of the greatest interest to search those remarkable species which are known both from a single *type-specimen* only.

As I stated before, *S. caeca* is one of the most interesting cavernicolous Orthoptera, as it shows remarkable adaptative characters consisting in the disappearance of the pigment, the unusual length of antennae, legs and cerci and the complete disappearance of the organs of sight. From that point of view, it is the most adapted cockroach known, as none of the species described till now show completely blind males.

Fam. PHASGONURIDAE.

Subfam. RHAPHIDOPHORINAE.

Gen. *Rhaphidophora*, Serville.

*Rhaphidophora rufobrunnea*, sp. nov.

(Pl. xxii, figs. 15 to 17.)

*Type*.—One immature male from a cave near Yawngnwe, foot of Elephant Hill, S. Shan States (F. H. Gravely, 6·iii·17).

Species of a probably medium size, with a very marked coloration, stout stature, almost without pubescence.

Head little narrower than the pronotum, occiput and forehead almost black, rostrum narrow, black, forming two sharp tubercles, separated by a very narrow furrow which does not extend to the base of the rostrum; two large whitish ocellar spots. Face yellow with two small brown spots beneath the eyes and two brown bands beneath the antennae which do not extend to the clypeus; anterior part of the face very broad, narrowing suddenly at the base of mandibles, clypeus about once and a half broader than high, much narrower downwards, presenting two impressions in its inferior part and two small brown spots in the superior part; labrum longer than wide, brown with a short basal keel.

Mouth parts short, brown; maxillary palpi long, yellow, the three last joints subequal in length (2·2—2·4—3·1 mm.), labial palpi rather long, the 3rd article equaling the other two together. Antennae rufous brown, almost glabrous at base, pubescent after, very close together at base; first joint big, yellowish, with a brown band along the internal border; second joint very short, yellow; third a little longer, brownish; fourth shorter than the third but longer than the following ones.

Pronotum rather narrow, with anterior and posterior margins little convex, lateral lobes moderately high, their inferior margin

regularly and slightly convex, thickened, anterior angle completely obliterated; colour dark rufous brown, marbled on the disk with large brown spots along the anterior and posterior borders. Mesonotum and metanotum coloured like the pronotum; posterior margin of mesonotum rather strongly, of metanotum feebly convex; lateral lobes moderately high, their inferior border thickened, sub-angulate before the middle.

Abdomen dark rufous, the tergites posteriorly lined with brown; 10th tergite presenting a median impression, bordered with two little diverging keels and two large lateral facets to which the supraanal valve is articulated; this is large, lengthened, sub-acute at the apex, with blackish margins, it is set very exactly on the inferior valves which are broad, triangular. Inferior face of abdomen yellowish; subgenital plate forming a little apical process, weakly bilobed, furrowed; styli rather short, cylindrical.

Cerci moderately long, rather thick at base, yellow, darkened near the apex.

Legs rather short, rufous yellow, the apex of femora and the base of front and intermediate tibiae strongly darkened. Front coxae exteriorly compressed and bearing a weak spine; femora a little compressed, armed with a rather long, movable internal spine and a very short external one, tibiae thick, hairy, armed with two subequal apical spurs and 3 inferior spines, 1 of which internal in the midst and 2 external, longer, inserted a little above the internal and between that one and the apex. Tarsi short with metatarsus very little dilated at the apex, a little shorter than the other articles together, carinate beneath in its distal half, the basal one bearing small spinules, 2nd and 3rd joints very short, carinate beneath, the carina, as well as that of the metatarsus, blackish. Intermediate legs similar to anterior ones; coxae inermous, femora armed with 2 long, subequal, apical spines; tibiae rather thick at base, armed with 4 apical spines, the 2 superior of which are shorter than the inferior ones; superior margins armed each with 2 spines, the internal a little above the external ones; inferior margins armed with 2 external and 1 internal spine, disposed as those of the anterior tibiae.

Posterior femora short and stout, rufous brown at base, blackish at apex, external face presenting oblique blackish bands; tibiae blackish except the apex which is rufous brown; their superior margins armed with about 20 spines (20 ext., 21 int.), rather strong and close, the apical one a little remote from the preceding; 6 apical spurs, the superior internal one equaling the metatarsus; tarsi short, the metatarsus equaling the other articles together, compressed, feebly dilated at the apex, its superior margin little convex, armed with a broad apical yellow tooth and 4 very little denticulations, inferior margin as that of the other metatarsi; 2nd and 3rd article extremely short, 4th rather long and slender.

Length of body 16 mm.; length of pronot. 5.5 mm.; width of pronot. 5 mm.; cerci 5 mm.; ant. fem. 6 mm.; ant. tib. 6 mm.;

interm. fem. 6 mm.; interm. tib. 6 mm., post. fem. 13 mm.; post. tib. 12.5 mm., post. tarsi 5 mm., post. metat. 2.5 mm.

This species is described after a single immature male, from what I know of these cavernicolous Orthoptera the mature specimens must present almost exactly the same characters and their size must be about 25 mm. It is closely allied to *R. mulmeinensis*, Chop., having like the latter species very short legs but the rostrum of the vertex is more acute and the coloration shows a very decided contrast between the rufous ground-colour and the blackish markings of the body and legs.

### Gen. *Diestrammena*, Brunner.

*Diestrammena*, Brunner, 1888, *Verh. zool. bot. Ges. Wien*, XXXVIII p. 298.

*Paradiestrammena*, Chopard, 1919, *Mem. As. Soc. Beng.*, VI, p. 375.

When I described the genus *Paradiestrammena*, I explained that its creation seemed necessary to me on account of the specific identity of *Diestrammena marmorata*, Haan and *Tachycines asynamorus*, Adel. Since then, Dr. H. Karny had the opportunity of examining the types of Haan in the Leyden Museum and he wrote to me that *D. marmorata* was quite a different species of the *Tachycines* found in the hot-houses of Vienna and several other towns of Central Europe. A little later Pr. R. Ebner had the kindness to send me all the specimens of *Diestrammena* and *Tachycines* of the Brunner collection and I could ascertain that both species are very different from one another. *D. marmorata*, Haan, is a large species of the *longipes* group, known only from Haan's type and 6 specimens (4 of which are very young) in the Brunner collection.

The genotype of *Diestrammena*, Br., is therefore *D. marmorata*, Haan, and the description I gave for *Paradiestrammena* can be applied exactly to this genus.

The cavernicolous species of *Diestrammena* are much smaller than the typical species and form a pretty well-defined group. Several forms having been described and a few modifications made since I published a key for this genus (*Bull. Soc. ent. Fr.* [1916], pp. 154-159) I think it necessary to give a new synopsis of its known species.

### Key to the species of *Diestrammena*, Br.

1. Anterior and intermediate tibiae armed with 2 apical inferior spurs without median spine between them ... .. 2.
- Anterior and intermediate tibiae armed with 3 and 4 apical spurs with a small median spine between the inferior spurs ... .. 3.
2. Small size (10 mm.), slender; anterior tibiae bearing 1 single spine beneath, intermediate tibiae without spine; posterior tibiae unarmed beneath; ♂ subgenital plate very large, widely rounded, epiphallus very small, conical; ♀ sub-

- genital plate triangular with convex borders, apex subacute, ovipositor rather long, acute at apex ... *D. minuta*, Chop.
- Medium size (18—20 mm.); posterior femora spined beneath; anterior tibiae with 3, intermediate ones with 2 inferior spines; legs, cerci and face whitish; subgenital plate of ♀ triangular, very narrow, subtruncate at apex ... *D. apicalis*, Br.
3. Posterior femora unarmed beneath; general colour rufous without brown markings on the disk of pronotum; size rather small (12—16 mm.) ... 4.
- Posterior femora armed beneath with small spines on one edge at least; body and legs very often marbled with fuscous; size medium or large (16—35 mm.) ... 6.
4. Frontal rostrum divided into two acute tubercles, very widely separated; epiphallus of ♂ cylindrical with its apex free, crescent shaped; subgenital plate of ♀ triangular, ovipositor short with superior valves weakly excavated near the apex ... *D. feai*, Chop.
- Frontal rostrum very short or truncated at apex; epiphallus of ♂ rather large, depressed, trapezoidal or Y-shaped; subgenital plate of ♀ rounded, ovipositor longer than the cerci with superior valves regularly incurved ... 5.
5. Frontal rostrum short, truncated and feebly divided at apex; intermediate tibiae unarmed beneath; large internal spur of posterior tibiae shorter than the metatarsus which is spined beneath on all its length; subgenital plate of ♂ truncated at apex, epiphallus trapezoidal with rounded angles; inferior valves of ovipositor armed with 12 teeth towards the apex ... *D. brevifrons*, Chop.
- Frontal rostrum very short, divided into two small triangular tubercles, almost crushed; intermediate tibiae armed beneath with 2 spines on each border; large internal spur of posterior tibiae equaling the metatarsus which is carinated and unarmed in its apical half; subgenital plate of ♂ rounded, epiphallus Y-shaped (pl. xxii, figs. 21 and 22); inferior valves of ovipositor armed with 6 large denticulations towards the apex... *D. vitalisi*, Chop.
6. Medium sized species (16—20 mm.); 7th tergite of males without process. General colour rufous with fuscous markings ... 7.
- Large sized species (25—35 mm.); 7th tergite of males usually with a long process extending to the apex of abdomen; tegument very thick, general colour brown or fuscous or rather bright, mixed with yellow and whitish<sup>1</sup> ... 9.
7. Posterior femora armed beneath with 7—8 small spines on the internal margin. Coloration yellowish rufous, marbled with fuscous markings;

<sup>1</sup> The *Diestrammena* of this group are large insects, none of which seem to inhabit caves exclusively. Accordingly their tegument is more resisting than that of the species of the preceding group. The long process of the 7th abdominal tergite of the males is very remarkable and I thought it characteristic of the group, yet it seems absent in several species, as Karny does not speak of it in a recent description (*D. ingens*, Karny, 1918,) and the male of *D. marmorata*, Haan, of the Brunner collection does not appear to possess such a process, but its posterior end being very much damaged does not permit of being quite certain.

- subgenital plate of ♀ notched at apex (♂ unknown) ... *D. indica*, sp. nov.
- Posterior femora armed beneath with 1—3 very small spines on the internal margin, subgenital plate of ♀ with 3 or 5 apical lobes ... 8.
8. Coloration rufous, rather uniform, thorax weakly shining, the tergites bordered with brown posteriorly, subgenital plate of ♀ with 5 apical lobes, cerci shorter than the ovipositor (♂ unknown) ... *D. annandalei*, Kirby.
- Coloration less uniform; pronotum marked with two large, very neat, yellowish spots near the anterior border and presenting, as well as the mesonotum, a median brown band; thoracic and three first abdominal tergites very shining; subgenital plate of ♀ trilobed at apex, the median lobe more or less notched at apex; cerci as long as or longer than the ovipositor, epiphallus of ♂ rectangular with a subacute process ... *D. graveleyi*, Chop.
9. Large internal spur of posterior tibiae shorter than the metatarsus ... 10.
- Large internal spur of posterior tibiae at least equal to the metatarsus ... 12.
10. Posterior femora armed beneath with 9—10 external and 16—17 internal spines; anterior tibiae with 2 spines on each inferior margin; coloration rather bright, mixed with small brown, light yellow and whitish spots; pubescence almost invisible; process—of 7th abdominal tergite of ♂ rounded at apex (♀ unknown) ... *D. longipes*, Rehn
- Coloration dull chestnut brown; armature of the posterior femora weaker (unknown in *D. ingens*, Karny) ... 11.
11. Formosan species; subgenital plate of ♂ large, posteriorly submarginate (♀ unknown) ... *D. ingens*, Karny.
- Tonkinese species; posterior femora armed beneath with 2—3 external, 9—11 internal spines; anterior tibiae with 2 external and 1 internal spine; subgenital plate of ♀ square (♂ unknown) ... *D. maculata*, Chop.
12. Face wholly black; large internal spur of posterior tibiae longer than the metatarsus; posterior femora presenting a large fuscous, longitudinal band on their superior margin; subgenital plate of ♀ carinated, notched at apex (♂ unknown) ... *D. griffinii*, Chop
- Face adorned with longitudinal, blackish bands; large internal spur of posterior tibiae equal to the metatarsus; subgenital plate of ♀ triangular ... 13.
13. Face adorned with 2 longitudinal bands; 7th tergite of ♂ without process, subgenital plate of ♀ acute at apex, ovipositor short (length of post. fem. 31 mm., of ovipositor 12 mm.) ... *D. marmorata*, Haan.
- Face adorned with 4 longitudinal bands; 7th tergite of ♂ with a long process, slightly notched at apex; subgenital plate of ♀ rounded at apex, ovipositor longer (length of post. fem. 32 mm., of ovipositor 21 mm.) ... *D. palpata*, Rehn.

### *Diestrammena brevifrons*, Chopard.

Rupmath Cave, north of Jaintiapur, Jaintia Hills, Sylhet District [alt. ca. 1000–1500 feet], (R. Friel and W. Ballantine, iii:18);



1 adult ♀, 3 immature ♀ and 5 immature ♂ (stages A and B), 6 very young examples.

This species was previously recorded from Maosmai Cave, Cherrapunji (*cf.* Chopard, *Mem. As. Soc. Bengal* VI [1919], p. 381).

*Diestrammena indica*, sp. nov.

(Pl. xxii, figs. 18 to 20.)

*Type*.—One immature female from a dark cave near Yawng-hwe), foot of Elephant Hill, S. Shan States (F. H. Gravely, 6·iii·17).

Medium sized species (ca. 16–18 mm.); coloration very neat, golden, abundant hair-clothing.

Head with short occiput, spotted with brown behind the eyes; face yellowish with a scarce pubescence, a longitudinal fuscous band beneath each eye and two other irregular ones from the internal angle of the antennary socket to the external angle of the clypeus; this is almost three times as broad as high, weakly carinated in the middle in its inferior half; labrum small, rounded, yellow. Mouth parts lengthened, yellow, maxillary palpi very slightly darkened, with 2nd joint rather long, the following joints being respectively 3·5–3·8 and 6 mm. in length; labial palpi with 3rd joint a little longer than the two other ones. Frontal rostrum short, formed of two blackish tubercles, broad at base but rather acute, widely separated at apex; a big, round, whitish ocellar spot at their base on each side. Antennae long, rufous, 1st joint large, 2nd thick and short, 3rd very long, cylindrical, 4th almost half as long as 3rd, 5th scarcely longer than the following ones.

Pronotum strongly convex, anterior border almost straight, posterior border very convex, subangulate in the middle; lateral lobes high, their inferior margin forming a feebly marked angle. Coloration rufous yellow, marbled with fuscous markings, irregularly disposed along the anterior and posterior borders; these markings are neat, chiefly near the posterior angle of the lateral lobes. Mesonotum with posterior margin very convex, coloured as the pronotum, its lateral lobes high with inferior margin very strongly convex; metanotum similar to the mesonotum but with posterior margin almost straight and lateral lobes a little high. Meso- and metathoracic episterna spotted with fuscous, the inferior margin of the mesothoracic episterna a little dilated in an angular lamina.

Abdomen presenting the same system of coloration as the thorax, 3rd tergite showing a fuscous mark larger than on the other tergites; 10th tergite emarginate at apex, brown in the middle; superior anal valve lengthened with sides a little convex, apex acute. Inferior face yellowish; subgenital plate not completely developed but its outline truncated and notched in the middle at apex. Cerci rather long, yellow, with a wide ring and the apical fourth fuscous.

Anterior coxae spotted with brown with a rather weak spine; femora presenting 3 fuscous rings and bearing a long external

yellow spine and a very small internal one; tibiae yellow with 4 fuscous rings, armed with 2 rather long, subequal, inferior apical spurs between which is a small spine, and with a short external superior spur, besides their inferior borders bear 2 external spines and 1 internal inserted a little above the inferior external one. Tarsi: long metatarsus longer than the other articles, wholly spined beneath except at apex, 2nd and 3rd joints keeled and glabrous beneath. Intermediate legs similar to the anterior ones, apical spines of the femora long and movable, the external a little longer than the internal one; armature of the tibiae similar but with 2 small superior spurs.

Posterior femora adorned with a brown ring and a few brown spots, bearing 2 very small genicular and 7-8 very small spines on the internal inferior border; tibiae spotted with brown, armed on each superior margin with 25-30 spines, one of which is stronger than the others and the apical one somewhat distant from the preceding. Apical spurs very long, the superior internal a little shorter than the metatarsus; this one is spined beneath and armed with a small apical spine.

Length of body 13 mm., pronot. 5 mm.; width of pronot. 5 mm., ant. fem. 11 mm., ant. tib. 11.5 mm.; interm. fem. 9.5 mm.; interm. tib. 10 mm.; post. fem. 20.5 mm.; post. tib. 21 mm.; post. tarsi 8.5 mm., post. metat. 5 mm.; sup. int. spur 4 mm.; cerci 8.5 mm.; ovipos. 5.5 mm.

This species belongs to the group of the medium sized cavernicolous species of *Diestrammena* (*D. annandalei*, Kirby, *D. gravelyi*, Chop., etc.); it differs from them in the numerous small spines of the inferior internal margin of the posterior femora, besides the shape of the subgenital plate must be very different when the insect is adult.

### Gen. *Tachycines*, Adelung.

*Tachycines*, Adelung, 1902, *Ann. Mus. zool. Ac. Petersbourg* VII, p. 56.  
*Diestrammena*, Chopard, 1919, *Mem. As. Soc. Beng.* VI, p. 376.

This genus, established by Adelung for *T. asynamorus*, is quite well characterised by the disposition of the spines on the superior margins of the posterior femora. All the variations shown by the species of *Diestrammena* as to the form of the subgenital plate and anal valves, the presence of a process on the 7th tergite of the ♂, the number of spines on the posterior femora, etc. may be found in the species of the present genus. A key for the determination of these species has been published by me in *Bull. Soc. ent. Fr.* [1916], p. 158.

### *Tachycines adelungi*, sp. nov.

(Pl. xxii, figs. 23 to 25; pl. xxiii, figs. 26 to 28.)

*Type*.— One male from Ngot bat Cave, Yawnghwe State, S. Shan States, ca. 4000 ft. (F. H. Gravely, 1917).

*Co-types*.—Three adult ♂, 1 immature ♀ and 3 young examples, same locality.

Size medium, coloration rather high, not shining; pubescence rufous, rather abundant.

Head rufous; occiput very short with a squamiform, brownish pubescence; frontal rostrum short, formed of two conical tubercles, very obtuse and smooth with a few hairs at apex, punctate at base, brown with a large ocellar spot; forehead very short and narrow, face uniformly yellowish, long; clypeus about twice as broad as high, presenting a slight transverse keel; labrum longer than broad. Maxillae with 2 apical and 1 anteapical teeth; palpi very slender, yellowish, each joint weakly darkened at base and apex; length of 3rd to 5th joints: 4-4.5-7 mm. Basilar almost square, mentum rather long, palpigere and lobes long; palpi with 3rd joint a little longer than the other two together. Antennae extremely approximated at base, rufous, internal face of the 1st joint almost touching each other.

Pronotum with anterior border weakly, posterior border rather strongly convex, lateral lobes high, their inferior margin weakly convex, subangulate in the middle, disk rufous, a little darkened in the middle, anterior and posterior margins narrowly and not neatly bordered with brown; a rather vague brown spot on each side of the median line, near the anterior margin and the posterior angle of the lateral lobes. Mesonotum with posterior margin rather strongly convex, lateral lobes with inferior margin straight, forming a rounded process backwards; colour as that of the pronotum with a large brownish spot in the middle, lateral lobes and 2 small spots near the posterior border brown. Metanotum like mesonotum with lateral lobes regularly rounded and posterior margin a little convex. Mesothoracic episternum with inferior border broadened, subangulate.

Abdomen rather bright rufous with posterior margin of each tergite slightly darkened; 10th tergite short, with posterior margin laterally keeled; supraanal valve triangular with convex sides, inferior anal valves triangular, acute at apex. Inferior face yellow, subgenital plate wide, convex at base, emarginate at apex.

Cerci long, very slender with extremely fine pubescence.

Genitalia composed of 4 membranous triangular valves and a flat, subrectangular epiphallus.

Legs long and slender; anterior and intermediate femora annulated with brown, tibiae brownish; anterior femora with a very short internal spine and a long external one, anterior tibiae armed with 4 apical spurs, the superior external one very small, and 1 short inferior spine between the spurs; inferior margins bearing 2 external and 1 internal spine; intermediate tibiae likewise armed but with only 1 external and 1 internal inferior spine, inserted at about the apical third; tarsi slender, the metatarsus equaling the other joints together. Posterior femora very slender, annulated near the apex and adorned, at their external face, with a few brown spots; inferior margin unarmed; 2 very small apical

spines; tibiae a little longer than the femora, armed with 65 to 75 very close spines forming very neat increasing series according to the formula below; superior internal spur equal to metatarsus, which is armed at apex with a very short spine, wholly keeled beneath.

*Individual variations.*—The armature of the posterior tibiae vary as follows (the series marked in thick cyphers is terminated by a spine stronger than the others).

- } int. 3-4-6-7-4-5-6-3-4-**5**-8-4-4-2-1=66.  
 } ext. 1-3-3-4-2-3-7-4-4-6-5-**5**-7-3-3-4-1=65.  
 } int. 2-3-3-2-3-3-4-2-2-2-4-3-5-7-**3**-8-3-4-2-1-1=67.  
 } ext. 1-1-3-4-4-6-4-4-3-5-2-5-3-6-**8**-9-3-5-2-1=79.  
 } int. 1-1-2-2-4-3-3-7-3-4-6-4-**7**-6-2-3-2-1-1=62.  
 } ext. 2-2-3-3-3-4-5-3-3-4-7-**7**-8-3-4-1=62.  
 } int. 1-2-3-3-3-3-6-3-5-7-6-**6**-**7**-12-4-2-1=74.  
 } ext. 1-2-2-4-4-6-1-6-6-5-**8**-10-7-2-1-1=66.  
 } int. 1-3-4-3-6-5-5-6-4-5-**4**-7-3-3-4-1-1=65.  
 } ext. 1-2-1-3-3-4-3-3-5-4-5-5-4-**5**-6-3-8-1-1=67.  
 } int. 1-2-2-3-3-3-4-5-3-3-4-6-4-5-**3**-7-3-3-3-2-1=70.  
 } ext. 1-2-2-1-1-4-1-5-3-4-4-4-5-3-**4**-6-5-5-1-1=62.  
 } int. 2-2-1-2-6-4-2-6-3-6-4-**5**-4-5-4-1-3-1=61.  
 } ext. 1-1-2-1-1-3-4-5-7-5-5-4-4-**7**-6-2-4-3-1=66.  
 } int. 1-3-1-2-4-4-5-4-5-9-6-**7**-8-4-3-2=68.  
 } ext. 1-4-3-2-3-7-4-4-5-6-6-6-**5**-10-5-1-1=73.  
 } int. 1-1-2-3-1-6-9-5-4-5-3-6-**4**-7-3-4-3-1-1=69.  
 } ext. 2-3-4-1-7-5-2-5-7-4-5-5-**6**-6-4-4-3-1=75.  
 } int. 1-3-3-2-2-4-5-**7**-5-4-**6**-6-3-6-1-1=59.  
 } ext. 1-1-3-1-3-6-4-3-2-3-6-4-4-**6**-10-3-2-1=63.

Length of body 15 mm.; pronot. 5.8 mm., width of pronot. 5.2 mm.; cerci 10 mm.; ant. fem. 11 mm.; ant. tib. 12.5 mm.; interm. fem. 10 mm.; interm. tib. 11 mm.; post. fem. 22 mm.; post. tib. 23.5 mm.; post. tarsi 9.6 mm.; post. metat. 5 mm.; sup. int. spur 5 mm.

This species is certainly very closely allied to *T. (Gymnaeta) beresowskii*, Adel., from occidental China and it is most difficult to give a good character to separate these forms. The latter is described from a single, very probably immature female, and a knowledge of the subgenital plate of the ♀ and epiphallus of the ♂ will be necessary to identify these two species with certainty. Yet I do not think there is the least doubt as to the validity of both of them as species of this group, chiefly the carvernicolous ones, prove to have a very restricted geographical distribution.

## Fam. GRYLLIDAE.

## Subfam. PHALANGOPSINAE.

Gen. *Arachnomimus*, Sauss.*Arachnomimus* sp.

Siju Cave, Garo Hills (R. Friel, Nov. 1917); two very young examples, ♂ and ♀

These very young specimens may belong either to one of the known species or to a hitherto undescribed form; their characters which merely allow a recognition of the genus are as follows:—

Length of body ♂ 8 mm., ♀ 5 mm.; post. fem. ♂ 6.5 mm. ♀ 4.5 mm.; post. tib. ♂ 7.5 mm. ♀ 5 mm.

Yellowish brown, legs spotted with fuscous, chiefly the posterior femora; face yellow; maxillary palpi with 3rd joint longer than 4th and 5th longer than 3rd. Pronotum showing two large brown impressions on the disc, lateral lobes with inferior margin strongly ascending backward, meso- and metanotum almost uniform dark brown. Posterior femora with 3 small internal spines and 3 longer and 1 very short external the latter quite near the apex; external spurs short, intermediate and superior ones long, the latter shorter than the former; metatarsi very long.

## APPENDIX.

Two species must be ascribed to the genus *Tachycines*, both of them known only from the types in the Indian Museum collections; one is new, the other having been very shortly described by me in *Bull. Soc. ent. Fr.* [1918], p. 245. Although this latter species is described from a specimen having lost its posterior limbs, it is so very close to the other that there is little doubt that they both belong to *Tachycines*, they form a special group in that genus characterized by rather stout shape and comparatively short legs. I give hereafter a full description of these two species.

*Tachycines cryptopygius*, Chopard.

(Pl. xxiii, figs. 29—33 & 34B.)

*Diestrammena cryptopygia*, Chopard, 1918, *Bull. Soc. ent. Fr.*, p. 245; 1920, *Recherches sur la conformation et le développement des derniers segments abdominaux chez les Orthoptères*, p. 144, fig. 187 et 188.

*Diestrammena palpata* (♂), Griffini, 1914, *Atti Soc. it. Sc. nat.*, LIII, p. 30.

Nemotha, Cachar (Assam); 1 ♂

A rather large-sized, brown-coloured species, face with 4 longitudinal brown bands; anterior and intermediate femora darkened near the apex and in the middle; hair clothing little abundant.

Head with occiput short, showing 4 longitudinal, indistinct, lighter lines; vertex terminated in a rather narrow rostrum furrowed and divided at apex forming two rounded, smooth tubercles; face yellowish, presenting 4 longitudinal brown bands,

one beneath each eye, extending to the external angle of mandible, the other two going from internal border of antennal socket to inferior angle of clypeus. Eyes rather small, black, broad and rounded in their superior portion, narrower inferiorly; ocellar spots scarcely visible at base of rostrum. Antennae rufous, approximated at base, 1st joint big, swollen, yellowish beneath, darkened above, 2nd joint very short, cylindrical, 3rd long and slender, 4th about half as long as 3rd, 5th and following ones short, cylindrical; the 2 first joints bear a short, weak pubescence above only, the following to the 10th are almost glabrous; from that last one on, each article bears beneath a rather thick tuft of rufous hairs; the antennae are broken off at about the 30th article, but it is probable that this special pubescence continues a little farther into a general regular pubescence. Mouth parts rather long; maxillae with 1 antepical tooth almost as long as the apical ones; palpi long and very slender, the 3rd to 5th joints being respectively 4.5-5.5 and 8 mm. in length, labial palpi with 1st joint short, dilated at apex, 2nd lengthened, somewhat curved, 3rd almost as long as both preceding ones together, a little swollen and rounded at apex.

Pronotum rather dark rufous, somewhat darkened anteriorly and in the middle; anterior border weakly convex, posterior one subangulate in the middle, concave laterally; lateral lobes high, their inferior margin forming a rounded angle a little before the middle, anterior angle completely obliterated, posterior one rounded. Mesonotum with posterior margin subangulate in the middle, strongly concave laterally, lateral lobes very high; their inferior margin convex. Metanotum a little shorter than the mesonotum, with posterior margin regularly convex, lateral lobes not so high, their inferior margin weakly convex.

Abdomen above rufous, each tergite being slightly darkened posteriorly, 7th tergite ending in a long, slightly curved process, the margins of which are almost parallel to the base, apex slightly emarginate; superior face of this process compressed with a rounded shelving ridge; 8th to 10th tergites very short, hidden under the process of the 7th, 10th truncate at apex with lateral right angles, feebly projecting, the 11th tergite is very small, triangular, actually crushed between the inferior anal valves, the strange aspect of which has been already pointed out by GRIFFINI (*l.c.*, p. 31). They are greatly developed, ending in a process rather longer than the body of the valve, somewhat curved, truncate at apex, pubescent beneath; external and superior faces of the valve very strongly rounded, swollen, inferior one flat. Subgenital plate large, swollen at base, regularly convex at apex.

Cerci rather short, dilated at base, with a short, fine pubescence and long, scarce bristles.

Genitalia presenting no sclerified epiphallus, the valves being divided into two groups, forming triangular lamellae.

Anterior and intermediate legs rather long, posterior ones failing, anterior femora armed with 2 apical spines, the internal

one being short as is usual in the genus; tibiae slender, somewhat compressed, armed with 4 apical spurs, the superior of which are very short, and 5 inferior spines of which 1 apical and 4 disposed in pairs a little beneath the middle and the apical third of the tibia; tarsi long, compressed, the metatarsus longer than the other articles together, the 3 first joints carinated beneath. Intermediate legs a little shorter than the anterior ones, presenting the same features and armature except the femora which bear two long apical spines.<sup>1</sup>

Length of body 22 mm.; pronot. 7.5 mm.; width of pronot. 7.3 mm.; ant. fem. 17.5 mm.; ant. tib. 19 mm.; interm. fem. 15 mm., interm. tib. 16.5 mm.; process of 7th abd. terg. 4.5 mm.

This species shows very remarkable characters in the abdominal end and also in the antennae; it is to be noted that the special pubescence of these organs is certainly restricted to the male sex, thus showing a link to the much differentiated antennae of the *Pachyrrhama* Br.

### *Tachycines validus*, sp. nov.

(Pl. xxiii, figs. 34A and 35 to 38.)

*Type*.—One female from Dawna Hills, Misty Hollow to Sukli, alt. 2100–2590 ft. (F. H. Gravely, 22–24-xi-II).

A species remarkable by its large size and chiefly by its stout form and relatively short and thick legs; colour rather irregularly and probably strongly marbled with brown (the type is much discoloured by a long stay in alcohol); face showing 6 longitudinal irregular bands; anterior and intermediate femora a little neatly annulated, darkened at apex, posterior femora almost unicolourous. Pubescence rufous, very caducous.

Head with occiput short, presenting a brown spot behind each eye. Frontal rostrum very narrow and lengthened, furrowed on its whole length but very feebly incised at apex, forming two acute tubercles. Face wide, yellowish, adorned with 6 longitudinal, irregular bands, joined to one another in their inferior part. Clypeus very broad, its inferior margin scarcely shorter than the superior one, adorned with two brown spots. Eyes small, much behind the base of antennae, ocellar spots very neat. Antennae about three times as long as the body, rufous; 1st joint large, cylindrical, 2nd very short, little swollen in the middle, 3rd almost twice as long as the 2nd, 4th a little longer than the following ones. Maxillary palpi long, testaceous, the 3rd and 4th joints not very slender, 5th almost twice as long as 4th (their length being respectively 3.1–3.7 and 7.5 mm.); labial palpi rather short, the 3rd joint a little shorter than the other 2 together.

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<sup>1</sup> To tell the truth, the specimen described does not bear on the one intermediate femur remaining more than 1 internal, long, movable apical spine, the external one being very short; but it is evident that this is an anomaly caused by a mutilation before the last moult, this spine being thick and yellowish and not at all slender and brown as the immovable spines of the anterior femora.

Pronotum very strongly convex, its anterior border convex, the posterior one rather strongly convex in the middle, almost straight laterally, lateral lobes very high, their inferior margin rather regularly rounded, anterior and posterior angles obtuse, rounded. Coloration rufo-testaceous with interrupted brown spots, forming a narrow band along the anterior and posterior margins and a large median, irregular fascia. Meso- and meta-notum similar to pronotum, the former with posterior margin sub-angulate in the middle, very strongly concave laterally, lateral lobes rather high, with inferior border weakly convex, the latter with its posterior margin almost straight, lateral lobes widely rounded.

Abdomen rufous above with a few irregular brown spots along the median line and near the posterior margin of each tergite; these margins are regularly convex to the 5th, 6th somewhat angular in the middle, 7th weakly projecting above the 8th and 9th, which are very short; anal valves triangular, acute at apex, the superior one very small, and pressed between the inferior ones which are somewhat projecting at apex. Subgenital plate yellowish, large enough, flat, presenting 2 small basal lobes, narrowing towards the apex which is rounded, feebly incised in the middle.

Cerci rather short, thick at base, little curved, presenting a blackish ring near the middle and darkened at apex.

Ovipositor somewhat longer than half the body, rather slender, almost straight; inferior valves bearing a few broad denticulations near the apex, internal ones extending almost to the apex.

Legs relatively short and thick; anterior femora armed with 2 apical spines, the external of which is long and movable; tibiae slightly longer than the femora, rather slender, armed with 3 or 4 apical spurs (the superior ones very short, the internal sometimes failing), 4 inferior spines disposed in pairs at the basal and apical thirds and 1 small spine between the inferior spurs; tarsi rather long, compressed, the metatarsus a little longer than the other joints together, the 3 first joints wholly carinated beneath. Intermediate legs very similar to anterior ones, femora armed with 2 movable spines, tibiae bearing 4 apical spurs, 2 external, 1 internal and 1 apical inferior spine. Posterior femora thick at base, their filiform part much shorter than the swollen part, their internal inferior margin armed with 9-10 small brown spines in their proximal part, genicular lobes armed with a small spine. Tibiae scarcely longer than the femora, indistinctly annulated, armed with about 80 spines, disposed in increasing series as follows —

{ int. 2-4-4-4-5-4-5-5-5-4-5-5-5-6-7-6-4-2-1=83.  
 { ext. 2-5-5-3-3-4-4-5-5-5-5-4-5-4-6-4-4-3-1=77.  
 { int. 3-4-4-4-6-6-4-5-5-6-6-5-5-5-4-5-4-1-1=83.  
 { ext. 1-3-5-4-4-3-4-5-5-5-5-5-3-5-4-6-4-4-3-1=79.

One of the spines on each margin (marked in thick cyphers) is stouter than the others, the apical one is rather strong and



separated from the preceding by a small inermous space. Spurs long, hairy, the superior internal extending to the apex of metatarsus ; this is provided at apex with 3 small brown spines.

Length of body 27 mm. ; pronot. 8.5 mm. ; width of pronot. 8 mm. ; cerci 7 mm. ; ovipos. 15.5 mm. ; ant. fem. 14.5 mm. ; ant. tib. 15 mm. ; interm. fem. 13 mm. ; interm. tib. 13.5 mm. ; post. fem. 30.5 mm. ; post. tib. 31 mm. ; post. tarsus 11.5 mm. ; post. metat. 6.5 mm.

This species is very similar to the preceding one but it cannot be the female of that species as it differs from it in many characters, chiefly in the length of the maxillary palpi and the shape of the pronotum.

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