THE FAUNA OF AN ISLAND IN THE CHILKA LAKE.[1]

THE DERMAPTERA AND ORTHOPTERA OF BARKUDA ISLAND.

By L. CHOPARD, *D.Sc.*

INTRODUCTORY NOTE.

[Dr. Chopard in his introduction to this paper has referred to the absence of Phasmids, to the comparative scarcity of Mantids and to the relatively large number of Blattids and Gryllids in our collection from Barkuda. The additional collections of the last two years have confirmed these points as actual facts in the fauna. I have found, indeed, few species which seemed to me different from those sent to Dr. Chopard.

The absence of Phasmids is probably to be accounted for by the peculiarities of the vegetation,[2] which includes very few plants with leaves which are neither hard nor leathery nor with milky juice. This peculiarity also accounts for the scarcity of many forms of Phasgonuridae, but the Pseudophyllids seem to be an exception. They are evidently able when adult to feed on the leathery leaves of such shrubs as *Glycosmis* and are also largely insectivorous in their immature stages, which they spend on the ground and low bushes. An interesting piece of evidence in confirmation of this view is to be found in the very occasional occurrence of the Acridid genus *Aularches* on the island. In Peninsular India this genus feeds almost exclusively on the wooly leaves and twigs of the Asclepiad shrub *Calotropis*, the juice of which is milky and obnoxious to most insects. As a rule this shrub does not occur in Barkuda, though it is common on the neighbouring mainland; but an occasional plant grows up on the shore from a stray seed. The leaves are left untouched by the Orthoptera of the island, but sooner or later *Aularches* appears, singly or in numbers, and devours them.

The scanty growth of grasses and other herbaceous plants on the island accounts for the absence of many Acridids, but the Tettiginae, which feed mainly on the algae that grow on damp stones, etc., have abundant food in the wet season.

The scarcity of Mantidae is probably correlated indirectly with the type of vegetation and due directly to the scarcity of small insects among shrubs and bushes. There is, indeed, very little prey for insectivorous species in this position.

In the dry season the Phasgonuridae, Acrididae and Mantidae almost completely disappear and even in the rainy season of a dry year individuals are scarce. In the summer of 1923, in which the rains did not begin until very late indeed on Barkuda, even the small Gryllids (*Tridactylus*, etc.) and Tettigines which usually fly to light in large numbers were scarce.

The insect fauna of the island as a whole is poor except in forms which conceal themselves under stones or in dead leaves. The fact of the comparative abundance of crickets and cockroaches is thus characteristic. I believe that the fact is due not to the dampness of the climate, as Dr. Chopard has suggested to me, but to the alteration of dampness and dryness and to the lack of humidity for long periods.

I agree with Dr. Chopard that very few of the species found in termite-mounds or with ants are actually termitophilous or myrmecophilous. Certain ants (for example *Acropyga acutiventris* and *Ponera tesserinoda*) are usually found under stones and with them various small millipedes, isopod crustacea, beetles, etc., occur occasionally which are also found in other places. The number of true myrmecophilous species in all groups is, however, small. Similarly the garden-chambers in termite-mounds which have been deserted by the termites are favourite hiding-places for all kinds of hygrophilous insects, because moisture is abundant in them long after the outside of the mound is quite dry. Prof. Silvestri notes, moreover, that a large proportion of the species I have sent him as termitophilous, that is to say as found with the living termites in mounds, are merely chance visitors. It is only those species which live actually in the fungus-combs which can be regarded as true termitophils.

The physical and floral conditions of the island are thus unsuitable for a rich fauna of leaf-eating or fruit-eating insects. It is too remote from any great desert region for the immigration of desert forms, for which the wet season would be unsuitable, and too small and too little isolated for the evolution of endemic species. The Orthopterous fauna probably represents a selection from that of the central parts of Peninsular India rather than a peculiar island fauna. The smaller species of Orthoptera, especially those of

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[1] For previous papers in this series see *Rec. Ind. Mus.*, XXII, pp. 313—422 (1921); XXIV, pp. 289—311 (1922); XXV, pp. 221—263 (1923).

[2] Annandale, *Mem. Asiat. Soc. Bengal*, VII, p. 274 (1922).

cryptic habits, have as yet been very little collected in this region. The small number of species on Barkuda as compared with that found in Trichinopoly is probably a fact and mainly due to the small area of the island and to the local conditions of vegetation, climate, etc.—*N. Annandale.*]

Dr. Annandale has sent me for examination a rather large number of Orthoptera collected by himself and his collaborators during the years 1919-20 on Barkuda Island. Although it cannot be maintained that the whole of the orthopterological fauna of the island is represented in this collection, we may admit that most of the common forms have been collected. Consequently an attempt can be made to analyze the composition of this fauna and to discuss its relations with the fauna of continental India. The first striking point is the poverty of the island in Orthoptera compared with the neighbouring regions. In fact Dr. Annandale has only collected 80 species whereas Bolivar in his essay on the Orthoptera of Trichinopoly records as many as 275 species. Among these 80 species, we find 5 Dermaptera, 17 Blattidae, 4 Mantidae, 10 Phasgonuridae, 21 Gryllidae and 23 Acrididae; those figures are interesting to compare with those recorded by Bolivar which are: 14 Dermaptera, 27 Blattidae, 23 Mantidae, 50 Phasgonuridae, 35 Gryllidae, 100 Acrididae and 26 Phasmidae. We can notice at once that the last family seems quite absent in Barkuda and that the Blattids and Gryllids are relatively much more abundant than the other families. As to the Phasmids, Dr. Annandale himself called my attention to this point; yet, owing to their way of living, it is possible that some of these insects have escaped his investigations; anyhow they must be very scarce on the island.

The scarcity of Mantids is remarkable and may be due also to the climate. Among the Acridids, as could be expected, the Tettiginae prove comparatively very abundant.

Finally a special notice can be made concerning termitophilous and myrmecophilous species which have been carefully searched for by the collectors. I believe that none of the species found in the termite-mounds are truly termitophilous species although there is among them a very interesting new form which I have placed with doubt in the genus *Mogoplistes*. As to the myrmecophilous ones, they are represented only by species of the genus *Myrmecophila* and perhaps a remarkable small *Ornebius* which would be the first species of the genus known as living with ants. I believe that all the other Blattids or Gryllids found in termite-mounds or with ants are merely hygrophilous species which find there a retreat.

As a whole the fauna of the island does not present very special characters; it can only be noticed that hygrophilous species seem more common than in neighbouring regions, while xerophilous species seem very scarce.

DERMAPTERA.

Family FORFICULIDAE.

1. **Pyge ophtalmica** Dohrn.

Barkuda, one immature male, viii-17 (*N. A.*).

Dr. A. Borelli, of Torino, had the kindness to identify this immature specimen.

2. **Diplatys flavobrunnea,** sp. nov.

(Fig. 1.)

Barkuda, one female (*type*), viii-19 (*F. H. G.*).

♀. Small and slender; general colour pale testaceous with head, apical half of the elytra and apex of abdomen blackish. Antennae yellow with 15 ? segments, first long, darkened, second very short, fourth shorter than the third as is usual in the genus. Head of a very dark brown colour, slightly tumid between the eyes; palpi pale at apex. Pronotum longer than broad, slightly narrowing posteriorly, posterior margin rounded; surface bearing a few long bristles. Scutellum rather large, yellow as the pronotum. Elytra yellow in their basal half, blackish in the apical one, ample, with a few stiff bristles on the shoulders; wings long, yellow. Abdomen yellowish, the two apical segments darkened; last dorsal segments sloping, truncated posteriorly; penultimate ventral segment slightly concave; last ventral segment angulate posteriorly. Forceps cylindrico-conical, rather slender, straight. Legs long and slender; femora yellow, tibiae darkened, tarsi very pale; anterior femora armed on each inferior margin with 5-6 long bristles.

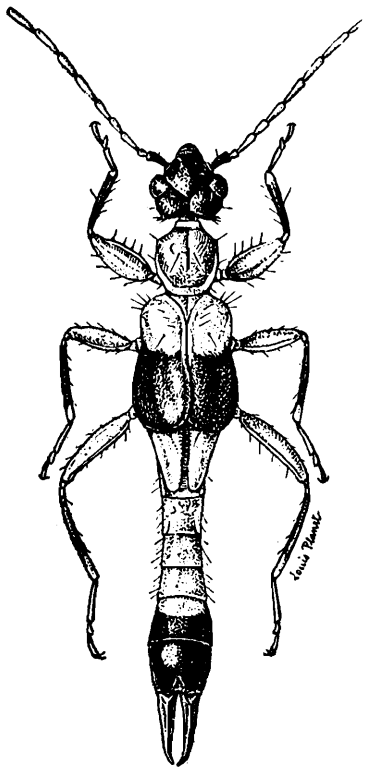

FIG. 1. *Diplatys flavobrunnea,* n. sp., ♀ ×7.

Length of body 10 mm.; forceps 1·5 mm.; elytra 2·5 mm.; wings 1·1 mm.

3. **Forcipula quadrispinosa** Dohrn.

Barkuda, numerous examples of both sexes and at different stages of development, 25-vii-4-viii-17 and 15-22-vii-16 (under stones on shore of island).
(This and the following species are the only common earwigs on Barkuda. They are both abundant under stones on the shore, but scarce in the interior of the island. *N. A.*).

A common species in India.

4. **Labidura riparia** var. **inermis** Br.

Barkuda, 2♂, 7 ♀, 25-vii—4-viii-17 and 15—22-vii-16.

A widely distributed species.

5. **Anisolabis annulipes** Luc.

Barkuda, Aug. 19, 1 ♀ (*F. H. G.*).

A cosmopolitan species. (Occasionally taken at light).

ORTHOPTERA.

Family BLATTIDAE.

6. **Theganopteryx parvula** Walk.

Barkuda, 4—19-x-19, 1 ♀ at light (*F. H. G.*).

A species known only from India.

7. **Ischnoptera fulvastra,** sp. nov.

Barkuda, ix-19, 1 ♂, 1 ♀ *types* (*F. H. G.*); Aug. 19 (*F. H. G.*), 2 ♀; 15—22-vii-16, (*F. H. G.*), 2 ♀; 27-x-20 and 20-vi-20 (*N. A.*), several females with egg-case, at light; 21-viii-20 (*N. A.*), 2 ♀; 9-vi-20 (corner of room), 1 ♂, 1 ♀.

Large species, of a rufo-testaceous uniform colouration. Eyes very approximated chiefly in the ♂; ocelliform spots large, round, yellow; forehead presenting a brown band between the eyes; face long, triangular, rufous; maxillary palpi testaceous, darkened at apex, with 4th and 5th joints short. Pronotum slightly convex, with anterior and lateral margins much rounded, almost semicircular; posterior margin subangulate. Legs testaceous; anterior femora armed on their infero-internal margin, besides 2 apical spurs, with 13 spines disposed as follows: 4 rather long ones, 2 little shorter, 3 slightly shorter, 1 very short, 3 equalling the 3 preceding ones. Elytra testaceous yellow, shining, with about 20 costal veins; discoidal sectors longitudinal; wings with ulnar vein showing 10 sectors, 3 of which are towards the apex and 7 joining the anal vein; apical triangle almost imperceptible.

♂. Abdomen yellow; 7th tergite presenting at base two big, rounded tubercles before a glandular depression; supraanal plate a little projecting, subtruncated (fig. 2), subgenital plate large, a little asymmetrical, with two short, cylindrical styles, inserted near the apex (fig. 3).

♀. Abdomen with two longitudinal brown stripes; supraanal plate very short triangular, subgenital plate large, rounded at apex.

Length of body 12—13 mm.; pronot. 3·5 mm.; elytra 14—15 mm. This species has the same nervation as *I. himalayica* Br. to which it seems very close, but the forehead shows a distinct brown band.

The egg-case is 9 millimetres in length, with a very finely crenulated suture; it contains about 50 larvae, quite near hatching, disposed in three rows.

8. **Mareta acutiventris,** sp. nov.

Barkuda, 2 ♀ (*types*), 8 and 11-ix-20 (*N. A.*), in empty nests of spiders on leaves of *Glycosmis pentaphylla*; July 20, 1 ♀ (*N. A.*); 11—16-xii-19, 1 ♂ *type* (*N. A.* and *F. H. G.*).

Rather large, rufo-testaceous species. Occiput exposed; forehead a little flattened, rufous. Eyes moderately approximated; occelliform spots yellow, feebly marked. Face long, rufous; antennae and palpi testaceous; maxillary palpi slender, with 3rd and 4th articles very long, 5th short (fig. 4). Pronotum wide, with disk rufous, lateral margins very widely translucid without any marking. Abdomen yellow, somewhat darkened above; cerci long, yellowish, composed of 12 articles. Legs testaceous; anterior femora armed with 2 apical

spurs and one subapical spine on the infero-internal margin, which is also provided with about 25 very short bristles and sometimes a small basal spine. Elytra very wide, extending little beyond the apex of abdomen, testaceous ; anterior area as wide as posterior one ; humeral vein with 10 sectors, the 2 last of which furcate ; discoidal sectors oblique. Wings with anterior margin darkened, ulnar vein with 5 sectors ; apical triangle almost imperceptible.

♂. Supraanal plate triangular, notched at apex (fig. 5) ; subgenital plate notched at apex, forming two lobes somewhat irregular, with styli short, slightly flattened, inserted near the apex (fig. 6).

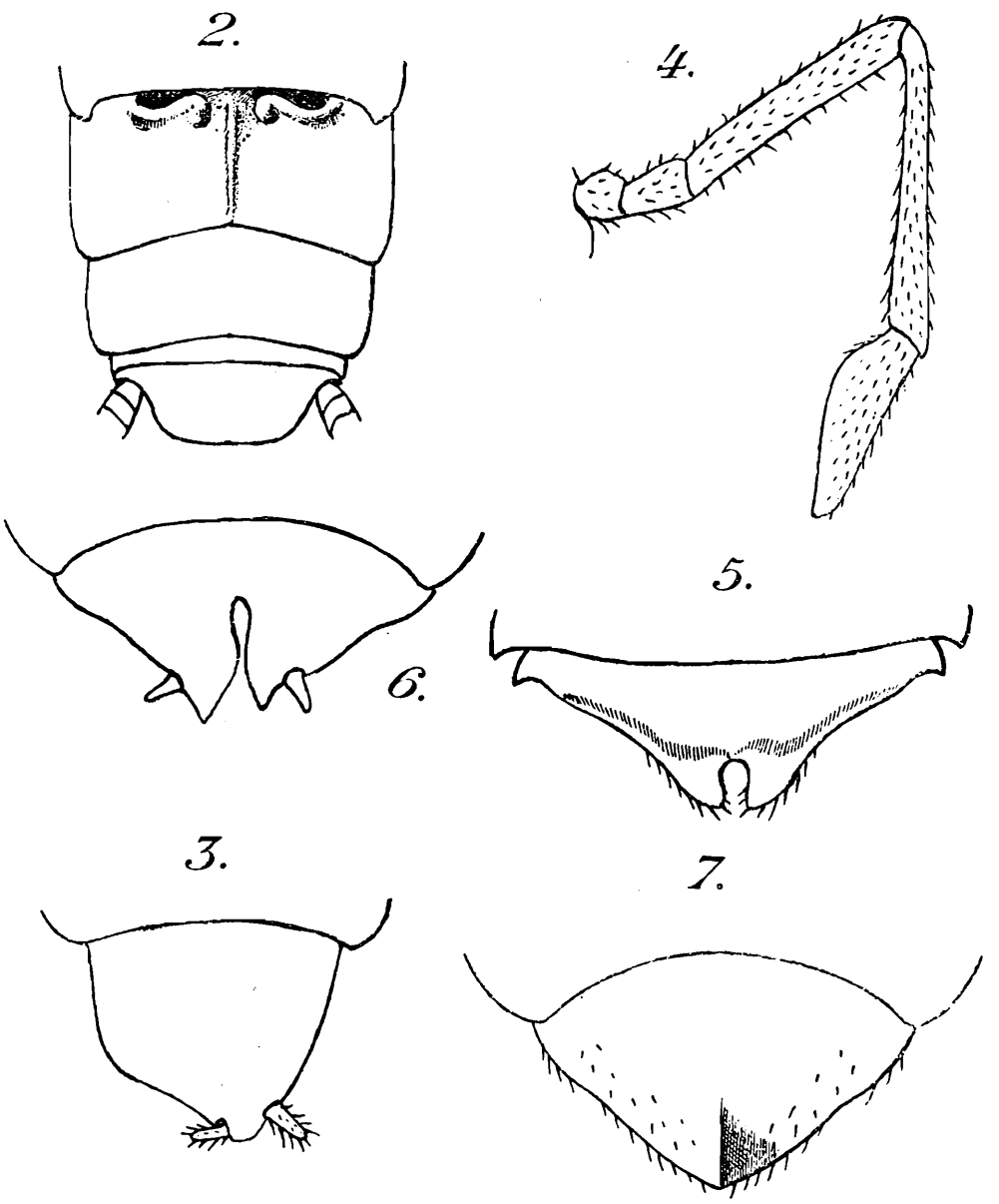

FIG. 2. *Ischnoptera fulvastra*, n. sp. Apex of abdomen of ♂, dorsal view, ×10 ;—fig. 3. *Id.* Subgenital plate of ♂ , ×10 ;—fig. 4. *Mareta acutiventris*, n. sp. Maxillary palpus, ×18 ;—fig. 5. *Id.* Supraanal plate of ♂, ×10 ;—fig. 6. *Id.* Subgenital plate of ♂, ×10 ;—fig. 7. *Id.* Subgenital plate of ♀ , ×10.

♀. Supraanal plate as in ♂ ; subgenital plate large, somewhat carinate in its posterior part and ending in a subacute angle (fig. 7).

Length of body 14 mm.; pronot. 3·5 mm.; elytra 12 mm.

This species seems closely related to *Blattella* (?) *ferruginea* Br. but it has much shorter elytra and wings.

9. **Mareta similis,** sp. nov.

Barkuda, 1 ♀, Aug. 19 (*F. H. G.*), among foliage at edge of well.

Very close to the preceding species, but smaller; forehead presenting a yellowish, indistinct band, with four punctiform impressions; ocelliform spots little visible; maxillary palpi with 4th article much shorter than 3rd, equal to 5th (fig. 8). Pronotum with disk rufous, sides widely translucid. Abdomen yellow above, with a large basal brown spot, yellowish beneath, finely punctured with brown and tinged with bluish on the sides; supraanal plate triangular, rather widely but not deeply notched at apex; subgenital plate large, subacute apically. Cerci long and rather slender, formed of 12 articles. Legs testaceous. Elytra wide, testaceous, with humeral vein bearing 12 plain branches and 2 apical ones very much ramified; ulnar vein of wing with 5 branches.

Length of body 10·5 mm.; pronot 2·8 mm.; elytra 10·5 mm.

This species looks very much like the preceding but the shape of the maxillary palpi is quite different.

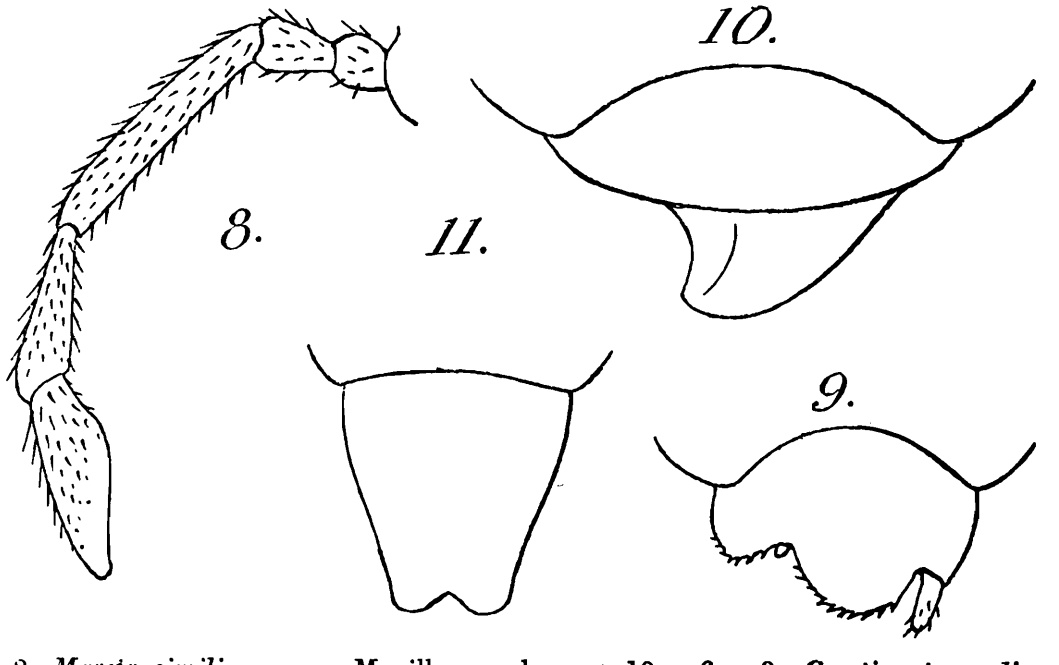

FIG. 8. *Mareta similis*, n. sp. Maxillary palpus, ×19;—fig. 9. *Ceratinoptera dispar* n. sp. Subgenital plate of ♂, ×10;—fig. 10. *Pycnoscelus tenebrigerus* Walk. Last sternites of abdomen of ♂, ×10;—fig. 11. *Amytta delicatula*, n. sp. Subgenital plate of ♀, ×10.

10. **Margattea** sp.

Barkuda, 14-x-20 (*N. A.*), in nest of *Acropyga acutiventris* Roger, several very young specimens.

These larvae, practically undeterminable, have a pale testaceous thorax, with two longitudinal brown bands extending to the apex of metanotum, abdomen fuscous,

I doubt very much whether this Blattid is myrmecophilous, I suppose that they were found accidentally with the ants as is often the case with hygrophilous insects. (I agree. *N. A.*).

11. **Margattea** sp.

Barkuda, 30-x-20 (*N. A.*), in galleries of deserted termite mound, 1 young ♀.

Although this young example is much older than the preceding ones, I have been unable to identify it specifically ; it is very finely coloured, the thorax testaceous with 2 wide longitudinal black bands, the abdomen black with angles of the tergites yellow, 6th tergite bordered with yellow, 7th tergite and supraanal plate spotted with yellow.

12. **Ceratinoptera dispar,** sp. nov.

Barkuda, 28-x-20 (*N. A.*), 1 ♂, 1 ♀ (*types*), among dead leaves on sandy shore of E. side of island.

♂. Size medium, colouration pale testaceous ; head rounded, vertex exposed ; face brown except the labrum which is yellow with two brown spots ; palpi yellow, last joint of maxillary palpi brown. Antennae yellow, darkened towards the apex. Eyes very wide apart ; ocelliform spots large, as distant one from the other as the eyes. Pronotum with anterior margin very little convex, testaceous yellow with sides widely translucid, presenting a brown spot forming two wide irregular bands joining widely anteriorly and narrowly posteriorly. Abdomen pale yellow with a small brown spot laterally on each tergite ; supraanal plate triangular ; subgenital plate with posterior margin irregularly trilobate, the median lobe finely denticulate, bearing a big cylindrical style on the right and a very small one on the left (fig. 9). Cerci formed of 10 articles, pale yellow above, brown beneath. Legs testaceous with apex of tibiae a little darkened ; anterior femora with 2 apical spurs and a row of 10 spines of which 4 long ones and 6 very short on the infero-internal margin ; intermediate and posterior femora with 5 or 6 rather strong spines on each inferior margin. Arolia present between the tarsal claws. Elytra attaining to the apex of abdomen, testaceous, darkened towards the sutural margin ; humeral vein bifurcate and sending 12 branches to the coast ; discoidal sectors longitudinal. Wings hyaline with anterior margin whitish, apical triangle visible, ulnar vein trifurcate.

♀. Larger than ♂. Elytra truncated, not extending over the apex of 1st abdominal tergite. Head and pronotum offering the same ornamentation as in the ♂ ; abdomen dark brown, each tergite with its sides yellow and presenting 2 pale long markings near median line and a very small one on each side ; supraanal plate rather large, triangular, rounded at apex, yellowish ; cerci brown at base. Legs as in the ♂. Elytra with few veins visible, the anal vein ending in the internal angle, apical margin truncated, a little concave and very slightly oblique.

Length of body ♂ 7 mm., ♀ 8 mm. ; pronot ♂ 1·8 mm., ♀ 2 mm. ; elytra ♂ 6 mm., ♀ 2·2 mm.

The female of this species seems closely related to *Ceratinoptera* (*Temnopteryx*) *martini* Bol. but the elytra of the male extend to the apex of abdomen.

13. **Temnopteryx obliquetruncata,** sp. nov.

Barkuda, 28-x-20 (*N. A.*), 1 ♀ *type*; Aug. 19 (*F. H. G.*), 2 ♀; 17-viii-20 (*C. D.*), 1 ♀; 24-ix-20 (*N. A.* and *B. P.*) 1 ♀ from a dead termite mound.

A species rather large for the genus. Head almost hidden by the pronotum; occiput testaceous, much rounded; face shining, brown; palpi testaceous, with last joint brown except at apex. Eyes very distant one from the other. Pronotum shining, rather convex, dark brown with a lighter, badly defined spot in the middle and a wide, irregular, yellowish stripe along the anterior and lateral margins; posterior margin feebly convex. Meso- and metanotum rufous brown with a large rounded light spot on each side. Abdomen very dark brown above with sides of each tergite spotted with yellow and two round yellowish spots on the second tergite; supraanal plate rounded at apex

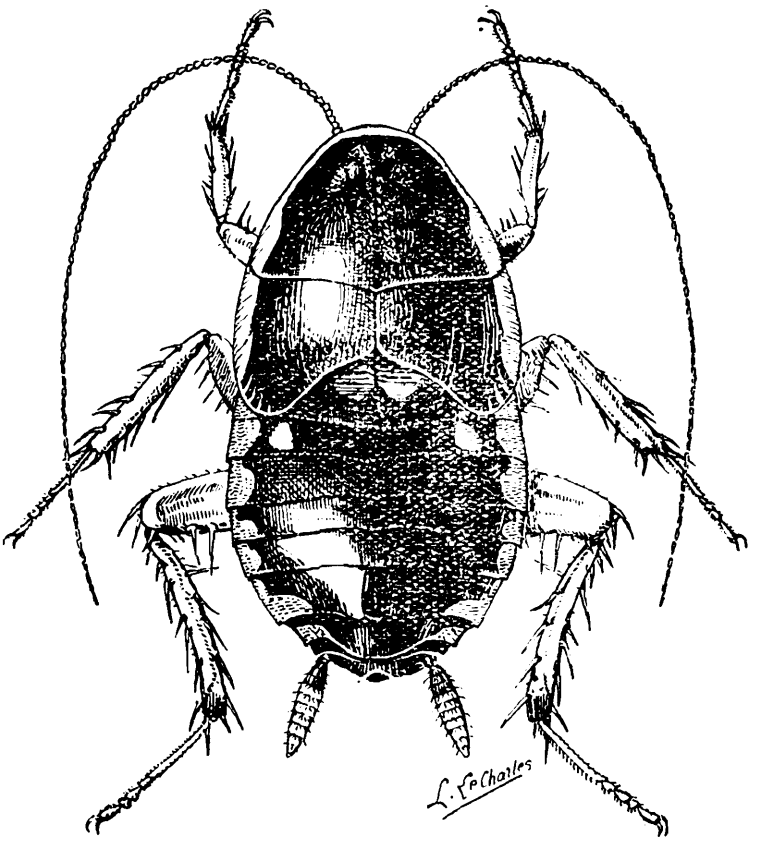

FIG. 12. *Temnopteryx obliquetruncata,* n. sp., ♀ ×6.

subgenital plate large, very slightly notched at apex. Cerci rather long, of 10 articles with the 4 basal ones brown, the rest yellow. Legs wholly rufotestaceous with apex of the tibiae and insertion of the spines slightly marked with brown; anterior femora armed with two long apical spurs and 10 spines on their infero-internal margin, these spines being rather strong, somewhat curved and decreasing very little in length from base to apex; intermediate and posterior femora armed with 5 or 6 rather strong and regular spines on each inferior margin; posterior tarsi slender with metatarsus very long; arolia present between the tarsal claws. Elytra thick with indistinct veins, colouration translucid brown with an external yellow stripe prolonging the lateral stripes of the pronotum; external margin a little convex, extending

to the apex of the metanotum, internal margin almost straight, scarcely exceeding the mesonotum; apical margin oblique, a little concave.

Length of body 11·5 mm.; pronot. 3·5 mm.; elytra 3·5 mm.

This species is close to *T. alca* Bol. but its size is much larger and the markings on the abdomen are different.

One of the females has the colour more extensive on the cerci and shows distinct light markings on the supraanal plate.

14. **Blatta orientalis** L.

Barkuda, 20-ix-19 (*N. A.*), 1 young ♀ found crushed in bungalow.

A cosmopolitan species.

(Probably introduced with furniture or stores. *N. A.*).

15. **Periplaneta americana** L.

Barkuda, Aug. 19 (*F. H. G.*), 1 ♂.

A very large specimen (length of body 30 mm., elytra 35 mm.) with pronotum very neatly marked with yellow; the genitalia are exactly similar to those of other examples of this very common and cosmopolitan species.

(Probably introduced with furniture or stores. *N. A.*).

16. **Periplaneta** sp.

Barkuda, 30-x-20 (*N. A.*), from galleries of deserted termite mound; a few young examples.

These Blattids are black with rufous head; they seem to belong to a species of *Periplaneta* rather than to *Blatta*, although their elytral cases are but little developed.

17. **Corydia nuptialis** Gerst.

Barkuda, Aug. 19 (*F. H. G.*), 1 ♂, 5 ♀; ix-x-19 (*N. A.*), 3 ♂, 1 ♀.

This species is found in India only; the female does not seem to have been described and is very similar to the male, the antennae being not quite so strongly thickened and the general shape being wider, more oval. The yellow markings are disposed as in the male but they seem rather variable, the one near the apex of the elytra being usually very small.

The egg-case is rather large (11 mm. in length, 4·7 mm. in height), weakly curved, the suture smooth, each side showing 8 longitudinal ridges.

Dr. N. Annandale states in a letter "that this cockroach, as a rule, conceals itself at the roots of fig-trees or in other corners. The small hairs on its elytra retain sufficient dust to conceal it, or at any rate to render it inconspicuous, when not on the wing. It does not take to flight readily, but when it does rise it flies high and strongly. On more than one occasion, I have mistaken it for a moth and also for a blister beetle of the genus *Mylabris*. I have often seen it on the wing by daylight."

18. **Polyphaga indica** Walk. ?

Barkuda, 15—22-viii-16 (*F. H. G.*), several young specimens two ♀ of which nearly adult; Aug. 19 (*F. H. G.*), 6 very young examples; 30-x-20 (*N. A.*), 2 young ♀ in galleries of deserted termite mound.

All these Blattids belong very likely to *P. indica* Walk. although the supraanal plate is more or less distinctly notched, its posterior margin being almost regularly rounded. The species, which is known only from the female, seems rather near to *P. aegyptiaca* L., but the pronotum is unicolourous blackish, the supraanal plate different, the antennae are whitish at apex.

19. **Polyphaga** sp.

Barkuda, Aug. 19 (*F. H. G.*), 1 ♂, 1 ♀ both immature.

This species seems very interesting and very likely new; it belongs to the *ursina* Burm. group but it is absolutely impossible to describe it from immature specimens.

20. **Pycnoscelus surinamensis** L.

Barkuda, Aug. 19 (*F. H. G.*), 1 ♀ with short elytra and wings; 20-viii-20 (*F. H. G.*), 1 ♀ with long elytra and wings.

A very common and cosmopolitan species.

21. **Pycnoscelus tenebrigerus** Walk.

Barkuda, Aug. 19 (*F. H. G.*), 1 ♂; 20-vi-20 (*N. A.*) 1 ♂ at light; 13—18-iv-14 (*N. A.*), 1 young ♀.

This species differs from the preceding, besides its larger size and darker colouration, by the 9th sternite being visible in the male (fig. 10, p. 170) and the eyes as distant as the ocellar spots; the length of the body is 20 mm., of the elytra 20 mm.

22. **Stilpnoblatta bengalensis** Sauss.

Barkuda, Aug. 19 (*F. H. G.*) 4 ♀, 3 young examples; 30-x-20 (*N.A.*) from galleries of deserted termite mound, 3 ♀.

One of the females was carrying its egg-case, containing the young larvae almost ready for hatching; like many species of Blattidae (chiefly Panchlorinae) this species must be viviparous.

The characters of this Blattid seem to me much more related to the Panchlorinae than to the Panesthinae, where the genus is usually included; the shape of the head and of the legs is absolutely similar to that of a *Pycnoscelus*. In the tube containing the 3 adult females mentioned above was included a great number of young individuals at different stages of development; these were very much like young *Pycnoscelus*, very wide with anterior part of abdomen shining, posterior part granulated. If these larvae really belong to *Stilpnoblatta*, as they probably do, there is no doubt that the genus has to be included in the subfamily Panchlorinae.

The species has been recorded from India only.

Family MANTIDAE.

23. **Humbertiella indica** Sauss.

Barkuda, 25-vii—4-viii-17 (*N. A.*), 1 ♂ at light; 28-x-20 (*N. A.*), 1 ♂; 18-iv-20 (*N. A.*) 1 ♂; 16—20-ix-19 (*E. B.*), 1 ♂.

(Not uncommon on tree trunks. *N. A.*).

24. **Hierodula membranacea** Burm.

Barkuda, August 17 (*N.A.*), 1♀; 27th June 1920 (*N.A.*), 1♀.

One of these two specimens is of a very large size (length of body 88 mm.); the species is much diffused in India, Ceylon, China, Java, etc. (Scarce, like all the bigger mantids, on Barkuda. *N.A.*).

25. **Hierodula doveri,** sp. nov.

Barkuda, 25th April 1920 (*C.D.*) at dusk, 1♀ *type.*

♀ Size rather large, green coloured. Anterior coxae armed with 5 to 6 rather short spines, a little flattened, rounded at apex. Prothorax slender; pronotum with a lateral brown spot on each side near the posterior margin; prosternum presenting near its posterior margin 4 rounded brown spots and a small median stripe of the same colour. Anterior legs with no internal marking; anterior tarsi marked with black at apex of the internal face. Elytra a little longer than the abdomen.

Length of body 65 mm.; pronot. 22·5 mm.; elytra 47 mm.

This species recalls *H. ventralis* Giglio-Tos by the armature of the anterior coxae, but the markings on the thorax are those of a *Parhierodula.*

26. **Parathespis humbertiana** Sauss.

Barkuda, 4th—19th October 1919 (*F.H.G.*), 1♂ at light; 1st October 1919 (*N.A.*), 2♂ at light; 25th October 1919 (*N.A.*), 1♀; 13th August 1920 (*S.R.*), 1 young ♀ at edge of pond.

The males of this species here recorded are somewhat larger than the typical specimen (length 38 mm.) but they agree quite well with the description in any other respect. It seems necessary to specify the armature of the anterior legs: the femora are armed with 4 discoidal spines of which the 2 first are short, the 3rd very long, the 4th very small and distant from the preceding; 5 external spines including a small genicular one, the 2 median being a little longer than the other two; 14 internal spines of which 3 short, 1 long, 1 short, 1 long, 1 short, 1 long, 3 short, 1 long and a small genicular one.

Family PHASGONURIDAE.

27. **Holochlora indica** Kirby.

Barkuda, August 1919 (*F.H.G.*), 1♂.

This species has already been recorded from India by Brunner (under the name of *biloba*) and by Bolivar.

28. **Trigonocorypha crenulata** Thunb.

Barkuda, 15th—22nd July 1916 (*F.G.H.*), 1 ♀; 4th—9th October 1919 (*F.H.G.*), 3 ♀; April 1920 and September 1920 (*N.A.*), 1 ♂, 1 ♀; 29th June 1922 (*N.A.*) 1 ♀ which laid its eggs during the night.

The eggs are laid all round the edge of the leathery leaves of *Glycosmis pentaphylla*, inserted into little pockets between the outer and the inner layer (fig. 13).

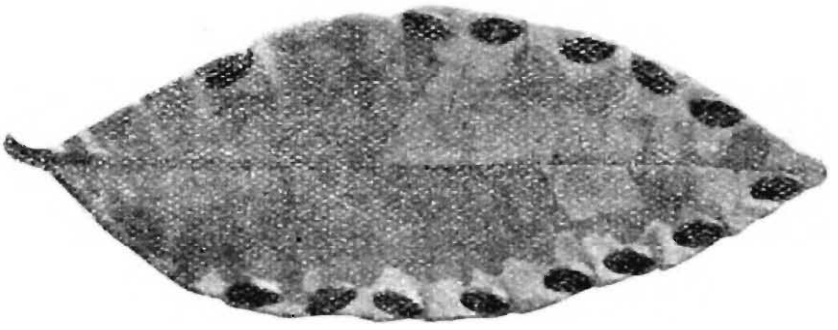

FIG. 13. Eggs of *Trigonocorypha crenulata* Thunb. laid all round the edge of a leaf of *Glycosmis pentaphylla*.

Dr. Annandale states that the species is nocturnal in habits, remaining concealed in the day time among the leaves of trees and shrubs. It only becomes active at sunset and does not lay its eggs until late at night. The male utters a monotonous, long-continued chirp—cherr'k—cherr'k-cherr'k, but does not begin till it is dark.

A certain number of young Phaneropterinae, which belong perhaps to this species, are interesting for their so-called mimicry. Dr. N. Annandale, who observed them in nature, gives the following peculiarities in a letter.

"Perhaps the most interesting member of this family (Phasgonuridae), however, is one in which the young bear an extraordinary resemblance to ants, both in movements and in general appearance. I have put a note on specimens sent you. What I believe to be the adult of this species is a much larger but still wingless form, of which you also have specimens. It bears a generalized resemblance, specially in movements, to certain Hymenoptera and also to beetles of the genus *Neocollyris* (Cicindelidae), but I have been able to find no resemblance that is specific. This insect feeds chiefly on small caterpillars."

The note accompanying the specimens states that "they were running about in damp weather on the plinth of the house. When undisturbed their movements were very ant-like; but when alarmed they betrayed themselves by leaping. They were not actually accompanied by ants but the specimen with them was captured at the same spot a few minutes later."

It is evident that the second form to which Dr. Annandale refers is not the adult but an older larval stage of the species. It is again a case of what Urarov calls "transformative deceptive resemblance"[1]; these cases seem more common than one could think among Phaneropterinae

[1] *Trans. Ent. Soc. London*, 1922, p. 269.

and, although they are very interesting, we must keep from anthropomorphism when trying to explain them.

29. **Isopsera pedunculata** Br.

Barkuda, 19th September 1919 (*E.B.*), 1♂ ; 14th August 1920 (*S.R.*), 1 ♀ ; August 1919 (*F.H.G.*), 2 ♀ at light ; September 1920 (*N.A.*), 2 ♂, 1♀.

This species lays its eggs in the same manner as the preceding ; in both species the eggs are flattened, ovoidal, black, but those of *Trigonocorypha* are a little larger and their surface is finely shagreened and not smooth as in *Isopsera*.

30. **Pyrrhicia inflata** Br.

Barkuda, 3rd—19th August 1919 (*F.H.G.*), 2♂, 2♀ ; 17th August 1920 (*C.D.*), 1 ♂.

This species has been recorded by Bolivar from Trichinopoly.

31. **Amytta delicatula,** sp. nov.

Barkuda, September 1920 (*N.A.*), 1♀ *type*.

♀. Long and slender, pale green with elytra translucent. Head short, frontal rostrum very narrow, neatly furrowed in the middle ; face wide, smooth ; maxillary palpi long, slender, with 5th article a little shorter than the two preceding, very slender at base, rather bluntly dilated at apex. Antennae long, very thin, testaceous. Eyes rather big, globulose, prominent. Pronotum smooth, rather strongly projecting backwards in an angular, translucent process ; lateral lobes high, their inferior margin subangulate. Abdomen slender, green ; subgenital plate rather long, with its posterior margin a little thickened and feebly notched (fig. 11, p. 170). Ovipositor almost straight, smooth, each valve ending in a very short diverging point. Legs slender ; anterior coxae with a long spine, tibiae perforated, armed beneath with 5 spines on each side ; intermediate tibiae a little dilated near their base, presenting the same armature as the anterior ones. Posterior femora rather strongly dilated at base, very slender at apex ; tibiae a little longer than the femora, their superior margins armed on their whole length with small spines. Elytra long and very narrow, subacute at apex ; mediastine vein distinct ; humeral (radial) vein straight, triramose ; discoidal (anterior ulnar) vein parallel with the humeral, furcate near the middle ; ulnar (posterior ulnar) vein furcate very near the base, its anterior branch long and parallel with the other veins.

Length of body 11 mm.; pronot. 4 mm.; elytra 19 mm.; post fem. 11·5 mm.; post. tib. 12 mm.; ovipos. 8 mm.

This interesting species seems rather near to *A. pellucida* Karsch from East Africa ; the shape of the subgenital plate is quite different.

32. **Mecopoda elongata** L.

Barkuda, 4th—19th October 1919 (*F.H.G.*), 1 ♂ ; April 20th (*N.A.*), 1 brown ♀, 1 green ♀ taken on *Glycosmis pentaphylla*.

A species very common in the Oriental Region. Rare on Barkuda. It is nocturnal in habits and lives amongst undergrowth. When dis-

turbed it takes immense leaps. The male utters a very loud, harsh chirp at night. *N. A.*)

33. **Euconocephalus incertus** Walk.

Barkuda, August 1919 (*F.H.G.*), 2 ♀; 13th September 1920 (*N.A.*), 2 ♂.

This species has been recorded from Borneo and Singapore.

34. **Sathrophyllia carinata,** sp. nov.

Barkuda, one female (*type*), 4th—19th October 1919 (*F.H.G.*).

♀. Large and fine species, pale brownish yellow, marbled with darker brown.

Head marked above with small brown spots; vertex a little shorter than the first antennal joint, presenting two small lateral tubercles at base of rostrum which is slightly incised at tip. Eyes globular, prominent; ocelli yellow, big, the lateral ones placed under the tubercles of the rostrum. Face pale, yellowish, punctured. Antennae yellowish with numerous brown rings.

Pronotum flattened anteriorly, but very strongly elevated posteriorly in a compressed crest; surface presenting a few ridges and tubercles; anterior margin rather prominent, truncated and bituberculate in the middle; posterior margin rounded, presenting a tubercle on each side of the median crest. Prosternum unarmed.

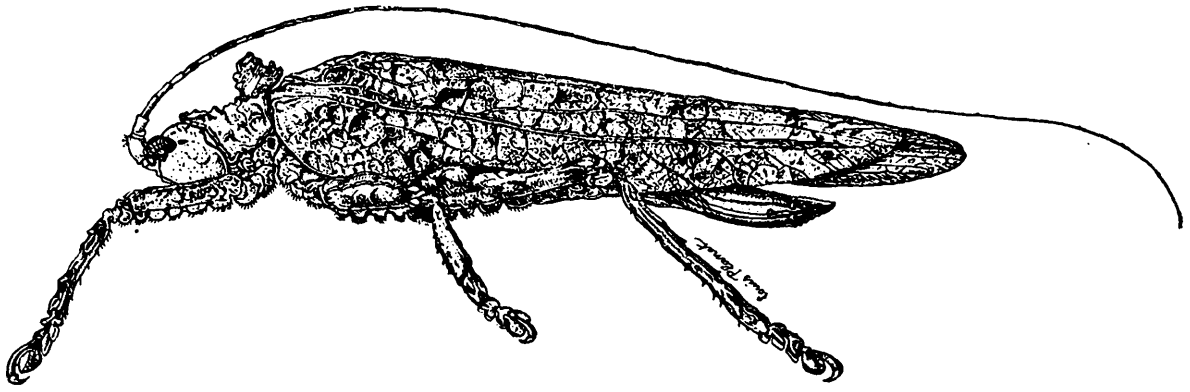

Fig. 14. *Sathrophyllia carinata,* n. sp. ♀ ×1·5.

Abdomen blackish above, yellowish beneath; supraanal plate projecting, oval, swollen at base, notched at apex; subgenital plate subtriangular, very slightly notched at tip. Cerci a little longer than the supraanal plate, curved, yellow. Ovipositor strong, straight, broad, the upper margin almost straight, finelly crenulate, lower one somewhat convex.

Legs concolourous; anterior femora compressed with superior margin straight, inferior one lobate; anterior tibiae prismatic, their upper surface presenting two tubercles, their inferior margins bearing 5—7 very small spines; intermediate femora much compressed and widened, with inferior margin lobulate and hairy, superior margin distinctly undulated; intermediate tibiae compressed, widened in the middle. Posterior femora rather narrow, with inferior margin lobulate.

Tegmina with anterior margin convex, very feebly crenulated; marginal field a little wider than half the width of posterior one; apex not very rounded. Wings reaching beyond the tip of tegmina, with apical part of the same colour as these, the remaining part hyaline, with transverse veins brownish.

Length of body 37 mm.; pronot. 8 mm.; elytra 50 mm.; post. fem. 16 mm.; ovipos. 15 mm.

This species seems very near to *Sathrophyllia rugosa L.*, but it can be readily distinguished by its intermediate femora with undulated upper margin; the elytra are also wider than in that species. There is but very little difference in the shape of the carina of intermediate femora in the new species and in the genus *Cymotamera*.

35. **Gryllacris hieroglyphicoides,** sp. nov.

Barkuda, April 1920 (*N.A.*), under dead tree trunks and branches lying in the jungle; sometimes found in deserted burrows of *Xylocopa*; 1 ♂, 1 ♀ *types*, 7 ♀, 2 young ♂, 5 young ♀ co-*types*.

♂. Large, ferrugineous. Head very wide, orbicular; occiput high, rounded; frontal rostrum almost twice as wide as the first joint of antennae, its margins forming two small keels; face a little depressed, presenting two impressions above the clypeus. Antennae and palpi testaceous. Eyes small, presenting a small white spot at their internal angle; ocelli yellow, the lateral ones very small, anterior one large, oval. Pronotum testaceous, anterior margin a little convex, posterior

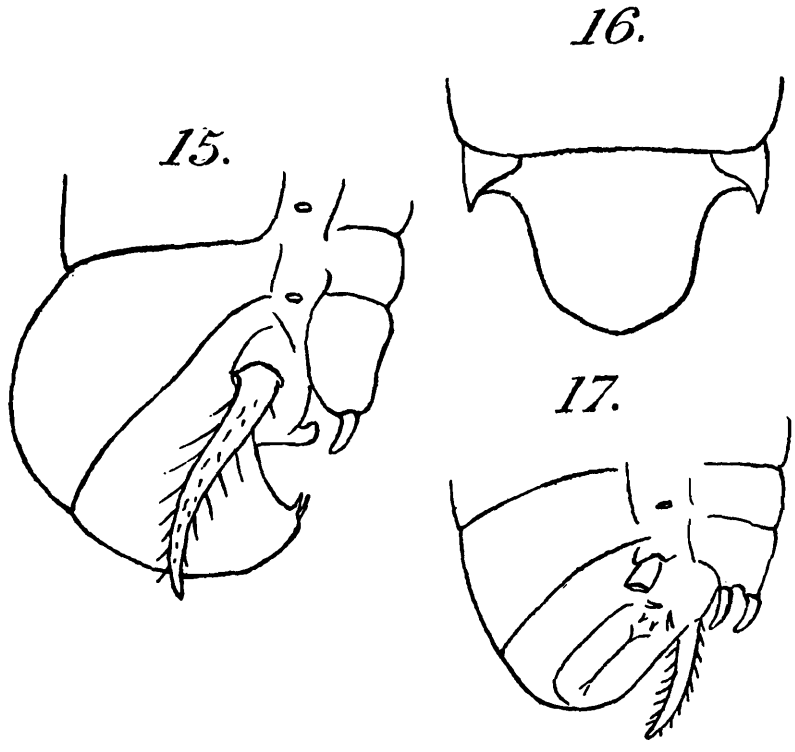

FIG. 15. *Gryllacris hieroglyphicoides*, n. sp. Apex of abdomen of ♂, lateral view, ×6;—fig. 16. *Id.* Subgenital plate of ♀, ×6;—fig. 17. *Gryllacris barkudensis*, n. sp. Apex of abdomen of ♂, lateral view, ×6.

margin straight, lateral lobes rather high, with inferior margin straight, humeral sinus pretty well marked; disk adorned with fine brown lines

and spots : 1 median line, 1 curved and forwardly diverging line on each side, 3 more or less confluent points on each side anteriorly, 1 spot near each posterior angle. Elytra and wings hyaline, with veins yellowish and veinlets narrowly and neatly marked with fuscous. Legs testaceous ; anterior femora rather short, armed with 3 or 4 internal spines and 5 or 6 external ones.

♂. Anal segment swollen, its inferior part truncated with 2 small spines (fig. 15).

♀. Ovipositor rather slender, a little curved, acute at apex ; subgenital plate shield-shaped, punctured (fig. 16).

Length of body ♂ 35, ♀ 44 mm.; pronot. ♂ 7·5, ♀ 9 mm.; elytra ♂ 39, ♀ 42 mm.; post. fem. ♂ 16·5, ♀ 18·5 mm.; ovipos. 19 mm.

This species is very close to *G. hieroglyphica* Br., from Ceylon, but its posterior femora are shorter, the ovipositor is also shorter, acute at apex and the shape of the subgenital plate of the female is quite different.

[Though sometimes found under dead logs, this species is much more common in dead branches still attached to trees of *Ficus bengalensis*, *F. obtusa* and *F. infectoria*. I have also found it in a dead branch of *Euphorbia neriifolia*. It eats the dead wood, which its powerful jaws enable it to masticate readily. Sometimes it occupies the deserted burrow of a carpenter bee (*Xylocopa*), but more frequently makes its own. The burrow runs parallel to the length of the branch and is of irregular shape. It is often occupied by more than one individual, sometimes by an adult with one or more half-grown young. *G. hieroglyphicoides* is the only Indian Gryllacrid except *Schizodactylus* I have seen in large numbers. It is abundant on Barkuda. *N.A.*]

36. **Gryllacris barkudensis,** sp. nov.

Barkuda, 22nd June 1920 (*N.A.*), 1 ♂ *type* captured by digging wasp ; 1 young ♂ among foliage of *Glycosmis pentaphylla*.

♂. Medium size, rufo-testaceous. Head a little wider than the pronotum, testaceous with two brown spots on the occiput ; frontal rostrum a little wider than the first joint of antennae, slightly spotted with brown on each side ; face long, yellow, ocellae large, yellow. Antennae testaceous. Pronotum a little wider than long, with anterior margin a little convex, posterior margin straight, lateral lobes ascending anteriorly, humeral sinus distinct ; disk presenting a transverse furrow near the anterior margin and a median longitudinal impression ; 2 brown spots near the anterior margin and 2 oblique lines extending on the lateral lobes. Abdomen with 8th tergite rather large, 9th short, flattened, forming two little concave facets and bearing 4 little spines (fig. 17) ; subgenital plate wide, styli wide apart. Legs testaceous ; anterior tibiae, posterior femora and tibiae presenting a wide black ring ; posterior femora short, armed with 4—5 internal spines and 6—7 external ones. Elytra and wings light rufo-testaceous, almost transparent, with veins and veinlets paler than the ground colour.

Length of body 29·5 mm.; pronot. 5 mm.; post. fem. 14·5 mm.; elytra 34·5 mm.

This species seems close to *G. dubia* Le Guill. and *G. oceanica* Le Guill. but differs from both by its larger size and by the different markings on the legs. The young individual is recognizable by these markings although they are not so neat as in the adult.

[I believe that this species fastens together the leaves of shrubs with a silky secretion to form a nest. At any rate I once disturbed a *Gryllacris* in such a nest on Barkuda and it seemed to be exactly like *G. barkudensis*. Unfortunately it escaped. *N.A.*]

Family GRYLLIDAE.

37. **Tridactylus thoracicus** Guér.

Barkuda, 4th—19th October 1919 (*F.H.G.*), numerous examples of both sexes at light.

These specimens are very pale in colour, though showing exactly the same features as given in Saussure's description; in both sexes the last ventral segment, before the subgenital plate, presents a straight and narrowly lined with black posterior margin.

I consider *T inflatus* Br., as a synonym of this species.

38. **Tridactylus riparius** Sauss.

Barkuda, 19th August 1919 (*F.H.G.*); 17th August 1920 (*C.D.*), at edge of island, among masses of damp rotten algae; 9th September 1920 (*N.A.*), on damp mud at edge of small pool of rain water, several examples of both sexes; 13th August 1920 (*S.R.*), 1 ♀ at light.

Those examples present a very constant dark colouration with few yellowish spots; the size is rather variable, from 6 to 7 millimeters and even one very small male is only 5 mm. long and could almost be taken for *T pulex* from Java. The wings are very variable in length; in some individuals scarcely exceeding the elytra, in others attaining as far as the apex of the abdomen.

39. **Tridactylus savignyi** Guér.

Barkuda, August 1919 (*F.H.G.*), 1♀; 23rd September 1920 and 21st October 1920 (*N.A* .and *B.P.*), 3 ♂ 2 ♀ at light.

These specimens present a very dark colouration for the species.

40. **Gryllotalpa africana** Beauv.

Barkuda, 25th July—4th August 1917 (*N.A.*), 1 ♂; 8th October 1920 (*N.A.*), 1 ♀ at light.

A very common species spread all over Africa and the south part of Asia.

[This species is almost amphibious in habits. It lives in very damp earth or sand at the edge of water. I have even dug it up from below water-level at the edge of brackish water. It flies to light at night commonly, but never in large numbers. *N.A.*]

41. **Pteronemobius histrio** Sauss.

Barkuda, 4th—19th October 1919 and 8th October 1920 (*F.H.G.* and *N.A.*), at light, numerous examples ♂ and ♀; 16th—20th September 1919 (*E.B.*), 1 ♀.

All these specimens belong to the macropterous form of the species already recorded by Bolivar (*Ann. Soc. ent. Fr.*, 1900, p. 793) from the Philippines.

It seems necessary to add the following precisions to Saussure's description. Maxillary palpi with 3 first joints fuscous, 4th and 5th whitish, the last one brownish at apex. Cerci with a narrow whitish ring in the middle. Elytra of male with well defined speculum, present-

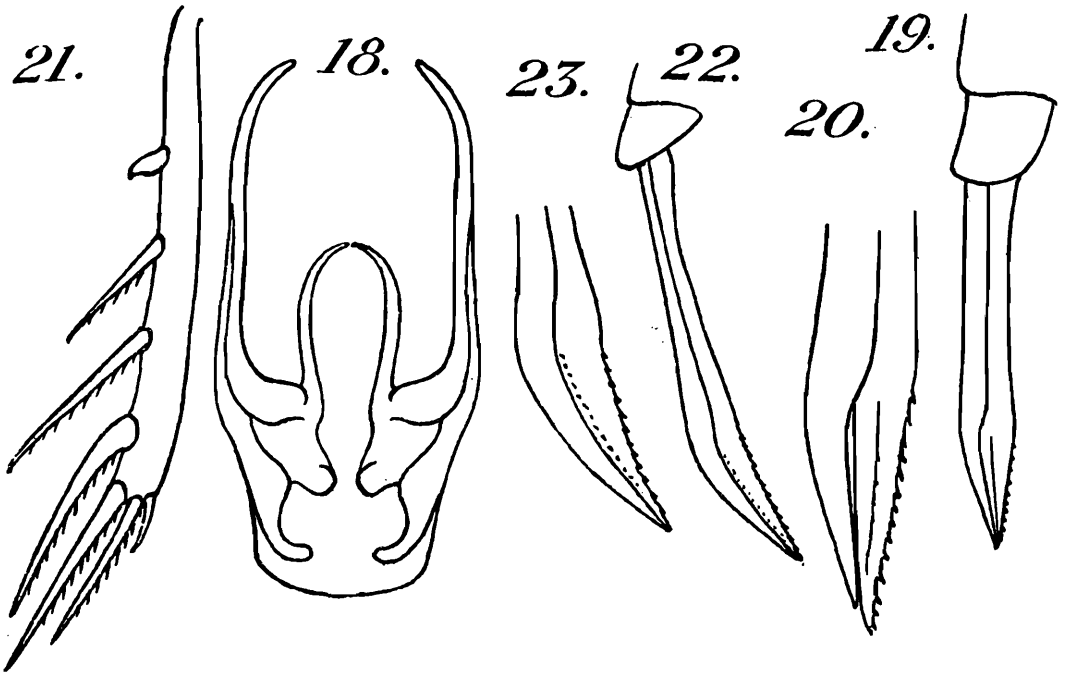

FIG. 18. *Pteronemobius histrio* Sauss. Genitalia of ♂, ×25; —fig. 19. *Id.* Ovipositor of ♀, ×19; —fig. 20. *Id.* Apex of the same, ×38; —fig. 21. *Pteronemobius gravelyi*, n sp. Posterior tibia of ♂, internal face, ×10; —fig. 22. *Id.* Ovipositor of ♀, ×19; —fig. 23. *Id.* Apex of the same, ×38.

ing two small apical cells (1st type of Saussure). Posterior tibiae with 3 external and 4 internal spines, the 1st internal short, tuberculiform, whitish; ♀ with only 3 spines on each margin of posterior tibiae. Genitalia presenting a large rounded superior piece and a forceps tuberculate at base (fig. 18); ovipositor (figs. 19 and 20) very short and straight, its apical superior valves bearing about 15 rather strong denticulations directed backwards (length of body 5 mm.; ovipos. 2 mm.).

42. **Pteronemobius javanus** Sauss.

Barkuda, 4th—19th October 1919 and 8th October 1920 (*F.H.G.* and *N.A.*), numerous examples of both sexes, at light.

I consider this species as being the macropterous form of *P. infernalis* Sauss.; it presents, as that species does, a very distinct colouration with lateral lobes of pronotum almost black, the last joint of maxillary palpi black, the elytra of male spotted with brown. The spines of posterior tibiae are 3 on each margin in the female, 3 external and 4 internal in the male.

43. **Pteronemobius gravelyi,** sp. nov.

Barkuda, 4th—19th October 1919 (*F.H.G.*), 1 ♂, 1 ♀ *types*, 2♂ 4♀ *co-types*, at light; October 1920 (*N.A.*), 1♂, 3♀ at light.

♂. Small, light testaceous brown, almost unicolourous. Head presenting only a few, little distinct, light stripes on the vertex; palpi unicolourous, testaceous. Pronotum very transverse, scarcely narrowing anteriorly, with lateral lobes a little darker. Abdomen testaceous; cerci fuscous. Legs testaceous, rather slender; posterior tibiae armed with 4 spines on each margin, these spines long, slender, concolourous, the 1st one short, thick, but ending in a small point, the last one curved at its base (fig. 21); inferior spurs unequal in length. Elytra attaining the apex of abdomen, a little narrowing posteriorly, testaceous, unicolourous; speculum small, divided in its posterior part into two small, equal cells, the internal one occupying only half of the length of the internal margin of the speculum (1st type of DE SAUSSURE); chordae a little curved, the 2 internal united up to the middle; lateral lobes with 4 veins.

♀. Same shape and colour as the male; posterior tibiae with 4 slender spines on each margin; elytra with dorsal field presenting 4 longitudinal veins. Ovipositor (figs. 22 and 23) rather long, almost straight, with apical valves long, their inferior margin very convex, their superior one almost concave, very finely crenulated.

Length of body 5 mm.; length with wings 10 mm.; fem. post. 4 mm.; ovipos. 2·5 mm.

This species is very close to *P. tartarus* Sauss., but it is smaller, with pronotum more transversal, scarcely narrowing forwards, the internal cell of speculum of male not extending to the angle; in the ♀ the ovipositor is a little longer with apical valves very long.

44. **Gryllus chinensis** Web.

Barkuda, 1st October 1910 (*N.A.*), 1 ♂ at light; 3rd—19th August 1919 (*F.H.G.*), 1 ♂, 2 ♀ at light.

45. **Gryllus consobrinus** Sauss.

Barkuda, July 1920 (*N.A.*), 1 ♂.

46. **Gryllus brunner** Sélys.

Barkuda, 1st October 1910 (*N.A.*), 2 ♀ at light.

47. **Gryllus mitratus** Burm.

Barkuda, 4th—19th October 1919 (*F.H.G.*), 1 ♀ at light.

This species, as well as the three preceding, is common in the Oriental Region.

48. **Gryllodes sigillatus** Walk.

Barkuda, 15th—22nd July 1916 (*F.H.G.*), 2 ♂ emerging at dusk from holes in termite mound; 1st October 1910 (*N.A.*), 1 ♂ at light; August 1919 (*F.H.G.*) 3 ♂, 4 ♀, some of them immature; July 1920 (*N.A.*), 1 young ♂; 27th June 1920 (*N.A.*), 2 ♀ in a crevice in the woodwork of a door.

This species is almost cosmopolitan, being found in all the tropical and subtropical countries of the world.

Dr. Annandale states that it was common in holes in a bungalow.

49. **Scapsipedus hastatus** Sauss.

Barkuda, 15th—22nd July 1916 (*N. A.* and *F. H. G.*), 1 immature ♂.

50. **Myrmecophila albicincta,** sp. nov.

Barkuda, (*N. A.*), 1 ♀ *type*, 3 ♀ co-*types*, found with ants (*Camponotus mitis*) in box of books in bungallow; 4th—19th October 1919 (*F. H. G.*), 1 ♀, with ants.

♀. Shape wide, dark brown with a very neat light band on the meso-notum. Palpi very pale yellow, 4th joint very short, 5th long, little widening at apex (fig. 24). Eyes small, formed of 14 big ommatidies. Posterior femora very short and thick; posterior tibiae armed with 3 internal

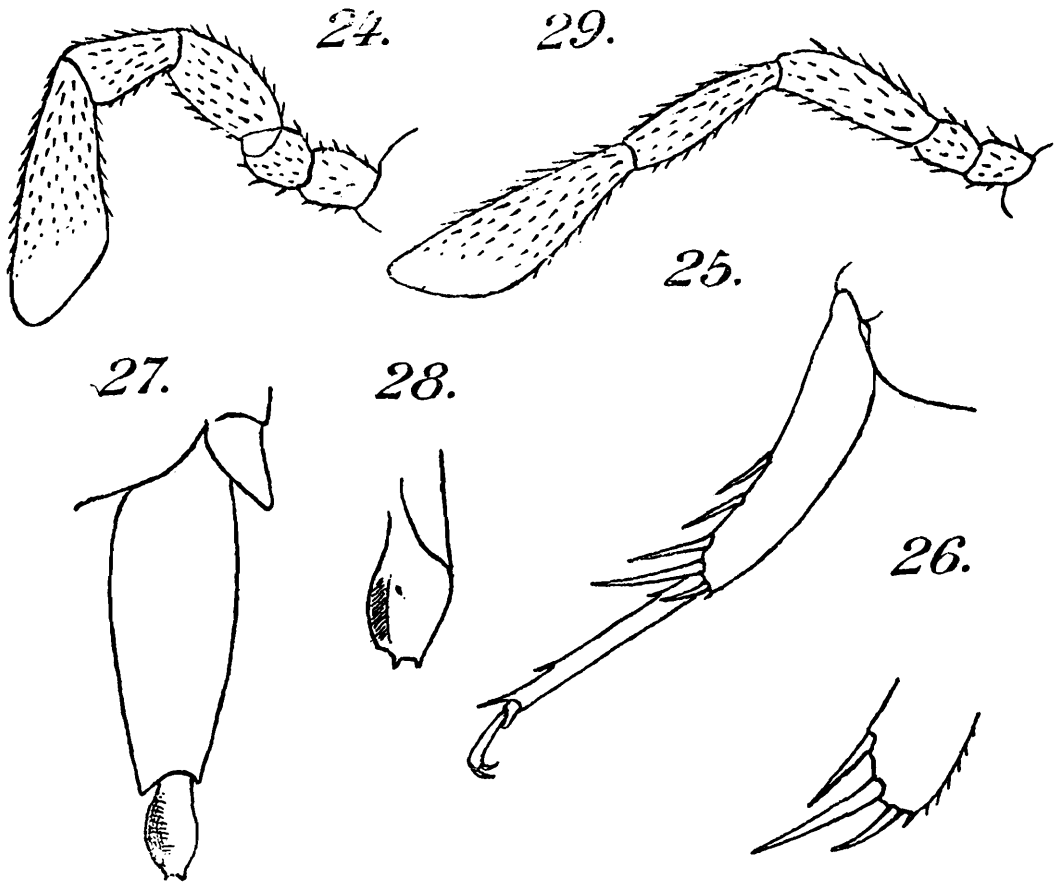

FIG. 24. *Myrmecophila albicincta*, n. sp. Maxillary palpus, ×80;—fig. 25. *Id.* Posterior tibia and tarsus, internal face, ×25;—fig. 26. *Id.* Apex of the posterior tibia, ×38;—fig. 27. *Id.* Ovipositor, ×38;—fig. 28. *Id.* Apex of the same, ×60;—fig. 29. *Myrmecophila graclipes*, n. sp. Maxillary palpus, ×80.

spines only, their inferior spurs very short (figs. 25 and 26). Superior anal valve triangular, subacute at apex. Ovipositor (fig. 27 and 28) very short, thick, the superior valves a little longer than the inferior ones, diverging, ending in the shape of an oval spatula, presenting two small points near the apex.

Length of body 3·5 mm.; ovipos. 1·3 mm.; cerci 1·6 mm.

This species has almost the same size and shape as *M. acervorum* but it differs very much from it by the shape of its ovipositor and the number of spines on the posterior tibiae; besides there is much more contrast in the colouration.

51. **Myrmecophila gracilipes,** sp. nov.

Barkuda, 17th October 1920 (*N. A.*), from nest of ant (*Acropyga acutiventris* Roger)[1]; under stone with ants (*Pheidole* sp.); 1 ♀ *type* and numerous ♀ co-*types*.

♀. Size and general habitus of *M. acervorum*, slightly more elongate, narrower. Eyes small; antennae rather thin, whitish; maxillary palpi whitish, rather long, their 4th joint as long as the 3rd, 5th feebly dilated at apex (fig. 29). Thoracic segments somewhat darkened posteriorly.

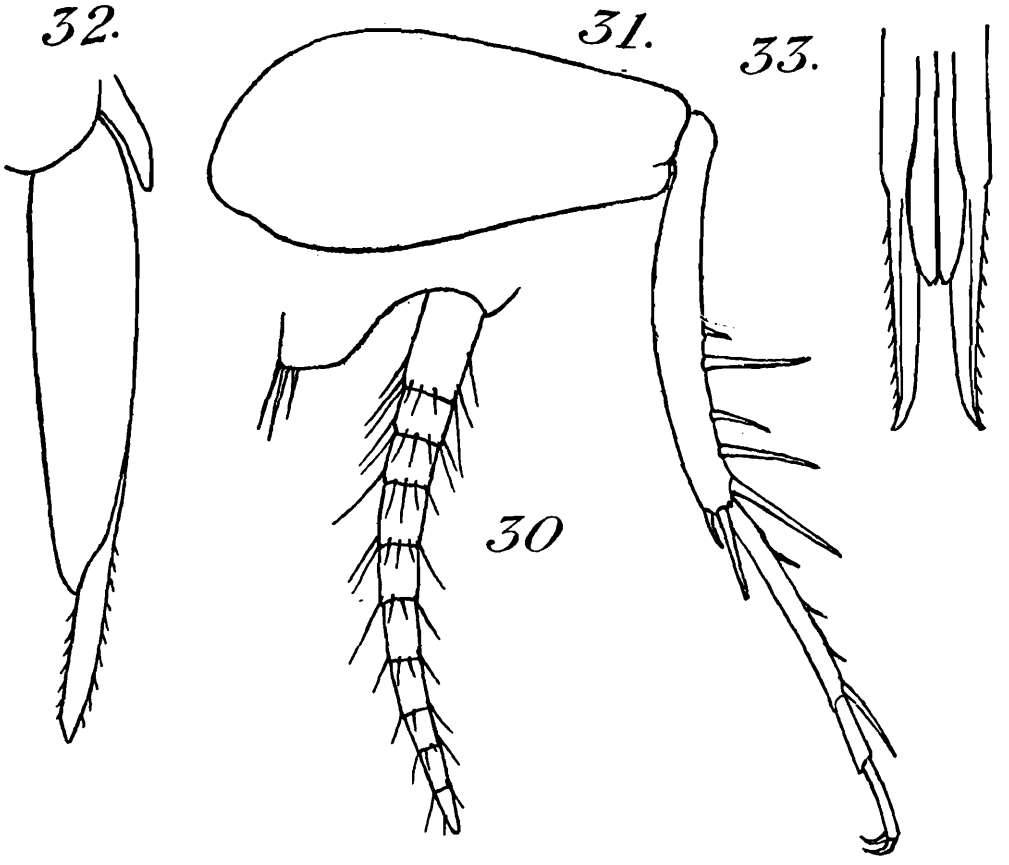

FIG. 30. *Myrmecophila gracilipes*, n. sp. Apex of 10th tergite and left cercus, ×38;—fig. 31. *Id.* Posterior leg, internal face, ×25;—fig. 32. *Id.* Ovipositor, ×38;—fig. 33. *Id.* Apex of the same, ventral view, ×38.

Abdomen narrowing backwards; 10th tergite forming two small tubercles with 3 bristles on each. Cerci comparatively narrower and longer than in other species of the genus, very neatly jointed (fig. 30). Ovipositor (figs. 32 and 33) rather long, narrow; superior valves much longer than inferior ones, very narrow, acute at apex, with superior margin subdenticulate; subgenital plate rather large. Legs paler than the body; posterior femora not so wide as in *M. acervorum*; tibiae (fig. 31) slender, curved, armed with rather long spines of which 4 internal, the 2nd and 4th much the longer, and one external; 6 apical spurs, the inferior ones very short. Posterior tarsi long and slender, the metatarsus armed with 2 long apical spurs and 3 small spines, 2nd joint rather long.

Length of body 7 mm.; post. fem. 2 mm.; ovipos. 1·6 mm.; cerci 1·45 mm.

Although looking very much like *M. acervorum*, this species is remarkable by its more slender stature and by the shape of its posterior legs.

Dr. Annandale states about the specimens found under a stone that, when the stone was lifted, one of the crickets strayed away; it was seized

[1] Dr. F. Santschi had the kindness to name this species of ant.

by a worker ant, which carried it back towards the nest. This cricket leaps less readily than the one found with *Camponotus mitis* and not so far.[1] It is however very active and eludes pursuit with great skill.

52. **Ornebius leucopygus,** sp. nov.

Barkuda, 24th September 1919 (*N. A.*), 1♀ *type* from a big termite-mound (*Odontotermes obesus*).

♀. General colour and habitus of *Mogoplistes brunneus* Serv., but larger. Head a little narrower than pronotum; frontal protuberance short, much wider than the 1st antennal joint; palpi almost black, very pubescent, the maxillary palpi (fig. 35) with 4th article longer than the 3rd

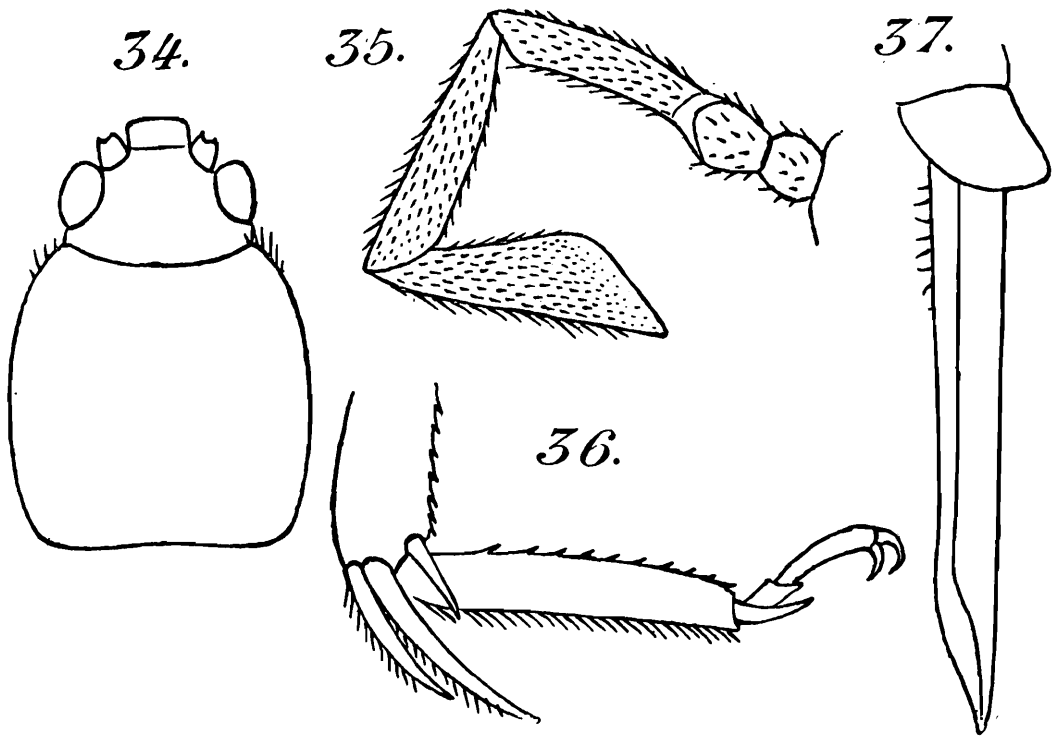

Fig. 34. *Ornebius leucopygus*, n. sp. Head and pronotum, dorsal view, ×10;—fig. 35. *Id.* Maxillary palpus, ×25;—fig. 36. *Id.* Apex of posterior tibia and tarsus, ×25;—fig. 37. *Id.* Ovipositor, ×18.

and the 5th, the last one triangular with internal angle a little rounded. Pronotum (fig. 34) a little wider than long, scarcely narrowing forwards and backwards; anterior margin concave, posterior one straight, sides weakly convex. Abdomen rather long; 10th tergite and supraanal valve forming a triangular, white plate, contrasting with the dark colour of the abdomen; subgenital plate very small. Cerci testaceous. Ovipositor rather short (fig. 37), straight, its apical valves narrow, lanceolate, acute. Anterior and intermediate femora testaceous with silvered scales, darkened at apex, with a few rufous erected bristles; tibiae brown with grey scales; anterior tibiae armed with 2 apical inferior spurs, the external of which very short, and presenting a very small round drum at its internal face near the base; intermediate tibiae armed with 3 apical spurs, the 2 inferior ones subequal in length and a supero-interal one a little shorter. Posterior femora thick, rather strongly dilated; tibiae short and a little curved, armed with fine denticles all the length

[1] This fact agrees perfectly well with the morphological difference between both species, *M. gracilipes* showing much less developed posterior femora than *M. albicincta*

of their superior margins; external spurs short, the median a little longer than the other two; medio-internal spur long, at least twice as long as the superior which is a little shorter than the inferior one (fig. 36); metatarsi long, armed with 2 apical spurs and about 10 denticles on each superior margin.

Length of body 10·5 mm.; pronot. 3 mm.; fem. post. 6·3 mm.; tib. post. 4·8 mm.; ovipos. 3·5 mm.

This species has very much the aspect of a *Mogoplistes*, but it differs from the species of this genus in its perforated anterior tibiae.

53. **Ornebius annandalei,** sp. nov.

Barkuda, 11th October 1920 (*N. A.*), 1♀ *type* with the ant *Acropyga acutiventris* Roger (= *flava* Mayr), from galleries in dead tree-trunk.

♀. Very small, yellowish, covered with silvered grey scales, forming on the legs somewhat darker stripes. Head (figs. 38 and 39) big; front

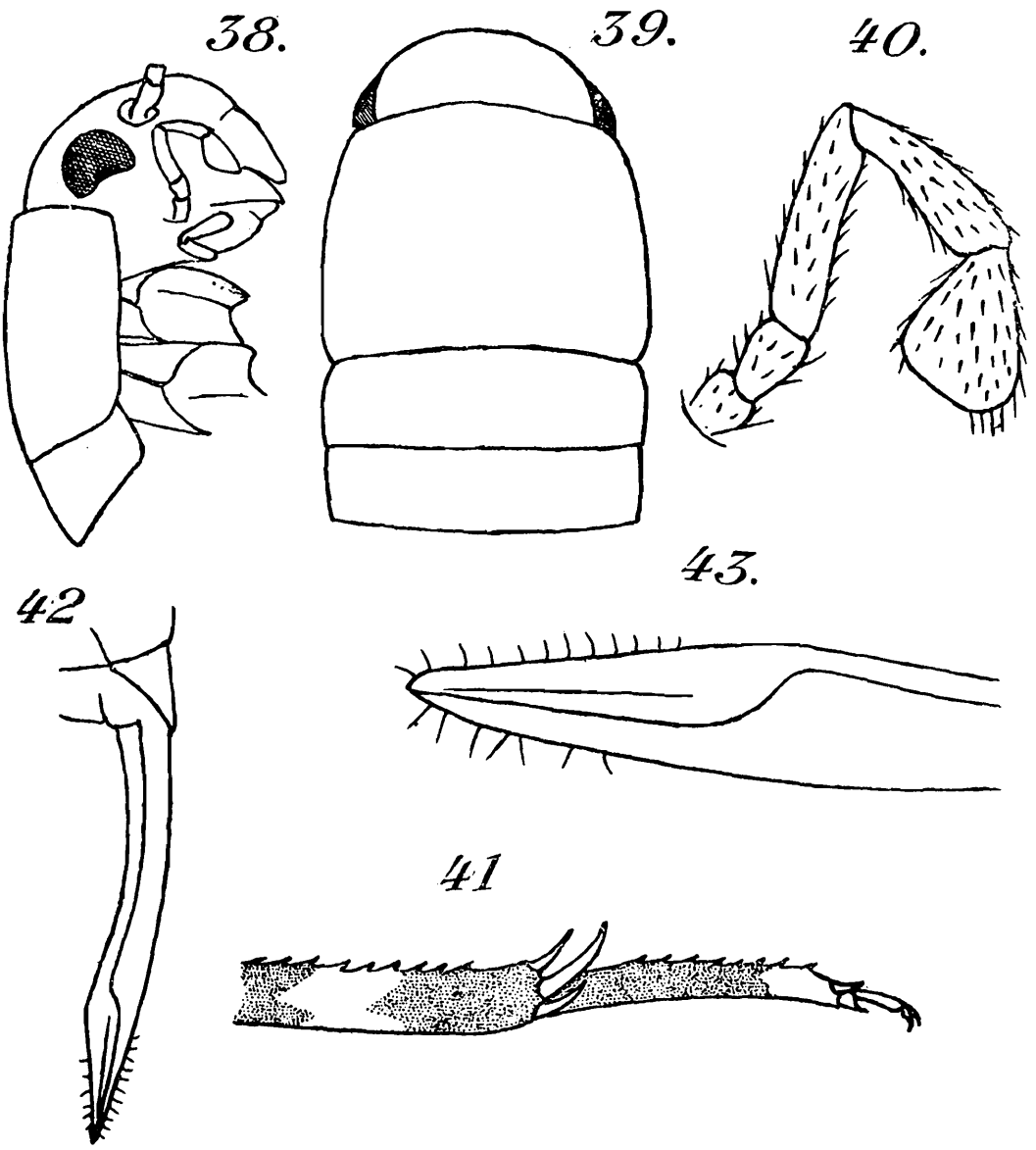

FIG. 38. *Ornebius annandalei,* n. sp. Head and thorax, lateral view, ×25;—fig. 39. *Id.* Head and thorax, dorsal view, ×25;—fig. 40. *Id.* Maxillary palpus, ×100;—fig. 41. *Id.* Apex of posterior tibia and tarsus, ×58;—fig. 42. *Id.* Ovipositor, ×38;—fig. 43. *Id.* Apex of the same, ×80.

very convex and very wide between the eyes; these are large enough, formed of big facets; frontal protuberance moderately projecting, not

divided, separated from the front by a small furrow; palpi greyish, last joint of maxillary palpi very short and wide (fig. 40). Pronotum convex with anterior and posterior margins straight, sides slightly convex near the middle; lateral lobes little high, inferior margin straight. Abdomen very little dilated in the middle; 10th tergite short, supraanal valve triangular, rounded; subgenital plate very large, triangular, subacute and translucent at apex. Cerci wanting? Ovipositor (figs. 42 and 43) short, very slightly curved upwards, its apical valves scarcely enlarged, smooth, little acute at apex. Legs indistinctly striped with brown; anterior tibiae provided with a large round tympanum near the base almost on the upper surface; tarsi rather short, the metatarsus equalling the other joints together. Posterior femora very wide, short; tibiae brown with two yellowish stripes, slightly curved; superior margins armed with very small denticles; apex with 6 very short, whitish spurs, the internal ones somewhat longer than the external, the median spur longer than the two others on each side (fig. 41); tarsi rather long, the metatarsus very long, greyish except at apex, with two rows of small denticles above and two short apical spurs; 2nd and 3rd joints very short and slender.

Length of body 4 mm.; post. fem. 2·5 mm.; ovipos. 1·4 mm.

Although this species has been found with ants, I do not think it is a true myrmecophilous species. [The ant with which it was found is subterranean in habits and only strays into dead logs. *N. A.*]

54. **Metioche humbertiana** Sauss.

Barkuda, 19th August (*F. H. G.*), 2♂, 4♀ at light.

All these specimens belong to the macropterous form. The species has been recorded from Ceylon and Trichinopoly but it seems rather common in India and in the Malay Archipelago.

55. **Anaxipha longipennis** Serv.

Barkuda, 7th—19th October 1919 (*F. H. G.*), 1♂, 3♀ at light; 23rd October 1919 (*N. A.*), 1♂, 2♀ in verandah of house.

This species has never been recorded from the Oriental Region, yet the specimens from Barkuda are quite similar to those from Madagascar. The male presents a very long speculum, extending much backwards on the elytra.

56. **Madasumma marmorata** Haan.

Barkuda, August 1919 (*F. H. G.*), 1 ♀ on lower side of Ficus branch; 26th June 1920 (*N. A.*), 1 ♀.

This species is known from Japan, Java, Singapore.

57. **Euscyrtus concinnus** Haan.

Barkuda, 23rd October 1919 (*N. A.*), 1♂, 1♀ caught in verandah of house; 4th—19th October 1919 and 11th—16th December 1919 (*F. H. G.* and *N. A.*), several examples of both sexes at light.

This species is common and widely distributed in the Oriental Region. Most of the specimens collected at Barkuda belong to the var. A of DE Saussure with the brown ornaments very much reduced.

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58. **Acanthalobus inornatus** Walk.

Barkuda, December 1919 (*N. A.*), 1 ♂, 2 ♀ at light.

59. **Mazarredia cristulata** Bol.

Barkuda, September 1919 and September 1920 (*N. A.*), 4 ♂.

These specimens differ from the type of the species by their shorter pronotum, which scarcely exceeds the apex of abdomen.

60. **Euparatettix scabripes** Bol.

Barkuda, 4th—19th October 1919 and December 1919 (*F. H. G.* and *N. A*) numerous individuals at light.

61. **Paratettix variabilis** Bol.

Barkuda, 4th—19th October 1919 and December 1919 (*F. H. G.* and *N. A.*), several specimens at light.

62. **Paratettix indicus** Bol.

Barkuda, August 1919 (*F. H. G.*), 1 ♂, 2 ♀; September 1919 (*N. A.*) 1 ♀.

63. **Paratettix scaber** Thunb.

Barkuda, December 1919 and July 1920 (*N. A.*), several specimens of both sexes at light.

64. **Coptotettix testaceus** Bol.

Barkuda, July and September 1920 (*N. A.*), 1 ♂, 2 ♀, 1 young example.

This species has been described from Ceylon; the specimens from Barkuda which I refer to it differ from the type in the pronotum, which is not longer than the abdomen.

65. **Aeolopus affinis** Bol.

Barkuda, August and September 1920 (*N. A.*, *C. D.* and *S. R.*), 3 ♂, 2 ♀.

66. **Pternoscirta bimaculata** Thunb.

Barkuda, August—September 1920 (*N. A.*), common on ground among low herbage.

This species has been recorded from Kodaikanal by Bolivar with the name *P. humbertiana* Sauss. The specimens from Barkuda often show dark green shades, chiefly the females.

67. **Morphacris citrina** Kirby.

Barkuda, 7th September 1920 (*N. A.*), on dead leaves on shore of lake, 1 ♂, 1 ♀.

68. **Trilophidia cristella** Stål

Barkuda, August 1919 (*F. H. G.*), 1 ♂

69. **Trilophidia turpis** Walk.

Barkuda, September 1919 (*N. A.*), 1 ♂.

70. **Trilophidia annulata** Thunb.

Barkuda, September 1919 (*F. H. G.*), 1♀; September 1920 (*C. D.*), 1♂, 2 ♀.

71. **Acrotylus inficita** Walk.

Barkuda, 25th August 1919 (*N. A.*), 2♀; 4th—19th October 1919 (*F. H. G.*), 1♀

72. **Chrotogonus saussurei** Bol.

Barkuda, August 1919 (*F. H. G.*), 1♀, 1♂ in copula; 16th—20th September 1919 (*E. B.*), 1 ♂.

73. **Chrotogonus brachypterus** Blanch.

Barkuda, August—September 1920 (*N. A.*, *F. H. G.* and *S. R.*), common on stony soil with a sparse covering of grass.

74. **Atractomorpha crenulata** F.

Barkuda, July—September 1920 (*N. A.*, *F. H. G.*), common on the leguminous plants *Tephrosia* and *Crotalaria.*

Dr. Annandale states that the colour of this insect alive is " uniform bright green, dorsal surface of abdomen tinged with rose-pink, sides of head and pronotum edged with shining white granules, a few similar granules on sides of mesonotum; eyes mottled."

75. **Aularches miliaris** L.

Barkuda, 4th—19th October 1919 (*F. H. G.*), 1♀.

[As I have stated in my introductory note, the chief if not the only food of this genus is the leaves and twigs of the common shrub *Calotropis*, of which several allied species are common in the drier parts of India. This is also the habitual food of the allied genus *Poecilocercus*. *N. A.*]

76. **Aularches punctatus** Drury.

Barkuda, September 1920 (*N. A.*), 1♀.

According to Dr. Annandale's observations, the natural colouration of this species is brownish with spots (*i.e.*, bands across sides of the thorax and face and callous spots on sides of second segment) pure white.

77. **Catantops indicus** Bol.

Barkuda, August and September 1919 (*N. A.*, *F. H. G.* and *E. B.*), numerous individuals of both sexes.

This species is common in Ceylon, in India and in China.

78. **Catantops karnyi** Kirby.

Barkuda, 16th—20th September 1919 (*E. B.*), 1 ♂.

79. **Oxya velox** F.

Barkuda, September 1920 (*N. A.*), common on *Tephrosia* and *Crotalaria.*

80. **Euprepocnemis pulchra** Bol.

Barkuda, July 1920 (*N. A.* and *F. H. G.*), 3 ♂, 4 ♀.

This beautiful species has been described by Bolivar from Kodaikanal.

[This is mainly a jungle species, usually found on bushes. The discrepancy in size between the male and the female is very striking. *N. A.*]

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