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Autor: Brindle, A.
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Ergebnisse der Bhutan-Expedition 1972 des Naturhistorischen Museums in Basel

Dermaptera

by A. Brindle

Abstract: 550 specimens of Dermaptera collected by the 1972 expedition to Bhutan, organized by the Naturhistorisches Museum, Basel, consist of 40 species, of which 11 are new and are described, whilst another 4 species are apparently new but are only represented by female specimens. Previous records of Dermaptera from Bhutan are not included, except for original references or synonymy, and reasons are given for presuming that these records are from localities in North Bengal, India, and not from Bhutan. Keys to all families, subfamilies, genera, and species represented are given, and the distribution of the species and composition of the fauna are discussed. *Kosmetor brahma* (Burr) (Forficulidae) is transferred to the genus *Timomenus* Burr, and *Labia lutea* (Bormans) (Labiidae) is transferred to the genus *Spongovostox* Burr. The status of the Himalayan species of Forficulidae found in Bhutan is clarified.

Bhutan has a fauna predominantly of the family Forficulidae, and mainly of Himalayan endemic species, with a few Oriental species which occur along the river valleys leading from India and which do not extend to high altitudes. The incidence of brachypterous and apterous species in the collection is low, and is less than 10%, but the incidence of high-altitude melanism is high, over 50%. Both these are features typical of the known Himalayan fauna. A comparison of made of the composition of the Bhutan fauna to that of the World fauna, in number of species in each family represented.

Due largely to its general inaccessibility, Bhutan is unknown as far as Dermaptera are concerned. Its geographical position is interesting; to the south lie Bengal and Assam, the richest part of India, whilst to the north are the arid tablelands of Tibet. Sikkim, to the west of Bhutan, has a rich fauna, and the lack of records from Bhutan has been a prominent gap in our knowledge of the distribution of the Dermaptera. Consequently it was with great pleasure that the present author has had an opportunity to examine a large collection of Dermaptera, resulting from an expedition organised by the Basel Museum in 1972. The expedition from the Basel Museum is the first to undertake systematic collecting of Dermaptera in Bhutan, and the 550 specimens collected represent 40 species, of which 11 are new and are described; four other species are apparently new but are only represented by female specimens. It is very appropriate to name some of the new species after the collectors, and I am pleased to be able to dedicate one new species to each of

the following:—Dr. C. Baroni Urbani; O. Stemmler; Dr. W. Wittmer; and Dr. W. Würmli, in recognition of their work in the difficult terrain and climate of this mountainous and most interesting country. These four species are *Diplatys urbanii*; *Diplatys stemmleri*; *Irdex wittmeri*; and *Spongovostox wuermlii*.

Although there are about twenty species of Dermaptera previously recorded from Bhutan in the literature, the localities given do not apparently refer to places within the Bhutan boundaries. Almost all previous records are from Pedong and Maria Basti, as given in Burr (1910) and Borelli (1912) and from “Bhoutan anglais” in Borelli (1912). It has not been possible to trace either of the first two localities in old or in new gazetters, nor on large scale maps of Bhutan, both those published at the beginning of the present century, nor those of recent date. However, reference to the Survey of India maps, scale one inch to four miles (about 1:250,000) of Sikkim and North Bengal (sheet 78a), shows Pedong, which lies about ten miles north-east of Kalimpong, North Bengal, on the Kalimpong to Lhasa trade route. Pedong lies south of the border with Sikkim, and is in North Bengal, India. That this is the Pedong referred to in previous records is also suggested in Hincks (1955, p. 75) where the holotype of *Diplatys rileyi* Hincks is recorded from “Pedong, Sikkim”. The confusion of the countries concerned is due to the poorly defined geographical boundaries between the countries, which even at the present time are not well defined. Maria Basti has not been traced although “Basti” occurs in a number of place names in the same area of North Bengal, such as Bhotia Basti, etc. Nepal, Sikkim, and Bhutan never formed an integral part of the former British India, and the reference to “Bhoutan anglais” by Borelli (1912) again suggests that this refers to the part of the Himalayan foothills, south of Sikkim, and formerly administered as part of British India. The previous records from Bhutan are therefore not considered in the present paper, except where reference is made to the original description or synonymy, and when Bhutan is quoted in connection with these it should be noted that all these records probably refer to North Bengal.

Most of the species previously recorded from “Bhutan” however are represented in the present collection, and Burr (1910) and Borelli (1912) have been most useful in dealing with the material. In addition various papers dealing with the Dermaptera of surrounding countries have been used, including those papers for Nepal (Bey-Bienko, 1968); for North-east India in Burr (1913) and Hebard (1923); for Tibet in Semenov and Bey-Bienko (1935), and Bey-Bienko (1938);

for North Burma (H i n c k s , 1947); and for South-west China (B e y - B i e n k o , 1934, 1959a).

My sincere thanks are due to Dr. C. Baroni Urbani for the opportunity to examine the material; for his comments on the localities of previous records; and for arranging for the editing and publication of the present paper. The identification of the specimens has been simplified by the fact that the male genitalia of the specimens were already extracted and mounted on the card of the specimen or beneath the specimen on the same pin. I am also indebted to Dr. D. R. Ragge and Mrs. J. Marshall for facilities in examining specimens of Dermaptera in the British Museum (Natural History).

The types of the new species are deposited in the Naturhistorisches Museum, Basel, with the exception of a few paratypes which have been retained in the Manchester Museum (MM) or in the British Museum (Natural History) (BMNH), and these specimens are noted.

The Dermaptera fauna of Bhutan appears to be rich, since the total of 40 species from the part of the country in which the expedition was able to operate, is remarkably good. In common with the Himalayas as a whole, the proportion of endemic species is high, the term "endemic" referring to species restricted to the Himalayas and those which extend through the mountainous country of North Burma into Yunnan. The endemic species account for 65 % of the number of species and 85 % of the number of specimens in the present collection. Non-endemic species account for 35 % of the number of species but only 15 % of the number of specimens. It is clear that the endemic species are strongly dominant in the Himalayas, and the non-endemic species can only compete at the lower altitudes. These non-endemic species appear to have entered the country along the river valleys from India, and do not extend as a rule much above 1500 metres, but such a genus as *Forcipula*, which is restricted to the banks of rivers and streams does extend higher, *F. trispinosa* (Dohrn) being recorded here from 2000 metres. In these cases, however, the effect of altitude is probably reduced in such sheltered habitats.

Another feature of the present collection, which is a feature of the Himalayan fauna in general, and of the Palaearctic Region, is the predominance of the family Forficulidae. In the collection this family accounts for 40 % of the number of species, and 65 % of the number of specimens (see Table 1). In contrast, the families Carcinophoridae and Labiidae, which have numbers of species approaching or equalling the Forficulidae on a world-wide basis, are poorly represented. The Labiduridae are also well represented in numbers of species, but not in numbers of specimens (Table 1).

There are two features of especial interest in the Himalayan fauna, well shown in the Bhutan material. These are the incidence of reduction of elytra and wings often associated with altitude, and the incidence of high altitude melanism.

The reduction of elytra and wings is not a common feature in the Himalayan Dermaptera as a whole. In some species, such as *Nala nepalensis* (Burr), the elytra are usually short and the wings may just be visible. In other species, such as *Prolabisca aroliata* (Bey-Bienko) and *Spongovostox wuermlii* sp. n., two forms exist, one in which the elytra and wings are fully developed, and another in which the elytra are short and the wings absent or concealed, but the latter form is not necessarily associated with altitude. It is in the high altitude species of the Forficulidae, however, that the low incidence of brachypterous and apterous species or forms is particularly well shown. The main high altitude species of the Forficulidae, that is, those species extending beyond 3000 metres, are *Allodahlia macropyga* (Westwood); *Anechura stoliczkae* Burr (not recorded here beyond 3000 metres but it extends higher in other areas); and six *Forficula* species — *schlagintweiti* (Burr); *bhutanensis* sp. n.; *beebei* Burr; *lebongae* Hebard; *beelzebub* (Burr); and *lucens* sp. n. Of these only *lucens* has very short elytra and is without visible wings; *beebei*, which is the highest ranging *Forficula*, has rather short elytra, but the wings may just be visible, as in the present specimens. The other species have normally developed elytra and wings, although *schlagintweiti* has a wingless form which is recorded here from the highest altitude, but this is not always the case. The incidence of brachyptery in the present collection is less than 10 %.

On the other hand the incidence of high-altitude melanism is high, the first five species listed above are almost entirely black or blackish, whilst dark forms of the other species occur. Well above 50 % of the present collection consists of melanic species or forms. This melanism may be associated with a red head, as in *F. beelzebub* and the wingless form of *F. schlagintweiti*: it frequently occurs in the family Carcinophoridae in montane species of the Himalayas and of other Regions.

Table. 1. Percentages of specimens and species of families in the present collection compared to the World fauna.

Family	Bhutan collection		World fauna
	% specimens	% species	% species
Diplatyidae	2	10	6
Pygidicranidae	10	7.5	10
Carcinophoridae	6	5	21
Labiduridae	2	15	4
Apachyidae	6	2.5	1
Labiidae	9	20	26
Chelisochidae	not represented		6
Forficulidae	65	40	26

The relative abundance of species in the collection shows that the common species are *A. stoliczkae* (175 specimens), *F. schlagintweiti* (74), and *F. bhutanensis* (41). *Echinosoma dentiferum* Borelli, *Anisolabis pervicina* Burr, *Irdex wittmeri* sp. n., and *Apachyus feae* Bormans, each have 30—36 specimens, but these are mainly from one locality, 87 km beyond Phuntsholing at 1680 metres, which appears to have been the richest locality. Other species are less well represented, 23 being represented by 3 specimens or less.

Check List of Bhutan Dermaptera

	Altitude of recorded specimens in metres
Diplatyidae	
* 1. <i>Diplatys urbanii</i> sp. n.	1900
* 2. <i>D. stemmleri</i> sp. n.	1700—3100
* 3. <i>D. bhutanensis</i> sp. n.	1900—2300
* 4. <i>D.</i> sp.	2300—2500
Pygidicranidae	
Pygidicraninae	
* 5. <i>Cranopygia constricta</i> Hincks	1400—3100
Echinosomatinae	
* 6. <i>Echinosoma dentiferum</i> Borelli	350—2300
Prolabiscinae	
* 7. <i>Prolabisca aroliata</i> (Bey-Bienko)	1680
Carcinophoridae	
Carcinophorinae	
* 8. <i>Anisolabis pervicina</i> Burr	350—3400
9. <i>Euborellia femoralis</i> (Dohrn)	200—450

	Altitude of recorded specimens in metres
Labiduridae	
10. <i>Labidura riparia</i> (Pallas)	350—1300
11. <i>Nala lividipes</i> (Dufour)	350— 450
* 12. <i>N. nepalensis</i> (Burr)	350—2300
13. <i>Forcipula quadrispinosa</i> (Dohrn)	350— 450
14. <i>F. trispinosa</i> (Dohrn)	1700—2000
* 15. <i>F. indica</i> Brindle	1300
Apachyidae	
16. <i>Apachyus feae</i> Bormans	1680
Labiidae	
Labiinae	
17. <i>Chaetospania silvestrii</i> Borelli	1680
18. <i>Labia minor</i> (Linnaeus)	200— 450
* 19. <i>Irdex pilosus</i> Bey-Bienko	2150
* 20. <i>I. wittmeri</i> sp. n.	1300—2000
* 21. <i>I.</i> sp.	1700—2000
Spongiphorinae	
22. <i>Spongovostox luteus</i> (Bormans)	350—1680
* 23. <i>S. wuermlii</i> sp. n.	350—1680
* 24. <i>S. aborum</i> Burr	1400—2600
Forficulidae	
Anechurinae	
* 25. <i>Allodahlia macropygae</i> (Westwood)	1680—3100
* 26. <i>Anechura stoliczkae</i> Burr	1680—2500
Forficulinae	
* 27. <i>Forficula schlagintweiti</i> (Burr)	1900—3300
* 28. <i>F. bhutanensis</i> sp. n.	2600—3400
* 29. <i>F. beebei</i> Burr	3100—3300
* 30. <i>F. lebongae</i> Hebard	2150—3400
* 31. <i>F. beelzebub</i> (Burr)	1680—3400
* 32. <i>F. distendens</i> sp. n.	2300—2500
* 33. <i>F. lucens</i> sp. n.	2150—3300
* 34. <i>F.</i> sp.	2300—2500
Eudohrninae	
* 35. <i>Eudohrnia uniformis</i> sp. n.	1700—2000
* 36. <i>Kosmetor gracilis</i> sp. n.	1680
Opisthocosmiinae	
* 37. <i>Liparura simplex</i> sp. n.	1300

- | | |
|---------------------------------------|-----------|
| * 38. <i>L. sp.</i> | 1300—2800 |
| * 39. <i>Timomenus brahma</i> (Burr) | 1700—2000 |
| 40. <i>Hypurgus humeralis</i> (Kirby) | 350—450 |

*) species endemic to the Himalayas or the mountainous country eastwards through North Burma into Yunnan.

Key to families and subfamilies

- | | |
|---|---|
| 1. Male genitalia with two distal lobes (figs. 3, 4, 8, 18, 19, 20) | 2 |
| — Male genitalia with a single distal lobe (figs. 21, 22, 23) | 8 |
| 2. Both distal lobes directed backwards at rest (figs. 3, 4, 8, 18, 19) | 3 |
| — One distal lobe directed backwards and one directed forwards at rest (fig. 20) | 6 |
| 3. Short and broad species; branches of forceps entirely cylindrical; elytra and wings strongly setulose, the setae being numerous, thick, short, and mainly truncate | Pygidicranidae (Echinosomatinae) |
| — More slender or elongated species; branches of forceps elliptical or trigonal at bases; elytra and wings glabrous or pubescent, any setae present being sparse and not truncate | 4 |
| 4. Basal antennal segments short and broad, segments 5-6 usually quadrate or transverse; larger species, typically blackish in colour with yellowish marks on anterior half. Body length over 20 mm | Pygidicranidae (Pygidicraninae) |
| — Basal antennal segments longer, segments 5-6 longer than broad; smaller species, body length 14 mm or less | 5 |
| 5. Elytra and wings punctured and pubescent, scarcely shining; much more slender species (fig. 1); virga of male genitalia broader, relatively short (figs. 3, 4, 8) | Diplatyidae |
| — Elytra, and wings when present, glabrous and brightly shining; broader species (fig. 13); virga of male genitalia very long, narrow, and spirally coiled (fig. 18) | Pygidicranidae (Prolabiscinae) |
| 6. Body flat; forceps with broad flattened branches, pygidium forming a broad flat process between the branches | Apachyidae |
| — Body normally convex; branches of forceps not flattened, pygidium smaller | 7 |

7. Elytra always present, wings often visible, the former being relatively dull, rugose or punctured; forceps with more slender branches, sometimes greatly elongated, and widely separated at base in males; virga of male genitalia broad at base and with a sinuous inner tube

Labiduridae

- Elytra and wings often completely absent or reduced, if both are developed they are glabrous, smooth, and shining; forceps with short and broad branches, those of male not widely separated at base; virga of male genitalia without a sinuous inner tube, often not visible

Carcinophoridae

8. Second tarsal segment simple; male genitalia often complex (fig. 21) 9

- Second tarsal segment not simple, short and strongly broadened, often cordiform or bilobed, the third (distal) segment arising from the dorsal surface of the second; male genitalia simple (figs. 22, 23) 10

9. Elytra and wings punctured and pubescent; third antennal segment usually shorter than the fifth

Labiidae (Labiinae)

- Elytra and wings impunctate and glabrous; third antennal segment as long as or longer than the fifth

Labiidae (Spongiphorinae)

10. First antennal segment long, often longer than the distance between the antennal bases (figs. 61, 63); distal segments narrow and long; body often fusiform in shape, strongly narrowed distally; forceps of both sexes often long and slender

Forficulidae (Opisthocosmiinae)

- First antennal segment shorter than the distance between the antennal bases (figs. 45, 54, 56, 59); distal segments usually broader and shorter; body not fusiform; forceps of both sexes long and slender or short and broad

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11. Male forceps long and slender, branches without basal inner teeth or flanges (fig. 59, 62); female forceps relatively longer

Forficulidae (Eudohrninae)

- Male forceps broader, each branch usually with a basal inner tooth or flange (figs. 37, 38, 39, 40, 45, 46, 48, 49, 50, 51, 54, 56, 58)

Forficulidae (Forficulinae with Anechurinae)

DIPLATYIDAE

A family of small to medium sized earwigs, slender in build and local in distribution, few species occurring over wide areas. The taxonomy of the family is based on the male genitalia and females are named in association with males; isolated females cannot be named with any accuracy. No species has previously been recorded from Bhutan, and the present specimens consist of three new species, together with a single female of a fourth unknown species. The three new species all belong to the *rufescens* group of the genus *Diplatys* Serville (Hicks, 1955, p. 66) in which the male parameres are simple, and all are closely related to known species from countries bordering Bhutan.

Key to species

1. Head strongly transverse; eyes very large; pronotum with lateral margins strongly convex and slightly angular (fig. 1); posterior margin of the male penultimate sternite with a wide and deep median excision (fig. 2); male genitalia fig. 3 **D. urbanii** sp. n.
- Head less transverse; eyes large; pronotum relatively small with sides much less convex (fig. 6) 2
2. Pronotum narrowed posteriorly; posterior margin of the male penultimate sternite with two median projections (fig. 7); virga and associated sclerites of the male genitalia small (fig. 8) **D. bhutanensis** sp. n.
- Pronotum more or less parallel-sided (fig. 6) 3
3. Pronotum relatively wider, transverse, blackish and concolorous with head, pubescence short; head more transverse (fig. 6); posterior margin of the male penultimate sternite with a small median excision (fig. 5); virga and associated sclerites of the male genitalia large (fig. 4) **D. stemmleri** sp. n.
- Pronotum relatively narrower, about as broad as long, yellow, contrasting with the black head, pubescence long; head less transverse; male unknown **Diplatys** sp.

1. **Diplatys urbanii** sp. n.

Head, pronotum, elytra, and wings dark brown, almost blackishbrown; antennae and legs yellowish, distal half of femora, except apices, darkened (more distally on anterior pair of legs); abdomen and forceps reddish-brown,

last tergite darker. Cuticle of head, pronotum, elytra, and wings punctured and pubescent, hairs short and yellow, mainly erect but those on head finer and depressed; cuticle of abdomen coriaceous and pubescent, hairs fine, yellow, and depressed.

Male (fig. 1): head strongly transverse, vertex depressed but post-occipital ridges not developed; eyes very large. First antennal segment relatively short second transverse, remainder somewhat variable, those of left antenna thicker and shorter than those of right. Pronotum transverse, lateral margins strongly convex and somewhat angular anteriorly, and with a few marginal setae. Elytra and wings fully developed, with a triangular scutellum visible. Legs long, femora broad, especially those of anterior pair of legs, dorsal ridges on femora well marked; tibiae slender and nearly as long as femora in posterior pair of legs; tarsi shorter in anterior pair, longer in median pair, and longest in posterior pair; in the latter the basal segment of the tarsus is longer than both distal segments, the second segment short, the third broadened distally with relatively short apical claws; arolium dark.

Abdomen slender, last tergite large, posterior margin oblique laterally, concave medially; penultimate sternite long, pubescent, hairs yellow, rather long, posterior margin with a large excision (fig. 2). Forceps with branches broader and elliptical in cross section near base, narrower and cylindrical distally, apex of branch curved medially (fig. 1). Genitalia with virga curved and associated with sclerites, one long and straight; parameres simple, narrower distally, apex curved (fig. 3).

Length of body 10 mm, forceps .85 mm.

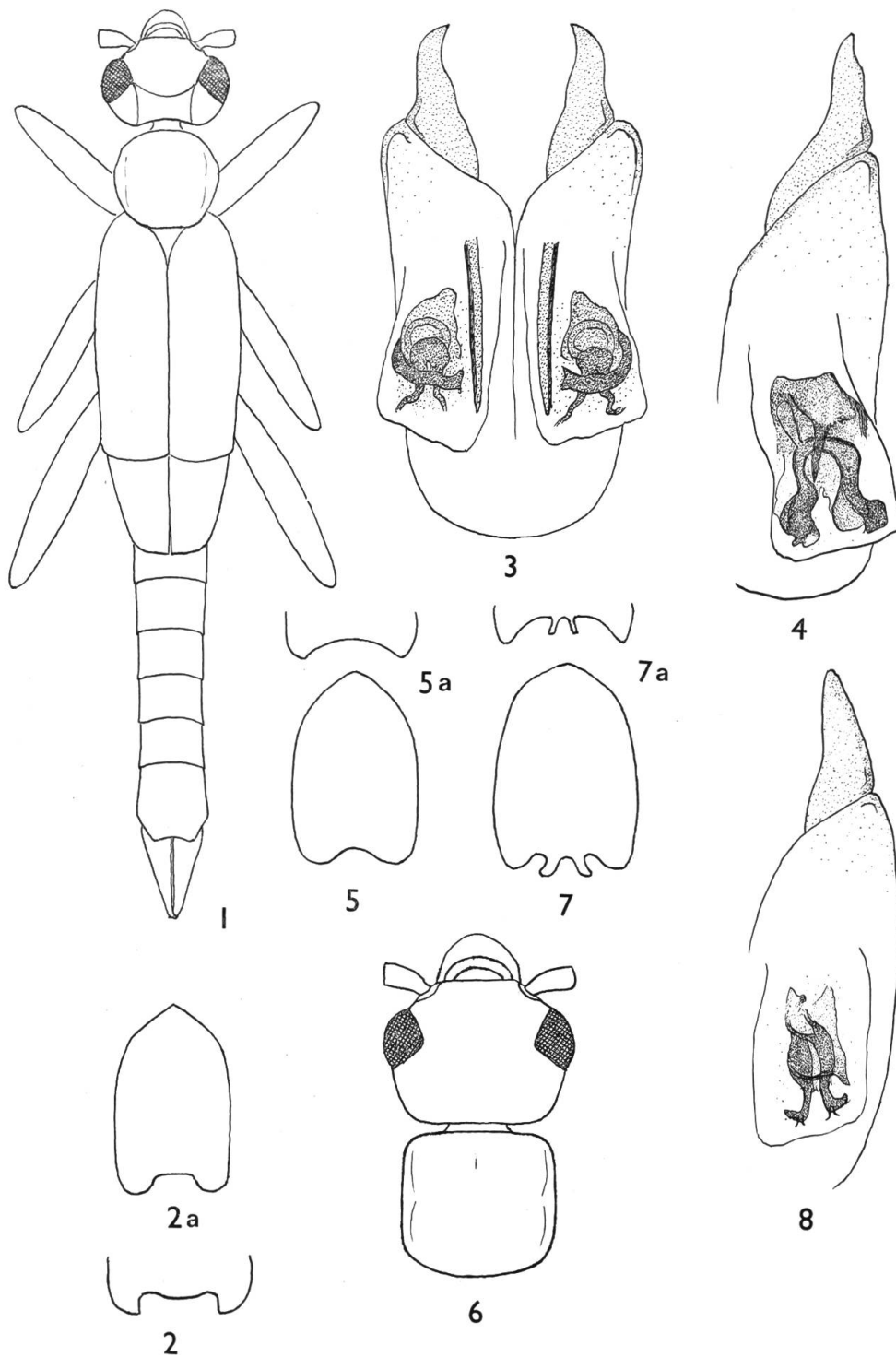
Female: unknown.

Material examined: Holotype ♂, Changra, 18 km S. Tongsa, 1900 m, 22.VI.1972.

D. urbanii is most closely related to *D. rileyi* Hincks from Sikkim (Hincks, 1955, p. 74), from which it can be distinguished by the form of the excision in the male penultimate sternite; in *rileyi* the excision has a median convexity, and the inner angles are sharp (fig. 2a). The parameres of *rileyi* are relatively much longer and the distal part is not curved inwards.

2. *Diplatys stemmleri* sp. n.

Blackish; antennae, elytra, and wings dark brown; legs brown to dark brown, tarsi yellowish (colour paler in teneral adults). Cuticle of head, pronotum, elytra, and wings punctured and pubescent, hairs yellowish to brown, and finer on head and pronotum, more conspicuous on elytra and wings and



Figs. 1—3 *Diplatys urbanii* sp. n. — 1 male — 2 penultimate sternite — 3 male genitalia. — Figs. 4—6 *D. stemmleri* sp. n. — 4 male genitalia (half) — 5 male penultimate sternite — 6 head and pronotum. — Figs. 7—8 *D. bhutanensis* sp. n. — 7 male penultimate sternite — 8 male genitalia (half). Figs. 2a, 5a, 7a, posterior margin of male penultimate sternite of *D. rileyi* Hincks, *D. tibetanus* Hincks, and *D. bidentatus* Hincks.

rather dense laterally; abdominal tergites scarcely punctured but with rather long pale pubescence.

Male: head transverse, vertex depressed but without postoccipital ridges; eyes large (fig. 6). First antennal segment relatively short, second transverse, fourth shorter than either third or fifth, these being subequal in length, segments broad and short; the distal segments more elongated. Pronotum slightly transverse, lateral margins nearly straight and parallel, surface depressed transversely towards posterior margin which is reflexed over the base of the elytra (fig. 6). Elytra and wings fully developed, and with a small triangular scutellum. Legs long, femora broadened, but with dorsal longitudinal ridges almost absent, those of ventral edges marked; tibiae long and slender, posterior tarsi almost as long as tibiae.

Abdomen slender, last tergite large, oblique laterally on posterior margin; penultimate sternite large, pubescent, hairs yellow, posterior margin with a small median excision (fig. 5). Genitalia with flanges associated with the virga, parameres short, narrowed distally (fig. 4).

Length of body 10-11 mm, forceps .9 mm.

Female: unknown.

Material examined: Holotype ♂, 21 km O Wangdiphodrang, 1700 to 2000 m, 15.VI.1972. Paratypes: — same data, 1 ♂ (MM); Dorju-la, 3100 m, 6.VI.1972, 1 ♂.

This species is most closely related to *D. tibetanus* Hincks from Tibet (Hincks, 1955, p. 76); the male penultimate sternite of the latter, however, is much more widely concave (fig. 5a), and the male parameres are blunt at the tip.

3. *Diplatys bhutanensis* sp. n.

Dark brown; elytra and wings paler in colour (some specimens are teneoreal so that the full colour is not developed). Cuticle similar to that of *stemmleri*.

Male: similar to *stemmleri* in most structural features, but the pronotum is as broad as long and narrowed posteriorly; the dorsal ridges on the femora are well developed. Penultimate sternite large, depressed along a median line, posterior margin with two rounded projections medially (fig. 7). Genitalia with virga relatively small, parameres broad, narrowed distally, apex blunt (fig. 8).

Length of body 10-11 mm, forceps .8-.9 mm.

Female: similar but larger and paler in colour; eyes smaller; penultimate sternite with posterior margin simple.

Length of body 14 mm, forceps 1 mm.

Material examined: Holotype ♂, Chimakothi, 1900-2300 m, 22.V.1972. Paratypes (including allotype): — same data 2 ♂, 1 ♀, 1 larva; same data 1 ♂, 1 ♀ (MM).

This species is most closely related to *D. bidentatus* Hincks from North Bengal (Hincks, 1955, p. 75); the median projections of the male penultimate sternite of *bidentatus* are much more slender (fig. 7a) and the male parameres are longer and much more narrowed distally.

4. *Diplatys* sp.

Head black, antennae yellow, basal two segments blackish; pronotum and base of elytra yellow; rest of elytra and wings dark brown; legs yellow, each femur with a broad dark band, placed nearer apex, tibiae of anterior pair darkened medially; abdomen blackish-brown. Cuticle shining, punctured and pubescent, hairs yellow and long on pronotum, elytra and wings. Head less transverse than *stemmleri*, depressed along epicranial sutures; pronotum, rather small, posterior margin strongly convex. Elytra and wings fully developed. Forceps simple.

Length of body 11 mm, forceps .8 mm.

Material examined: Thimphu, 2300-2500 m, 21.V.1972, 1 ♀.

This cannot be readily assigned to any known species of the area, most of which are dark brown unicolorous species. Males are essential to settle its identity.

PYGIDICRANIDAE

Pygidicraninae

One genus, *Cranopygia* Burr, is represented in the Oriental Region. Large in size and dark in colour, the anterior part of the insect usually being marked with yellow stripes, bands, or spots. One species is recorded from Bhutan.

5. *Cranopygia constricta* Hincks

Cranopygia constricta Hincks, 1955, Ann. Mag. nat. Hist. (12) 8: 822 (holotype ♂, Bhutan; ♂♂ paratypes, Bhutan and Sikkim: BMNH).

Cranopygia constricta Hincks; H i n c k s , 1955, Syst. mon. Derm. 2: 101 (Bhutan).
Cranopygia picta (Guerin-Meneville); B u r r , 1910, Fauna Brit. India: 55 (Bhutan).
Cranopygia marmoricrura (Serville); B u r r , 1910, Fauna Brit. India: 58 (Bhutan).

Blackish; antennae yellowish-brown basally; two small yellow spots between the antennal bases; pronotum narrowly yellow laterally; each elytron with a yellow elongated narrow basal spot and a second spot medially; wings yellow, blackish on external margins; legs black with joints and most of tarsi yellow. Anterior part of insect dull, abdomen more shining. Penultimate sternite of male rounded, posterior margin with a small apical excision (fig. 12). Each branch of male forceps broad, with a dentated inner ventral edge at base, dorsal inner edge almost smooth; surface with a transverse depression near base; branch narrowed medially thence broadened before tapering to apex (fig. 9). Genitalia long and narrow, virga simple, narrow and very long; each paramere broad at base with a narrow distal part, apex bifurcated (fig. 11). Each branch of female forceps more simple, narrowed from base to apex, ventral inner edge less strongly dentated than that of male, but with a similar transverse depression near base (fig. 10).

Length of body: 21 mm, forceps 5 mm (male), 23 mm, forceps 4.5 mm (female).

Material examined: Thimphu, 2300-2500 m, 31.V.1972, 1 larva; Wangdiphodrang, 1400 m, 6.VI.1972, 1 ♀; Gogona, 3100 m, 10.VI.1972, 1 ♂.

World distribution: Sikkim; Bhutan.

This appears to be the first recorded female specimen.

Echinosomatinae

This subfamily includes the single genus *Echinosoma* Serville, an Old World genus which is recognizable by the short and broad body and the strongly setulose cuticle. One species is recorded from Bhutan.

6. *Echinosoma dentiferum* Borelli

Echinosoma dentiferum B o r e l l i , 1912, Bull. Mus. nat. Hist. nat. Paris 1912: 3 (holotype ♂, Bhutan; Paris Museum).

Echinosoma dentiferum Borelli; H i n c k s , 1959, Syst. mon. Derm. 2: 159 (Bhutan).

Echinosoma sumatranum (de Haan); B u r r , 1910, Fauna Brit. India: 70 (Bhutan).

Blackish; elytra sometimes blackish-brown; antennae black, first two segments yellow; pronotum with a yellow triangular patch at each side; wings partially yellow; legs yellow, femora and tibiae darkened medially. Cuticle of head, pronotum, elytra, and wings dull, with numerous short hairs

and truncate setae, mainly black but some are yellow; abdomen more shining, strongly pubescent, hairs mixed, short and long, mainly yellow or brown; posterior margins of abdominal tergites with long pointed setae. Penultimate sternite of male with a median excision on posterior margin (fig. 17), that of female simple, broadly triangular, apex rounded. Each branch of forceps cylindrical, those of male arcuate and usually with a small inner tooth towards midpoint (fig. 15) and with a broad short pygidium; those of female similar but less arcuate, pygidium large and triangular (fig. 16).

Length of body 9-13 mm, forceps 1.75-2 mm.

Material examined: Samchi, 350 m, 7/11.V.1972, 1 ♂, 3 larvae; km 87 von Phuntsholing, 1680 m, 22.V.1972, 4 ♂, 1 ♀, 18 larvae; Chimakothi, 1900-2300 m, 22.V.1972, 1 ♂; Thimphu river, 2300 m, 23.IV.1972, 1 larva.

World distribution: Bhutan; and North Bengal, India.

One male from Phuntsholing is tenereal and is yellowish in colour. Only the male of this species has previously been described, although Hincks (1959, p. 159) mentions a female specimen named as *E. sumatranum*, in the Paris Museum, which is from the same locality as the type of *dentiferum*, and which was thought may be the female of the latter species. Hincks describes the pygidium of this specimen as large and pointed, and this corresponds with the present female. *E. dentiferum* appears to be an endemic Bhutan species, but it may be more widely distributed since similar species have been confused with *sumatranum* in the past. There also may be a second Bhutan species, since the larva from Thimphu river differs structurally from those from Phuntsholing.

E. dentiferum is closely related to *E. convolutum* Hincks, from Burma (Hincks, 1959, p. 152), especially in the form of the male genitalia, but the male of *convolutum* lacks the small inner tooth on the forceps and the female pygidium of *convolutum* is short and truncate.

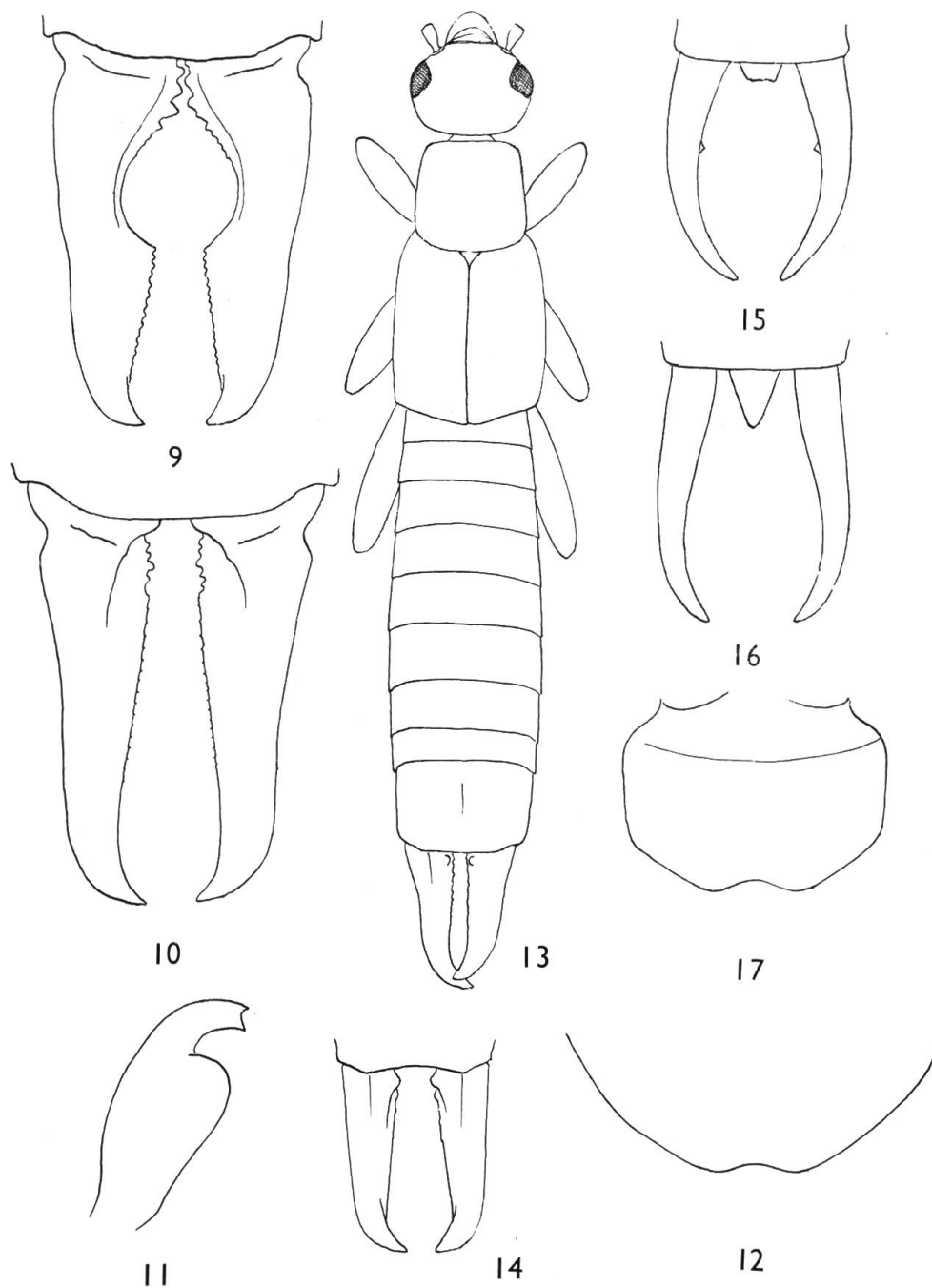
Prolabiscinae

7. *Prolabisca aroliata* (Bey-Bienko)

Protolabis aroliata Bey-Bienko, 1959a, Rev. ent. URSS 38: 598 (♂, ♀, Yunnan).

Prolabisca aroliata (Bey-Bienko); Bey-Bienko, 1959b, Rev. ent. URSS 38: 943. (change of generic name which is preoccupied).

Black; antennae brown, basal two segments black; femora black, tibiae and tarsi yellowish; apices of forceps more or less reddish. Cuticle almost entirely glabrous, impunctate, and brightly shining.



Figs. 9—12 *Cranopygia constricta* Hincks — 9, 10 male and female forceps — 11 male paramere — 12 male penultimate sternite. — Figs. 13—14 *Prolabisca aroliata* (Bey-Bienko) — 13 male — 14 female forceps. — Figs 15—17 *Echinoma dentiferum* Borelli — 15, 16 male and female forceps — 17 male penultimate sternite.

Male (fig. 13): head transverse, tumid, slightly depressed on frons; eyes large; first antennal segment very short, second transverse, third segment nearly three times as long as broad, fourth about half as long as third, and fifth intermediate in length between third and fourth; distal segments two and half times as long as broad, almost cylindrical but gradually narrowed basally; segments pubescent, hairs not dense, and variable in size. Pronotum about as long as broad, widened posteriorly; elytra long, posterior margin obliquely truncate, wings absent, or present and very prominent; legs short, femora strongly broadened, tibiae more slender, tarsi shorter than tibiae, and basal segment of tarsus shorter than distal segments in all legs; arolia small, narrow.

Abdomen almost parallel-sided, depressed, tergites with isolated marginal setae; last tergite large; penultimate sternite large, evenly rounded posteriorly. Each branch of forceps trigonal basally, broad, and with a dentated ventral inner edge; a broad tubercle of variable size occurs near the base, dorso-medially; branches slightly assymetrical (fig. 13). Genitalia with two distal lobes, parameres narrow, virga very long and spirally coiled (fig. 18).

Female: similar to male; forceps symmetrical, inner ventral edge of branches less dentated but with a dorso-median tubercle (fig. 14).

Length of body 7-8 mm, forceps 1-1.5 mm.

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 3 ♂, 4 ♀, (wings absent or concealed) 3 ♀ (fully winged), 11 larvae.

World distribution: Bhutan; Yunnan.

As far as the present author is aware, this is the first description since the original Russian description. It was first described by B e y - B i e n k o (1959a) as *Protolabis aroliata* and a new subfamily, Protolabiinae, was erected for it. As two distal lobes of the male genitalia were present, both directed backwards, the subfamily was placed in the Pygidicranidae, which is its correct placing. However, *Protolabis* B e y - B i e n k o 1959a is pre-occupied by *Protolabis* C o p e 1876 and *Protolabis* W o r t m a n n 1898 (Mammalia), so B e y - B i e n k o (1959b) proposed the replacement name of *Prolabisca*, and amended the subfamily name to Prolabiscinae.

P. aroliata resembles a small Carcinophorid at first sight, but the unusual structure of the male genitalia at once separates it from other families or subfamilies. The species evidently has a fairly wide distribution, and has a wingless and a winged form. The immature specimens resemble the adults but the distal part of the forceps is usually more conspicuously reddish.

CARCINOPHORIDAE

Carcinophorinae

This is the largest subfamily of the Carcinophoridae, and is the only one known from Bhutan. The species are typically dark coloured earwigs without elytra or wings and with rather short and broad forceps. A minority of species have rudimentary elytra, and some have the elytra and wings fully developed. The taxonomy is based on the male genitalia, and isolated females are usually impossible to name with certainty.

Two species in two genera are recorded here from Bhutan. A third species, *Anisolabis gaudens*, was described by Burr (1904, p. 291) from Pedong, and although originally described as a male, the type, in the Paris Museum, is really a female (Burr, 1910). It is a black species with a red head, although Burr (1913) provisionally assigned to this species an all black female from the Abor district of Assam. The future recognition of *gaudens* is likely to be difficult since there seems to be a number of closely similar species of *Anisolabis* along the Himalayas, separable only on the male genitalia. *A. pervicina* Burr, recorded here from Bhutan, is very similar to *A. nepalensis* Brindle, from Nepal, and appears to be only satisfactorily separable from this latter species by the form of the male parameres. The red head of the type of *gaudens* may not be a stable character as this is often associated with montane Dermaptera, where it tends to be subject to darkening.

Key to genera and species

1. Male genitalia with short parameres, about as long as broad; each distal lobe without a visible virga but with prominent well defined denticulated pads or lobes (*Euborellia* Burr). Elytra and wings fully developed **E. femoralis** (Dohrn)
- Male genitalia with longer parameres; each distal lobe with or without a visible virga but without well defined denticulated pads or lobes, any denticulations being well separated and not within well defined areas. Elytra and wings always completely absent (*Anisolabis* Fieber) **A. pervicina** Burr

8. *Anisolabis pervicina* Burr

Anisolabis pervicina Burr, 1913, Rec. Indian Mus. 8: 137 (♂ holotype, ♂, ♀, paratypes, North-east Assam and Maria Basti, "Bhutan": Indian Museum and BMNH., except the specimen from Maria Basti in the Paris Museum).

Paralabis pervicina (Burr); Burr, 1915, J. R. Micr. Soc. 1915: 540.

Black; antennae dark brown, first segment blackish; pronotum slightly yellow laterally; legs yellow, femora and tibiae broadly darkened medially. Cuticle shining, glabrous, head and thorax impunctate, abdominal tergites punctured, basal tergites less strongly punctured than distal tergites. Each branch of forceps short, trigonal basally, cylindrical distally, ventral inner edge strongly dentated; branches of male forceps more curved than those of female. Male genitalia without a visible virga but with rows of denticulations on each distal lobe, each paramere with a large membraneous inner projection (fig. 20).

Length of body 8-12 mm, forceps 1.5-2 mm.

Material examined: Phuntsholing, 200-400 m, 21./28.IV.1972, 2 ♂; Samchi, 350-450 m, 7/11.V.1972, 3 ♂, 5 ♀, 5 larvae; Chimakothi, 1900 to 2300 m, 22.V.1972, 1 ♀, 1 larva; Tango, 12 km nach Thimphu, 2500 to 2900 m, 30.VI.1972, 2 ♂; Dorju-la, 2800 m, 29.VI.1972, 1 ♀; Wangdiphodrang, 1300 m, 6/9.VI.1972, 1 ♂, 2 ♀; Sampa-Kothoka, 1600-2600 m, 9.VI.1972, 2 ♀; Kothoka-Gogona, 2600-3400 m, 10.VI.1972, 2 ♀; Changra, 18 km, S. Tongsa, 1900 m, 22.VI.1972, 3 ♀.

World distribution: Bhutan; and North-east India.

The accurate determination of this species is considerably simplified by the figure of the male genitalia in Burr (1915, pl. XII, fig. 3) in which the large membraneous inner extension of the paramere is shown. As Burr (1913) remarked, this species resembles a large *Euborellia annulipes* (Lucas). All the males in the present material have similar genitalia, but there are some small females, some only 8 mm in length, and these are named in association with males.

9. *Euborellia femoralis* (Dohrn)

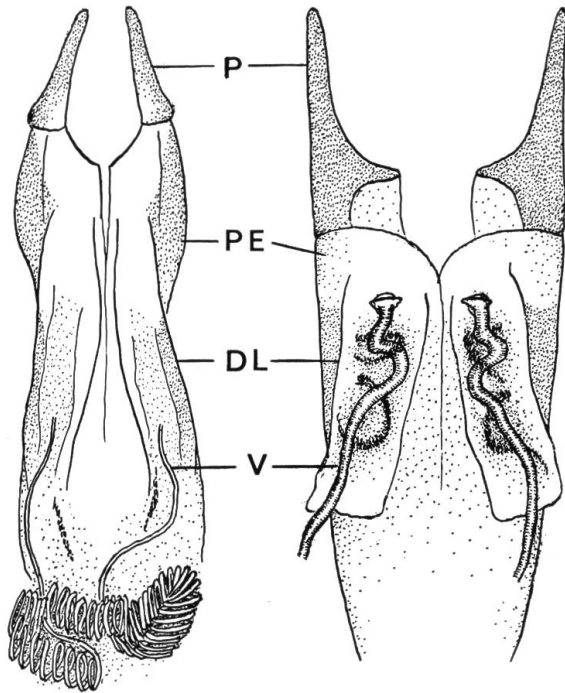
Labidura femoralis Dohrn, 1863, Stettin. ent. Ztg. 24: 321 (♀, Ceylon; in coll. Dohrn).

Psalis femoralis (Dohrn); Burr, 1911, Genera Insectorum 122: 31.

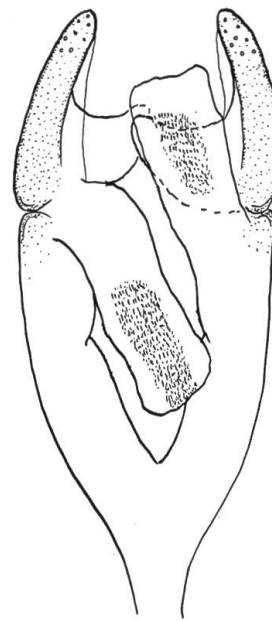
Landex femoralis (Dohrn); Burr, 1915, J. R. Micr. Soc. 1915: 445 (partim).

Euborellia femoralis (Dohrn); Hinks, 1954, Verh. naturf. Ges. Basel 65: 11.

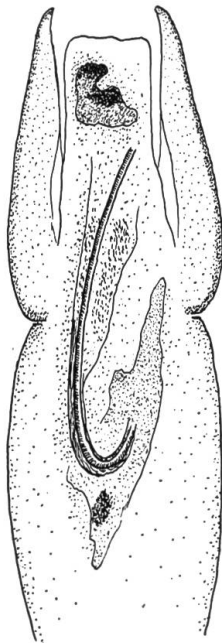
Blackish; first antennal segment yellow, rest dark brown; pronotum yellow laterally, elytra and wings fully developed brown or dark brown; legs yellow, femora darkened medially, tibiae darkened more basally. Cuticle shining, nearly glabrous and impunctate, but abdominal tergites finely and sparsely punctured and pubescent. Forceps short, those of male more strongly curved than those of female. Genitalia with short parameres, each distal



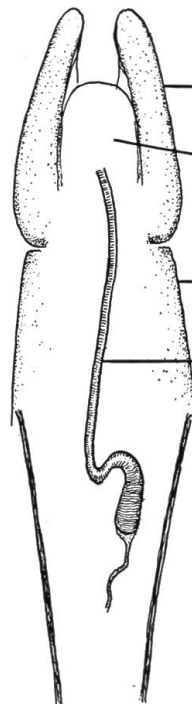
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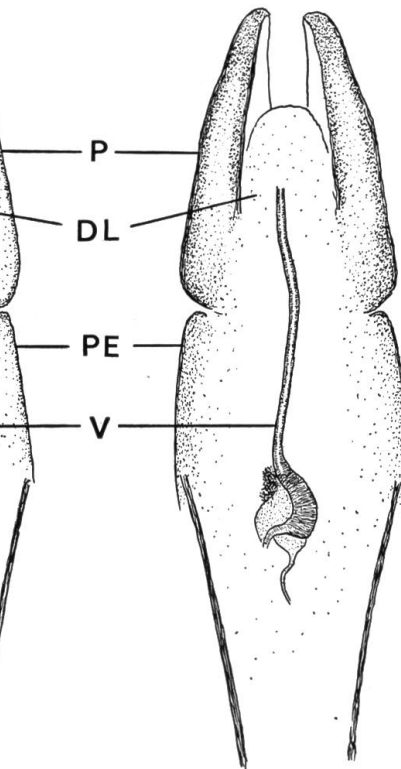
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21



22



23

lobe with denticulated end and a lateral denticulated pad. Length of body 10-12 mm, forceps 2 mm.

Material examined: Phuntsholing, 200-400 m, 24/28.IV.1972, 2 ♀; Samchi, 350-450 m, 7/11.V.1972, 1 ♂, 3 ♀.

World distribution: Oriental Region, from India and Ceylon to Burma, Malaya, Vietnam, South-west China, Java, Sumatra, and the Lesser Sunda islands.

Well distributed and frequent throughout India, except the North-western areas.

LABIDURIDAE

A small family, of small to very large species; characterized by the sinuous inner tube of the male virga. Of the four genera, three are now known from Bhutan.

Key to genera and species

1. Legs relatively short, posterior femora not longer than pronotum; smaller, body length less than 12 mm (*Nala*) 2
- Legs relatively long, posterior femora much longer than pronotum; larger species, body length 16 mm or more 3
2. Pronotum as broad as long, posterior margin strongly convex; male forceps without a basal inner tooth **N. lividipes** (Dufour)
- Pronotum transverse, posterior margin weakly convex; male forceps with a large basal inner tooth **N. nepalensis** (Burr)
3. Abdomen of male without lateral spines or tubercles; male forceps with broader branches which are arcuate; female forceps without a ventro-median tooth near apex (*Labidura*) **L. riparia** (Pallas)
- Abdomen of male with lateral spines or tubercles; male forceps with slender branches, often conspicuously and strongly curved; female forceps with a ventro-median tooth near apex (*Forcipula*) 4

Figs. 18—23 male genitala — 18 *Prolabisca aroliata* (Bey-Bienko) — 19 *Echinosoma dentiferum* Borelli — 20 *Anisolabis pervicina* Burr — 21 *Spongovostox luteus* (Bormans) — 22 *Forficula bhutanensis* sp. n. — 23 *Anechura stoliczkae* Burr (DL = distal lobe; P = paramere; PE = penis; V = virga).

4. Elytra rugose, each elytron with a lateral longitudinal ridge well marked; abdominal tergites 3-6 of male each with a long, tuberculate spine on each side **F. quadrispinosa** (Dohrn)
- Elytra not rugose, punctured and without a lateral longitudinal ridge on each elytron, or this only slightly developed 5
5. Pronotum quadrate or transverse, strongly convex laterally and posteriorly; abdominal tergites 3-5 of male with thorn-like spines on each side **F. trispinosa** (Dohrn)
- Pronotum longer than broad, lateral and posterior margins more or less straight or nearly so; abdominal tergites 3-6 of male each with a spine on each side, the spine thorn-like basally, tuberculate distally **F. indica** Brindle

10. **Labidura riparia** (Pallas)

Forficula riparia Pallas, 1773, Reise Russ. Reichs. 2: 727 (sex?, Siberia: location unknown).

Labidura riparia (Pallas); Burr, 1911, Genera Insectorum 122: 37.

Variegated, yellow and dark brown, variable in colour. Elytra and wings fully developed in present specimens; elytra rugose and with lateral longitudinal ridges. Length of body 16-26 mm, forceps 5-10 mm (male) 3.5-5 mm (female).

Material examined: Samchi, 350-450 m, 7/11.V.1972, 2 ♀, 1 larva; Wangdiphodrang, 1300 m, 6.VI.1972, 1 ♀.

World distribution: Cosmopolitan; in all faunal Regions, but probably basically Asian.

Common throughout India.

11. **Nala lividipes** (Dufour)

Forficula lividipes Dufour, 1829, Annls. Sci. nat. 13: 340 (♂, ♀, Spain; location unknown).

Nala lividipes (Dufour); Burr, 1911, Genera Insectorum 122: 35.

Blackish, often with elytra and wings dark brown or brown; legs yellow, femora darkened at least basally. The present specimens are darker than usual, but have the elytra and wings normally developed. Forceps of male arcuate, more or less simple; those of female more slender and contiguous. Length of body 7-10 mm, forceps 1.2-2 mm.

Material examined: Samchi, 350-450 m, 7/11.V.1972, 2 ♂, 1 ♀.

World distribution: Southern Europe throughout Africa and eastwards to India, China, Japan, Philippine Islands and Australia.

Common throughout India.

12. *Nala nepalensis* (Burr)

Labidura nepalensis Burr, 1907, Rec. Indian Mus. 1: 28 (♂, ♀, Nepal: Indian Museum).

Nala lividipes (Burr); Burr, 1911, Genera Insectorum 122: 36.

Dark brown to blackish; a more slender species than *lividipes*, and with elytra and wings often short as in the present specimens. Each branch of male forceps with a large inner tooth at base, female forceps simple. Length of body 7-11 mm, forceps 1.5-2.5 mm, or slightly longer.

Material examined: Samchi, 350-450 m, 7/11.V.1972, 2♂; Thimphu river, 2300 m, 23.IV.1972, 1♂.

World distribution: Himalayas, from North-western India to Nepal, Bhutan; and eastwards to Yunnan.

13. *Forcipula quadrispinosa* (Dohrn)

Labidura quadrispinosa Dohrn, 1863, Stettin. ent. Ztg. 24: 311 (♂♂, India and Ceylon; Paris and Berlin Museums and coll. Westermann).

Forcipula quadrispinosa (Dohrn); Burr, 1910, Fauna Brit. India: 94 (Bhutan).

Forcipula quadrispinosa (Dohrn); Burr, 1911, Genera Insectorum 122: 38.

Dark brown to blackish, more or less unicolorous; legs yellowish to brown. Each branch of male forceps long, strongly arcuate for basal half, more or less contiguous distally, but the forceps are often straighter in smaller males. Length of body 14-22 mm, forceps 8-14 mm (male), 4-5 mm (female).

Material examined: Samchi 350-450 m, 7/11.V.1972, 1♂.

World distribution: Oriental Region; North India eastwards through South-east Asia and southwards to Ceylon, Java, and to the Philippine Islands; also Mauritius and Reunion. It also occurs in Afghanistan.

14. *Forcipula trispinosa* (Dohrn)

Labidura trispinosa Dohrn, 1863, Stettin. ent. Ztg. 24: 310 (♂♀, Vienna Museum and Coll. Motschulsky).

Forcipula trispinosa (Dohrn); Burr, 1911, Genera Insectorum 122: 38.

Similar in colour to *quadrispinosa*, but the elytra are smooth and punctured, not rugose; the male has three abdominal tergites which each have one

thorn-like spine at each side. The basal half of each branch of the male forceps tends to be straighter than in *quadrispinosa* and this basal half often has an inner tooth. Length of body 17-26 mm, forceps 9-17 mm (males), 5 to 7 mm (females). A smaller form also occurs in which the male forceps are nearly straight.

Material examined: 21 km O. Wangdiphodrang, 1700-2000 m, 15/16.VI.1972, 1 ♀ (last abdominal tergite and forceps missing).

World distribution: Iran eastwards to India, Nepal, Bhutan, and Burma.

15. *Forcipula indica* Brindle

Forcipula pugnax Burr, 1910 (not Kirby 1891), Fauna Brit. India: 93.

Forcipula indica Brindle, 1966, Ann. Mag. nat. Hist. (13) 9: 265 (♂ holotype, Bhutan, ♂♂ paratypes, North India: BMNH and MM).

Similar to *trispinosa*, especially in the form of the male forceps, but the pronotum is different in shape and there are four abdominal tergites each with a spine at each side, the anterior spines larger than the posterior ones. Length of body 20-24 mm, forceps 12-16 mm (male), 6 mm (female).

Material examined: Wangdiphodrang, 1300 m, 25/26.VI.1972, 1 ♀.

World distribution: North-east India; Bhutan.

This is the first recorded female specimen.

APACHYIDAE

Formerly regarded as a subfamily of the Labiduridae, the male genitalia are so different as to warrant family status (Brindle, 1973). Characterized by the strongly flattened body and the large flat process between the forceps.

16. *Apachyus feae* Bormans

Apachya feae Bormans, 1894, Annali Mus. civ. Stor. nat. Giacoma Doria 34: 373 (♂, ♀, Burma: Genoa Museum).

Apachyus feae Bormans; Burr, 1910, Fauna Brit. India: 34 (Bhutan).

Apachyus feae Bormans; Burr, 1911, Genera Insectorum 122: 45.

Blackish, wings largely yellow and very prominent; legs yellow or brown; posterior part of abdomen and forceps reddish-brown. Male process almost pentagonal, that of female large and triangular. Length of body 26 to 34 mm, forceps 5-6 mm.

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 3 ♂, 5 ♀, 25 larvae).

World distribution: India; Bhutan; Yunnan; Burma; Vietnam; Thailand.

LABIIDAE

One of the largest families of the order, and includes mainly the smaller species, although some are large. Characterized by the simple second tarsal segment and the single distal lobe of the male genitalia. Two subfamilies, very closely related, are now recorded from Bhutan, and are separated in the key.

Labiinae

Apovostox Hebard 1927, with type species *Labia pygidiata* Dubrony 1879, was synonymized with *Irdex* Burr 1911, with type species *Spongophora nitidipennis* Bormans 1894, in Brindle (1971). It should be noted, however, that *Irdex nitidipennis* has been applied to more than one species, those from India being clearly distinct from those from Sumatra. An examination of the type, from Burma, is desirable.

Key to genera and species

1. Eyes large, as long as length of head behind eyes or almost so (fig. 24) (*Irdex* Burr) 2
- Eyes small, much shorter than the length of head behind eyes (fig. 31) 4
2. Smaller, body length 6-7 mm; darker in colour, usually with the base of wings and sometimes the posterior part of elytra yellow; male pygidium angular (fig. 24); female forceps with inner teeth (fig. 25) 3
I. wittmeri sp. n.
- Larger species, body length 8-9 mm; paler in colour, elytra and wings unicolorous 3
3. Elytra and wings with long pale pubescence; male pygidium widened distally, lateral part curved dorsally (figs. 26, 29); female forceps slender, long, with only a very small ventral inner tooth, pygidium large, more or less rectangular 3
I. pilosus Bey-Bienko
- Elytra and wings with sparse shorter pale pubescence; female forceps similar to those of *wittmeri* but broader; male unknown 3
Irdex sp.

4. Forceps glabrous or pubescent, but without long setae, and without prominent inner flanges or teeth (*Labia* Leach). Male penultimate sternite with a narrow rectangular projection, visible from a dorsal view, pygidium very small **L. minor** (L.)
- Forceps pubescent and with long setae, branches usually with prominent inner flanges or teeth (*Chaetospania* Karsch). Male penultimate sternite without a projection, pygidium large and bilobed **C. silvestrii** Borelli

17. *Chaetospania silvestrii* Borelli

Chaetospania silvestrii Borelli, 1927, Boll. Lab. Zool. gen. agr. Portici 20: 73 (♂ holotype, Vietnam; location uncertain).

Blackish; antennae dark brown, paler distally; legs yellow; abdomen and forceps reddish-brown. Cuticle punctured and pubescent, that of elytra and wings with longer and more conspicuous pale pubescence. Male forceps more or less straight, except at apices, each branch with a ventral inner flange which broadens to form an inner tooth, pygidium angular (fig. 31), similar to that of *Irdex wittmeri* in shape. Forceps of female broader, with a short longitudinal ridge on inner dorsal margin of each branch near base, distal part of branch broad and with ventral inner margin dentated (fig. 32). Length of body 6 mm, forceps 1.5—1.75 mm.

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 1 ♂, 1 ♀.

The present specimens are rather smaller than in the original description, and the legs lack the darker markings; the male pygidium of the type has longer projections but is very similar in shape.

World distribution: Bhutan; Yunnan; Burma; Vietnam.

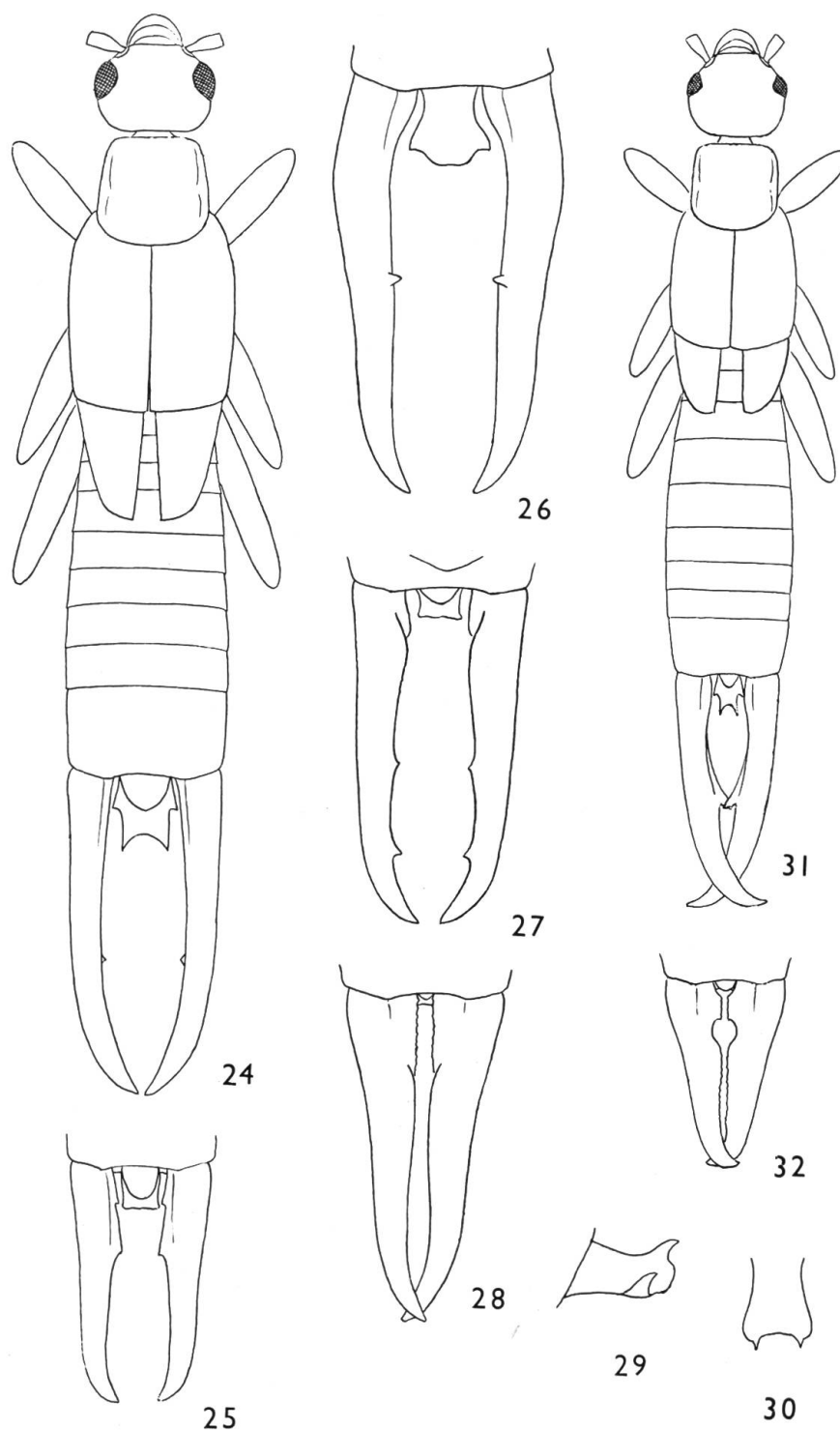
Although the male pygidium of this species is remarkably like that of *Irdex wittmeri*, the two species can easily be separated by the general body shape (figs. 24, 31). The size of the eyes, the shape of the pronotum, and the structure of the male and female forceps are distinctive.

18. *Labia minor* (Linnaeus)

Forficula minor Linnaeus, 1758, Syst. nat. 2: 423 (♀ holotype, Europe; Linnaean Society, London).

Labia minor (Linnaeus); Burr, 1911, Genera Insectorum 122: 55.

Brownish to blackish, pronotum sometimes yellowish; legs yellow to brown. The present specimens are darker than usual. The characteristic features of this species lie with the male; the forceps are simple or nearly so,



Figs. 24—25 *Irdex wittmeri* sp. n. — 24 male — 25 female forceps. — Figs. 26, 29 *I. pilosus* Bey-Bienko — 26 male forceps — 29 male pygidium, lateral. — Figs. 27—28 *Spongovostox luteus* (Bormans), male and female forceps. — Fig. 30 *Irdex pygidiatus* (Bormans), male pygidium. — Figs. 31—32 *Chaetospania silvestrii* Borelli — 31 male — 32 female forceps.

and the penultimate sternite has a median rectangular or slightly cylindrical projection posteriorly, visible from a dorsal view; the parameres of the male genitalia are distinctive in being bifid, the outer lobe being rounded distally and the inner lobe being pointed. Length of body of present specimens — body 6.5 mm, forceps 2 mm (male), 5 mm, forceps 1 mm (female).

Material examined: Samchi, 350-450 m, 7/11.V.1972, 1 ♂; Phuntsholing, 200-400 m, 1.VI.1972, 1 ♀.

World distribution: Cosmopolitan, in all faunal Regions, but probably basically Palearctic, and often adventive elsewhere, becoming established where conditions are suitable.

19. *Irdex pilosus* Bey-Bienko

Irdex pilosus Bey-Bienko, 1959, Rev. ent. URSS 38: 611 (♂, ♀, Yunnan; location uncertain).

Reddish-brown, head darker; legs yellow; antennae yellowish-brown. Cuticle rather strongly punctured and pubescent, elytra and wings with fairly dense long pale hairs, abdominal tergites with hairs more depressed. Head transverse, tumid, eyes very large. Pronotum as broad as long, almost parallel-sided, posterior margin weakly convex. Elytra and wings fully developed (or apparently may be reduced). Each branch of male forceps trigonal for basal third, slightly arcuate, and with a dorso-median tooth beyond midpoint, ventral inner edge finely dentated beyond tooth; pygidium large, declivent, distal part expanded into a wide almost triangular plate with the lateral parts curved dorsally, and with median part emarginate (figs. 26, 29). Female forceps similar to those of male but branches closer together and more straight, and without a dorso-median tooth, inner ventral edge more strongly dentated; pygidium more or less rectangular, declivent, prominent. Length of body 8-9 mm, forceps 3.25 mm (male), 2.75 mm (female).

Material examined: Tongsa, 2150 m, 24.VI.1972, 2 ♂, 2 ♀.

World distribution: Bhutan; Yunnan.

20. *Irdex wittmeri* sp. n.

Dark reddish-brown; antennae dark brown; legs yellowish; wings usually yellow at base, sometimes the yellow colour extends on to apex of elytra. Cuticle shining, punctured and pubescent, hairs fine on head and pronotum, stronger on elytra and wings; abdominal tergites relatively strongly punctured, tergites 5-6 most strongly punctured, tergite 6 almost

rugoso-striate. Posterior margins of abdominal tergites with marginal setae, forceps with long setae.

Male (fig. 24): head transverse, tumid, with two small elliptical depressions between antennal bases; eyes large; first antennal segment nearly as long as the distance between the antennal bases, second transverse, third nearly twice as long as broad, fourth and fifth shorter; rest about three times as long as broad, strongly moniliform. Pronotum as broad as long, slightly widened posteriorly, posterior margin weakly convex. Elytra and wings rather short, somewhat variable in length.

Abdomen depressed and more or less parallel-sided; lateral tubercles on third and fourth tergites represented only by cuticular swellings; last tergite transverse. Each branch of forceps trigonal basally, with the dorso-median edge well marked and darkened, rest cylindrical, but with one or more small dorso-median teeth; pygidium large, declivent at base, pentagonal, with posterior margin deeply concave (fig. 24).

Length of body 6-7 mm, forceps 1.75-2.75 mm.

Female: similar to male; each branch of forceps short, broad, ventral inner edge slightly widened to form an inner tooth; pygidium declivent at base, ventral part rectangular (fig. 25).

Material examined: Holotype ♂, 87 km von Phuntsholing, 1680 m, 22.V.1972. Paratypes (including allotype): — data as holotype, 7 ♂, 11 ♀, 10 larvae; Wangdiphodrang, 1300 m, 20.IV.1972, 2 ♂; 21 km O Wangdiphodrang, 1700-2000 m, 15/16.VI.1972, 2 ♀ (3 ♂, 3 ♀ paratypes retained in MM and BMNH).

This is a most distinctive species, and may be that named as *Apovostox pygidiatus* (Bormans) in B e y - B i e n k o (1959) from Yunnan. The genera *Irdex* and *Apovostox* have been synonymized, and *Irdex pygidiatus* (Bormans) was described from Burma. However syntypes of this species are readily separated from *I. wittmeri* by the shape of the pronotum, which in *pygidiatus* is longer than broad and more conspicuously widened posteriorly, whilst the pygidium of the male of *pygidiatus* is widened distally, with two marginal teeth (fig. 30).

21. *Irdex* sp.

Dark brown, rather dull; head black, pronotum blackish-brown; antennae dark brown; legs yellowish, darker on basal half of femora. Head strongly transverse; eyes very large, nearly twice as long as the length of head behind eyes; pronotum transverse, almost parallel-sided. Forceps of

female similar to those of *wittmeri* but broader. Length of body 9 mm, forceps 1.75 mm. Male unknown.

Material examined: 21 km O Wangdiphodrang, 1700-2000 m, 15/16.VI.1972, 1 ♀.

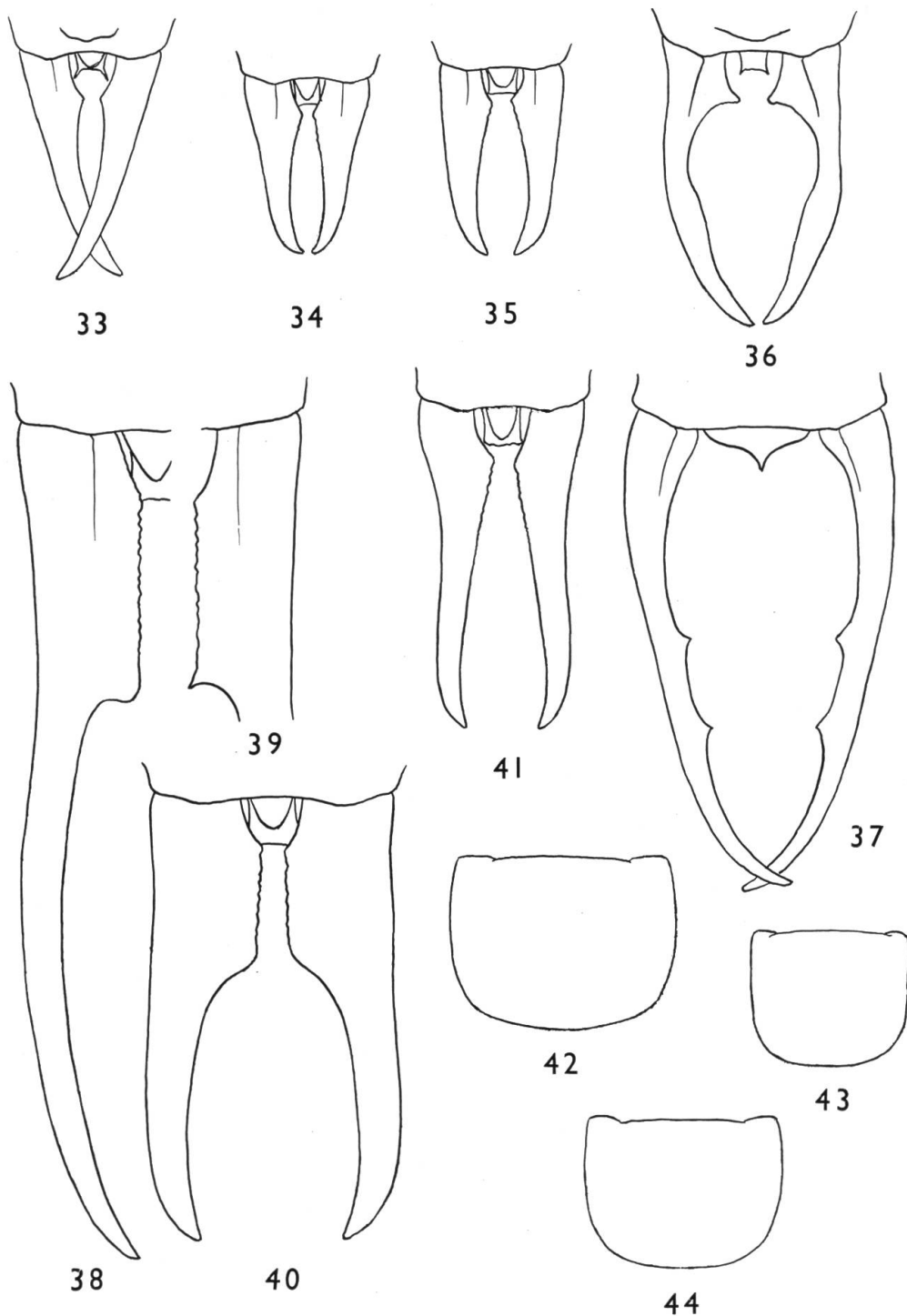
This female cannot be adequately associated with any known species; from the female forceps it appears to be closely related to *wittmeri*, but is much larger and duller, apart from other structural features. *Irdex nitidipennis* (Bormans) is recorded from North-east India in Burr (1913) but the female of this species, from North Indian specimens, does not correspond with the present female.

Spongiphorinae

Three species of this subfamily are now known from Bhutan, all belonging to the genus *Spongovostox* Burr. Two of the species, *wuermlii* and *aborum* are known to have two forms, one in which the elytra and wings are fully developed, and another in which the elytra are short and the wings absent or concealed. Such dimorphism is more typical of the genus *Marava* Burr, but this genus has the basal antennal segments almost conical, whilst those of *Spongovostox* are more or less cylindrical.

Key to species

1. Each branch of male forceps with a sinuous dorso-median ridge near base, but without a prominent basal inner tooth; pygidium without postero-lateral spines or projections (fig. 27); branches of female forceps relatively longer and more slender, with a well marked discontinuity on inner margin about one third from base (fig. 28) **S. luteus** (Bormans)
- Each branch of male forceps without a sinuous dorso-median ridge near base, but with a prominent basal inner tooth; pygidium with postero-lateral spines or projections; branches of female forceps relatively shorter and broader, with discontinuity less well marked 2
2. Pronotum widened posteriorly; elytra with few lateral setae; each branch of male forceps with a dorso-median inner tooth near base and branch evenly narrowed distally (fig. 33); branches of female forceps relatively shorter and more narrowed distally (fig. 34) **S. wuermlii** sp. n.



Figs. 33—34 *Spongovostox wuermlii* sp. n., male and female forceps. — Figs. 35—36 *S. aborum* Burr, female and male forceps. — Fig. 37 *Allodablia macropyga* (Westwood), male forceps. — Figs. 38—41 *Forficula beelzebub* (Burr), forceps — 38 form *beelzebub*, male — 39 form *acris*, male — 40 form *celer*, male — 41 female. — Figs. 42—44 Pronota of *F. schlagintweiti* (Burr), *F. lebongae* Hebard, and *F. beelzebub* (Burr).

- Pronotum parallel-sided; elytra with more conspicuous lateral setae; each branch of male forceps with a ventro-median inner tooth near base, and branch not evenly narrowed distally (fig. 36); branches of female forceps relatively longer and less narrowed distally (fig. 35) **S. aborum** Burr

22. **Spongovostox luteus** (Bormans) comb. nov.

Spongophora lutea B o r m a n s , 1894, Annali Mus. civ. Stor. nat. Giacoma Doria 34: 383 (♂, ♀, Burma; Genoa Museum).

Labia lutea (Bormans); B u r r , 1911, Genera Insectorum 122: 56.

Shining, yellowish or reddish-brown; legs yellow; antennae yellow or brown. Cuticle of head, pronotum and elytra smooth; impunctate, glabrous, with a few lateral setae on the elytra; abdominal tergites finely punctured and pubescent. Head transverse, tumid, eyes small; pronotum relatively large, widened posteriorly, posterior margin almost straight. Elytra short, wings absent or concealed. Last tergite of male with a transverse ridge towards posterior margin, the ridge broadly triangular, with the apex posterior. Each branch of forceps almost straight, dorso-median edge with a sinuous ridge near base, distal part with one or more small median or ventro-median inner teeth; pygidium short, quadrate with posterior margin somewhat sinuate (fig. 27). Each branch of female forceps similar but more narrowed distally and closer together, dorso-median ridge more distal, and basal quarter or third of branch with a darkened ventro-median inner edge, and a marked discontinuity present where ventro-median inner edge ends; pygidium small, almost hidden (fig. 28). Length of body 7.5-8 mm, forceps 2.5 mm.

Material examined: Phuntsholing, 350-400 m, 30.VI.1972, 1 ♂; km 87 von Phuntsholing, 1680 m, 22.V.1972, 4 ♀.

World distribution: North-east India; Bhutan; Burma; and Yunnan.

All specimens of this species seen have short elytra and are without visible wings, but fully winged specimens may occur, as in the other two species. Although *luteus* was placed in *Labia* in B u r r (1911) this was mainly due to the small eyes, and this is not a reliable character in this group of *Spongovostox*, since the wingless form of *wuermlii* has small eyes and the fully winged form has large eyes. All three species included in the present paper are certainly very closely related, and this necessitates the transfer of *lutea* from *Labia* to *Spongovostox*.

23. *Spongovostox wuermlii* sp. n.

Dark reddish-brown (fully winged type form) or paler (wingless form); antennae brown or dark brown; legs yellowish, basal part of femora darkened. Cuticle shining; head, pronotum, elytra, and wings glabrous with sparse lateral setae on elytra; abdominal tergites finely punctured and pubescent.

Male (type form): head transverse, tumid, eyes very large, larger than the length of head behind eyes; antennal segments slender, basal segments more or less cylindrical, distal segments somewhat moniliform. Pronotum transverse, widened posteriorly, posterior margin weakly convex. Elytra and wings fully developed, the wings yellow at base. Abdomen more or less parallel-sided, lateral tubercles on tergites 3 and 4 small and represented by cuticular swellings. Last tergite transverse, with a transverse ridge medially near posterior margin, the ridge bordered posteriorly by a deep depression. Each branch of forceps relatively short, widened towards base to form a broad, but not large, inner tooth, the tooth on the dorso-median surface; pygidium declivent, short, dorsal part bluntly triangular, ventral part almost quadrate with a slender spine at each postero-lateral angle (fig. 33).

Female: similar, but last tergite without the transverse ridge; each branch of forceps short, wider basally, inner margin slightly darkened and dentated and with a slight discontinuity about one third from base (fig. 34); pygidium rectangular ventrally with a short postero-lateral projection on each side.

Wingless form: similar to type form but paler in colour; eyes small; elytra short but longer than the pronotum, wings absent or concealed.

Length of body 6-7 mm, forceps 1.5-2 mm.

Material examined: Holotype ♂, km 87 von Phuntsholing, 1680 m, 22.V.1972; allotype ♀, Samchi, 350/450 m, 7/11.V.1972. Paratype ♂, (wingless) km 87 von Phuntsholing, 1680 m, 22.V.1972 (MM).

Similar to *lutea* but less robust in build and more slender.

24. *Spongovostox aborum* Burr

Spongovostox aborum Burr, 1913, Rec. Indian Mus. 8: 140 (♂ holotype, ♂, ♀, paratypes, North-east India; Indian Museum and BMNH).

Similar to *S. wuermlii* and *lutea*, but rather duller, and distinct in both sexes by the parallel-sided pronotum and the more conspicuous lateral setae on the elytra. Each branch of male forceps trigonal at base, with a well marked dorsal ridge, inner surface of branch broadened to form a large ven-

tro-median tooth near base; the branch narrows beyond the tooth then widens slightly before narrowing again towards the apex; the curvature of the branch is not even, and straightens beyond midpoint; pygidium small, posterior margin concave, with a small projection at each postero-lateral angle (fig. 36). Branches of female forceps simple, wider towards base, actual base excavated to accommodate the pygidium, and with a slight discontinuity as in *wuermlii*; pygidium rectangular ventrally, rounded dorsally (fig. 35). Length of body 7 mm, forceps 1.25 mm (present specimen).

Material examined: Sampa-Kotoka, 1400-2600 m, 9.VI.1972, 1 ♀.

World distribution: North-east India and Bhutan.

The above descriptions are from paratypes in the British Museum (Natural History) but only the wingless forms are available. Burr (1913) gives the body measurement as from 6.5-7.5 mm (males) and 4.5-6 mm (females), which is rather a wide range. Forceps of original material range from 4.5 to 6 mm (males) and 1.5 mm (females).

FORFICULIDAE

Forficulinae (with Anechurinae)

The key to subfamilies of the Forficulidae in Burr (1911) has had to be considerably modified in recent years. In particular those couplets referring to the Chelidurinae, Anechurinae, and Forficulinae, are not satisfactory, being largely based on the comparative character of the width of the sternal plates, a character which varies with the width of the body, and there is no clearly defined separation between the subfamilies. The Chelidurinae have been merged with the Anechurinae for some time, and the differences between some Anechurinae and some Forficulinae are very slight. This is particularly evident with the Himalayan species, where *Anechura stoliczkae* Burr and *Forficula schlagintweiti* (Burr) are very similar and more or less indistinguishable in the females. The latter species was originally described in *Anechura* but removed to *Forficula* in Burr (1907); however a transfer of *schlagintweiti* back to *Anechura* would not solve the difficulties since in the Himalayas there is a complete gradation from typical Anechurine to typical Forficuline structure. Pending a revision of the World Forficulidae it is proposed to retain the present combinations.

There has also been some confusion between some Himalayan species. Hebard (1923) confused the brachylabic form of *A. stoliczkae* with the

type form of *schlagintweiti*, and his interpretation of *schlagintweiti* consists of two distinct species: - (1) *F. beebei* Burr ("anechuroid" forceps of Hebard, 1923) and (2) what appears to be *bhutanensis* sp. n. "forficuloid" forceps of Hebard, 1923). Syntypes or paratypes of *A. stoliczkae* and *F. schlagintweiti* have been available in the British Museum (Natural History) and have been examined. In the Forficulidae generally the male genitalia tends to be similar in various species, and reliance is usually placed on the structure of the male forceps for species separation. It should be noted, however, that figures of male forceps which appear to be similar in structure can apply to species of much different external appearance. The male forceps of *F. bhutanensis* (fig. 45), for example, are similar to those of *F. lebongae* Hebard (fig. 49), although these species are easily separated on other external characters.

Some wingless specimens of Himalayan *Forficula* have been referred to forms of fully winged species of the genus, on the assumption that these species tend to be brachypterous, or lack wings completely, at higher altitudes. Whilst this appears to be true of some species, it should not be regarded as axiomatic. *F. schlagintweiti* retains fully developed elytra and wings often at the highest altitude, and although a form of this species with short elytra and without visible wings is known, this is not always found at the highest altitude. This is true, however, of the present material. *A. stoliczkae* appears to be always fully winged, and *F. beelzebub* (Burr) is similar throughout its considerable altitude range. *F. beebei* Burr, the highest ranging Himalayan *Forficula*, often has short elytra and no wings but a specimen in the present material has longer elytra and the tips of the wings are visible. Each case of a brachypterous or apterous specimen should be considered in relation to other characters, and it is notable that most of the recorded Himalayan species are fully winged. Three wingless species of *Forficula* in the present material cannot be adequately referred to wingless existing species, nor wingless forms of existing fully winged species.

As usual in the Forficulidae males are much more easily and certainly named than females, largely on the structure of the forceps, and females are associated with males on other external characters and by locality. In the present material, the separation of the females of *stoliczkae*, *schlagintweiti*, and to a lesser extent, of *bhutanensis*, would have been extremely difficult had there not been considerable differences in localities. It so happens with the Bhutan specimens that females of *stoliczkae* have longer forceps than females of *schlagintweiti*, but the former species have shorter forceps in other areas of the Himalayas. These differences in localities, however, may indi-

cate a real ecological difference in habitat. Almost all specimens of *stoliczkae* are from Thimphu, 2300-2500 m, in dry coniferous forest; almost all specimens of *bhutanensis* are from Gogona and Kothoka-Gogona, 2600 to 3400 m, in Rhododendron-coniferous forest with agriculture; whereas *schlagintweiti* was taken mainly either at Chimakothi, 1900-2300 m, in deciduous forest or at Decchi Paka in Rhododendron-coniferous forest. There does not appear to be any significant altitude differences between the species.

Key to genera and species

1. Each elytron with a well marked lateral longitudinal ridge (*Allo-dahlia* Verhoeff). Cuticle very strongly and deeply punctured; male forceps undulate from a lateral view and pygidium large and pointed (fig. 37) 2
A. *macropyga* (Westwood)
- Elytra without lateral longitudinal ridges; cuticle much less strongly punctured or almost impunctate; male forceps not undulate from a lateral view and pygidium not so shaped 2
2. Abdominal tergites coarsely coriaceous, punctures absent or almost so; abdomen strongly broadened and depressed (fig. 45); pronotum relatively larger and strongly transverse (figs. 42, 45); blackish, unicolorous species, sometimes with the head reddish or with dorsum of abdominal tergites reddish medially; distal antennal segments relatively longer (fig. 53) 3
- Abdominal tergites mainly smooth with puncturation distinct, sometimes coarsely coriaceous or even rugose on some median or posterior tergites; abdomen much less broadened and depressed (figs. 54, 56); pronotum relatively smaller and less transverse (figs. 43, 44, 54, 56); reddish-brown to blackish species, not usually unicolorous, sometimes with head reddish but abdomen not blackish with median part reddish; distal antennal segments relatively shorter (fig. 52) 5
3. Male forceps greatly elongated (fig. 50) or shorter (fig. 51), branches evenly and gently curved, or almost straight; female forceps relatively longer; dorsum of some abdominal tergites sometimes reddish medially 4
Anechura *stoliczkae* Burr
- Male forceps short, strongly and unevenly curved (figs. 45, 46); female forceps relatively shorter (fig. 47); dorsum of abdominal tergites blackish, unicolorous 4

4. Elytra and wings short, the latter extending down to third or fourth tergites, lateral tubercles on third and fourth tergites not concealed; distal antennal segments shorter; pronotum narrowed posteriorly; each branch of male forceps quadrangular in cross section and with an inner serrated basal flange (fig. 45); forceps of female shorter and broader **Forficula bhutanensis** sp. n.
- Elytra and wings longer, lateral tubercles on third and fourth tergites usually concealed, or, if elytra short, wings absent or concealed; distal antennal segments longer (fig. 53); pronotum not narrowed posteriorly; each branch of male forceps cylindrical with a large blunt inner tooth at base (fig. 46); forceps of female longer and more slender (fig. 47) **Forficula schlagintweiti** (Burr)
5. Elytra and wings fully developed or not, but elytra always much longer than the pronotum 6
- Elytra very short, shorter than the pronotum, measured along sutures, wings absent or concealed 8
6. Abdominal tergites more strongly punctured, the punctures closer together than the diameter of the punctures on at least basal part of tergites, and often coalescing, tergites in males may be rugosely punctured near posterior margin. Elytra and wings always fully developed; male forceps with a large basal inner flange on each branch (figs. 38-40) **Forficula beelzebub** (Burr)
- Abdominal tergites much less strongly punctured, the punctures separated by more than their own diameter, and tergites never rugosely punctured; Elytra and wings fully developed or elytra shorter and wings absent or concealed; male forceps without or with only a short inner flange on each branch 7
7. Distal antennal segments short, less than three times as long as broad; almost entirely blackish species, often with elytra short and wings absent or concealed; male forceps more or less simple, each branch with a dorso-median tubercle near base (fig. 48) **Forficula beebei** Burr
- Distal antennal segments longer, more than three times as long as broad; not almost entirely blackish species, elytra and wings always fully developed; male forceps less curved, each branch with a short inner basal flange (fig. 49) **Forficula lebongae** Hebard
8. Larger species, body length 11-12 mm; abdominal tergites of female impunctate or almost so, those of male only weakly punctured

on tergites 1-5; each branch of male forceps almost straight, robust (fig. 54); branches of female forceps relatively broad (fig. 55)

***Forficula distendens* sp. n.**

- Smaller species, body length 7-8 mm; abdominal tergites of both sexes punctured on most tergites 9

- 9. Pronotum less transverse (fig. 56); abdominal tergites of female uniformly and relatively closely punctured, forceps of female more slender (fig. 57); male forceps curved distally (fig. 56)

***Forficula lucens* sp. n.**

- Pronotum more transverse (nearly as transverse as fig. 54); abdominal tergites of female weakly and sparsely punctured; forceps of female shorter and broader (similar to fig. 55); male unknown

***Forficula* sp.**

25. *Allodahlia macropyga* (Westwood)

Forficula macropyga Westwood in Royle, 1836, Illus. Himalayas 2: 1iii (♂ holotype, Himalayas; Hope Department of Entomology, Oxford, England).

Allodahlia macropyga (Westwood); Burr, 1911, Genera Insectorum 122: 71.

Blackish when fully mature, antennae and legs reddish-brown or darker. Cuticle shining, sometimes with a brassy sheen; elytra with deep and large punctures, punctures close and tending to coalesce, forming irregular ridges; abdominal tergites with large and deep punctures more widely separated. Male forceps with each branch undulate and with two inner teeth close together; pygidium triangular or with a apical spine (fig. 37); female forceps with simple branches which are more or less straight and contiguous. Smaller males tend to have the forceps less curved and undulate. Length of body 11-14 mm, forceps 5.5-6.5 mm (males), 4.5-5.5 mm (females).

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 1 ♀; Chimakothi, 1900-2300 m, 22.V.1972, 2 ♀; Dorju-la, 3100 m, 6.VI.1972, 1 ♂; 21 km O Wangdiphodrang, 1700-2000 m, 15/16.VI.1972, 1 ♀; Nobding, 41 km O Wangdiphodrang, 2800 m, 17./18.VI.1972, 1 ♀; Changra, 18 km S Tongsa, 1900 m, 22.VI.1972, 2 ♀.

World distribution: Himalayas, from North-west India eastwards to Bhutan, and further eastwards in the mountains of Northern Burma and Yunnan.

Separable from other known species of *Allodahlia* in the eastern Himalayas by its metallic sheen and the very large puncturation. Three other species are recorded from the general area (Brindle, 1972), *ochroptera* Brindle, distinct by its dark colour and entirely yellow wings; *scabriuscula*

(Serville) by its tuberculate elytra; and *abrimanes* Burr, with its partially reddish elytra and a yellow spot on each wing.

26. *Anechura stoliczkae* Burr

Anechura stoliczkae Burr, 1911, J. Asiatic Soc. Bengal (NS) 7: 792 (♂, ♀, syntypes, Upper Sutlej district, NW. India: Vienna Museum and BMNH).

Anechura himalayana Santokh Singh, 1955, Agra. Univ. J. Research (Science) 4: 180 (♂ holotype, ♂, ♀, paratypes, Upper Chenab Valley, NW. India: author's collection) **syn. nov.**

Himanechura labaulensis Santokh Singh, 1955, Agra Univ. J. Research (Science) 4: 184 (immature) (synonymy by Santokh Singh, 1955, Agra Univ. J. Research (Science), Supplement, 4: 741).

Black, rather shining, or with posterior abdominal tergites dark reddish medially. Cuticle glabrous, coriaceous, that of abdominal tergites usually coarsely coriaceous and almost rugose on posterior parts of tergites, and with sparse indistinct punctures along posterior margins of tergites.

Male: head transverse, vertex often somewhat depressed, widened behind eyes; eyes small. First antennal segment shorter than the distance between the antennal bases, second segment transverse, third from three to three and half times as long as broad, fourth twice as long as broad, fifth about equal in length to third. Segments 1-3 not pubescent, but with a few long hairs, segments from fourth distally pubescent, hairs short and yellow; distal segments elongated and narrow. Some variation occurs in the relative length of the segments, the fourth sometimes being much shorter. Pronotum strongly transverse, lateral margins almost straight, sometimes slightly converging posteriorly, posterior margin very weakly convex. Elytra and wings broad and well developed. Abdomen broad, lateral tubercles on third tergite small, those on fourth large. Last tergite transverse with two broad swellings near the posterior margin and separated by a median depression, the swellings variable in size and sometimes tuberculate. Each branch of forceps elliptical at base with a broad blunt tooth, which is sometimes more triangular, on the inner margin, rest of branch cylindrical or with inner surface rather flattened, length variable but curvature relatively slight; pygidium short and broad (figs. 50, 51).

Female: similar to male; last tergite small and swellings small. Each branch of forceps simple, almost contiguous, pygidium similar to that of male (similar to fig. 47, but relatively longer).

Length of body: 10-14 mm, forceps 3-5.5 mm and 6.5-10 mm, (males); 3.75-4 mm (females) (present specimens).

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 2 ♂ (short forceps), 2 ♀; Thimphu, 2300-2500 m, 12/31.V.1972, 44 ♂ ♂; 10.VI.1972, 2 ♂ (all long forceps), 30.IV./31.V.1972, 49 ♂, (all short forceps), 3:IV./31.V.1972, 72 ♀, 27.VI.1972, 4 ♀.

World distribution: Himalayas, from North-west India to Bhutan.

The present specimens are notable for the variation in length of the male forceps which form two series as listed above, but this is not necessarily significant. The species ranges from Kashmir along the Himalayas to Bhutan, and shows a considerable range in length of the male forceps and a small range in the female forceps. Syntypes of the species in BMNH are similar to Kashmir specimens in the length and curvature of the male forceps, and the longer forceps of the males may be more common in the west and east of the range of the species. They are not necessarily associated with the longest body length. A series showing the range of forceps length along the Himalayas is as follows:

	body length	male forceps	female forceps
	mm	mm	mm
Kashmir	10-12	4-9	3-3.25
Upper Chenab, NW. India (types of <i>himalayana</i> Santokh Singh)	9.5-15.5	3.5-9.5	3-4.5
Upper Sutlej Valley, (types of <i>stolickae</i> Burr)	11-13.5	9	4
Kulu	10-11	3-3.5	2.75-3
Dehra Dun	9.5-10.5	2.75-3	2.75-2.5
Nepal	9-10	3	2
Bhutan	10-14	3-5.5 6.5-10	3.75-4

The male genitalia appear to be identical, except occasional specimens in which the parameres are broader in genital mounts, possibly caused by distortion due to lack of sclerotization. In fully mature specimens the parameres are relatively strongly sclerotized (fig. 23).

27. *Forficula schlagintweiti* (Burr)

Anechura schlagintweiti Burr, 1904, Trans. ent. Soc. Lond. 1904: 313 (♂, Tibet, coll. Dohrn, ♂, ♀, paratypes, Darjeeling, NE. India: Paris Museum and BMNH).

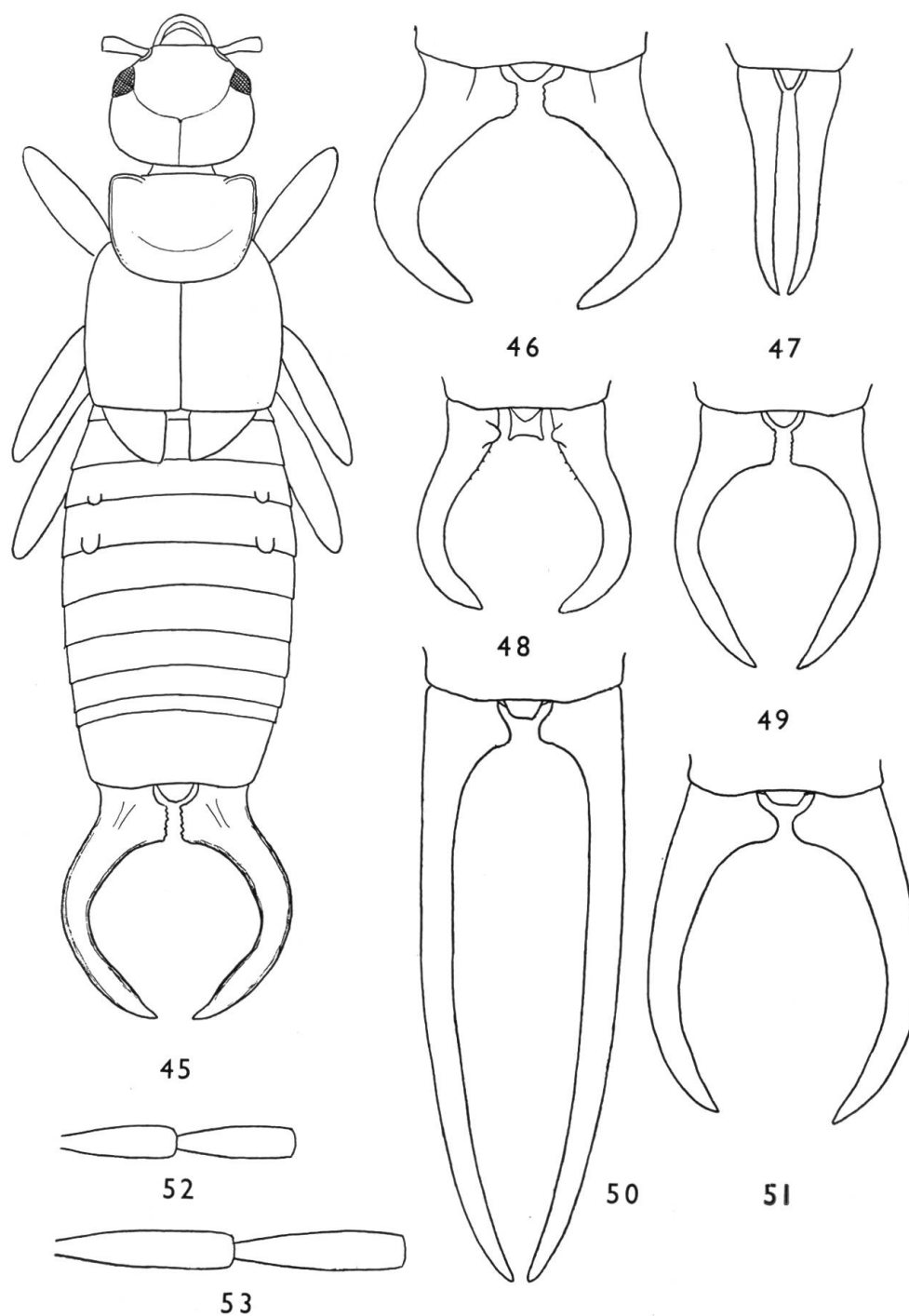


Fig. 45 *Forficula bhutanensis* sp. n., male. — Figs. 46—51 forceps — 46, 47 *F. schlagintweiti* (Burr), male and female — 48 *F. beebei* Burr, male — 49 *F. lebongae* Hebard — 50, 51 *Anechura stoliczkae* Burr, males, long and short forms. — Figs. 52—53 distal antennal segments of *F. lebongae* and *F. schlagintweiti*.

Forficula schlagintweiti (Burr); Burr, 1910, Fauna Brit. India (Dermaptera): 166. *Anechura stoliczkae* Burr; Hebard, 1923, Mem. Dept. agr. India 7: 224 ("brachylabic condition").

Black, rather shining, sometimes with head reddish. Cuticle glabrous, coriaceous, with very sparse and indistinct punctures, abdominal tergites often dull due to microsculpture, on median areas.

Very similar to *stoliczkae*, but elytra and wings less broad and rather shorter, and abdomen usually more strongly depressed and broadened. Usually with elytra and wings normally developed, but sometimes with the elytra short and wings absent or concealed. Each branch of male forceps elliptical basally, inner margin with a large blunt tooth directed slightly dorsally and surface with small denticulations; rest of branch relatively broad, strongly and unevenly curved; pygidium conical dorsally, apex rounded (fig. 46). Occasional males occur in which the forceps are less curved and weak (fig. 58). Female similar to that of *stoliczkae* but the forceps are shorter in the Bhutan material (fig. 47). Length of body 10-14 mm, forceps 2.5-3.5 mm.

Material examined: Chimakothi 1900-2300 m, 22.V.1972, 21 ♂, 16 ♀ (two of males with weak forceps as fig. 58); Gidaphu, 2300 m, 2.VI.1972, 2 ♀; Paro, 2300 m, 28.IV.1972, 1 ♀; Dorju-la, 3100 m, 6.VI.1972, 3 ♀; Sha Gogona, 3100 m, 10/12.VI.1972, 8 ♀; Dechhi Paka, 3000 m, June 19, 1972, 2 ♂, 8 ♀ (normal), 3300 m, 19.VI.1972, 6 ♂, 7 ♀ (with red head, short elytra, and without visible wings).

World distribution: Himalayas, from North-west India eastwards to Bhutan and Tibet, and further east through North Burma to Yunnan.

The original description of this species refers to the male forceps as follows: — "forceps unarmed except for a stout but blunt tooth at base on inner margin", and this description agrees with 1 ♂, 1 ♀ paratypes from Darjeeling in BMNH. Although a holotype was not designated, it is assumed that the first mentioned male from Tibet constitutes the holotype. There is little variation in the male forceps as a rule, but a small weak form occurs (fig. 58) as described and figured in Burr (1910, p. 166, and Pl. VI, fig. 54a). The form with a red head, short elytra, and without visible wings has male forceps identical to those of the normal form; similar specimens are known from Nepal, and it is thought to be a local form of the species, in the Bhutan material apparently at the highest altitude, but this is not the case in Nepal specimens so far examined.

The species is easily recognized in the male by its black colour, its very strongly broadened and depressed body, and by the form of the male for-

ceps. Some males are less broadened and the females appear to be indistinguishable from those of *stoliczkae* as a general rule.

28. *Forficula bhutanensis* sp. n.

Forficula schlagintweiti (Burr); Hebard, 1923, Mem. Dept. agr. India 7: 225 ("forficuloid forceps").

Black, rather shining; legs dark brown, tarsi yellow; antennae dark brown; head sometimes slightly reddish and wings occasionally dark yellow, possibly due to immaturity. Cuticle of head smooth, pronotum coriaceous, especially medially; elytra and wings finely coriaceous, glabrous; abdominal tergites coriaceous, punctures sparse and not well marked but more distinct than in *schlagintweiti*.

Male (fig. 45): head transverse, tumid, except for depressed occiput, epicranial sutures well marked. Third antennal segment two to two and half times as long as broad, fourth one and half times as long as broad, fifth equal in length to third; segments 1-3 almost glabrous, with a few long hairs; segments from fourth distally pubescent, pubescence relatively long and yellow. Distal segments less elongated than in *schlagintweiti*. Pronotum strongly transverse, lateral margins almost straight and converging posteriorly, posterior margin weakly convex. Elytra and wings short. Abdomen broad and depressed but less so than in *schlagintweiti*. Each branch of forceps almost quadrate in cross section, edges well marked, widened at base to form a rectangular flange which has a serrated margin, the actual base excised; pygidium short, bluntly triangular (fig. 45).

Female: similar to male; last tergite narrower. Each branch of forceps slender, almost cylindrical but with a more or less developed longitudinal ridge situated dorso-laterally; branches close together at base, apical part incurved; pygidium small, rounded dorsally.

Length of body 9-12 mm, forceps 3-3.5 mm (males), 2.75-3 mm (females).

Material examined: Holotype ♂, Kotoka-Gogona, 2600-3400 m, June 10, 1972. Paratypes (including allotype) — same data, 15 ♂, 8 ♀ (2 ♂, 2 ♀, in MM, and 2 ♂ in BMNH); Gogona, 3100 m, 10/12.VI.1972, 10 ♂, 8 ♀ (3 ♂ in MM, 2 ♀ in BMNH).

Easily recognizable in the male, much less so in the female.

29. *Forficula beebei* Burr

Forficula beebei Burr, 1911, J. Asiatic Soc. Bengal (NS) 7: 795 (♂, ♀, Darjeeling district, NE. India: Indian Museum).

Forficula schlagintweiti Burr; Hebard, 1923, Mem. Dept. agr. India 7: 225 ("anechuroid forceps").

Black, sometimes with the head slightly reddish; antennae dark brown; legs dark brown or with tarsi yellowish. Similar to *schlagintweiti* but with abdomen much less broadened (as fig. 54), head less transverse and antennal segments shorter, the distal segments being relatively short and broad, about two and half times as long as broad and with a distinct narrow base. Elytra longer than pronotum, wings absent or concealed, or, as in present specimens, tips of wings protruding from elytra. Abdominal tergites smooth, not coriaceous as in *schlagintweiti* and clearly punctured, the punctures relatively fine; the tergites are shining and sometimes have a bluish or brassy metallic sheen. Each branch of forceps of male short and curved, almost simple, slightly broader towards base, and with a dorso-median tubercle near base, which is sometimes developed as a short ridge; rest of branch cylindrical, sometimes with small denticulations on inner margin on basal half; pygidium of male rounded dorsally, ventral surface rectangular or quadrate, posterior margin concave and each postero-lateral angle with a short process (fig. 48). Female similar, branches of forceps simple, narrowed distally, more or less straight and contiguous, similar to those of *schlagintweiti* but shorter and relatively broader. Length of body 7-9 mm, forceps 1.75-2.25 mm (males), 1.25-1.75 mm (females).

Material examined: Sha gogona, 3100 m, 10/12.VI.1972, 1♂, 1♀; Decchi Paka, 3300 m, 13/20.VI.1972, 1♂, 1♀.

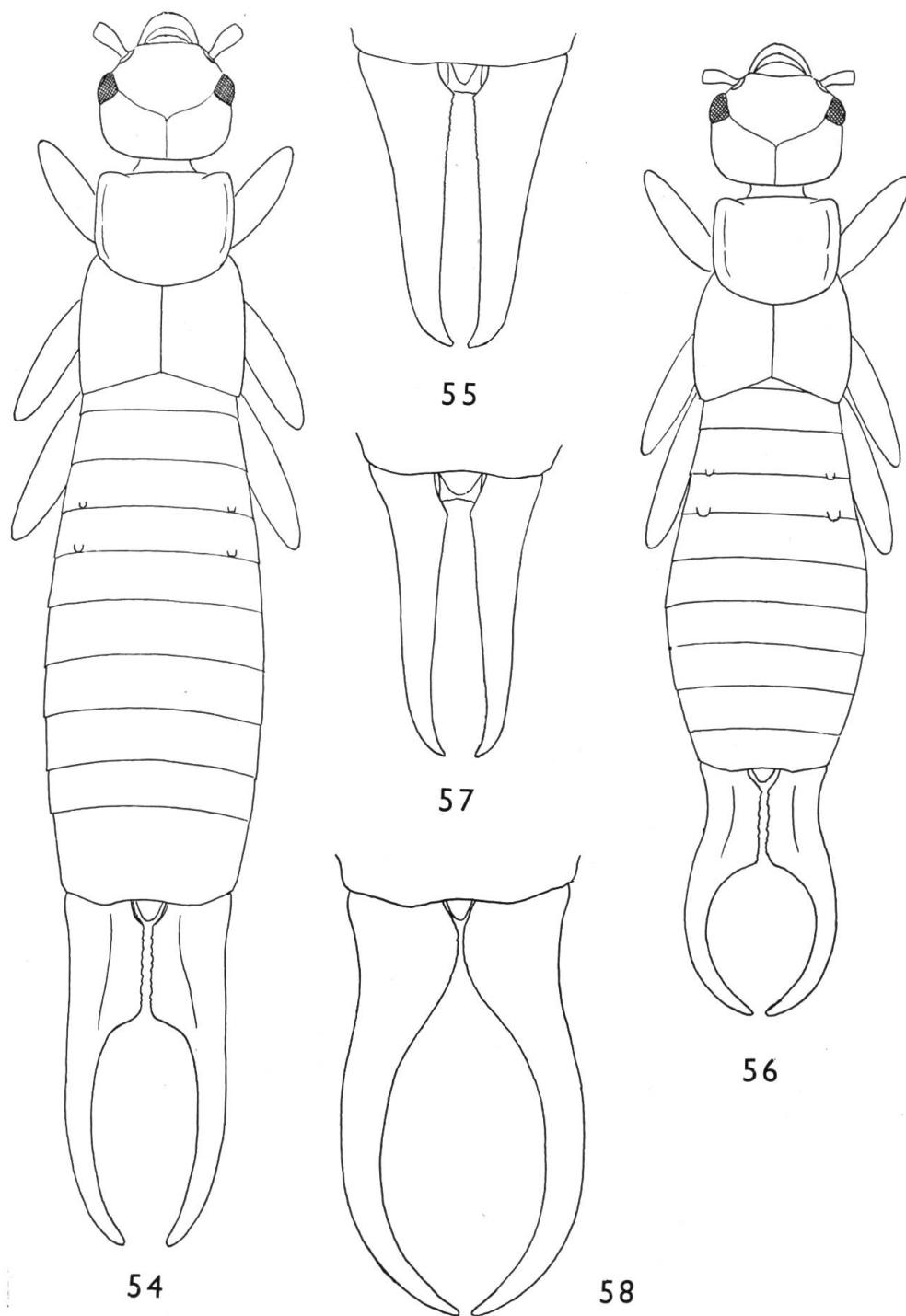
World distribution: Himalayas, from Nepal to Bhutan and Northeast India.

This is a distinctive species in the male, and appears to be the highest ranging species, its recorded altitude always being above 3000 metres and it is known from 4200 metres.

30. *Forficula lebongae* Hebard

Forficula lebongae Hebard, 1923, Mem. Dept. agr. India 7: 226 (♂ holotype, Sikkim; Academy of Sciences, Philadelphia, USA).

Dark brown or blackish; antennae yellowish-brown, lateral margin of pronotum yellow; legs yellow, or with femora somewhat darkened; abdomen and forceps may be reddish-brown or reddish-yellow. Somewhat variable



Figs. 54—56 *Forficula distendens* sp. n. — 54 male — 55 female forceps. — Figs. 56—57 *F. lucens* sp. n. — 56 male — 57 female forceps. — Fig. 58 *F. schlagintweiti* (Burr) weak form of male forceps.

in colour. Cuticle rather shining, smooth, abdominal tergites distinctly punctured, punctures irregular, often close together on basal half of tergites.

Similar to *beebei* in general structure but the distal antennal segments are much more elongated, more than three times as long as broad, and base of each segment not strongly narrowed. Elytra and wings usually fully developed but sometimes rather short. Each branch of forceps of male cylindrical except at base where the inner margin is widened to form a short flange, the margin of which is serrated (fig. 49), the curvature of the branch is variable, sometimes being almost straight. Female similar, but with simple forceps, these resembling those of *beebei* but relatively longer and more slender. Length of body 8-9 mm, forceps 2-2.75 mm (males), 2-2.25 mm (females).

Material examined: Kothoka-Gogona, 2600-3400 m, 10.VI.1972, 1 ♂; Tongsa, 2150 m, 24.VI.1972, 1 ♂.

World distribution: Sikkim, Bhutan, North Burma, and Yunnan.

Although the figure of the male forceps of *bhutanensis* (fig. 45) and that of the male forceps of *lebongae* (fig. 49) appear to be similar, those of *bhutanensis* are much more robust and quadrangular in section, whereas those of *lebongae* are much weaker and cylindrical; often the basal inner flange of *lebongae* are more rounded and smaller. *F. lebongae* seems to be uncommon but has a much wider range than that known for *beebei*, and it is not restricted to the highest altitudes.

31. *Forficula beelzebub* (Burr)

Chelisoches beelzebub Burr, 1900, Ann. Soc. ent. Belge, 44: 51 (♂ holotype, North-east India; Brussels Museum).

Forficula beelzebub (Burr); Burr, 1911, Genera Insectorum 122: 81.

Forficula acer Burr, 1905, J. Asiatic Soc. Bengal 1: 30 (♂ holotype, Sikkim; Indian Museum).

Forficula aceris Burr; Burr, 1911, Genera Insectorum 122: 81.

Forficula acris Burr; Hebard, 1923, Mem. Dept. agr. India 7: 228.

Forficula celeris Burr, 1905, J. Asiatic Soc. Bengal 1: 31 (♂, ♀, North-east India; Indian Museum).

Forficula celeris Burr; Burr, 1911, Genera Insectorum 122: 81.

Forficula celer Burr; Hebard, 1923, Mem. Dept. agr. India 7: 228.

Variable in colour, from blackish to dark reddish-brown, often with elytra and wings paler than rest of body, head generally reddish. Cuticle more or less glabrous and impunctate anteriorly, abdominal tergites strongly punctured, often almost rugose on posterior margins, tergites of female less strongly punctured. Elytra and wings fully developed. Each branch of

male forceps with an inner flange, the margin of which is serrated, distal part long and curved or shorter and almost straight (figs. 38-40). Female forceps with simple branches (fig. 41). Length of body 8-12 mm, forceps 4-9 mm (males), 2.5-3 mm (females).

Material examined: km 87 von Phuntsholing, 1680 m, 22.V.1972, 1 ♂; Thimphu river, 2300 m, 23.IV.1972, 1 ♂; Thimphu, 2300 m, 18.V.1972, 1 ♂, 1 ♀; Paro, 2300 m, 28.IV.1972, 2 ♂, 1 ♀; Kotoka-Gogona, 2600 to 3400 m, 10.VI.1972, 1 ♂, 1 ♀; Changra, 18 km S Tongsa, 1900 m, June 22, 1972, 1 ♀.

World distribution: Himalayas (N. W. India to Bhutan) and east to Yunnan.

The three names applied to this species refer mainly to forms of the male, although the colour of the types are different. *F. beelzebub* refers to specimens in which the inner flange of the forceps ends in a rounded protuberance or ends smoothly (fig. 38); *acris* to those specimens in which the flange has a sharp distal tooth (fig. 39); *celer* to those specimens in which the forceps are short, almost straight, and more robust (fig. 40). Although *celer* is placed in a different section of the key to *beelzebub* and *acris* in B u r r (1910, p. 165) on the shape of the pronotum, this seems to be in error. H e b a r d (1923, p. 228) synonymized *celer* with *acris* and regarded *beelzebub* as distinct, but *beelzebub* was synonymized with *acris* by B u r r (1913, p. 186). At present *beelzebub* is regarded as a single variable species, and there appears to be little difference in localities or altitude between the three forms. However, although *beelzebub* and *acris* do appear to be conspecific, and the value of the character of the toothed flange of the forceps has been shown to be of only varietal significance in montane African *Forficula*, *celer* may well be distinct since the abdominal tergites tend to be much less punctured than in the other two forms.

32. *Forficula distendens* sp. n.

Blackish-brown or dark reddish-brown, head partly or entirely reddish or reddish-yellow; antennae dark brown; legs brown, femora darker. Cuticle of head smooth, rest of body coriaceous, abdominal tergites 1-5 punctured and those on tergites 2-4 tending to form transverse striations largely towards the base; tergites 6-7 coarsely coriaceous; abdominal tergites of female impunctate.

Male (fig. 54): head transverse, tumid except for a slight depression on vertex; antennal segments somewhat variable in size, ratio of antennal segments 3,4,5=1.75:1.25:2 (holotype), 2:1.25:2.25 (allotype), 2.5:2.25:2.5

(other female paratypes). Distal segments elongated and narrow, segments pubescent, pubescence short and yellow. Pronotum strongly transverse, lateral margins almost straight, posterior margin weakly convex. Elytra short, wings absent or concealed. Abdomen long, almost parallel-sided, lateral tubercles on third tergite very small, those on fourth small; last tergite transverse, with a median depression near posterior margin. Each branch of forceps almost straight, with a large inner basal flange, the flange with a low rounded longitudinal ridge medially, and margins of flange darkened and with small crenulations, distal part of branch cylindrical or nearly so, inner margin somewhat flattened; pygidium bluntly triangular.

Female: similar to male; last tergite narrower; each branch of forceps simple, broad at base and excised at extreme base, narrowed distally, inner margin finely dentated, pygidium declivent, ventral surface rectangular (fig. 55).

Length of body 11-12 mm, forceps 4.5 mm (male), 1.5-1.75 mm (females).

Material examined: holotype ♂, Thimphu river, 2300 m, 23.IV.1972. Paratypes, including allotype — Thimphu, 2300-2500 m, 31.V.1972, 3 ♀ (1 ♀ in MM).

The prominence of the abdomen in this species is notable, especially in the females where the tergites are distended. The body length may be shorter in further specimens, but the characters given should allow this species to be readily recognized.

33. *Forficula lucens* sp. n.

Reddish or yellowish-brown to blackish-brown, rather variable in colour shining, especially abdominal tergites; pronotum yellow laterally; antennae dark brown; legs yellow. Cuticle smooth anteriorly, but abdominal tergites closely and almost uniformly punctured, punctures closer together on distal tergites of male.

Male (fig. 56): head transverse, tumid; eyes small; antennal segments relatively slender, ratio of lengths of segments 3,4,5 = 2.5:2.25:2.75; distal segments elongated, four times as long as broad, segments pubescent, pubescence short and yellow, that on first three segments sparse. Pronotum transverse, lateral margins straight, posterior margin convex. Elytra short, wings absent or concealed. Abdomen depressed and wider medially, lateral tubercles on third tergite very small, those on fourth relatively large. Each branch of forceps widened at base to form an inner flange, the margin of

which is irregularly dentated; a rounded longitudinal ridge occurs on basal part of branch medially; distal part of branch cylindrical and curved; pygidium short and rounded.

Female: similar to male; last tergite narrower; each branch of forceps slender, simple, with inner margin scarcely dentated; pygidium declivent, triangular dorsally, rectangular ventrally, with a short projection at each postero-lateral angle (fig. 57).

Length of body 7-8 mm, forceps 3 mm (males), 1.75 mm (females).

Material examined: Holotype ♂, Tongsa, 2150 m, 24.VI.1972. Paratypes (including allotype) — same data, 1 ♂, 3 ♀ (1 ♂, 1 ♀ in MM); Dechhi Paka, 3300 m, 13.VI.1972, 2 ♂ (1 ♂ in BMNH); Nobding, km 41 O Wangdiphodrang, 2800 m, 17/18.VI.1972, 1 ♀. Also one larva from Dechhi Paka.

This species is named from the shining abdominal tergites, the elytra are sometimes duller. The male forceps are similar to those of *planicollis* Kirby, a fully winged species from North Bengal, but the inner flange in *planicollis* is smaller, and the branch is more strongly curved.

34. *Forficula* sp.

Dark yellow or reddish-brown, abdomen darker than the anterior part of the body, but the general colouration is much more uniform than in *lucens*. Antennae and legs yellowish-brown. Cuticle coriaceous, abdominal tergites weakly and sparsely punctured. Pronotum more transverse than in *lucens*. Elytra shorter than pronotum, wings absent or concealed. Length of body 8 mm, forceps 1.5 mm.

Male unknown.

Material examined: Thimphu, 2300-2500 m, 27.IV.1972, 2 ♀.

This is closer to *distendens* on structure but the differences suggest it is distinct. Even allowing for the distended abdomen of specimens of *distendens*, the present species is smaller.

Eudohrninae

A small subfamily of Oriental species, related to the subfamily Opistocosiinae, but distinct by the shorter antennal segments, the first being shorter than the distance between the antennal bases. There are two genera, *Eudohrnia* Burr and *Kosmetor* Burr. Although Burr (1911, p. 68) keys

out the Eudohrninae by the short antennal segments, *Kosmetor brahma* (Burr) has long antennal segments, and is here transferred to the genus *Timomenus* Burr in the subfamily Opisthocosmiinae. A revision of the Oriental species is desirable and *Kosmetor* and *Timomenus* are similar in many characters, differing mainly in the relative lengths of the antennal segments. *Eudohrnia*, with type species *metallica* (Dohrn), is distinguished from *Kosmetor*, with type species *annandalei* (Burr), in Burr (1911) by the former species and genus having bicarinate first antennal segments, and coloured wings. However, undescribed species from South India and South China are so closely similar to *E. metallica*, except for the bicarinate antennal segments, that it appears that this character is too restrictive. Although the type species of *Kosmetor* has not yet been examined, the following key separates the two genera by another character. Two species in two genera are recorded from Bhutan, both being new.

Key to genera and species

1. Elytra deeply and strongly punctured; abdominal tergites almost rugose, punctures large (*Eudohrnia*); larger in size, body length at least 13 mm, wings uniformly dark; male forceps without an inner tooth on each branch (fig. 59) **E. uniformis** sp. n.
- Elytra impunctate; abdominal tergites with smaller punctures, the punctures sometimes forming irregular transverse ridges (*Kosmetor*); smaller in size, body length 10.5 mm, wings dark with a large yellow spot; male forceps with a prominent inner tooth on each branch (fig. 62) **K. gracilis** sp. n.

35. *Eudohrnia uniformis* sp. n.

Blackish; antennae, tibiae, and tarsi dark brown. Elytra dark reddish or purplish-red. Cuticle shining, that of abdomen with a brassy sheen, that of elytra and wings duller. Cuticle of head smooth, pronotum rugose posteriorly; elytra and wings deeply and strongly punctured, the punctures large and coalescing, forming irregular ridges; wings smooth except for scattered punctures. Abdominal tergites with puncturation as elytra and wings but punctures rather smaller and tending to form transverse striations; posterior tergites of male less strongly punctured; last tergite of both sexes partially smooth.

Male (fig. 59): head transverse, vertex depressed posterior to epicranial sutures, the sutures distinct; two triangular depressions occur between the an-

tenal bases; eyes small, rather prominent. First antennal segment short, second quadrate, third nearly two and half times as long as broad, fourth slightly longer, fifth longer than fourth. Pronotum strongly transverse, widened posteriorly. Elytra and wings fully developed. Abdomen almost parallel-sided, slightly widened to tergites 7-8, lateral tubercles on third tergite small, those on fourth large; last tergite transverse, swollen above the base of each branch of the forceps. Each branch of forceps mainly cylindrical, but widened and angular near base, the inner margin with small crenulations on basal third; branch curved near base, thence straight and narrowing, apical part slender and incurved; pygidium short, narrowed distally, with a semi-circular posterior excision (fig. 59).

Female: similar to male, but smaller; head less depressed on occiput, depressions between the antennal bases almost absent; last tergite narrow, each branch of the forceps trigonal for basal two thirds or more with a blunt dorsal ridge, inner margin with very small crenulations, apical part slender and incurved.

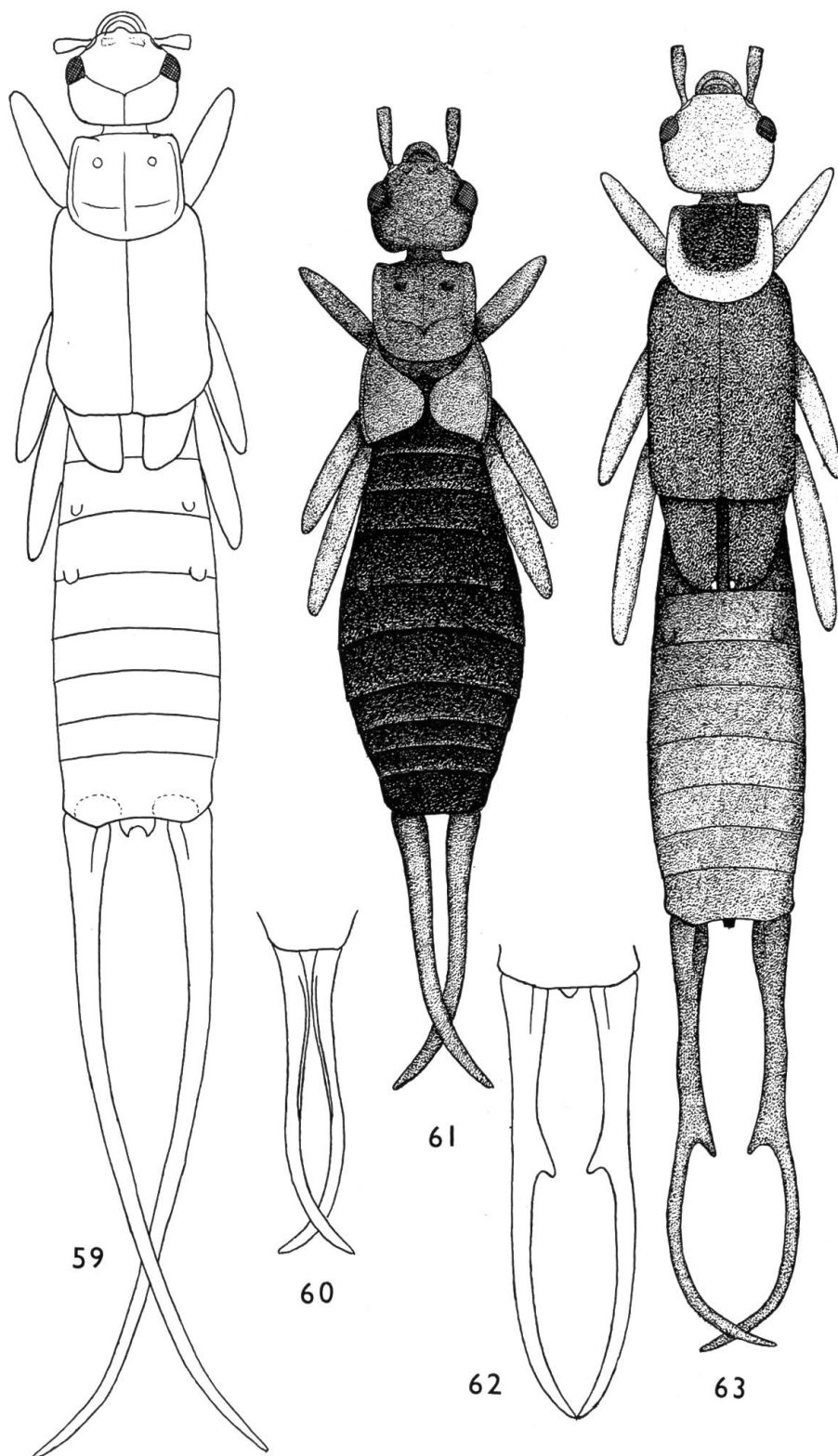
Length of body 17 mm (male), 13.5 mm (female), forceps 14.5 mm (male), 6 mm (female).

Material examined: Holotype ♂, 21 km O Wangdiphodrang, 1700 to 2000 m, 15/16.VI.1972. Paratype (allotype) — same data, 1 ♀. Also one larva, which may be this species although the pronotum is parallel-sided, from Changra, 18 km S Tongsa, 1900 m, 22.VI.1972.

This species can be separated from the other species of *Eudohrnia*, *E. metallica* (Dohrn), which occurs in the Himalayas, by the following key: —

1. Pronotum narrowed posteriorly, posterior margin strongly convex;
first antennal segment with a longitudinal ridge along each side;
third antennal segment scarcely longer than broad; head reddish
metallica (Dohrn)
- Pronotum widened posteriorly, posterior margin weakly convex;
first antennal segment simple; third antennal over twice as long as
broad; head dark
uniformis sp. n.

E. uniformis appears to be a much more uniformly coloured species than *metallica*, mainly due to the concolorous head, but the elytra are also relatively less contrastingly coloured than in *metallica*. The only other known species of the genus, *E. zae* (Liu) from Szechuan, is distinct by the weak puncturation of the abdominal tergites, and may not be generically related to the other species of *Eudohrnia* although the first antennal segment appears to have an incipient ridge along each side.



36. *Kosmetor gracilis* sp. n.

Dark reddish-brown, elytra and wings slightly paler; lateral margins of the pronotum whitish-yellow; wings with a large basal yellow spot on outer margin. Cuticle shining; head, pronotum, elytra, and wings impunctate, abdominal tergites punctured, the punctures small but tending to form transverse striations on at least the basal parts of the tergites.

Male: head transverse, tumid but depressed along the epicranial sutures; two shallow triangular depressions occur between the antennal bases; eyes small. First antennal segment short, second quadrate, third nearly twice as long as broad, fourth one and half times as long as broad but wider than third; distal segments relatively short, two and half times as long as broad, with the base of each strongly narrowed. Pronotum transverse, lateral margins slightly convex, posterior margin convex. Elytra and wings fully developed. Abdomen slender, almost parallel-sided, slightly narrowed posteriorly; lateral tubercles on third tergite almost absent, those on fourth small; last tergite transverse, rugosely punctured but with two longitudinal irregular smooth bands medially. Above the base of each branch of the forceps is a low tubercle. Each branch of forceps cylindrical, straight except at apex, slightly widened at base, and with a large thorn-like tooth just before midpoint (fig. 62).

Female: unknown.

Material examined: Holotype ♂ km 87 von Phuntsholing, 1680 m, 22.V.1972.

This is a dark slender species with elongated slender forceps. In form it is similar to *Timomenus brahma* (Burr) (fig. 63) but more slender; the pronotum is not widened and the first antennal segment is much shorter; forceps similar to those of *brahma*, but straight, not sinuate, and the pygidium is broader and triangular (figs. 62, 63).

K. gracilis can be distinguished from the other species of *Kosmetor* recorded from the eastern Himalayas by the colour and by the single tooth on the male forceps. *K. temora* (Burr) from Sikkim, has two inner teeth on each branch of the male forceps, one placed about one third from base, the other nearly two-thirds from base. *K. vishnu* (Burr), also from Sikkim has

Fig. 59 *Eudohrnia uniformis* sp. n., male. — Fig. 60 *Liparura punctata* Burr, male forceps. — Fig. 61 *L. simplex* sp. n., male. — Fig. 62 *Kosmetor gracilis* sp. n., male forceps. — Fig. 63 *Timomenus brahma* (Burr), male.

only one inner tooth on each branch of the male forceps but is reddish in colour, the pronotum is more strongly transverse, and the male forceps are more strongly curved, forming an elongated ellipse.

Opisthocosmiinae

Characterized by the long first antennal segment, which is long, often longer than the distance between the antennal bases and relatively slender; the distal segments are narrow and elongated, often very narrow. The body tends to be fusiform, cylindrical and strongly narrowed anteriorly and posteriorly, the last tergite being small but there are exceptions. The branches of the forceps are usually long and slender with or without inner teeth, but *Hypurgus* has short forceps. *Kosmetor brahma* (Burr) has long first antennal segments, not short as in the Eudohrninae in which the genus is placed, so it is transferred here to the genus *Timomenus* Burr, a genus which belongs to the Opisthocosmiinae. A re-examination of the types of *Kosmetor* and *Timomenus* is desirable so that their taxonomic positions can be checked. Three genera and four species are now recorded from Bhutan, one species being represented only by female, so that it cannot be adequately described.

Key to genera and species

1. Each elytron with a lateral longitudinal ridge, the elytra short; wings absent or concealed (*Liparura* Burr) 2
- Elytra without lateral longitudinal ridges, both elytra and wings fully developed 3
2. Pronotum quadrate (fig. 61); abdominal tergites very strongly and deeply punctured; male and female forceps simple **L. simplex** sp. n.
- Pronotum strongly transverse; abdominal tergites very weakly punctured; female forceps simple, male unknown **Liparura** sp.
3. Head less transverse, eyes smaller; lateral margins of pronotum almost straight, not curving smoothly into the posterior margin; elytra and wings unicolorous, dark; punctures on abdominal tergites large and shallow; forceps long and slender (fig. 63)
Timomenus brahma (Burr)
- Head more transverse, eyes large; lateral margins of pronotum convex and curving smoothly into posterior margin; elytra and wings reddish-brown, each with a yellow spot; punctures on abdominal tergites almost absent; forceps short and relatively broad
Hypurgus humeralis (Kirby)

37. *Liparura simplex* sp. n.

Very dark reddish or yellowish-brown, abdomen blackish; antennae yellow, basal segment brown; legs reddish-brown. Cuticle of head sparsely punctured and pubescent, pronotum smooth and shining; elytra coriaceous, dull; abdomen smooth, shining, with very large and deep punctures, punctures closest dorso-laterally, diameter of punctures twice that of space between punctures; punctures more widely spaced medially and basally on tergites where they are separated by rather less than their own diameter; last tergite irregularly punctured.

Male (fig. 61): head transverse, tumid, except for a transverse depressed area along the epicranial sutures, and with two small depressions between the antennal bases; eyes rather large and prominent. Antennal segments long and slender, first longer than the distance between the antennal bases, second quadrate, third nearly three times as long as broad, fourth nearly equal in length to third, fifth four times as long as broad, distal segments narrower and more elongated, about eight times as long as broad, segments pubescent, less so on basal three. Pronotum as broad as long, lateral margins slightly curved and reflexed dorsally, posterior margin weakly convex; two small transverse elliptical depressions occur on each side of anterior half and a longitudinal median furrow extends almost the entire length. Posterior part of pronotum reflexed above the base of mesonotum, and bordered anteriorly by curved furrows. Elytra short, exposing a part of the mesonotum and a triangular scutellum; each elytron with a narrow explanate border curved dorsally and forming a lateral ridge. Legs long and slender. Abdomen strongly narrowed anteriorly and posteriorly, widest at tergites 5-6; lateral tubercles on third tergite relatively large, those on fourth very large; last tergite small, swollen above the base of each branch of the forceps and with a median depression on posterior margin. Each branch of forceps cylindrical, gradually narrowed distally and curved beyond midpoint; entirely simple. Length of body 10 mm, forceps 3.75 mm.

Female: unknown.

Material examined: Holotype ♂, Wangdiphodrang, 1300 m, 6.VI.1972.

Apart from the uncertain *Liparura sinensis* Chen, from China, the genus contains only the type species, *L. punctata* Burr, from Sikkim and "Bhutan" (Pedong-really North Bengal). There are two specimens in the British Museum (Natural History) from the Burr collection, which are probably syntypic, although this has not yet been checked. The male has the longitudinal ridge on each branch of the forceps which is mentioned by Burr (1910) as

a character of this species, but the abdominal tergites of this male are less strongly punctured than those of the female, the latter approaching *simplex* in this respect. Although females sometimes have less abdominal puncturation than males, the reverse seems less likely, and it is this which raises doubts whether the two specimens in BMNH are really conspecific. Any difference in puncturation between the sexes is usually small, and two females in the present material are distinct by the very weak and sparse puncturation, so that these are thought to represent a new species, of which the male should be distinct by a similar, although possibly less weak, puncturation.

38. *Liparura* sp.

? *Liparura* sp. Hincks, 1947, Ark. zool. 39: 38 (1 ♀, Southern Shan States, Burma).

Similar in general appearance to *simplex*, but broader; pronotum strongly transverse, posterior margin not reflexed over base of mesonotum and almost simple. Elytra longer, mesonotum not exposed except for a broad triangular scutellum; abdomen more depressed than in *simplex*, and very weakly and sparsely punctured, last tergite almost impunctate. Each branch of the forceps very slender, cylindrical except at base which is slightly wider and excavated on inner margin at extreme base; pygidium short, relatively narrow, rounded apically.

Length of body 10 mm, forceps 4 mm.

Male unknown.

Material examined: Nobding, 41 km O Wangdiphodrang, 2800 m, 17/18.VI.1972, 1 ♀; Wangdiphodrang, 1300 m, 25/26.VI.1972 1 ♀ (MM).

This may be that recorded in H i n c k s (1947) who remarked on the weak puncturation.

L. punctata, *L. simplex*, and the undescribed females can be separated as follows: —

- | | |
|---|------------------------------|
| 1. Pronotum quadrate; abdominal tergites very strongly and deeply punctured; male forceps simple (fig. 61) | <i>simplex</i> sp. n. |
| — Pronotum transverse; abdominal tergites less strongly punctured | 2 |
| 2. Abdominal tergites strongly punctured; male forceps with a longitudinal dorsal ridge along part of the inner margin of each branch (fig. 60) | <i>punctata</i> Burr |
| — Abdominal tergites very weakly and sparsely punctured; male unknown | <i>Liparura</i> sp. |

39. *Timomenus brahma* (Burr) comb. nov.

Opisthocosmia brahma Burr, 1904, Trans. ent. Soc. Lond. 1904: 310 (♂♂, Darjeeling and Bhutan: Paris Museum).

Kosmetor brahma (Burr); Burr, 1910, Fauna Brit. India (Dermaptera): 202.

Dark brown; head yellow; pronotum broadly whitish-yellow laterally; legs yellow; abdomen dark reddish. Cuticle of head and pronotum smooth, elytra and wings finely coriaceous; abdominal tergites with large but shallow punctures.

Male (fig. 63): head less transverse, tumid, eyes small. Pronotum transverse with a wide lateral margin, and a wide posterior margin which is reflexed over the base of the elytra; elytra and wings fully developed. Each branch of forceps slender, sinuate, and with a large inner tooth, pygidium short and blunt. Length of body 11-12 mm, forceps 5.5-6 mm.

Female: unknown.

Material examined: 21 km O Wangdiphodrang, 1700-2000 m, 15/16.VI.1972, 1 ♂.

World distribution: North Bengal and Bhutan.

This is a distinctive species by the yellow head and form of the male forceps. The two other species recorded from the area, *aesculapius* (Burr) and *nevilli* (Burr) have two inner teeth on each branch of the male forceps, and the pronotum is long, not transverse, and narrowed posteriorly, with the posterior margin very strongly convex (Brindle, 1968).

40. *Hypurgus humeralis* (Kirby)

Opisthocosmia humeralis Kirby, 1891, J. Linn. Soc. 23: 523 (♀, Ceylon: BMNH).

Hypurgus humeralis (Kirby); Burr, 1910, Fauna Brit. India (Dermaptera): 188.

Reddish-brown; antennae and legs yellowish to brown; elytra and wings darker reddish-brown, each with a large yellow elongated spot; abdomen often darker laterally. Elytra and wings fully developed. Each branch of male forceps short, cylindrical, relatively broad, and sinuate, with a small ventral inner tooth near apex. Female forceps with more slender branches, straight or nearly so, and contiguous. Length of body 7-10 mm, forceps 2.5-3 mm (males), 2-2.5 mm (females).

World distribution: Oriental Region.

Material examined: Samchi, 350-450 m, 7/11.V.1972, 1 ♂, 2 ♀.

A common Indian species.

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Author's address:

Mr. A. Brindle, Dept. of Entomology,
Manchester Museum, The University, Manchester England

