

MISCELLANEOUS PUBLICATION
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**Contribution to the gryllid fauna of the
Western Himalayas (Orthoptera : Gryllidae)**

by

H. K. BHOWMIK

**Issued by the Director
Zoological Survey of India, Calcutta**

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Contribution to the Gryllid Fauna of the Western Himalayas
(Orthoptera : Gryllidae)

- 1 With a complete list of valid species from the area
2. Description of four new species

by

H K. BHOWMIK

Zoological Survey of India, Calcutta-16



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CONTRIBUTION TO THE GRYLLID FAUNA
OF THE WESTERN HIMALAYAS
(ORTHOPTERA . GRYLLIDAE)

By

H K. BHOWMIK

Zoological Survey of India, Calcutta-16

INTRODUCTION

The Western Himalayas include all the hilly regions from Kumaon to Kashmir (excluding N.W. Frontier Province) and also the western part of Tibet which extends from the Indus to the region of the holy lakes Manasarobar and Rakastal (Fig. 1 map). The Indus and its five chief tributaries run through these hills and form water falls along their courses. Besides these rivers, the area has some natural lakes like Wular, Dal, Renuka etc. and numerous valleys. The main Himalayan range is divided into three more or less parallel ranges, an outer, a middle and an inner range ; of these, the outer is the lowest and inner the highest. The inner and the middle are mostly separated by the Chandrabhaga valley and the middle and the outer by the Ravi valley. The precipitation is extremely low. The rainfall (including the winter snowfall) in the Chandrabhaga valley is 15.2 cm, while in the Ravi valley and at Nagar in Kulu (Beas valley) in similar situation it is 121.5 cm. In the outer Himalayan regions, rainfall is between 126.0 and 253.0 cm. Snowfall is of universal occurrence during the winter. The climate is dry and cool and strong wind usually blows in the afternoon. The minimum temperature is exceedingly low , even in summer, in many places, water freezes at night and in winter the temperature usually falls down below 5°C

Since types of vegetation of a particular region is a great delimiting factor in determining the population and speciation in crickets, a brief account of the vegetation of Western Himalayas will be given.

The vegetation of W. Himalayas may be divided into three altitudinal zones : (a) tropical and sub-tropical (up to 1,500m) (b) temperate (between 2,000-3,500m) and (c) alpine (from 4,000m to just below the snow line). The two sides of the Himalayas exhibit vegetation of extremely different types. On the southern slope are luxuriant forests, with all their usual associated forms of vegetation, whereas the northern side is practically a barren desert. The luxuriance of vegetation on the Indian side gradually decreases from East to West, this is due to several conditions : a gradual decrease in rainfall, the peculiar course of the Himalayan range from south-east to north-east end, therefore, the position of western part in a higher latitude, and the great distance of the western part from the sea.

The vertical sequence of vegetation in the Garhwal Himalayas (i.e., in Kumaon range) is noteworthy. At the foot of the outer hills i.e. in tropical and sub-tropical zones, the vegetation is of sclerophyllous type ; a little higher, between sub-tropical and temperate zones (609.5-1, 829m) are forests of *Pinus longifolia* which gradually become mixed with *Quercus incana* ; still higher are other oaks e.g., *Q. Semecarpifolia* and *Q. dilatata* with *Cedrus deodara*, *Pinus excelsa*, *Picea morinda*, *Abies pindrow* and higher up *A. webbiana*. In the temperate zone, species of oaks (i.e., *Quercus*) occur in association with deciduous trees like *Acer*, *Alnus*, *Aesculus*, *Betula*, and two species of *Rhododendron*. In the inner drier valleys like the upper Sutlej (Kunawar) and upper Chandrabhaga valleys (Lahoul, Pangi and Padar), the forests are formed by *Pinus gerardiana* and *Cedrus deodara*—these trees extend to about 3,048m or so. Still higher up in these valleys, forests of *Juniperus religiosa* and *Betula utilis* (Bhojpatra) are noted. In the tropical and sub-tropical zones comprising the Siwaliks, the main forest is *Shorea robusta* interrupted by patches of savannah, riverain types of forests and swamps. In savannahs, the

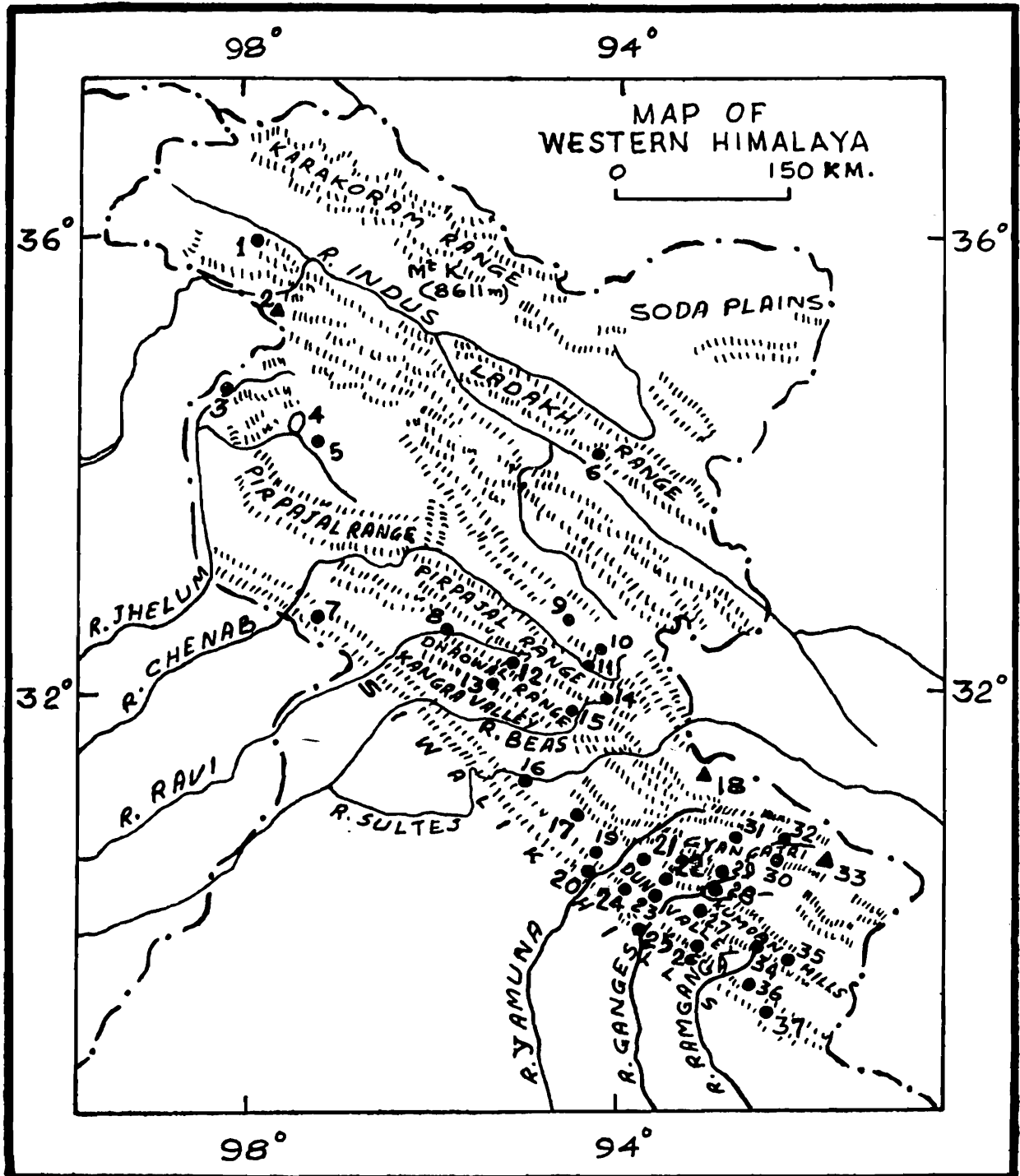


Fig. 1. Map of the Western Himalayas showing some important places including chief collecting centres,

- J. & K.* 1. Gilgit, 2. Nanga Parbat, 3. Gulmarg, 4. Wulrah, 5. Srinagar, 6. Leh, 7. Jammu.
- H. P.* 8. Dalhousie, 9. Keylong, 10. Rawal, 11. Rohtang Pass, 12. Dharmasala, 13. Kangra, 14. Manali, 15. Kulu, 16. Bilaspur, 17. Simla.
- U. P.* 18. Mt. Kamet, 19. Nahan, 20. Kalsi, 21. Mussorie, 22. Narendranagar, 23. Rishikesh, 24. Dehra Dun, 25. Hardwar, 26. Katduar, 27. Pawuri, 28. Debrag, 29. Rudraprag, 30. Joshimath, 31. Kedarnath, 32. Badrinath, 33. Nanda Devi, 34. Raniket, 35. Almorah, 36. Nainital, 37. Katgudam.

arboreal plants are represented by *Bombax malabaricum*, *Butea monosperma*, *Acacia catechu*, *Dalbergia sisso* etc. Swampy areas contain *Cedrela toona*, *Bischofia*, *Albizzia* spp., *Ficus glomerata* etc.

In the outer parts of western Himalayas at lower levels a rich undergrowth of herbs is noteworthy in the eastern part while towards the west this undergrowth becomes less luxuriant. In the eastern part (in the Kali valley near Askot along Nepal borders) many epiphytic orchids and epiphytic ferns; and at Dehradun (609.6m) still epiphytic orchids and ferns are seen while at Mussoorie and Simla (1.524-1, 829m) terrestrial orchids and ferns are found instead of epiphytic types, in the drier inner parts of Chandrabhaga and Sutlej these are absent. Besides *Fraxinus xanthoxyloides*, spp. of *Buxus* and *Pinus* are also found.

Above the tree limit i.e., in Alpine zone, the vegetation is mainly grassland. The hard-rocky hills are bare and have very little water, these are covered with grass extending to the snow line. Many herbs with beautiful flowers are met with in the grass, such as species of *Anemone*, *Geranium*, species belonging to the family Gentianaceae, species of *Saussurea* with tufted habits etc. Among gymnosperms, *Abies spectabilis*, *Picea smithiana*, *Juniperus* with association of *Betula* and *Rhododendron* are mainly found.

In the river valleys which cross the Himalayas, the vegetation gradually passes into xerophytic forms, this type is noted in Sutlej valley.

Once across the Himalayas the vegetation changes entirely. Trees are absent except for a few willows and poplars. In Ladak stunted trees of *Juniperus religiosa* occur. The most important and conspicuous character of the vegetation is the cushion like habit of all shrubby plants, *Caragana pygmaea* is such type of plant occurring as hemispherical cushions. Other species, generally found are *Arenaria polytrichoides*, *A. musciformis*, *Acantholirion lycopodioides*, species of *Astragalus*, *Capparis leucophylla*, *Ephedra vulgaris* etc.

References about the gryllid fauna of the Western Himalayas are rather few and scattered, notwithstanding the fact that the region is very interesting from zoogeographical point of view. Burmeister (1838), Serville (1839) and Walker (1869) made some stray observations on the gryllid fauna, based on collections sent to them from India. Chopard (1928, 1933, 1935 and 1939) while contributing to Indian fauna also worked out material or recorded species from the area. More recently, substantial contributions were made by Bhowmik (1967a, 1967b, 1969, 1977a, 1977b) and in 1974 Tandon and Shishodia described two new species. But up till now there was no consolidated and up-to-date account of these interesting insects from the W. Himalayas. In the present paper an attempt has been made to give an adequate picture of gryllid fauna of this very interesting zoogeographic region, including an up to date checklist. As a result of the present study 21 species are now being added for the first time to the faunal list of gryllidae of the W. Himalayas.

The major portion of the material available for this study was sent by the O/C. of North Regional Station, Dehra Dun. The High Altitude Regional Station, Solan, also sent some materials. The writer also collected material from Jammu and Kashmir and Himachal Pradesh. The collections preserved in Head Qrs. Office were also examined and references in the literature were consulted. As a result 70 valid species belonging to 34 general and 10 subfamilies are found to occur in the W. Himalayas.

For the known species only additional characters of taxonomic importance have been provided, illustrations and measurements have also been given, wherever it was felt necessary. Besides the taxonomic account, data have been furnished in respect of the zoogeographical distribution.

Keys have been provided for subfamilies, genera and species whenever there is more than one form of a taxon. Literature citations under each species dealt with here have been limited to the original description and important subsequent records.

Types will be deposited in the national collections of the Zoological Survey of India.

All measurements are given in mm.

Following abbreviations are used in the text :

J & K	—	Jammu and Kashmir
H P	—	Himachal Pradesh
U P	—	Uttar Pradesh
A P	—	Andhra Pradesh
ZSI	—	Zoological Survey of India, Calcutta.

A COMPLETE LIST OF VALID SPECIES OF GRYLLIDS SO FAR KNOWN FROM THE WESTERN HIMALAYAS

(*NEW RECORDS)

(**Species studied earlier by the writer)

(***Species recorded from literature)

Class	—	INSECTA
Order	—	ORTHOPTERA
Family	—	GRYLLIDAE

I Sub-family—GRYLLINAE

- 1 *Brachytrypes portentosus* (Lichtenstein)
2. *B. orientalis* (Burmeister)
3. *Gymnogryllus kashmirensis* Bhowmik
- **4. *G. erythrocephalus* (Serville)
5. *Gryllus bimaculatus* De Geer
6. *Modicogryllus confirmata* (Walker)
7. *M. blennus* (Saussure)
- *8. *M. facialis* (Walker)
- *9. *M. lineiceps* (Walker)
10. *M. tikaderi* sp. nov.
11. *Acheta domesticus* Linnaeus
12. *Teleogryllus mitratus* (Burmeister)

13. *T. testaceus* (Walker)
14. *T. longipennis* (Saussure)
- *15. *T. fletcheri* (Chopard)
16. *Plebeiogryllus guttiventris* (Walker)
17. *Platygryllus melanocephalus* (Serville)
- ***18. *P. brunneri* (Saussure)
19. *Gryllopsis furcata* (Saussure)
- **20. *G. falconneti* (Saussure)
- ***21. *G. babaulti* (Chopard)
- *22. *Turanogryllus histrio* (Saussure)
23. *T. rufoniger* (Chopard)
24. *T. dehradurensis* Bhowmik
25. *T. janmuensis* Bhowmik
26. *T. mitrai* sp. nov.
- *27. *Velarifictorus sikkimensis* (Bhowmik)
- *28. *V. ceylonicus* (Chopard)
- *29. *V. parvus* (Chopard)
30. *V. lambai* sp. nov.
31. *V. basui* sp. nov.
32. *V. raychaudhuri* (Bhowmik)
33. *V. sukhadas* (Bhowmik)
34. *V. bhadurii* (Bhowmik)
35. *V. dehradurensis* Tandon & Shishodia
36. *V. indicus* Tandon & Shishodia
37. *Gryllodes sigillatus* (Walker)
- **38. *Itaropsis tenellus* (Walker)
- *39. *Loxoblemmus equestris* Saussure
40. *L. detectus* (Servilla)
- *41. *L. macrocephalus* Chopard
42. *L. nigriceps* Chopard
43. *L. taicoun* Saussure
- **44. *L. animae* Bhowmik
45. *Stephoblemmus humbertiellus* Saussure
- **46. *Landreva semialata* Chopard

II Subfamily—NEMOBIINAE

- **47. *P. stringipennis* (Chopard)
- 48. *Pteronemobius fascipes* (Walker)
- *49. *P. csikii* (Bolivar)
- *50. *P. taprobanensis* (Walker)
- 51. *P. concolor* (Walker)
- **52. *Paranemobius pictus* (Saussure)

III Subfamily—MYRMECOPHILINAE

- **53. *Myrmecophilus albicinctus* variety *concolor* Chopard

IV Subfamily—SCLEROPTERINAE

- *54. *Scleropterus coriaceus* (Hann)
- 55. *S. punctatus* Burmeister
- 56. *Acanthoplistus birmanus* Saussure

V Subfamily—MOGOPLISTINAE

- **57. *Ornebius nigripalpis* Guerin
- *58. *Gotvandia albipennis* Chopard
- *59. *Derectaotus maindroni* (Chopard)

VI Subfamily—CACOPLISTINAE

- **60. *Cacoplistes rogenhoferi* (Saussure)

VII Subfamily—PHALANGOPSINAE

- 61. *Homoeogryllus cincticornis* (Walker)
- 62. *H. japonicus* (Hann)

VIII Subfamily—TRIGONIDIINAE

- 63. *Homoeoxipha lycoides* (Walker)
- 64. *Trigonidium cicindeloides* Rambur
- 65. *Anaxipha venustula* (Saussure)
- 66. *Amusurgus unicolor* (Chopard)

IX Subfamily—E_{NEOPTERINAE}

67 *Xenogryllus transversus* (Walker)

X Subfamily—P_{ODOSCIRTINAE}

68. *Calyptotrypus maindroni* (Chopard)

69. *Madasumma ventralis* Walker

70. *Euscyrtus hemelytrus* (Hann)

KEY TO SUBFAMILIES

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <p>1. Body short, oval ; antennae and cerci relatively short ; femora massive, scarcely one and a half times as long as wide ; myrmecophilous insects.....</p> <p>Body not unusually short ; antennae long, setaceous ; cerci long ; posterior femora not so massive.....</p> | <p>Myrmecophilinae</p> <p>.....2</p> |
| <p>2. Second segment of tarsi compressed, minute</p> <p>Second segment of tarsi depressed, subcordiform.....</p> | <p>.....3</p> <p>.....7</p> |
| <p>3. Posterior tibiae always armed with a few spines on the superior margins.....</p> <p>Posterior tibiae with serrulated margins, without spines (exception Genus <i>Acanthoplistus</i>).....</p> | <p>.....4</p> <p>.....6</p> |
| <p>4. Posterior tibiae never with denticles between spines.....</p> <p>Posterior tibiae usually serrulated between spines (Head short, vertical ; legs long with posterior femora rather strongly swollen, at base)</p> | <p>.....5</p> <p>Phalangopsinae</p> |
| <p>5. Posterior tibiae with fixed spines ; sometimes with denticles basad ; posterior metatarsi sulcated and with two rows of serrulations on superior margins</p> | <p>Gryllinae</p> |

- Posterior tibiae with long, pubescent and movable spines, never with denticles ; posterior metatarsi not sulcated and with only one serrulation ; one oblique vein in male elytron Nemobiinae
6. Body squamose ; facial shield strongly convex ; small species with body more or less covered with scales ; elytra of male short, membraneous ; females apterous Mogoplistinae
- Body subpubescent ; facial shield almost flat ; body without scales ; male and female with fully developed elytra Scleropterinae
7. Posterior tibiae non serrulated, armed with three spines on each margin ; very small, delicate insects Trigonidiinae
- Posterior tibiae serrulated both at base and between spines.....8
8. Posterior tibiae with short, subequal external apical spurs ; posterior metatarsi short. Podoscirtinae
- Posterior tibiae usually armed with three long apical spurs, median longer than other two, both on internal and external sides ; posterior metatarsi long (head big ; frontal rostrum parallel sided) Eneopterinae

SYSTEMATIC ACCOUNT

Subfamily GRYLLINAE

KEY TO GENERA

1. Body almost glabrous : ocelli arranged more or less in a straight line ; posterior femora as long as or longer than tibia and tarsus together.....2
- Body usually more or less pubescent ; ocelli arranged in a triangle ; posterior femora never longer than tibia and tarsus taken together.....3

2. Anterior metatarsus moderately long ; anterior and middle tibiae ciliated with long hairs ; ovipositor moderately long *Gymnogryllus* Sauss.
- Anterior metatarsus very short ; very robust species ; ovipositor unusually short *Brachytrypes* Serv.
3. Both sexes with convex face.....4
- Face of males strongly flattened and front more or less strongly projected7
4. Frontal rostrum almost subequal to first antennal segment (Head somewhat flattened above ; female apterous or with reduced lateral lobes ; ovipositor very long) *Gryllodes* Sauss.
- Frontal rostrum always wider (almost twice) than first antennal segment...5
5. Body more or less depressed, never very convex ; female with somewhat perfectly developed elytra, never reduced to lateral pads *Gryllus* complex
- Body very convex, cylindrical ; female with imperfectly developed elytra, often present as lateral pads.....6
6. Subgenital plate with conical or rounded apex ; no styliform process in male genitalia. *Gryllopsis* Ch.
- Subgenital plate somewhat bilobed ; epiphallus with styli on its postero-lateral extremities *Turanogryllus* Tarb.
7. Frontal rostrum of male projected and somewhat angular *Loxoblemmus* Sauss.
- Frontal rostrum of male strongly projected, presenting a wide corneous process, divided in middle *Stephoblemmus* Sauss.

Genus (1) *Brachytrypes* Serville, 1839*KEY TO SPECIES*

- Very large species (nearly 40) ; ovipositor rather long ; apical field of male elytron with very large areolae ; ocelli arranged almost in a straight line *Portentosa* (Lich.)
- size medium (nearly 25) ; ovipositor shorter ; apical field of male elytron with nearly square areolae ; ocelli arranged in a feebly arched line *Orientalis* (Burm.)

1 *Brachytrypes portentosa* (Lichtenstein)

(Figures 2 and 3)

1796. *Acheta portentosa* Lichtenstein, *Cat. Mus. Zool. Hamburg*, 3 : 86.
1931. *Brachytrypes portentosus* : Chopard, *Bulr. Raffles Mus.*, 6 : 128 ;
Chopard, 1969. *Fauna India, Orth.* 2 : 16.
1964. *Brachytrypes portentosa* : Randell, *Canad. Ent.*, 96 : 1587.

Distribution.—Widely distributed in oriental region but Chopard (1969) says that it is insufficiently known in India.

Material.—U. P : 3 ♂, 2 ♀, Dehra Dun, 6.10.77; A. Kumar. Assam : 1 ♂, 2 ♀, Kaziranga ; 8.10.1961; R. K. Katiyer. 2 ♀, Gaown, Tezpur ; 30.5.1966 ; A.N.T, Joseph. NEFA : 1 ♀ ; Kameng.

Additional description.—Males : General colouration rufous brown. Body stout, Head large, wider than pronotum, ocelli arranged almost in a straight line. Posterior margin of pronotum sinuated. Pesterior tibiae with four apines on each margin. Elytra with four oblique veins, most extreme external one isolated and distinct from others, diagonal long, straight and connected with first chord by three veinlets ; mirror divided by a curved vein and connected with first chord by one veinlet ; apical field very long, with eight oblique veins and two false veins ; areolae distinct and almost rectangular ; anal field very thinly reticulated.

Females : Differ from males in having on dorsal field of elytra six veins and about eleven clear branches arising from discoidal , ovipositor straight and long.

Measurements.—Length of body ♂ 37-38.5 ; ♀ 36.5-38 , length of pronotum ♂ 6.75-7.5, ♀ 7.25-8.25 ; maximum width of pronotum ♂ 11.5-12, ♀ 12.25-12.75 , elytron ♂ 25.5-27.5, ♀ 29-35.5 ; posterior femur ♂ 20.5-21.75, ♀ 22-23.25 , posterior tibia ♂ 12.5-13.8, ♀ 12.5-13.7 , ovipositor 9.5-10.5.

Remarks.—Morphologically this species is very close to *B. orientalis* (Burmeister, 1838) but careful examination reveals differences in size, pubescence and arrangement of ocelli. But undoubtedly authors differ in their opinion about the taxonomic position of this species as is revealed from the synonymy list.

2. *Brachytrypes orientalis* (Burmeister)

1838. *Gryllus orientalis* Burmeister, *Hand Ent.*, 2 : 735.

1877. *Brachytrypes orientalis* : Seussure, *Mem. Soc. Phys. Hist. nat. Genave*, 25 : 290-291 ; Chopard, 1936, *Spolia Zelan.*, 20 : 20 ; Chopard, 1969 ! *Fauna India, Orth.*, 2 : 17.

1964. *Brachytrypes orientalis* Randell, *Cand. Ent.*, 96 : 1587.

Distribution.—Sri Lanka , Burma , India (WB Assam , NEFA Orissa Mysore ; Madras , Rajasthan and UP).

Material.—UP : 1 ♀ , Dhikala , 5.8.75 ; R. N. Chopra. Also from—Assam : 1 ♀ , Goranpani , 9.10.1961 R. K. Katiyer. NEFA : 1 ♀ , Kamang , 20.5.1966 , K. C. Jayaramkrishna, Rajasthan : 2 ♀ Pilani 12.4.1965 , H. L. Kundu.

Additional description.—Females : General colour varies from yellowish brown to blackish brown. Frontal rostrum slightly more than twice width of scape. Clypeofrontal suture straight. Ocelli arranged on a feeble arched line. Posterior margin of pronotum almost straight or feebly sinuated. Dorsal field of elytra with four to five oblique branches which are irregularly arranged at base and a sort of nine curved branches from discoidal , lateral field with six regularly spaced veins and sometimes with two other short branches at external part of it , mediastinal vein with five to six branches.

Measurements.—(Females) Length of body 24.5.-25.75 ; length of pronotum 4.75-5 width of pronotum 8.5 , elytra 16.5-24; posterior femur 16-17 ; posterior tibia 9-10, ovipositor 3.9-4.5.

Remarks—It is a very variable species. Hence a number of species have been synonymized with it and very often transferred in different way by different workers.

Genus (2) *Gymnogryllus* Saussure, 1877

3. *Gymnogryllus kashmirensis* Bhowmik

1967. *Gymnogryllus kashmirensis* Bhowmik, *Sci. Cult*, 33 : 246,

Fig. 4 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 24.

1969. *Gymnogryllus minor* Chopard, *Fauna India, Drth.* 2 : 29-30.

Distribution.—Distributed almost throughout India including Pakistan (Rawalpindi) ; Burma , South Vietnam , Java , Malay.

Material.—H P : 1 ♂ , 1 ♀ ; Near lake, Bilaspur , 29.9.80 , H. K. Bhowmik. 1 ♀ ; Swarghat. Bilaspur ; 20.1.72 , K. K. Mahajan. U P : 1 ♀ , Shankracharpa Vagar, Tehri , 11.7 75 , R. N. B. 2 ♂ , Ranihat (Srinagar), Tehri, 1.10.75, J. C. T 1 ♀ , That, Pitharagarh dist., 25.10.75, A Kumar. 2 ♂ , Budhana, Pauri dist , 29.9.75 , J.C.T. 1 ♀ , Banbasa, Nainital, 7.10.71, A. Kumar. 1 ♂ , Tanakpur, Nainital, 6.10.77, A. Kumar. 3 ♂ , 3 ♀ , Lalkua, Nainital, 1-4.10.74, P.K. Maity. 1 ♂ Dehra Dun, 16.9.73, A. Singh. 1 ♀ , Bhadra, Dehra Dun, 25.6.74 , J.C. Tripathi,

Other localities : Bihar : 4 ♂ (damaged), 2 ♀ (at light) : Chakulia Dist. Board Bungalow, Singhbhum : 25-22.10.68 : R. Tilak. Gujarat : 1 ♂ ; Umbargaon Camp, Dist. Bulsar and 20, 2 ♀ : Dadha : 14-17.11 73; P.T Cherian. 1 ♂ ; Surendranagar : 21.9.69 ; T.G. Vazirani.

Remarks.—The present material fairly agrees with the original description except size as some of the male specimens are as long as 15. The species is recorded here for the first time from Gujarat.

Gryllus complex

(The genera which are now included in the complex are hard to be distinguished morphologically. As such they have been separated from the stand point of male genital parts).

- 1. Epiphallus deeply emarginate posteriorly forming an H shaped structure2
 Epiphallus not deeply emarginate posteriorly, posterior margin with three lobes of approximately equal size3
- 2. Median line of bridge of epiphallus entire or with a postero-median projection *Modicogryllus* Ch.
 Median line of bridge of epiphallus with a small V-shaped emargination ; apices of mesal lobes lying between bases of ectoparameres *Velarifictorus* Rand.
- 3. Anterior projections of ectoparamere nearly equal ; endoparamere without a transverse parameral muscle apodeme [apex of ectoparamere digitiform] *Gryllus* Linn.
 Internal anterior projection of ectoparamere much longer than external anterior projection4
- 4. Virga with a transverse parameral muscle insertion crest5
 Virga without transverse parameral muscle insertion crest6
- 5. Mesal lobes with their apices between bases of ectoparameres ; endoparamere J—shaped *Plebeigryllus* Rand.
 Mesal lobes with their apices between apices of ectoparameres ; endoparamere C—shaped *Teleogryllus* Ch.

6. Endoparamere elongate and J—shaped *Acheta* Fabr.
 Endoparamere C—shaped ; apices of
 mesal lobes between apices of ecto-
 parameres *Platygyrillus* Ch.

Genus (3) *Gryllus* Linnaeus, 1758

4. *Gryllus bimaculatus* De Geer

1773. *Gryllus bimaculatus* De Geer, *Mem. Ins.*, 3 : 521.

1877. *Liogryllus bimaculatus*: Saussure, *Mem. Soc. Phys. Hist. nat. Geneve* 25 : 307 ; Bolivar, 1900. *Annls. Soc. ent. Fr.*, 68 : 795.

1936. *Gryllus bimaculatus* Chopard, *Spolia Zelan.*, 20 : 22 ; Chopard, 1961. *Eos.*, 37 : 269 ; Randell, 1964. *Canad. Ent.*, 96 : 1592 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 35 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 229-230.

Distribution.—This species is distributed over the Mediterrian region , Africa and in tropical Asia. It is very common and widely distributed throughout in India.

Material.—H P : 1 ♂ , 2 ♀ (and 2 nymphs) , Bakra Nangal Dam, Bilashpur , 29-30.8.72 , K. K. Mahajan. UP : 1 ♀ , Dehra Dun , 7.3.70 , M. K. Biswas. 1 ♀ , Mussorie , 5.7.73 , R. N. Chopra. 1 ♂ , Rishikesh; 12.6.72 R. N. Chopra. 2 ♂ 2 ♀ Sahiya, Dehra Dun , 5.9.72 , R. N. Chopra. 8 ♂ , 13 ♀ Sahiya , 14.6.73 , R. N. Chopra. 2 ♂ , 3 ♀ , Sahiya , 16.9.72 R. N. Chopra. 1 ♂ , Satya Narain Forest, Dehra Dun ; 19.8.72 R. N. Chopra. 1 ♀ , Chakrata, Dehra Dun , 17.9.72 , R. K. Bargava. 1 ♀ , (and 2 nymphs) Timb Forest, Dehra Dun ; 5.10.71 ; R. N. Chopra. 6 ♂ , 6 ♀ , Mussorie , different dates and collectors. 2 ♂ , 4 ♀ , Jhari Pani , Mussorie 28.7.65 , T D. Soota. 1 ♀ , Almora PWD Rest House, Almora , 14.11.76.

Other localities Rajasthan : 1 ♀ , Guranhatalob, 7km. S. W. of Jodhpur ; 30.11.63 , R. N. Bhargava. 1 ♀ Mathaina via Jodhpur ; Nov. 62, Survey Party. 1 ♀ Jodhpur, 5.1.63, Motilal. 1 ♀ , Unrad Sagar, 14 km W. Jodhpur , V. C. Agarwal. Gujarat : 1 ♀ , Motibari, Jamnagar 12.2.72 , V. D. Srivastava.

Remarks.—It is a variable species and difference in colouration and measurement are always noticeable even in specimens of same locality.

Genus (4) *Modicogryllus* Chopard, 1961

KEY TO SPECIES

1. Large species (length of body 18-26)
 (Head with a very faint yellow band along
 internal margin of eyes *facialis* Walk.

 Rather smaller species (length of body
 8-16)2

2. Head black or brown, without ornamenta-
 tion or with very short light lines on
 occiput (Blackish with fulvous legs ;
 lateral field of elytron with widely separa-
 ted veins) *blennus* (Sauss.)

 Head adorned with light lines on occi-
 put or with a transverse band between
 ocelli3

3. Head without transverse light band bet-
 ween ocelli (wings abortive in both
 sexes ; females with lateral and strongly
 oblique elytra) *tikaderi* sp. nov.

 Head with a transverse light band
 between ocelli4

4. Veins (1st & 2nd) of lateral fields of
 elytra strongly curved ; elytra of females
 as long as abdomen ; ovipositor shorter
 (5.5-6.5) *confirmatus* (Walk.)

 Veins of lateral fields of elytra regularly
 and feebly spaced ; elytra of females
 about half of abdomen ; ovipositor
 longer (8.5-9) *lineiceps* (Walk.)

5. *Modicogryllus confirmata* (Walker)

1859. *Acheta confirmata* Walker, *Ann. Mag. nat. Hist.*, 3 (4) : 221.
 1969 *Gryllus confirmatus*: Chopard, *Fauna India, Orth.*, 2: 48, figs 41-43, 50.
 1961. *Modicogryllus confirmata* Chopard, *Eos*, 37 : 272 ; Randell, 1964, *Canad. Ent.*, 96 : 1584 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73: 231, fig. 1B.

Distribution.—Common throughout oriental region.

Material.—U P : 3 ♂, 7 ♀ (at light) , Hardurah, Dehra Dun ;
 T D. Soota.

Also from—Assam : 1 ♀, N. Lakhimpur 4.10.66 , S. K. T. &
 G. S. A. NEFA : 1 ♀, Jeep camp, Siang Div. 6.10.66 , S. K. T and
 G. S. A. Gujrat : 1 ♂, Puno Tank, Jamnagar, 6.3.66 , V. C. Agarwalla.
 Rajasthan : 1 ♂, Bijdai Tank, Jodhpur , 19.11.63 , K. Chansal.

Remarks.—A very common Oriental cricket.

6. *Modicogryllus blennus* (Saussure)

(Fig. 4 & 5)

1877. *Gryllodes blennus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 383.
 1928. *Gryllus flavipes* Chopard, *Spolia zelan.*, 14 : 197, figs 1,2.
 1931. *Gryllus blennus*: Chopard, *Bull. Raffles Mus.*, 6 : 130 ; Chopard, 1969.
Fauna India, Orth., 2 : 55, figs 28, 39.
 1961. *Modicogryllus blennus*: Chopard, *Eos*, 37 : 274 ; Bhowmik 1977. *Rec. zool. Surv. India*, 73 : 232.

Distribution.—India , Burma Sri Lanka , Malaya , Java ;
 Australia and Solomon Isle.

Material.—U P : 3 ♂, Lalkua, Nainital, 1-4.10.74 ; P. K. Maity &
 party. 2 ♂, 2 ♀, Bambasa, Nainital dist. , 7.10.77 A. Kumar. 2 ♂, 5 ♀ ;
 F. R. H. Tanakpur, Nainital dist. , 5-6.10.77 , A. Kumar. 1 ♀ ;
 Herbertpur, Dehra Dun , 13.10.70 , A. Singh.

Remarks.—Though the species had been recorded from Dehra Dun it is newly recorded here from Nainital. The specimens fairly tally with the described account except the lateral margins of pronotal disc which distinctly narrowed towards the anterior margin and not parallel sided. Since venation of lateral lobe of elytron is a very

characteristic morphological structure, the same is figured here for the first time.

7. *Modicogryllus facialis* (Walker)

1871. *Gryllus facialis* Walker, *Cat. Derm. Salt. Br. Mus.*, 5 (supple) : 5 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 46, fig 28.
1961. *Modicogryllus facialis* : Chopard, *Eos*, 37 : 274.

Distribution.—Himalayas (without exact locality), Maharashtra, Tamil Nadu.

Material.—H P : 1 ♀, Renuka lake 27.9.75, A. Kumar and party. 1 ♂; Talhia, Deragopipur, Kangra district, 10.5.75, K. A. Ali and party.

Remarks.—This species is very close to *T. mitratus* (Burm.) in its general appearance but differs in details its body is stouter, the number of branches from the mediastinal vein is less (3 vs. 5) and the veinlets between 1st chord and diagonal vein is 2 whereas in *mitratus* it is more (3 to 4), besides, distinct differences in genital parts.

The species is recorded here from H P for the first time.

8. *Modicogryllus lineiceps* (Walker, 1869)

(Fig. 6)

1869. *Gryllus lineiceps* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 44 ; Walker, 1871. *ibid.*, 5 (supple) : 7.
1951. *Gryllulus lineiceps* : Chopard, *Rec. S. Aust. Mus.*, 9 : 412, fig. 23.
1961. *Modicogryllus lineiceps* : Chopard, *Eos*, 37 : 274, fig. pt. 9.

Distribution.—Australia.

Material.—U P : 3 ♂, 1 ♀, Chamoli, 10-18.6.78 R. N. Bhargava.

Additional description.—Males : Body slender, convex. Head blackish-brown with six short rufous lines on occiput (in one example this light lines not recognizable), lateral ocelli connected with a very narrow and inconspicuous transverse rufous line. Clypeo-frontal suture rather moderately arcuate, below this line colouration of face brownish, maxillary palpi yellowish, 5th segment obliquely truncated

(not shaped as a triangle as in *Walkeri*) and slightly deeper in colouration at margin (and not darkened as described for *walkeri*). Pronotum black, postero-lateral margin with yellowish spaces, convex, transverse (width 4, length 2.5), disc sparsely pubescent, lateral lobes unicolourous except at margin of anterior angle which is yellowish. Elytron as long as abdomen, light brown, mirror longer than wide, wider at anterior region, may or may not be divided with a curved vein, much below middle line, chord united with mirror at anterior region with a veinlet or may be without it, 2 slightly curved oblique veins; apical field short with 2 lateral veins, and with irregular areolae, lateral field with five to six somewhat regularly spaced veins, connected with transverse veinlets at apicad, mediastinal vein having two branches at apicad. No wing. Legs yellowish, striated with brown, anterior tibia with an elongated tympanum at external side, posterior femur stout, longer than tibia, latter, with six external and five internal spines. Median prolongation of epiphallus almost as long as epiphallus at median region, apex of ectoparamere unique (fig. 8)

Female: Smaller than males. Elytra light brown, extend up to middle of abdomen, leaving least five segments free, touching at basad but oblique and separated at apical half, with somewhat three oblique veins, with very irregular cells, lateral field almost brown, lower part transparent, with four almost straight veins, mediastinal vein with a small, apical branch on right side, and on left, with a long branch from basad. Ovipositor long, curved upwards, with acute apex.

Measurements.—Length of body ♂ 11.25-12, ♀ 10.5, elytron ♂ 8-8.5, ♀ 4.5, posterior femur ♂ 8.5-9, ♀ 8, post. tibia ♂ 5.25-5.5, ♀ 5, ovipositor 9.

Remarks.—Walker described the species, *Gryllus lineiceps*, once in 1869 with Australian material and again in 1871, from Indian material. Chopard (1969) included the specimen from India as

G. lineiceps (Fauna p. 61, fig 44) which he (1961) in his revision of the genus *Gryllus* already put under the genus *Modicogryllus*, with a new name *Modicogryllus walkeri* nom. nov., on the basis of male genitalia, keeping the name *Modicogryllus (Gryllus) lineiceps* for the Australian material.

The present material at my disposal, after examination of genitalia, clearly shows that it refers to *M. lineiceps*, thus recording the species for the first time from India. Walker (1869) described the species on an immature female. Chopard (1951) gives the description of both male and female including genitalia. The specimens before me though definitely belongs to the species, show some differences which apart from completing its features will show its distinctiveness or otherwise from that of *M. walkeri* Chopard.

9. *Modicogryllus tikaderi* sp. nov.

(Fig. 7)

Holotype: U P : 1 ♂ ; Birhai River, Chamoli 15.6.1978 R. N. Bhargava.

Allotype 1 ♀ , same data as the holotype.

Paratype 8 ♂ , 9 ♀ , same data as the holotype. U P : 10 ♂ , 9 ♀ Joshimath Rd., Chamoli , 15.6.1978 , R. N. B. H P : 1 ♂ Solan 18.7 1974 M. Chandra. 2 ♂ , 3 ♀ Giri River Sainj, Simla , 17.7 1974 , M. Chandra. 10 ♂ , 3 ♀ (in spirit) , same data as the holotype.

Description.—Males : Size small, body pubescent. General colouration testaceous with brown or dark-brown. Head convex, as wide as or slightly wider than pronotum in front , occiput brown or dark-brown with six testaceous longitudinal lines , frontal rostrum a little wider than width of first antennal segment. Ocelli yellowish. Eyes round, dark. Antenna testaceous to brownish, its socket encircled with an incomplete brown colour ring. From below median ocellus, face yellowish , clypeo frontal suture almost straight, a little convex at middle. Maxillary palpi yellowish or pale brownish

fourth segment slightly shorter than third. Pronotum mostly dark variegated with yellowish spaces and spots, chiefly on sides, a little wider than long, anterior margin somewhat concave at middle, posterior margin straight superior margin of lateral lobes with a regular dark band, remaining portion yellowish except inferior border which is narrowly brown, its posterior angle rounded but a little oblique. Leg pale testaceous to yellowish, pubescent, anterior tibia with an elongated tympanum on external face, posterior femur stout, long, striated with brown externally, posterior tibia with five to six spines on both margins. Elytron light brownish, as long as or a little shorter than abdomen, mirror as long as wide, almost square shaped, mostly non-divided, but may be divided with a very small oblique vein, much below median line, diagonal long, somewhat straight two oblique veins, only in one paratype it's three, first chord usually united with mirror by a veinlet, apical field short and variable, varies from a few irregular areolae to some regular areolae with two to three recognizable lateral veins, lateral field transparent, apically oblique with four to five oblique veins, interconnected with transverse veinlets, mediastinal vein usually with one, rarely with two, apical branches. No wing. Internal genitalia as shown in figures.

Females Almost identical to males except a little larger in size and differ remarkably by having lateral, strongly oblique and very shortened elytra. Elytron as long as first tergite, separated at base by at least 2 mm distance, dorsal veins inconspicuous, lateral field with four to five veins, mediastinal vein may or may not have an apical branch. In addition to six external spines on posterior tibiae, an additional tooth-like spine may be at basad. Ovipositor brownish, almost straight, with pointed apices.

Measurement.—Length of body 11-12.5, 12.5-13.5, length of pronotum ♂ 2.5-3, ♀ 3.25, width of pronotum ♂ 4.5-5, ♀ 4.5-5.25; elytron ♂ 6-7 ♀ 1.75-2 posterior femur ♂ 9-9.5, ♀ 10-10.25; post. tibia ♂ 6.25-6.5, ♀ 6.5-7; ovipositor 9-10.

Affinity.—The species approaches to *Modicogryllus signifrons* (Walker, 1869) but differs strikingly by absence of wings in both sexes and by lateral and strongly oblique female elytra. The short, lateral female elytron is a reminiscent of the genus *Turanogrullus* and is a unique possession for the present genus.

The species is named in honour of Dr B. K. Tikader, Ph.D., D.Sc., Director of ZSI.

Genus (5) *Acheta* Fabricius, 1775

10. *Acheta domesticus* (Linne)

1758. *Gryllus Acheta domesticus* Linnaeus, *Syst. Nat. 10th ed. 1* : 428.
 1877. *Gryllus domesticus* : Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 341-345 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 37.
 1961. *Acheta domesticus* : Chopard, *Eos.*, 37 : 271 ; Randell, 1964. *Canad. Ent.*, 96 : 1596, fig. 30.

Distribution.—This is a common house-cricket in European countries, which is cosmopolitan in distribution. In India it is known from Kashmir (Srinagar) ; U P ; W B , Bombay and Kerala.

Material.—U P : 1 ♀ , Village Manjhera, Dehra Dun : 3.6.65 , R. K. Bhatnagar. 3 ♀ , Hardwaur, Rishikesh, Ranipur forest, Dehra Dun ; 12-13.7.65 & 27.9.65 , T D. Soota. 1 ♀ , D. L. Road, Dehra Dun , 22.8.74 , R. N. Bhargava. 1 ♂ , 3 ♀ ; Dehra Dun , different dates and collector. H P : 1 ♂ , Bilashpur, 20.8.72 , K. K. Mahajan.

Also from—Rajasthan : 1 ♂ , 1 ♀ , Jaswantthara , 10.7.63 R. C. Sharma.

Remarks.—Though the species is very common in European countries yet very rarely meet with in oriental region. It is recorded here from Rajasthan for the first time.

The specimens studied tally nicely with the known account except smaller in size and measure as given below :

Measurements.—Length of body ♂ 13.5, ♀ 13.5-15 , elytron ♂ 10, ♀ 11-11.5 , length of pronotum ♂ 2.7, ♀ 2.5-3 , width of pronotum

♂ 4.85, ♀ 5-5.5, posterior femur ♂ 9, ♀ 10-10.25; posterior tibia ♂ 6.5, ♀ 7.75-8.25; ovipositor 8.25-9 (measured 1 ♂ and 3 ♀).

Genus (6) *Teleogryllus* Chopard, 1961

KEY TO SPECIES

1. Large species (length of body 18-28)2
 Rather smaller species (length of body 8-16).....3
2. Head without any ornamentation; body uniformly testaceous; head yellowish testaceous; pubescent *testaceus* (Walk.)
 Head presenting a yellow band along internal margin of each eye; body darker; head brown *mitratus* (Burm.)
3. Length of body 11; posterior tibiae shorter than femora *fletcheri* (Ch.)
 Length of body 15-17; posterior tibiae as long as femora *longipennis* (Sauss.)

11 *Teleogryllus mitratus* (Burmeister)

1838. *Gryllus mitratus* Burmeister, *Hand. ent.*, 2: 734; Chopard, 1969. *Fauna India, Orth.*, 2: 41, fig. 24.
1961. *Teleogryllus mitratus*: Chopard, *Eos*, 37: 277; Randell, 1964. *Canad. Ent.*, 96: 1596; Bhowmik, 1977. *Rec. zool. Surv. India*, 73: 235.

Distribution.—Common throughout oriental region. Also known from Tibet; Japan; Philippine Islands and Malaya Archipelago.

Material.—H P: 2 ♀, Lal-khud, Dadana, Sirmour dist., 24.9.73; H. P. Agarwala. 1 ♂, 1 ♀; Pandoh, Mandi dist.; 18.9.80; H. K. Bhowmik. 1 ♂, 1 ♀, Sallaghat, Bilaspur dist., 30.9.80; H. K. Bhowmik. U P: 1 ♂, Asarari forest, Dehra Dun, 15.9.70, A. Singh. 1 ♂, Lakhwar, Dehra Dun; 6.6.72, R. N. B. 1 ♀, Almora, 29.10.77; A. Kumar. 10 ♂, 4 ♀, Almora, 17.9.78, A. Kumar. 1 ♂, 1 ♀; Darhari, Chamoli dist., 3.8.78, R. N. B. 1 ♀, Damrikheh, Pithoragarh; 18.10.77, A. Kumar. 3 ♂, 4 ♀, Uttarkashi, N. I. M.; 13.9.76; R.N.B. 1 ♀ Tanakpur, Nainital 8.10.77, A. Kumar.

Also from—Meghalaya : 1 ♂, 1 ♀, Polo ground, Shillong, 29.10.74, S. K. Gupta & R. Kulin. 2 ♀ (damaged) Dainedubi 1 B (at light), Assam—Meghalaya survey, 13.9.75; N. Muraleedharan. W B : 1 ♂, Garia, 24-Parganas, 12.7.74; P. Halder. 1 ♀, Nilpara, Darjeeling, 2.9.75, H. K. Bhowmik. 1 ♀; Murti Rivulet, Samsing, Darjeeling dist., 6.3.74, H. K. Bhowmik. 3 ♂, 6 ♀, Mirik, (5000) Darjeeling dist., 17.12.74 H. K. Bhowmik. 1 ♀ Borneo, 10.9.1899; Hose coll. 1 ♂, 1 ♀, Sinabarrg (Simalour), Sumatra, May 1913, E. Jacobson. 1 ♂; Lifu, Mar. 1968, A. Willey. 1 ♂, Sri Lanka, F. C. Fiyer. Nymphs : 4 Lohit Divn., Kandu Roing (300 km), NEFA, 15.3.69, S. K. Tandon.

Measurements.—(Nymphs) : Length of body 9.5-20.5, elytron 2.5-7, ovipositor 2-7.

Remarks.—The nymphs are quite identical to adults, their antennae perfectly developed but ovipositor imperfectly formed, in smallest ones not visible at all, elytra and wings also rudimentary. They are easily and unmistakably identifiable by the presence of a somewhat curved whitish band on first tergite.

The availability of nymphs in March as well as in August indicates that it breeds throughout the year.

The species is very common in oriental region and is highly variable in its morphology—differing in size, colouration and number of oblique veins. In specimens from Sinabarry, head and pronotum dark with a neat internal band encircling eyes and with very faint yellowish longitudinal lines on occiput. In specimens from Lifer general colouration light testaceous, 6 light lines on occiput more distinct but internal band of eyes not distinguishable; dark patches on pronotal disc prominent and elytron with only 3 oblique veins. Internal band of eyes as a whole absence in many cases.

12. *Teleogryllus testaceus* (Walker)

1869. *Gryllus testaceus* Walker, *Cat. Derm. Salt. Br. Mus.* 1 : 38; Chopard, 1969. *Fauna India, Orth.*, 2 : 40, fig 23.

1961. *Teleogryllus testaceus* : Chopard, *Eos*, 37 : 277 ; Randell. 1964. *Canad. Ent.*, 96 : 1956 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 236 fig. 1E

Distribution.—Available throughout Oriental region but less common than *mitratus* Burm.

Material.—U P : 1 ♂, 1 ♀, Ambari village, Kalsi, Dehra Dun dist., 7.5.65 ; T D. Soota. 2 ♂, 1 ♀ ; Kalsi, Dehra Dun, 26.9.70 ; J. C. Tripathi. 1 ♂, 1 ♀ ; Satya Narani, Dehra Dun, 14.9.71, J. C. Tripathi.

Remarks.—The specimens studied tally fairly with the known account except size which is variable within the range.

Measurements.—Length of body ♂ 21.5-23.75, ♀ 22-24, length of pronotum ♂ 5-6, ♀ 5.25-6.5, width of pronotum ♂ 7-7.5, ♀ 7.25-7.8, elytron ♂ 14-15.5, ♀ 15.25-17 ; posterior femur ♂ 14-15.5, ♀ 15.25-17 posterior tibia ♂ 12-13.75, ♀ 13.5—15.25 ; ovipositor 22-25.

13. *Teleogryllus fletcheri* (Chopard, 1935)

(Fig. 9)

1935. *Gryllus fletcheri* Chopard, *Ann. Mag. nat. Hist.*, 16 (10) : 285 (♀ non ♂).

Distribution.—Shillong (Meghalaya).

Material.—U P : 2 ♂, Piml Forest, Almorah ; 18.9.78, A. Kumar.

Description.—Males (previously undescribed) : Small size. Colouration dark to dark brown variegated with rufous-brown. Head convex, almost rounded, smooth, shiny black with very pale or moderately marked, short six rufous lines on occiput. Eye rounded, brownish, encircled basally by an incomplete testaceous ring. Frontal rostrum about one and half times width of scape. Ocelli rufous. Scape and pedicel deep brown, flagellum brownish, pubescent. Face unicolourous with head or a little pale dark. Clypeo-frontal suture arcuate, almost bordering antennal sockets. 1st, 2nd and 3rd segments of maxillary palpi brownish, 4th segment and about basal third of 5th segment yellowish, rest of apical portion of 5th segment dark-brownish ; 4th segment longer than 3rd one. Pronotum

dull black, transverse, both anterior and posterior margins with bristles, disc pubescent with silky hairs and with scattered ciliae ; depressed, with a median suture , both anterior and posterior margins a little constricted, former concave, latter sinuated , lateral lobes unicolourous with disc, posterior angle a little ascending. Legs with brown pubescence, testaceous with brownish spots , anterior tibia with a prominent, elongated external and a small rounded internal tympana , posterior femur stout, longer than tibia, rufous, striated externally with brown , posterior tibia brown, with seven external and six internal yellowish spines , metatarsus about half of tibia, with ten to eleven external and seven to eight internal denticles. Elytron extending to apex of abdomen, brownish , four oblique veins, separated at base , diagonal long, almost straight, united with chord by two to three transverse veinlets ; mirror longer than broad, perfectly rounded at all angles, less so at antero-external and postero-external angle due to inpushing of postero-external border, not connected with chord, divided by a semi-circular vein below middle line , apical field presenting three lateral veins, areolae of variable shapes but clear , postero internal cell large , lateral field translucent with a rufous-brown band along superior margin, with six regularly spaced veins ; mediastinal vein having two to three branches. Wings a little longer than elytra, brownish. Internal genitalia resembles to that of *T longipennis* but differs in shape of ectoparemeres.

Measurements.—Length of body 11-11.5 , length of pronotum 2.75-3 ; width of pronotum 3.7-4 , elytron 8-8.5 ; wing 10-10.25 , posterior femur 9-9.5 , post tibia 7-7.5 (measured 2 males).

Affinity.—The colouration of maxillary palpi is unique. Morphological the species differs from *longipennis* by its smaller size (11 vs. 15-17), uniform colouration of lateral pronotal lobes, size and shape of maxillary palpi and by its elytral venation.

Remarks.—Chopard (1935) described the species on both male and female sexes. But he (1969) points out that the male described

certainly belongs to *Itaropsis tenella*. The specimens before me, by its size and general colouration seems to be the male sex of the species. Besides, its closeness with regard to genital parts to that *T. longipennis* (Saussure, 1877) but morphological differences with that species, supports my inference and refrain me from describing a new species with this material. Chopard (1961) included provisionally *G. fletcheri* in the genus *Teleogryllus*.

14. *Teleogryllus longipennis* (Saussure)

1877. *Gryllus longipennis* Saussure, *Mem. Soc. Phys. nat. Hist. Geneve*, 25 : 329, pt. 12 (10), fig 3 (♂), Chopard, 1969. *Fauna India, Orth.*, 2 : 48, figs. 31-32.

1961. *Teleogryllus longipennis* : Chopard, *Eos*, 37 : 277.

Distribution.—India (U P ; Bihar , Bombay) and Sri Lanka.

Material.—U P : 1 ♂ ; Jhalasu village, Chamoi ; 3.7.78 ; R. N. Bhargava.

Remarks.—The specimen (16) at hand tallies with the diagram of male given by Saussure (1877). Its frontal rostrum about double width of scape. Clypeo-frontal suture moderately arcuate. Face darkish. Anterior tibia with a prominent, elongated external tympanum and a small, elongated internal one. Number of oblique vein in elytron three, 2nd and 3rd ones united at basad ; lateral field presenting seven to eight veins.

The species is yet inadequately known.

Genus (7) *Plebeiogryllus* Randell, 1964

15. *Plebeiogryllus quttiventris* (Walker)

1871 *Gryllus quttiventris* Walker, *Cat. Derm. Salt. Br. Mus.*, 5, suppl., : 6 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 51, fig. 35.

1964. *Plebeiogryllus quttiventris* Randell, *Canad. Ent.*, 96 : 1598 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 235, fig. 1D.

Distribution.—Widely distributed in the south of Oriental region including Sri Lanka and Burma.

Material.—U P : 5 ♂, 4 ♀ ; Dehra Dun, March-August, 1965 ; R. K. Bhatnagar and A. Singh. 5 ♂, 6 ♀ (and 5 ♀ nymphs) ; vill. Bhagwana, Srinagar, Pauri dist , 13.2.72 , J. C. Tripathi. 6 ♂, 5 ♀, Darhari. Chamoli dist. , 3.8.78 , R. N. Bhargava. 3 ♀ (12 nymphs) , Chhatibahu, Rohtak dist., 4.3.71 , A. Singh. 1 ♂, 1 ♀, Garakhpur, Dehra Dun dist. , 25.8.76, R. N. B. 1 ♂, 1 ♀, Barkot forest, Dehra Dun , 12.2.72 , R. N. Chopra. 1 ♂, 1 ♀ ; P. W. D. Rest House, Sorgarh, Chamoli dist. ; 24.6.78 R. N. B.

Additional description.—Frontal rostrum almost twice width of 1st antennal segment. Anterior margin of pronotal disc concave and a little wider than posterior margin. Legs rufous, rather black , anterior tibia with a very long, elongated external tympanum and a small, rounded internal one , number of internal spine varies from 5 to 6, and external 6 to 7 , number of denticles on posterior metatarsi varies from 6 to 8. Mediastinal vein triramous. Number of branches of discoidal 5 and not 3 as recorded by Chopard.

Remarks.—This species of the monotypic genus is abundantly found in rainy season, often at light in houses.

Genus (8) *Platygyryllus* Chopard, 1961

16. *Platygyryllus melanocephalus* (Serville)

1839. *Gryllus melanocephalus* Serville, *Ins. Orth.*, 342 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 53, fig. 37.

1961. *Platygyryllus melanocephalus* : Chopard, *Eos*, 37 : 276 ; Randell. 1964. *Canad. Ent.*, 96 : 1598 ; Bhowmik, 1977, *Rec. zool. Surv. India*, 73 : 232, fig. 1C.

Distribution.—W B , Bihar , Madhya Pradesh U P , H P , J & K. Also recorded from Nepal.

Material.—U P : 1 ♂, Pithoragarh, Jhorlaghat Rd., Pithoragarh , 16.10.77 , A Kumar. 7 ♂, 3 ♀, Uttar Kashi , 13.9.76. 8 ♂ 7 ♀ ;

Almora-Bageshwar Rd., Almora dist. , 18.9.78 ; A. Kumar. 3♂, 3♀ ; Bageshwar—Basinag Rd., Almora , 31.10.77 , A. Kumar. 1♂, Vill-Chaukni, Almora , 11.9.78 , A. Kumar. 8♂, 10♀, Majkhali, Almora ; 14.9.78 ; A. Kumar. 2♂, 5♀, Piml Forest, Almora ; 18.9.78 ; A. Kumar. H P : 1♂, 1♀ (understone) , Gosalpur ; 16.1.68 ; H. Khajuria. J & K. 6♂, 8♀ ; Paddar, Kishtrawar ; 25.9.76 , H. K. Bhowmik (also contains 5 apteous examples).

Also from Bihar : 2♀ ; Chakulia dist. Board Banglow, Lot no 50 (at light) Singhbhum dist. ; 25.10.68 , R. Tilak. Gujarat : 1♀ ; Umbargaon, Bulsar dist. ; 14.9.73 ; P. T Cherian.

Remarks.—The species is not yet reported from South India and it is newly recorded here from Gujarat.

Genus (9) *Velarifictorus* Randell, 1964

Remarks.—Of late some new species have been described, under this genus, basing mostly on only one male specimen. As such a lot of mistakes and oversights have been caused.

As a result of my present studies of types, I have suggested some new combinations and until a thorough analysis, prefer to refrain from providing a key to species.

17. *Velarifictorus sikkimensis* (Bhowmik)

1967. *Scapsipedus sikkimensis* Bhowmik, *Proc. zool. Soc. Calcutta*, 20: 126, figs. 1D, F.
1976. *Velarifictorus sikkimensis* : Bhowmic. *Indian Mus. Bull.* 11 (1) : 44-45, figs. 3,4.
1972. *Scapsipedus lahitensis* Tandon and Shishodia, *Orient. Ins.*, 6 (3) : 285-286, fig. 2B. *Comb. Nov.*
1974. *Velarifictorus dehradurensis* Tandon and Shishodia, *Orient. Ins.*, 8 (3) : 299, fig. 1A. *Comb. Nov. (?)*.

Distribution.—North Sikkim ; Arunachal , Meghalaya , W B (Darjeeling and Jalpaiguri districts) ; U P (Dehra Dun).

Material.—U P : 3 ♂, 7 ♀, Dehra Dun, 4-10.6.76, T. D. Soota. 2 ♂, 3 ♀; Gorakpur village, Dehra Dun, 25.8.76; R. N. Bhargava. 3 ♂; Asarari Forest, Dehra Dun, 27.7.76, R. N. Bhargava. 1 ♂ Mahund, Saharanpur, 15.9.70. 1 ♂; Deval Thal, Pithoragarh, 17.10.77; A. Kumar. 1 ♀; Garus, Almora, 7.9.78, A. Kumar. 1 ♂, Silli village, Chamoli, 27.6.78, R. N. B. 1 ♂; Joshi math Rd., Chamoli, 15.6.78, R. N. B. 1 ♂, Junata village, Tehri, 25.6.78, R. N. B. 1 ♂; Amdanda Rambagar, Naini Tal; 25.8.75, R. N. Chopra. 5 ♂, 1 ♀; Dhikala Sarapduli Rd., Pauri; 7.8.75, R. N. Chopra.

Additional description.—In males, number of oblique veins in elytra usually two, rarely three; mediastinal vein may be having up to 3 branches. Number of veins in lateral field in females varies from 4 to 7; often mediastinal vein without any branch. Both in males and females, posterior tibia with 5 spines on superior margins, internal superior and median spurs densely covered with prominent hairs, subequal, longest, more than double size of inferior spur; external superior and inferior spurs subequal and almost half in length of median one. Posterior metatarsus pubescent, armed with 7 external and 5 internal, brownish denticles, metatarsus almost half of posterior tibia. Anterior tibia with a large, elongated external tympanum and with a small round internal one.

Measurements.—Length of body ♂ 14-16.5, ♀ 13-17, length of pronotum ♂ 3.2-3.5, ♀ 2.8-3, width of pronotum ♂ 5.2-5.5, ♀ 4.8-5.2, elytron ♂ 8-10, ♀ 5-6.25, posterior femur ♂ 10-12, ♀ 11-11.5, posterior tibia ♂ 7.5-8.5, ♀ 7-8, post. metatarsus ♂ 3-3.25, ♀ 2.9-3, ovipositor 10-13.

Remarks.—Though the members of this species seems rather abundant in the Western Himalayas, it is recorded here for the first time.

The species is easily recognizable by its prominent yellowish band on lateral pronotal lobes externally and by the presence of two conspicuous denticle-like projections on dorsal side of epiphallus.

Studies of types of *S. lohitis* and *V. dehradurensis* confirm that both the species are conspecific with *V. sikkimensis* (Bhowmik). The diagram of male genitalia of *V. dehradurensis* given by the authors are without denticle like projection. But morphologically it is identical. However it has been put under synonymy provisionally.

18. *Velarifictorus ceylonicus* (Chopard)

1928. *Scapsipedus ceylonicus* Chopard, *Rec. Indian Mus.*, 30: 13; Chopard, 1969. *Fauna India, Orth.*, 2: 113.

1977. *Velarifictorus ceylonicus*: Bhowmik, *Rec. zool. Surv. India*, 73: 237, fig. 1 G and H.

Distribution.—So far was known from Mysore (Karnatak) and Sri Lanka.

Material.—U P: 1 ♂; P. W. D. Rest House, Pilibhit; 19.10.73; A Hussain. 1 ♂ (legs wanting); Deval Thal, Dt. Pithoragarh; 17.10.77; A. Kumar.

Remarks.—The specimens at hand tally fairly with the known account except in a few minor points. In one example the light lines of the occiput confluent giving it an appearance of irregular band. Legs and pronotum fairly pubescent. Left lateral field of elytron having 4 widely separated veins in one example, in another specimen, number is five and almost regularly spaced.

The species is recorded here for the first time from North India (U P).

19. *Velarifictorus parvus* (Chopard)

(Fig. 25)

1928. *Scapsipedus parvus* Chopard, *Rec. Indian Mus.*, 30: 18; Chopard, 1933. *Revue suisse Zool.*, 40: 165; Chopard, 1969. *Fauna India, Orth.*, 2: 114, fig. 78.

Distribution.—W B (Darjeeling); Khasi Hills (Biswas et al. 1975 : 25).

Material.—U P : 2 ♂, 1 ♀, F. R. H. Pithoragarh ; 19.10.77 ; A. Kumar. 1 ♀, Phata, Chamoli , 23.6.78 , R. N. Bhargava. 3 ♂, Sialsu village, Tehri , 26.6.78 , R. N. Bhargava. 5 ♂ Tunata village, Tehri ; 25.6.78 ; R. N. Bhargava. 1 ♂, Birhai River, dist. Chamoli 15.6.78 , R. N. Bhargava. 1 ♂, Silli village, dist. Chamoli 20.6.78 ; R. N. B. 3 ♂, 2 ♀, Mandal village, Dist. Chamoli , 20.6.78 R. N. Bhargava.

Additional description.—Males : Clypeo frontal suture almost straight. Frontal rostrum more than one and half times width of 1st antennal segment. Head convex , Both anterior and posterior margins of pronotum straight, dark pronotal disc transverse. Anterior tibia with an elongate, prominent internal tympanum. Posterior femur stout, longer than post. tibia ; latter, with 5 testaceous spines on each margin , internal external and median spurs subequal, external median longest ; posterior metatarsi with 6-7 spines in pubescence. Lateral field of elytron transparent, usually with six regularly spaced curved veins , mediastinal vein having 2 apical branches. Number of oblique veins constantly 2 ; in some cases, mirror undivided , size and nature of apical field variable. In one example from Mandal village, dist., Chamoli, elytron shorter than abdomen, leaving last three tergites free.

Females.—Fairly agree with known account.

Measurements.—Length of body ♂ 10-12.5, ♀ 11.5-12 ; length of pronotum ♂ 2-2.5, ♀ 2.5-2.75 , width of pronotum ♂ 4.2-4.75. ♀ 4-4.5 , elytron ♂ 6.75-7, ♀ 4-4.5 ; posterior femur ♂ 8.5-9, ♀ 8-8.25 , posterior tibia ♂ 6-6.5, ♀ 5.8-6 , ovipositor 10-11

Remarks.—The present localities are new records for the species indicating its distribution throughout the Himalayas. The type specimen deposited in ZSI is lost.

20. *Velarifictorus lambai* sp. nov.

(Figs. 14—17 & 26)

Holotype : U P : 1 ♂ Chamoli , 18.6.1976 R. N. Bhargava.

Allotype : 1 ♀ same data as the holotype.

Paratypes : 4 ♂, 6 ♀, same date as the holotype. U P : 6 ♀, Ban Basa, Naini Tal ; 7.10.1977, A. Kumar. 1 ♂; Lalkua, Naini Tal 1-4.10.1974, P. K. Maity and Party. H P : 1 ♂, 1 ♀; Paonta, Sirmour ; 19.9.1973 ; H. P. Agarwal.

Description.—Males : Size small. Head wider than pronotum, brown, shiny with six yellowish longitudinal lines on occiput, spherically convex. Frontal rostrum one and half times width of first antennal segment. Face mostly brownish except mandibles and lower portion which is yellowish ; clearly concave, mandibles moderately lengthened but not excavated, clypeo-frontal suture slightly curved. Fourth and fifth segments of maxillary palpi yellowish, other segments rather somewhat dark, fourth smaller than third. Pronotum pubescent, dark-brownish, transverse, its disc depressed, both anterior and posterior margins straight, lateral margins parallel-sided, lateral lobes rather high, both anterior and posterior angles rounded, anterior one more so, feebly to moderately lightened in inferior border. Legs yellowish, hairy. Anterior tibia with an elongated tympanum on external face. Posterior femora stout, striated with brown externally posterior tibiae with five spines on each margin. Elytra light brown, as long as abdomen ; mirror as long as wide, almost square shaped with rounded angles except antero-posterior angle which is somewhat angulate, divided with an almost semicircular vein, united with chord by a veinlet, two oblique veins, diagonal vein long and very close to 1st chord, apical field short, tranversed by two lateral veins, areolae almost regular ; superior margins of lateral fields brown, remaining portion transparent, with 5 veins, 3rd and 4th veins curved and wide apart from each other ; mediastinal vein with an apical branch. Macropterous, wings almost double size of body. Internal genitalia as shown in figure (fig.14—15) : ectoparameres very long, curved upwards (dorsally), apices of mesal lobes extend up to middle of ectoparameres.

Females.—Almost identical to males and differ in some minor features—Face somewhat flat. Anterior tibia with a small, round internal tympanum, in addition to external ones as that of males. Elytra as long as abdomen; with four oblique dorsal veins and with confused venation between fourth and humeral veins, lateral field with four veins, mediastinal vein may or may not with an apical branch. Macropterous. Ovipositor rufous, almost straight, with blunt apices.

Measurements.—Length of body ♂ 10-10.5, ♀ 9-9.5, length of pronotum ♂ 2-2.25, ♀ 1.9-2, width of pronotum ♂ 3.5-3.75 ♀ 3.2-3.5; elytron ♂ 7-7.5, ♀ 6.5-7, wing ♂ 16-16.5, ♀ 15-16, posterior femur ♂ 7.25-7.5, ♀ 7-7.25, posterior tibia ♂ 5-5.5, ♀ 5-5.5, ovipositor 6-6.25.

Affinity.—The species comes very close to *V. albipalpis* Chopard (1969) in its general morphology but differs strikingly by its macropterous condition, in both sexes, and divided mirror in males. The genitalia seems intermediate between *V. latithorax* Chopard (1928) and *V. fallax* Chopard (1969).

The species is named in honour of Dr. B. S. Lamba, Jt. Director, ZSI, Dehra Dun (at present posted at Poona).

21 *Velarifictorus basui* sp. nov.

(Fig. 18—20)

Holotype : U P : 1 ♂, Lohghat Mayawati Road, Pithoragarh, 12.10.1977, A. Kumar.

Allotype : 1 ♀, same data as the holotype.

Paratypes : 1 ♂, 1 ♀, same data as the holotype. 1 ♂, Barinagthal Road, Pithoragarh, 26.10.1977, A. Kumar.

Description.—Males : Very close to *Y latithorax* (Chopard, 1928). Size small. Head uniformly blackish, without any colour marking. Frontal rostrum about one and half times of scape. Clypeo-frontal suture slightly curved. Maxillary palpus pale testaceous, fifth segment

slightly dark apically ; fourth segment smaller than third. Mandibles almost normal in shape, rufous, clypeus dark-rufous ; face hardly excavated for the genus. Pronotum including lateral lobes almost blackish-brown, transverse, both anterior and posterior margins straight, non-pubescent except bristles at margins. Legs brownish with yellow spots. Anterior tibia with an elongated tympanum on external face. Posterior femora stout, tibiae with six external and five internal spines. Abdomen dark-brown on dorsum, ventrum brownish. Elytra light brownish, as long as abdomen, two somewhat straight oblique veins ; mirror roughly square-shaped with somewhat rounded angles, mirror divided by a curved vein, below middle line, apical field short, reduced to seven to eight areolae ; lateral field short, superior margin brownish, gradually fading towards lower margin, with three oblique veins (2nd and third close together) ; mediastinal vein with an apical branch. Internal genitalia as shown in figures (18).

Females : Identical to males. Elytron shorter than half of abdomen, leaving last six tergites free, overlapping or slightly separated at base ; dorsal field with somewhat three curved veins, with irregular areolae ; lateral field oblique, with similar venation identical to males but much smaller. Ovipositor mostly rufo-testaceous, apex rufous, straight with blunt apices.

Measurements.—Length of body ♂ 10-10.5, ♀ 11-12, length of pronotum ♂ 1.8-2, ♀ 2-2.2 width of pronotum ♂ 4-4.25, ♀ 4-4.5 ; elytron ♂ 6.5-7, ♀ 3.5-4, posterior femur ♂ 8.5-9, ♀ 8-8.25, posterior tibia ♂ 5.2-5.5, ♀ 5.5-5.75 ovipositor 8.5-9.

Affinity.—The species is very close to *V. latithorax* (Chopard, 1928) in its general morphology but differs decidedly from it by having two oblique veins (vs. three) and other details of elytral venation and by the shape of male genitalia.

The species is named after my friend, Sri D. N. Basu, Taxidermist, Dehra Dun.

22. *Velarifictorus sukhadae* (Bhowmik)

(Plate I fig. 33)

1967. *Scapsipedus sukhadae* Bhowmik, *Proc. zool. Soc., Calcutta*, 20 : 125, fig 1C, G.
1974. *Velarifictorus indicus* Tandon and Shishodia, *Orient. Insects*, 8 (3) : 300, fig. 1 B. *Comb. Nov.*

Distribution.—U P (Dehra Dun and Joshi Math).

Remarks.—On my critical examination of the types of both the species, available in ZSI., I consider that *V. indicus* is a synonymy of *V. sukhadae*. The little difference in morphology is tolerably within the specific level.

23. *Velarifictorus bhadurii* (Bhowmik)

(Plate I fig. 34)

1967. *Scapsipedus bhadurii* Bhowmik, *Proc. zool. Soc., Calcutta*, 20 : 127, fig. 1E.
1975. *Velarifictorus jaintianus* Biswas and Ghosh, in Vasanth et al. *Orient. Insects*, 9 (2) : 223-224, fig. 1. *Comb. Nov.*

Distribution.—U P (Dehra Dun) and Meghalaya.

Remarks.—Studies of types have convinced me that *V. jaintianus* is a synonymy of *V. bhaduri*.

Genus (10) *Gryllopsis* Chopard, 1928**24. *Gryllopsis furcata* (Saussure)**

1877. *Grylloides furcatus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 399-400, pt. 13 (XII) fig. 4.
1918. *Apterogryllus gestroi* Chopard, *Annls. Soc. ent. Fr.*, 68 : 562, figs. 90-94.
1969. *Gryllopsis furcata* : Chopard, *Fauna India, Orth.*, 2 : 79-80, fig. 61 ; Bhowmik, 1975. *J. Bombay nat. Hist. Soc.*, 72 (2) : 369-370.

Distribution.—Madhya Pradesh , Karnatak , AP , Tamil Nadu and UP (Dehra Dun).

Material.—AP : 2 ♂ , Nagarjun Konda, Guntur Dist. ; 6-8.9.62 , B. Nath. 2 ♀ (Partly damaged) , Marcholla, Nagarjun Konda. 2 ♀ ,

South Asawanadha mdusta, N 1/30. 7/9. 1 ♀; Nagarjun Sagar, Nalgonda Dist. ; 7.8.72 ; B. Nath. 1 ♀ (damaged) ; Nagarjun Hill, 4 km. N.W. , 27.7.62 , B. Nath. 1 ♂ , 3 ♀ ; Valley near Stadium, N. from Camp, N 1/1-8/9 ; B. Nath. 1 ♂ , 1 ♀ ; Siddelder hill, 4 km N. E. of camp N./26.7/9 , B. Nath.

Remarks.—It is mostly a species of southern India although it has been described from Madhya Pradesh and also recorded from Dehra Dun.

Genus (11) *Turanogryllus* Tarbinskii, 1940

KEY TO SPECIES

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1. Elytra as long as abdomen |2 |
| Elytra shorter than abdomen |3 |
| 2. Body cylindrical ; clypeo frontal suture moderately arcuate ; head blackish brown with six distinct yellow lines on occiput | <i>mitrai</i> sp. nov. |
| Body rather depressed ; clypeo frontal suture indistinct, straight ; head strongly rounded and without any ornamentation | <i>dehradurensis</i> (Bh.) |
| 3. Clypeo frontal suture more or less strongly arcuate (female elytra short, obliquely truncated and separated from each other by a short distance ; abdomen with three dark brown bands) | <i>jammuensis</i> (Bh.) |
| Clypeo frontal suture almost straight or a little arcuate |4 |
| 4. Pronotum fulvous with a wide posterior brown band ; three to four oblique veins in males ; female elytra longer than metanotum, separated by a very narrow space | <i>rufoniger</i> (Ch.) |
| Pronotum without any posterior band ; clypeo frontal suture a little arcuate ; female elytra short, widely separated | <i>histrion</i> (Sauss.) |

25. *Turanogryllus histrio* (Saussure)

1877. *Gryllodes histrio* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 357.
 1933. *Gryllopsis histrio* : Chopard, *Revue suisse, zool.* 40 : 163 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 70.
 1963. *Paragryllopsis histrio* : Chopard, *Bull. Res. Council. Israel*, 11 (8) : 169.
 1975. *Turanogryllus histrio* : Bhowmik, *J. Bombay nat. Hist. Soc.*, 72 (2) : 378, figs 11—14.

Distribution.—Assam , Bihar , HP Punjab and Tamil Nadu.

Material.—HP : 1 ♂ ; Kulu and 1 ♀ , Giri River, Sirmour dist., Solan ; 17-23.7.74 ; M. Chandra. 2 ♀ , Simla , 24.7.1925 ; H. Whistler (*Br. Mus.*). UP : 5 ♂ , Pashulok, Rishikesh, Dehra Dun dist. , 5.6.70 , J. C. Tripathi. 2 ♂ , 2 ♀ ; Donga, Dehra Dun , 2.7.71 , K. P. Singh. 1 ♂ , 6 ♀ , Kotal Goan, Dehra Dun , 1.9.76 , R. N. B. 1 ♀ , Dehra Dun (no other date). 8 ♂ , 15 ♀ , Koteshwar, Chamoli dist. 20.6.78 , R. N. B. 11 ♀ , Denal Dhan, Chamoli , 20.6.78 ; R. N. B. 2 ♂ , 20 ♀ ; Chamoli , 10.7.78 ; R. N. B. 18 ♀ ; Chamdhar, Chamoli , 1.8.78 , R. N. B. 1 ♂ , 5 ♀ , Jhalasuvn village, Chamoli , 3.7.78 R. N. B. 11 ♀ Dhampur village, Pauri dist. , 2.8.78 , R. N. B. 2 ♀ , Suyal Bridge on Almora ; 21.9.78 , A. Kumar. 5 ♂ (and 1 nymph) , Mandal village, Chamoli ; 20.6.78 , R. N. Bhargava. 1 ♂ , Dhuri, Sangrur 15.2.71 ; A. Singh. 1 ♂ , Juneta vill., Tehri, 25.6.78 , R. N. Bhargava.

Also from—WB : 4 ♂ , 5 ♀ , Suklapara and 1 ♂ , Nilpara, Jalpaiguri , 29-31.8.75 ; H. K. Bhowmik.

Additional description.—Males : Body profusely pubescent ; pronotum with brownish bristles. Head dark brown, with six yellowish lines on occiput , frontal rostrum about twice width of scape. Eyes dark, prominent, projected and horizontal. Both anterior and posterior margins of pronotum straight , lateral edges parallel. Elytra dark-brownish, shortened, leaving last 4 tergites free, number of oblique veins three , mirror undivided, more than twice in breadth than length, postero-internal cell much larger than transverse postero-

external cell, apical field distinguishable with 4 lateral, curved veins, areolae indistinct but generally square in nature though some of them smaller and irregular, lateral field up to 2nd branch of mediastinal unicolourous with dorsal field, otherwise yellowish-white, transparent. Entire abdominal dorsum dark, contrasting with ventral yellowish colouration. Posterior tibia with fixed number of spines viz., 5 internal and 6 external. Posterior metatarsus almost half of post. tibia, armed with 6-7 external and 5-6 internal brownish denticles.

Female.—Dark band of abdominal dorsum in some cases not neat. Size remarkably stouter than males. Subgenital plate navicular and not bilobed.

Measurements.—Length of body ♂ 10-11, ♀ 12-14.5; width of rostrum ♂ 1.8-2, ♀ 2-2.5; interocular distance ♂ 2.25-2.5, ♀ 3.2-4; length of pronotum ♂ 2.2-2.5, ♀ 3-3.25; width of pronotum ♂ 3.25-3.5, ♀ 3.9-4.5, minimum gap of elytron ♂ 5.1-5.5, ♀ 2.5-3.25, posterior femur ♂ 8-8.25, ♀ 9-10, post. tibia ♂ 5.5-6.5, ♀ 6.5-7; post. metatarsus ♂ 2.5-2.75, ♀ 3-3.5, ovipositor 11-11.5.

Remarks.—The species is recorded here for the first time from UP and North Bengal. The undivided, transverse and widest mirror is one of the unique characters for spot identification of the species.

26. *Turanogryllus rufoniger* (Chopard)

1925. *Gryllodes rufoniger* Chopard, *Annls. Soc. ent. Fr.*, 94 : 292.

1935. *Gryllopsis rufoniger* : Chopard, *Ann. Mag. nat. Hist.*, 16 (10) : 288; Chopard, 1969. *Fauna India, Orth.*, 2 : 71-72, figs. 52, 55.

1963. *Paragryllopsis rufoniger* : Chopard, *Bull. Res. Council. Israel*, 11 (8) : 169.

1975. *Turanogryllus rufoniger* : Bhowmik, *J. Bombay nat. Hist. Soc.*, 72 (2) : 374, figs. 3-6.

Distribution.—Meghalaya; WB; Punjab; UP (Dehra Dun) and also from Upper Burma, French Indo-China and Laos.

Material.—UP : 2 ♂, 5 ♀, Sahastra Dhara, Dehra Dun 2-9-16.7. 1964, R. K. Bhatnagar. 1 ♀; Asarari Range, Dehra Dun, 16.7.65, T. D. Soota. 2 ♂, 3 ♀; Barnigad Kuwa, Uttar Kashi, 3.7.73, Raj Tilak. 1 ♀, Gairal C. M. P., Nainital, 17.8.75, R. N. Chopra, 10 ♂, 15 ♀, Dhampur village, Pauri dist.; R. N. Bhargava, 15 ♂, 20 ♀, Amlawa R. Sahiya, Dehra Dun, 15.6.73; R. N. Chopra, 2 ♂, 6 ♀, Pashulok, Dehra Dun, 25.6.74, J. C. Tripathi. 1 ♀ and (1 nymph) Kotal goan, Dehra Dun, 1.9.76, R. N. B. 5 ♂, 8 ♀, Sahiya, Dehra Dun; 16.6.73, R. N. Chopra. 2 (nymphs) Asarari, Dehra Dun; 14.5.69. 1 ♂, Donga, Dehra Dun; 2.7.71, K. P. Singh. 12 ♂, 15 ♀, Sonla village, Nand Prayag, Dehra Dun; 16.6.78, R. B. B. 1 ♀, Dehra Dun (no other date). 1 (nymph), Sashatra Dhara Fields, Dehra Dun, 7.8.68; R. K. Bhatnagar. 1 ♂, Asarari Forest, Dehra Dun; 26.6.78, Suresh.

Also from—AP : 1 ♀ (nymph), Barapet, Chittor dist.; 23.8.64, K. Reddiah. *Br. Mus.* collections—Meghalaya : 1 ♂, Shillong, June-July, Fletcher, det. Chopard. 1 ♀; Gharial, 2.9.43, D. Leston, det. Chopard.

Measurements.—Length of body ♂ 17-18, ♀ 17-23, length of pronotum ♂ 4.5-5, ♀ 5-6, width of pronotum ♂ 6.5-7, ♀ 6-8, elytron ♂ 12-13, ♀ 3.5-4, posterior femur ♂ 12.5-13, ♀ 14-15, posterior tibia ♂ 10-11, ♀ 10.5-11, ovipositor 13.5-14.25.

Remarks.—The large number of specimens at disposal tally nicely with original description read with Bhowmik's account (1975) except in some minor features. The specimens are rather big for the measurements previously noted—the females are as long as 23. Dorsum of female abdominal tergites having 3 longitudinal brownish bands, a broad, median band, and two lateral median sized, one on each side, bands of same colour extending from base of pronotum to abdominal tip. Entire body specially abdomen densely pubescent with brownish hairs.

What is more significant is that in some male specimens, there is a small round internal tympanum in anterior tibia this is a new

character for the genus, since it has been stated that there is no internal tympanum in the species of this genus.

The collection contains one nymph collected in May and another (from A P) during August.

Though the species appears rather common in the Western Himalayas, it has been newly recorded from AP.

27. *Turanogryllus dehradurensis* Bhowmik

(Fig. 11, Plate I, figs 29-30)

1969. *Turanogryllus dehradurensis* Bhowmik, *Zool. Anz.*, 182 (1/2): 143-144 ;
Bhowmik, 1975. *J. Bombay nat. Hist. Soc.*, 72 (2) : 373.

Distribution.—UP (Dehra Dun) ; Bihar (Hazaribagh) ; Punjab (Karnal).

Material.—UP : 1 ♂, Rajpur, Dehra Dun ; 12.9.72.

Remarks —The specimen at hand tallies with the original description except that the lateral field of elytra with 7 veins and mediastinal vein having 2 branches—one from the basal region, the other from the apical region and it is slightly longer and measures as follows. Length of body 15 ; pronotum 3 ; width of pronotum 5.5, posterior femur 11 ; post. tibia 8.

28. *Turanogryllus jammuensis* (Bhowmik)

(Figs. 23, Plate I, figs 31-32)

1967. *Gryllopsis jammuensis* Bhowmik, *Proc. Ind. Sci. Cong. Assoc. Benaras, Part 8* : 491.

1969. *Gryllopsis pakistana* Chopard, *Fauna India, Orth.*, 2 : 75. *Comb. Nov.*

1969. *Turanogryllus quadrilineatus* Bhowmik, *Zool. Anz.* 182, (1/2) : 144-145. *Comb. Nov.*

1975. *Turanogryllus jammuensis* : Bhowmik, *J. Bombay nat. Hist. Soc.*, 72 (2) : 375, figs. 7-9.

Distribution.—J & K , UP (Dehra Dun) ; T. N. (Shevaroy Hills) ; Pakistan (Malir—type locality of *pakistana*).

Material.—J & K : 2 ♂, 3 ♀, Jhajjorkotli ; (type locality of *jammuensis*), 15.9.79 , H. K. Bhowmik UP : 1 ♀ (and 3 ♀ nymphs) ; Kotalgaon, Dehra Dun 1.9.76 , R. N. Bhargava. 3 ♀ ; vill. Gujrana, Dehra Dun 10.9.65 , R. K. Bhatnagar. 1 ♂ , 1 ♀ , Sahastra Dhara, Dehra Dun 1 ♂ , Dhikala—Sarapduli Rd., Pauri ; 7.8.75 , R. N. Chopra. 1 ♂ ; Sukhna Lake, Chandigarh ; 12.8.78 ; H. P. Agarwal.

Measurements.—Length of body ♂ 10-13, ♀ 11-12 ; maximum width of pronotum (at posterior margin) ♂ 4-5, ♀ 4-4.5 , length of pronotum ♂ 2.5-3, ♀ 3-3.2 ; elytron ♂ 7.5-9 , ♀ 3-3.25 ; posterior femur ♂ 9-10.5, ♀ 10-11 , post. tibia ♂ 7-9, ♀ 7-8.5 , ovipositor 12.5-13.

Remarks.—Bhowmik (1967) described the species on a single female from Jhajjarkotli, Jammu. He (1975) while re-describing the species opined that the species appears to be identical to *G. pakistana* Ch. (1969). The study of the present lot of specimens specially the males from the type locality along with other material from UP has confirmed his earlier conviction.

The male specimens studied tally nicely with the description given by Chopard (1969) for *pakistana* except that the dorsum of elytron light brown throughout, and not "darkened along the internal margin and in the apical field" and, mirror wider than one and half times of its length.

The female specimens at hand show difference only in the apposition of elytra—they are in some cases close, touching one another, though their internal margins convexes—degree of proximity perhaps depend on maturity of individual specimen.

The nymphs are easily recognisable with adults except that their elytral and genital parts are yet ill developed.

Chopard (1969) draws affinity of *pakistana* with *T. rufoniger* (Chopard, 1925b) but from the collections before me it appears that the present species resembles *T. histrio* (Saussure, 1877) in its general

appearance and differs chiefly by its stout body, divided mirror, longer ovipositor (as 11 to 13 vs. 7 to 8) and confused venation in space between fourth vein and second discoidal of female elytra.

T rufoniger (Chopard, 1925) is at once separable from the species by its more broad and stout appearance, irregular but wide and prominent dark band along posterior margin of pronotal disc, and blackish apices of stout, posterior femora.

While examining critically the males of the species specially its genitalia, I find that it completely tallies with the genital parts of *T quadrilineatus* Bhowmik (1969). Further, study of types of *quadrilineatus* Bhowmik, and the series of specimens before me has confirmed me about the synonymy suggested.

29. *Turanogryllus mitrai* sp. nov.

(Figs. 12-13, 24)

Holotype : UP : 1 ♂, Kalsi, Dehra Dun, 2.9.1969, J. C. Tripathi.

Allotype : UP : 1 ♀ Mahund, Saharanpur 15.9.1970. (posterior leg wanting ovipositor broken).

Paratypes UP : 1 ♂ Kalsi, Dehra Dun, 2.9.1969. 1 ♂, Kotalgaon, Dehra Dun; 1.9.1976, R. N. Bhargava (Posterior legs wanting; genitalia dissected), 1 ♂, Gorakhpur village, Dehra Dun, 25.8.1976.

Description.—Males : Median sized. Vertex of head up to median ocellus and disc of pronotum including superior margins of pronotal lobes dark-brown, dorsum of elytron and posterior femur light brown, rest of body yellowish. Head small, shiny, convex, with six distinct yellowish longitudinal lines on occiput, lateral ones rather inconspicuous. Frontal rostrum double the size of first segment of antenna. Eyes round, unicolourous as head. Antenna brownish except first segment which is yellowish. Clypeo-frontal suture a little arcuated at middle. Face including maxillary palpi pale yellowish; fourth segment of the latter, a little smaller than third.

Pronotum depressed, transverse, its width more than one and half times than its length, with a medium suture, pubescent with brown hairs, anterior region rather compressed, posterior region widened, lateral pronotal lobe high, yellowish, its posterior angle a little ascending. Elytron as long as abdomen, three separated curved oblique veins; mirror much wider than long, almost rounded, divided by a curved vein much above median line, united with first chord by two veinlets, diagonal vein almost straight, well separated from chords and oblique veins, apical field small, transversed by three oblique veins, areolae regular; lateral field yellowish as lateral lobes of pronotum, with five to six regularly spaced veins; mediastinal vein with a branch from basad and with one or two apical branches. Legs yellowish with dense brownish pubescence. Anterior tibia with an elongated external tympanum, no internal tympanum but represented by a small depression, posterior femora stout, striated with brown, gradually tapering apically, posterior tibiae with seven external and six internal spines, tipped with brownish; posterior metatarsi less than half of posterior tibiae, and with 7 external and six internal denticles. Genitalia typical for the genus but shape and denticulation of ectoparameres unique (Figs 12-13, 24).

Female : Easily distinguishable by the following characters:— Size a little larger, dorsum of abdomen dark-brownish like pronotal disc, pubescent. Elytron convex, separated from each other, at basad, by about 2 mm distance, covers first two segments of tergites; dorsal field with 4 longitudinal veins, transverse veinlets few, inconspicuous, lateral field pale yellowish like males, oblique apicad, with six regular veins (6th one very short), mediastinal vein with an apical branch at right field and from base at left field, all veins and branches of lateral field interconnected with straight, transverse veinlets. Ovipositor broken at base.

Measurements.—Length of body ♂ 12-15, ♀ 15.5, length of head ♂ 2-2.2, ♀ 2.5, maximum width of head ♂ 4-4.5, ♀ 5.5, length of pronotum ♂ 3-3.5, ♀ 4, maximum width of pronotum ♂ 5-5.5, ♀ 6

elytron 1 ♂ 10-10.75, ♀ 3.5; posterior femur ♂ 11-12.5; post. tibia ♂ 9-10.

Affinity.—The species comes close to *T. dehradurensis* Bh. but distinguishes it by the presence of prominent colour lines on occiput, yellowish colouration of lateral pronotal lobes and lateral elytral fields and in details of elytral venations. Internally the shape and denticulation of ectoparameres quite different (vide Bhowmik, 1969).

The species is named in honour of my respected friend, Sri H. N. Mitra (Kalubabu).

Genus (12) *Gryllodes* Saussure, 1874

30. *Gryllodes sigillatus* (Walker)

1869. *Gryllus sigillatus* Walker, *Cat. Derm. Salt Br. Mus.*, 1 : 46.

1877. *Gryllodes sigillatus*: Saussure, *Me'm. Soc. Phys. Hist. nat. Geneve*, 25 : 210; Randell, 1964, *Canad. Ent.*, 96 : 1588.

Distribution.—A common household pest in all tropical countries.

Material.—J & K : 1 ♂, 2 ♀ (and 7 nymphs), Barwal Kathua; 17-20.12.77, M. Chanda. H P : 2 ♀ (and 2 nymphs), Kandhor, Bilaspur 18.8.72, K. K. Mahajan. U P : 1 ♂, 3 ♀, D. L. Road, Dehra Dun 2.10.74 R. N. Bhargava. 8 ♂, 10 ♀, stream Sahiya, Dehra Dun 16.9.72 R. N. Chopra. 4 ♂ (and 10 nymphs); Pauri, Dehra Dun 23.11.76. A. Singh. 1 ♂, 22 ♀ Rishikesh Kala Pani, Dehra Dun 8.8.69, J. C. Tripathi. 5 ♂, 2 ♀, Dehra Dun : 2 10.75; R. N. Bhargava. 3 ♂, 2 ♀, Sahastra Dhara Hill, Dehra Dun; 9.8.72. 7 ♂, 23 ♀, Nainital 6-8.3.73. 2 ♂, 6 ♀, Jamnagar, CNP. Nainital; 26.2.73. 4 ♂, 6 ♀, Tarakpur, Nainital, 29.10.75. 2 ♂, 1 ♀, Chilkia Ramnagar, Nainital, 25.12.68 M. Prasad. 15 ♂, 15 ♀; Dhikala, F.R.H. C.N.P. Pauri; 11.8.75, R. N. Chopra.

Also from—Bihar : 2 ♂ (at light), Chakulia dist. Board Bunglow, Singhbhum; 25.10.68, R. Tilak. Damen : 1 ♂, 1 ♀ and (1 ♀ nymph); Chicharigram 21.2.73, B. Dutta. Rajasthan : 2 ♂, Umadh Chowk;

26.8.74 , S. N. Daclhich (also 4 advanced nymphs from Rajasthan on different localities and dates).

Remarks.—This species is found both in houses as well as open fields including river sides and sea beaches (Bhowmik, 1975).

Genus (13) *Loxoblemmus* Saussure, 1877

KEY TO SPECIES

1. First segment of antennae usually without any process, rarely with a tooth-like projection on external angle2
 First segment of antennae with external angle produced in a long process5
2. Frontal rostrum very wide, about four times as broad as scape ; head very broad *macrocephalus* Ch.
 Frontal rostrum not so wide ; head almost normal3
3. Head shiny black above, without any marking *nigriceps* Ch.
 Head brown above, with yellow lines4
4. Small sized (11-12) insects ; scape usually with a short dentiform projection (or may be without it) *equestris* Sauss.
 Rather larger (14-18) ; scape plain (frontal rostrum convex, feebly projected, with a transverse yellow band) *detectus* (Serv.)
5. Antennal process very long, curved *animae* Bh.
 Antennal process much shorter, not longer than second segment of antennae *taicoun* Sauss.

31 *Loxoblemmus equestris* Saussure

1877. *Loxoblemmus equestris* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 420-421, pt. 13 (XVI), figs. 4a—c ; Chopard, 1969. *Fauna India, Orth.*, 2 : 122 ; Bhowmik 1969. *Zool. Anz.* 182 (1/2) : 150.

Distribution.—More or less distributed throughout India. Also known from Sri Lanka, Burma, Malaya, Java, Celebes etc.

Material.—UP : 1 ♂, vill. Manjhera, Dehra Dun, 3.7.65; R. K. Bhatnagar. 1 ♂, 1 ♀, Kansrao block, Dehra Dun, 22.1.65 and 5.2.65; R. K. Bhatnagar. 4 ♂, 6 ♀, Dehra Dun (Rishikesh Rajaji Sanctuary, Dharmawala Fort etc.), May to Nov. T. D. Soota 2 ♀; Lalkua, Nainital; 1-4.10.74, P. K. Maity. 3 ♂, 4 ♀; Dehra Dun, 28.6.73; A. Singh. 3 ♂, 1 ♀, Dehra Dun; 10.7.71 3 ♂; Ban Basa, Naini Tal; 7.10.77; A. Kumar. 26 ♂, 31 ♀, Tankpur, Naini Tal, 5-6.10.77; A. Kumar. 3 ♂, 2 ♀, Dhubmaset C. N. P., Nainital; 14.11.72; J. C. Tripathi. 1 ♂, 1 ♀ Bageshwar—Gwaldam Road, Almora; 30.10.77; A. Kumar. 5 ♂, 9 ♀, Chamdhar Pauri; 1 12.78, R. N. Bhargava. 5 ♂, 4 ♀; Pauri Garhwal; 11 11.72; J. C. T. 2 ♂, 5 ♀, Garhwal C. N. P., Pauri, 14.6.76; S. C. Verma. 1 ♂; Rudra Prayag, Pauri; 4.7.78; R. N. Bhargava. 2 ♂, Soregorh, Chamoli, 30.6.78, R.N.B.

Also studied the following collections present in *Br. Mus.*

2 ♂ Chopra, Bengal (now Bihar), Machenzie, Pusa coll. 1 ♀; Pusa, Bihar; Krishnan; 1.7.1924. 1 ♀; N. W. India (no other data). 2 ♂, 4 ♀, Sri Lanka. 1 ♂, 2 ♀, Nala, Upper Burma; 24.4.1918; Y. R. Rao. 9 ♀, Siam. 3 ♀, Malaya.

Remarks.—Tandon and Shishodia (1972) recorded the species from NEFA. The species is recorded here for the first time from UP.

32. *Loxoblemmus detectus* (Serville)

1839. *Platyblemmus detectus* Serville, *Ins. Orth.*, 356.

1877. *Loxoblemmus detectus*: Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 423, pt 13 (XVI), fig 3; Chopard, 1969. *Fauna India, Orth.*, 2 : 123-124; Bhowmik, 1969. *Zool. Anz.* 182, (1/2) : 149-150, figs 8, 9.

Distribution.—Bihar; UP (Dehra Dun); Sikkim; Sri Lanka and Malaya.

Material—HP : 2 ♂, Lalkund, Dadahu, Dist. Sirmour, 24.9.73 ; H. P. Agarwal. UP : 2 ♂; Lalkua, Nainital dist., 1-4.10.74, P. K. Maity. 2 ♀; Dehra Dun, Rishikesh, 27.9.65, T. D. Soota. 2 ♂, Amlawa River, Dehra Dun; 4.10.73; Raj Tilak. 1 ♂, 1 ♀, Kalapani, Rishikesh, 9.6.72, R. N. Chopra. 1 ♂; Motichur Forest, Dehra Dun; 28.2.71; A. Singh. 6 ♂, 8 ♀; Tanakpur F. R. H., Naini Tal, 5-6.10.77, A. Kumar. 4 ♂, Sharda Berrage Ban Basa, Naini Tal, 7.10.77, A. Kumar. 1 ♂, 1 ♀; Khirchna stream, Pithoragarh, 24.10.77, A. Kumar. 1 ♂, Suwalake, Pithoragarh, 17.10.77; A. Kumar. 1 ♂, 3 ♀, Bageshwar—Baijnath Rd., Almora; 28.10.77, A. Kumar. 2 ♂, 3 ♀, Chamdhar, Pauri, 28.9.75, J. C. T. 3 ♂, 3 ♀, Dhampur vill., Pauri, 2.8.78, R. N. Bhargava.

Additional description.—Males : Yellowish light lines of occiput six and not four as described by earlier authors. Frontal rostrum rounded, convex, 2.5 to 2.7 wide. Face distinctly concave at frontal ridge; clypeo-frontal suture not distinct, but seems to be a little concave at middle. Maxillary palpi yellowish, long, 4th segment smaller than 3rd, 5th longer than 3rd and gradually widened at apex, with anterior margin obliquely truncated and dark, segments measures in length as follows—3rd 2.25-2.5, 4th 7.75-7.9, 5th 3-3.25. Labial palpi yellowish, 5th segment (2.25-2.5) much longer than 4th (1 to 1.25), rounded at apex and slightly dark. Legs covered with dense brownish hairs. Anterior tibia perforated with a large, elongated external tympanum and a small oval internal one. Posterior femur stout, yellowish but faintly striated with oblique brownish lines, longer than posterior tibia, posterior tibia with 5 hairy spines on both margins, external superior spur smaller than median one and equal to inferior one, internal superior and median spurs longest and equal in length, inferior one slightly longer than external internal metatarsus densely pubescent and with 6 to 7 prominent denticles on either margin. Pronotum transverse. Mirror undivided, anterior angle angulated, posterior angle rounded, posterior internal cell large and prominent. Humeral margin as well as super margin of lateral

field of elytra brownish ; inferior margin transparent and besides biramous mediastinal veins have 5 curved widely separated veins as *Modicogryllus confirmatus*.

Females : Tally nicely with known description.

Measurements.—Length of body ♂ 16.5-17.6, ♀ 13.5-14 ; length of pronotum ♂ 3-3.25, ♀ 3.25-3.5 ; width of pronotum ♂ 5.5-5.75, ♀ 5-5.25 ; elytron ♂ 11-11.25, ♀ 11-11.5, posterior femur ♂ 10-11, ♀ 10-10.5 ; posterior tibia ♂ 8-8.25, ♀ 8.25-8.5, ovipositor 8-8.5.

Remarks.—It is a common and widely distributed species of the genus in India but less frequently met with than *L. equestris*.

33. *Loxoblemmus macrocephalus* Chopard

1969. *Loxoblemmus macrocephalus* Chopard, *Fauna Indica, Orth.*, 2 : 130-131, fig. 94 ; Tandon and Shishodia, 1972. *Orient. Insects*, 6 (3) : 288 ; Bhowmik, 1976. *Indian Mus. Bull.*, 11 (1) : 45, figs. 6-8.

Distribution.—Assam, NEFA ; WB (Jalpaiguri) and UP.

Material.—H P : 1 ♂ ; Lal-kund, Badahu, Sirmour dist. ; 24.9.73 ; H. P. Agarwal 2 ♂, 1 ♀ ; Renuka Lake ; 27.9.75 ; A. Kumar. J & K : 3 ♂, 6 ♀ ; Jhajharkoli ; 13.9.1976 ; H. K. Bhowmik.

Additional description.—Males : Elytron longer than the typical, almost as long as abdomen, and differs in minor details, viz., number of oblique veins 3 to 4, first chord connected with mirror by 3 veinlets mirror divided by 2 veins, one slightly curved vein in middle, other distinctly curved and divides mirror at postero-internal border ; postero-internal cell very prominent, apical field short with 3 oblique veins.

Females : Agree nicely with Chopard's description.

Measurements.—Length of body ♂ 13-13.5, ♀ 12-12.5 ; pronotum ♂ 3-3.6, ♀ 3.25-3.5 ; width of pronotum at anterior and posterior margins ♂ 5.5 and 4.25-4.5, ♀ 4-4.2 and 3.5-4 respectively ; maximum width of head ♂ 5.5-7, ♀ 4-4.25 ; frontal rostrum ♂ 3-4.2, ♀ 2-2.2 ;

posterior femur ♂ 9.5-10.2, ♀ 9.5-10, post. tibia ♂ 7.2-8, ♀ 6.5-6.75, post. metatarsus ♂ 3.5-3.75, ♀ 3.75-4, ovipositor 6.75-7.

Remarks.—The species is reported here for the first time from J & K and HP.

34. *Loxoblemmus nigriceps* Chopard

(Fig. 27)

1933. *Loxoblemmus nigriceps* Chopard, *Stylops*, 2 : 120, fig 7 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 129 ; Bhowmik, 1976. *Indian Mus. Bull.*, 11 (1) : 45, fig 5 (misidentification).

Distribution.—Sikkim : Gangtok, (type locality).

Material.—UP : 1 ♂ (and an advanced ♂ nymph) ; Darhari village, Chamoli, 3.9.78, R. N. Bhargava.

Additional description.—Male : Head including frontal rostrum shiny black, pronotal disc and dorsum of abdomen black, all legs chiefly and ventrum of abdomen roughly rufo-testaceous, maxillary palpi yellowish. Pronotum widened at anterior portion; posterior portion narrow, a little compressed; disc convex, transverse; lateral lobes short, a little angulated at anterior margin, slightly ascending posteriorly. Internal face of anterior tibia with a small, rounded tympanum; posterior femur uniformly rufous, not striated with brown. Elytron not black as pronotum, but rather light brownish while lateral fields dark-brown mirror about double in length than breadth, not connected with chord by veinlets but first chord directly connected at middle of its anterior border, this is something very unique practically no apical field, only 5 areolae occupy space between end of chords and postero-internal margin of mirror another characteristic feature, lateral field clearly with three veins, mediastinal vein uniramous.

Nymph : Size 7.8. Easily identical but differs from adult individuals in some minor points—legs less rufo-testaceous, posterior femur striated with brown, post. tibia with six external and five

internal spines. Elytra yet buds, rufous in colouration. Forehead rounded, frontal rostrum not yet projected; clypeo-frontal suture arcuate whereas in adult low, slightly curved. Tympanum not yet visible at anterior tibiae.

Measurements.—Length of body 9; length of pronotum 2.2; maximum width of pronotum 3, elytron 4.25; posterior femur 6.5; post. tibia 5 (measured one male).

Remarks.—Chopard (1933b) described the species from Sikkim on male sex. The present locality of availability extends the zoogeography of the species.

35. *Loxoblemmus taicoun* Saussure

1877. *Loxoblemmus taicoun* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25: 424; Chopard, 1969. *Fauna India, Orth.* 2: 126.

Distribution.—India: UP (Kumaon); Japan and Java.

Material.—UP: 2♂, 2♀; Dehra Dun; 16.9.73; A. Singh. 1♂; Dehra Dun; 18.10.77, V. C. Agarwal. 1♂; Ramganga R. area, Pauri dist. 5.11.72. 4♂, 11♀ Campur, Srinagar, Pauri dist.; 28.9.75; J. C. T. 30♂, 40♀; Srinagar, Pauri; 3.10.75 J. C. T. 10♂, 12♀; Gairal, C. N. P., Pauri; 15.6.76; S. C. Verma. 21♂, 25♀; Chamoli; 1.10.75. 1♂, 1♀, Dkhimath, Chamoli, 15.10.75, J. C. T. 7♂, 9♀, Kausani-Garus Rd., Almora dist. 1♂, 1♀, Sarap Duli C. N. Park, Nainital; 21.11.71; A. Singh. 1♂; Lahaghat-Chanpaorat, Pithoragarh dist.; 12.10.77, A. Kumar.

Remarks.—Tandon and Shishodia (1972) reported the species from NEFA quoting wrong page number of original work and disseminating wrong statement regarding description of both sexes by Chopard (op. cit.). In fact, Saussure (op. cit.) described both sexes, though briefly, and Chopard says "it is impossible to differentiate it from the neighbouring species." Indeed it is very difficult to differentiate females of the species of the genus in a mixed collection.

Genus (14) *Stephoblemmus* Saussure, 187736. *Stephoblemmus humbertiellus* Saussure

1877. *Stephoblemmus humbertiellus* Saussure, *Mem. Soc. Phys. Hist. nat Geneve*, 25 : 428, pt 13 (XVII) figs. 1-3 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 136-137, fig. 98 ; Bhowmik, 1975. *J. Bombay nat. Hist. Soc.*, 72 (2) : 381-382, figs. 16-18.

Distribution.—Sri Lanka India (UP and Meghalaya).

Material.—UP : 1 ♂, 3 ♀, Garegarh, Chamoli dist., 30.6.78 R. N. B. 5 ♂, 13 ♀, Darhari village, ca. 9 km from Rudra Praga on Saterakhal Rd., Chamoli dist., 3.8.78, R. N. Bhargava. 1 ♂, 2 ♀, Gorakhpur village, Dehra Dun dist., 19.7.76, R. N. B. 7 ♂, 8 ♀, Pauri dist., 4.7.78.

Remarks.—The species was described from Sri Lanka on male sex. Vasantha (1978) described females from Meghalaya. The specimens studied tally with the known account except on a few minor points. The number of oblique veins on male elytron varies from 2 to 3. Posterior tibia usually with 4 internal and 5 external spines. Females (7.5-9) with rounded shiny head, oviposital length varies from 5.5. to 6.25.

Subfamily NEMOBIINAE

Genus (15) *Pteronemobius* Jacobson and Bianchi, 1904

KEY TO SPECIES

- | | |
|-----------------------------------------------------------------------------------------------------------|-------------------------|
| 1. Posterior femora adorned with blackish bands |2 |
| Posterior femora unicolourous |3 |
| 2. Maxillary palpi black basad, with 4th and 5th segments whitish ; lateral lobes of pronotum blackish | <i>fascipes</i> (Walk.) |
| Maxillary palpi testaceous, a little darkened apically ; lateral lobes of pronotum nearly rufo-testaceous | <i>csikii</i> (Bol.) |

3. Lateral lobes of pronotum and lateral fields of elytra blackish, contrasting with testaceous upper part

taprobanensis (Walk.)

Lateral lobes of pronotum and lateral fields of elytra of same colour as upper part (smaller size, 4-7 ; posterior tibiae with four spines on each margin)

concolor (Walk.)

37. *Pteronemobius fascipes* (Walker)

1869. *Eneoptera fascipes* Walker, *Cat. Derm. Salt. Br Mus.*, 1 : 67.

1931. *Pteronemobius fascipes* : Chopard, *Bull. Raffles Mus.*, No. 6 : 134 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 164-165, figs. 108, 111 ; Bhowmik, 1976. *Indian Mus. Bull.* 11 (1) : 45 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 28.

Distribution.—Common throughout India. Also recorded from Sri Lanka ; Burma , Malaya and Java.

Material.—H P : 1 ♂, 3 ♀ ; (Brachypterous) , Gaura, Giripul Rajgarh Road, Solan ; 4.12.71 ; H. P. Agarwal. U P : 1 ♂, 2 ♀ ; Pilibhit, Pilibhit, dist. ; P. K. Maity. 1 ♂, 2 ♀ ; Tehri ; 26.6.78. 4 ♂, 5 ♀ ; Bhaniwala, Dehra Dun ; 28.8.70 ; A. Singh. 12 ♂, 12 ♀ ; Dehra Dun (no other date). 1 ♂, 2 ♀ Almora ; A. Kumar. 5 ♂, 10 ♀ ; Bhimtal, Nainital ; 24.9.78 ; A. Kumar. 20 ♂, 20 ♀ ; Sat Tal, Nainital ; 25.9.78 ; A. Kumar. 10 ♂, 12 ♀, Timli Forest, Dehra Dun , 11.8.76 ; B. S. Lamba. 5 ♂, 5 ♀ ; Sukhi Dhang, Pithoragarh ; 11.11.76 ; A. Singh. 2 ♂, 3 ♀ ; Chamdhar, Pauri ; 1.7.78. 3 ♂, 4 ♀ ; F. R. H. Tanakpur, Nainital ; 5.10.77 ; A. Kumar. 40 ♂, 40 ♀ ; Lakhidiyar nr. Barechdira, Almora ; 11.11.76 , A. Singh. 1 ♂, 4 ♀ ; Bageswar, Almora , 16.9.76 ; A. Singh. 8 ♂, 15 ♀ ; Barkot, Uttarkashi , 12.11.73 ; A. Singh. 5 ♂, 10 ♀ ; Rani Bagh, Nainital , 28.9.78. A. Kumar. 20 ♂, 24 ♀, Dwarakot, Almora ; 18.11.76 ; A. Singh. 10 ♂, 15 ♀ ; Katar Mal, Almora ; 17.9.78 ; A. Kumar. 7 ♂, 8 ♀ ; Champawat, Pithoragarh , 6.11.76 ; A. Singh.

Remarks.—The species is easily distinguishable by its unique colouration of posterior femora which is alternatively adorned with testaceous and blackish bands.

38. *Pteronemobius csikii* (Bolivar)

*1901. *Nemobius csikii* Bolivar, *Zich. Zool. Ergebn.*, 2 : 243.

1926. *Pteronemobius csikii* : Uvarov, *Ann. Mag. nat. Hist.*, 11 (9) : 285 ; Bey-Bienko, 1956. *Zool. Zh.*, 35 (2) : 230 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 155 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 28.

Distribution.—More or less widely distributed throughout India. Also known from Sri Lanka , Burma , China.

Material.—UP : 1 ♂ , Dehra Dun , 17.9.73 ; A. Singh.

Remarks.—Less common than the preceding species and is a new record from the area.

39. *Pteronemobius taprobanensis* (Walker)

1869. *Trigonidium taprobanensis* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 102.

1925. *Pteronemobius taprobanensis* : Chopard, *Ann. Mag. nat. Hist.*, 15 (9) : 507 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 163-164 ; Bhowmik, 1976. *Indian Mus. Bull.*, 11 (1) : 45 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 28.

Distribution.—Widespread in India ; Indo-China , Burma ; Java and Sumatra.

Material.—UP : 10 ♀ , Jhoolaghat Road, Pithoragarh dist. ; 16.10.77 ; A. Kumar. Numerous examples ; Naukuchia Tal ; 24.9.78 ; A. Kumar. 7 ♀ , Champawat, Pithoragarh , 11 10.77 , A. Kumar. 19 ♀ ; Kapkote, Almora Dist. ; 16.11.76 ; A. Singh. 1 ♀ , Bageshwar, Almora ; 20.10.77 , A. Kumar. 30 ♂ , 21 ♀ , Kateshwar, Chamoli dist ; 20.6.78 , R. N. B. 20 ♂ , 15 ♀ , Nainital , 14.11 76. 1 ♂ , 2 ♀ ; F. R. H. Tanakpur, Nainital , 5.10.77 ; A. Kumar. 15 ♂ , 9 ♀ ; P. W. D. R. H. Pilibhit, Dehra Dun , 19.10.73 ; A. Hussain. 6 ♂ Dehra Dun ;

19.9.73, A. Hussain. 1 ♂, Kotalgaon, Dehra Dun; 7.3.70, M. K. Biswas. 1 ♂, 1 ♀; Deval Dhar, Chamoli; 20.6.78, R. N. Bhargava.

Remarks.—Though one of the commonest nemobian species in India, it has never been recorded earlier from the W. Himalayas.

40. *Pteronemobius concolor* (Walker)

1871. *Eneoptera concolor* Walker, *Cat. Derm. Salt. Br. Mus.*, 5 (Supple): 10.

1931. *Pteronemobius concolor*: Chopard, *Bull. Raffles Mus.*, No. 6: 136; Chopard, 1969. *Fauna India, Orth.*, 2: 160-161, fig. 110; Bhowmik, 1976. *Indian Mus. Bull.* 11 (1): 45; Bhowmik, 1977. *Rec. zool. Surv. India*, 73: 29.

Distribution.—A very common species in India including Andaman and Nicobar Islands. Also distributed in Sri Lanka; Burma, Malaya and Perak.

Material.—UP: 1 ♂; Dehra Dun; 4.10.73. 3 ♂, 4 ♀; Dehra Dun (no other date) 1 ♀, Corbett National Park, 1970, A. Singh.

Remarks.—The species is available both in macropterous and micropterous forms.

Subfamily MYRMECOPHILINAE

Genus (16) *Myrmecophilus* Berthold, 1927

41 *Myrmecophilus albicinctus* var. *concolor* Chopard.

1928. *M. a.* var. *concolor* Chopard, *Rec. Indian Mus.*, 30: 21.

Remarks.—This interesting variety was so far represented from HP (Simla) by a single male specimen. The type deposited in ZSI seems to be lost; only the label bearing the information—Matiana, 8000 ft., Simla Hills, 28-30 No. 07, Regd. No. H1/6308, is left. Recently Bradoo and Bradoo (1979. *Curr. Sci.*, 48 (11): 509-580, figs 1-3) have reported the availability of a series of specimens including nymphs from Chandigarh, erroneously terming them as "types."

Subfamily SCLEROPTERINAE

KEY TO GENERA

Posterior tibiae serrulated without spine ;
head rounded ; pronotum long, its edges
rounded *Scleropterus* Haan

Posterior tibiae having three spines on
each margin ; head depressed ; edges of
pronotum carinated *Acanthoplistus* Sauss.

Genus (17) *Scleropterus* Haan, 1842

KEY TO SPECIES

Elytra of male with three to four oblique
veins ; mirror scarcely wider than long ;
dorsal field of female elytra filled with
very close and regular transverse veinlets *coriaceus* (Haan)

Elytra of male with five to six oblique
veins ; mirror much wider than long ;
dorsal field of female elytra closely reticu-
lated and punctated between veins *punctatus* Br.

42. *Scleropterus coriaceus* (Haan)

1842. *Gryllus (Scleropterus) coriaceus* Haan, *Temm. Verhandl., Orth.*, : 232.

1877. *Scleropterus coriaceus* : Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 :
490, pl 15, figs. 1-2, 2a ; Chopard, 1969. *Fauna India, Orth.*, 2 : 211,
fig. 131 ; Bhowmik, 1977. *Rec. zool. Surv. India*, 73 : 31

Distribution.—Assam and Kerala. Also recorded from Burma ;
Thailand , Malaya and Java.

Material.—UP : 1 ♀ , Timli forest, Dehra Dun dist. , 11.8.78 ;
B. S. Lamba. 1 ♀ ; Asarari Forest, Dehra Dun ; 26.6.76 , Suresh.
2 ♀ ; Chamdhar, Chamoli dist. ; 1.7.78 ; R. N. B. 1 ♂ , 1 ♀ , Silli
village, Chamoli dist. , 27.6.78 , R. N. B. 1 ♂ , Deval Dhar,
Chamoli , 20.6.78 ; R. N. Bhargava. 3 ♂ , Tunata village , Tehri dist. ,
25.6.78 , R. N. B.

Also studied *Br. Mus.* collections—1 ♂ ; Siam (at light), 6.11.33 ; det Chopard. 1 ♀ , Sarawak, Mt. Dulit, R. Koyan, 2, 5000 ft. Primary forest, Rotten wood, det Chopard. 1 ♀ ; Siam, 21 April 1930 ; det Chopard.

Additional description—Males (9.25-10.5) with four oblique veins in one example, elytra shortened, exposing last three tergites free , apical field short, anal field reticulated ; lateral fields of elytra, in addition to mediastinal vein with four wavy veins, interconnected with transverse veinlets. All the specimens are brachypterous.

Females : (10.5-11) agree with the known description.

Remarks—The species is reported here for the first time from the western Himalaya.

Recently Bhargava (1981) has described a new species, *S. lambai*, from Dehra Dun, which I believe, after going through the lot of specimens before me, conspecific with the species as the number of oblique vein is a variable feature.

43. *Scleropterus punctatus* Brunner

1893. *Scleropterus punctatus* Brunner, *Ann. Mus. Geneve*, 13 (33) : 204, pl. 6, fig 73b (♀ non ♂), Chopard, 1969. *Fauna India, Orth.* 2 : 212 ; Bhowmik ; 1977. *Rec. zool. Surv. India*, 73 : 32.

Distribution—Arunachal Pradesh ; Assam ; UP and Karnatak. Also known from Burma ; Japan , Vietnam and Sumatra.

Material—UP : 1 ♀ , Asarari forest, Dehra Dun dist. , 27.7.76 ; R. N. Bhargava. 2 ♀ , Rudra—Prayag, Pauri dist. ; 4.7.78 , R. N. Bhargava.

Also studied *Br. Mus.* collections—1 ♀ , Waleer coll., Da-laen-saen, 93-52 (damaged specimen) Kerala : 1 ♀ ; Sidapur, Coorg ; 9.5.1917 ; Y R. Rao.

Remarks—The female specimens at hand have a whitish ring, composed of 8 to 9 segments, of antennae at middle.

Genus (18) *Acanthoplistus* Saussure, 1877

44. *Acanthoplistus birmanus* Saussure

1877. *Acanthoplistus birmanus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 490, pt. 15 (31) fig. 2 ; Chopard, 1933. *Revue suisse Zool.*, 40 : 165 ; Bhowmik, 1977. *Rec. Zool. Surv. India*, 73 : 31.

Distribution.—Tamil Nadu , Karnatak , HP , UP (Naukuchia Tal , Kumaon and Dehra Dun). Also known from Burma , Thailand , Tonkin ; Anam.

Material.—UP : 1 ♂ , 1 ♀ , Kotalgaon, Dehra Dun , 1.9.76 , R. N. Bhargava. 1 ♂ , 7 ♀ , Tinli, Dehra Dun ; 24.6.76 ; R. N. B. 1 ♂ (and 6 nymphs) , Gorakhpur, Dehra Dun , 25.8.76 , R. N. B. 2 ♂ , 6 ♀ , Gorakhpur, Dehra Dun , 22.7.76 R. N. B. 3 ♂ , 3 ♀ ; Dehra Dun ; 27.7.76 , R. N. B. 10 ♂ , 12 ♀ , Timli Forest, Dehra Dun , 11.8.76 , B. S. Lamba. 1 ♀ , Tarakpur, Nainital , 6.10.77 , A. Kumar. 1 ♂ , 1 ♀ , Sore Gash, Chamoli 24.6.78 , R. N. B.

Measurements.—Length of body ♂ 7.5-8, ♀ 7.75-8 , length of pronotum ♂ 3-3.2, ♀ 2.8-3.2 , maximum width of pronotum ♂ 3.25-3.5, ♀ 3.2-3.4 ; elytron ♂ 4.5-5, ♀ 5-5.2 ; posterior femur ♂ 3.75-4, ♀ 4-4.25 , posterior tibia ♂ 3.5-3.7, ♀ 3-3.28 ; ovipositor 2.5-2.75.

Remarks.—The male specimens at hand show that the frontal rostrum is about two times wider than the first segment of antennae. Other details of the species, of both sexes, agree fairly with the known description though the specimens are smaller than the measurements given.

The availability of quite a good numbers of nymphal stages during August indicates that new generation starts in rainy season or immediately after monsoon.

Specimens were collected from "under store" or "under leaf litter."

Subfamily MOGOPLISTINAE

KEY TO GENERA

Elytra of male usually completely concealed beneath backwardly produced pronotum

Derectaotus Ch.

Elytra of male almost entirely visible, i. e. almost completely freed from pronotum

Gotvandia Bcl.

Genus (19) *Gotvandia* Bolivar, 192745. *Gotvandia albipennis* Chopard

1969. *Gotvandia albipennis* Chopard, *Fauna India, Orth.*, 2 : 200.

Distribution—Karachi (Pakistan).

Material—HP : 1 ♂, Bancthi, dist. Sirmour, Solan, 4.1.73, M. Chandra. UP : 1 ♂, Barkot, Dehra Dun, 12.2.72, R. N. Chopra.

Additional description—Males : Dark-brown, covered with white scales ; pubescent. Frontal rostrum about 4 times wider than scape, and not furrowed at middle. Pronotum with a median suture. Abdomen pubescent ; dark with whitest scales but transverse rufous bands not detectable. Elytra a little bigger than half of abdomen, testaceous ; mirror transverse, much longer than width, anterior angle angulated, posterior angle rounded, apical field restricted to only 2 inner posterior cells ; diagonal straight, 2 chords, oblique vein not detectable due to longitudinal striations, all dorsal veins etc. yellow-white ; lateral field short, brownish (thus contrasting with dorsal field), presenting only one slightly curved vein ; mediastinal vein straight, unbranched. Posterior femora rather stout, yellowish, longer than posterior tibiae. Posterior tibiae brownish, scaly, with a series of denticles on superior margins. External medium spur longest, superior and inner spurs subequal, metatarsi exactly half of post. tibiae (2 vs. 4), more densely pubescent than tibiae and armed with a few denticles.

Measurements—Length of body 8.5, elytron 2.75 length of pronotum 3 ; width of pronotum 3.25 ; post. femur 5.5 (measured one male).

Remarks—The type species of the genus was described from Persia by Bolivar (1927) and subsequently Chopard (op. cit.) describes the species, on a male specimen, from Karachi (W. P.). The genus thus has a restricted distribution to desertic terrain. The availability of the species from HP and UP not only extends its range but also indicates its non-desertic habitat.

The present specimens differ from the recorded description of the species by having no rufous transverse bands on the abdomen and by the presence of testaceous elytra.

Genus (20) *Derectaotus* Chopard, 1936

46. *Derectaotus maindroni* (Chopard)

1928. *Cryptoptilum maindroni* Chopard, *Rec. Indian Mus.*, 30 : 23, figs. 32, 38.

1969. *Derectaotus maindroni*: Chopard, *Fauna India, Orth.*, 2 : 197-198, fig. 125.

Distribution—Tamil Nadu (Nilgiri Hills and Coonoor).

Material—UP : 1 ♂ ; Dehra Dun, Narendra Nagar ; 8.2.64 ; T. D. Soota.

Remarks—The specimen (7.5) at hand tallies nicely with the known account of the species which was described from Nilgiri Hills and Coonoor. It is, however, not only a new record from Northern India but also the sole representative of the genus from aforesaid region.

Subfamily P_{HALANGOPSINAE}

Genus (21) *Homoeogryllus* Guerin, 1847

KEY TO SPECIES

Antennae whitish with first two segments

dark

japonicus (Haan)

Antennae more or less distinctly annulated with brownish and yellowish

cincticornis (Walk.)

47. *Homoeogryllus cincticornis* (Walker)

1870. *Meloimorpha cincticornis* Walker, *Cat. Derm. Salt. Br. Mus.*, 3 : 469.

1969, *Homoeogryllus cincticornis* : Choprad, *Fauna India, Orth.*, 2 : 242-243, fig. 159 ; Bhowmik, 1977. *Rec. Zool. Surv. India*, 73 : 30, fig 1, D & E.

Distribution—India and Pakistan.

Material—UP : 1 ♀, Gola Forest (425 m), Lalkua, Nainital dist. ; 1 10.1974 ; P. K. Maity. 12 ♂, 9 ♀ ; (and also 10 ♀ nymphs) ; Laxman Sidh, Dehra Dun ; 3.9.76, R. N. Bhargava. 1 ♀ ; Rishikesh ; 12.9.75 ; J. C. Tripathi. 1 ♂, 2 ♀, Asarari forest, Dehra Dun dist., 24.9.74 and 28.10.76 ; R. N. Bhargava.

Additional description—Females : Quite identical to males except differing in elytral venation, subgenital plate and ovipositor. Elytron slightly shorter than abdomen ; all veins and veinlets yellowish contrasting with blackish background, dorsal field with 5 oblique veins, veinlets generally transverse, but some of them elongated, a few of them irregular in shape. Mediastinal vein with 6 to 8 oblique branches, interconnected with numerous transverse but irregular veinlets. Humeral vein prominent and connected on either side with mediastinal and median, with irregular transverse veinlets. Wings absent. Subgenital plate partially navicular with median concave margin at apex. Ovipositor long, slender with sharp valves. Cercus brownish, slightly longer than ovipositor. Antenna with a big whitish band, composed of about 25 segments (8 mm), at about middle.

Males—Nicely tally with the known description.

Nymphs—Fairly identical to adults except that their elytra and wings and genital parts ill developed. Elytra and wings yet pad-like, lateral, ovipositor (6-10) unspecialised. General body colouration though resembles adult form yet a little lighter and brownish specially on head and pronotum. Measures 8-15.

Measurements—Females : Length of body 15-17 , length of pronotum 3-3.5 ; maximum width of pronotum 4.2-4.5 , length of elytron 11-11.5 ; posterior femur 14-14.5 , posterior tibia 15-15.2 ; ovipositor 12.75-15.

Remarks—The species was so far known from Maharashtra, Tamil Nadu and North West Province (Pakistan). Its present record which is a new one, indicates its probable distribution throughout oriental region, although it must be considered a rare species. The availability of nymphal stages, in September, indicates that the species starts new generation immediately after monsoon.

Some of the specimens were collected from "Pit on the termite mould."

48. *Homoeogryllus japonicus* (Haan)

1842. *Gryllus (Phalangopsis) japonicus* Haan, *Temminck, Verhandl. Orth.*, 236.

1869. *Phalangopsis albicornis* Walker, *Cat. Derm Salt. Br. Mus.*, 1 : 106.

1878. *Homoeogryllus japonicus* : Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 568 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 244, fig. 161

Distribution—India (Northern India) ; Japan.

Material—U P : 1 ♀ and (1 ♀ nymph) ; Sidh, Dehra Dun ; 3.9.76 ; R. N. Bhargava.

Female (previously undescribed) : The female specimen at hand conspicuous in having whitish antennae except scape and pedicel which are blackish. Elytron testaceous, as long as abdomen , dorsal field with five somewhat oblique veins ; transverse veinlets irregular , lateral field with slightly oblique veins. Ovipositor testaceous, curved upwards, very slender, apical halves very narrow, smooth. Frontal rostrum less than half width of first segment of antennae.

General colouration and other details alike males. Female nymph (length of body 10.5 ; elytral pad 3.5 , wing 4.7 ; ovipositor 6) almost identical to adult except that its elytra, wings and genital parts yet undeveloped.

Measurements—Length of body 11.5 ; elytra 8.5 ; posterior femur 13 ; posterior tibia 14 ; ovipositor 9.75 (measured one female).

Remarks—The species was described on male specimens. *P. albicornis* Walker* (1869) was described from North-India (without exact locality) and since then it was never recorded from elsewhere. The female specimen (damaged) at hand is the first reference of its occurrence since the description of the species.

*Study on the ♂ type of *P. albicornis* Walker, deposited in British Museum (*Nat. Hist.*).

1 ♂ type (one of the series)—no data. Colour dark brown. Yellowish spots on occiput not recognizable, but testaceous stripe on vertex distinct. Frontal rostrum not more than half width of 1st antennal segment. Lateral lobes of pronotum dark brown but not black in true sense. Pronotum brownish with pale spaces but callous spots not visible. Mirror of elytra distinctly wider than long; divided by 3 veins, hindermost one roundedly curved and far away from other two ; mediastinal vein with 16 branches. Anterior tibia perforated on each side by an elongated tympanum. Posterior legs wanting.

Length of body 8.5 ; elytron 16.5 ; maximum width of elytron 10. It is smaller in size than the measurements given for *japonicus* (Haan)

Subfamily TRIGONIDIINAE

KEY TO GENERA

1. Elytral venation quite different in both sexes, males always with a neat anal field and mirror2
- Elytral venation more or less similar in both sexes (Elytra presenting false veins between principal ones which make them appear finely striated) *Trigonidium* Ramb.

2. Pronotum narrowing and rounded in front ;
female elytra having false veins between
principal veins

Homoeoxipha Sauss.

Pronotum with anterior margin slightly
convex, but neither rounded nor strongly
narrowing ; no false vein between
principal ones in females (elytra membra-
naceous in both sexes)

Anaxipha Sauss.

Genus (22) *Homoeoxipha* Saussure, 1874

49. *Homoeoxipha lycoides* (Walker)

1869. *Phyllopalpus lycoides* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 71.

1925. *Homoeoxipha lycoides* : Chopard, *Ann. Mag. nat. Hist.*, 15 (9) : 532 ;
Chopard, 1969. *Fauna India, Orth.*, 2 : 275, fig. 178.

Distribution—Common throughout Indo-Australian region.

Material—UP : 2 ♂ ; P. W. D. Rest House, Pilibhit , 19.10.73 ,
A. Hussain.

Remarks—Seems to be a new record from the area.

Genus (23) *Trigonidium* Rambur, 1839

50. *Trigonidium cicindeloides* Rambur

1839, *Trigonidium cicindeloides* Rambur, *Faune Andal.*, 2 : 39 ; Chopard,
1969. *Fauna India, Orth.*, 2 : 304 ; Bhowmik, 1976. *Indian Mus.*
Bull. 11 (1) : 46.

Distribution—A very widely distributed species from South Europe
to South Asia and all over Africa.

Material—UP : 1 ♂ ; Almora , A. Singh. 1 ♂ ; Nainital , A. Kumar.

Remarks—In India, it was so far recorded from WB , Bihar ,
Assam ; Tamil Nadu and Andaman Island. So it is a new record
from the Western Himalayas.

Genus (24) *Anaxipha* Saussure, 187451 *Anaxipha venustula* (Saussure)

1878. *Cyrtoxiphus venustulus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 482.

1931 *Anaxipha venustula* Chopard, *Bull. Raffles Mus.*, 6 : 137 ; Chopard, 1969. *Fauna India, Orth.*, 2 : 282.

Distribution—So far was known from Malaya and Java.

Material—UP : 1 ♀ ; F. R. H. Tanakpur, Nainital dist , 5.10.77 ; A. Kumar. 1 ♀ , Banbasa, Nainital dist. ; 7.10.77 , A. Kumar (at light trap).

Females (previously undescribed) : Size (7) slightly smaller than males (8.5). Head rufo-testaceous but without any brown band between eyes , latter being prominent, brownish in colour. Face dark-brown, interrupted at middle with testaceous. Apical half of fifth segment of maxillary palpus dark-brown. Pronotum unicolourous as head, slightly narrowed in front , anterior margin darkened ; anterior and inferior margins of lateral pronotal lobes similarly darkened.

Colouration of legs with bands of posterior femora identical to males. Elytral venations testaceous but areolae brownish ; 5 almost straight dorsal veins, interconnected with somewhat straight transverse veinlets ; lateral field mostly darkened, with three to four veins ; mediastinal vein straight, without any branch. Wings very long. Ovipositor short and strong, basal half almost straight, rufous , apical half feebly up-curved, dark-brown with a series of fine denticles.

Measurements—Length of body 7-7.25 ; length of pronotum 2-2.1 , maximum width of pronotum 2.5-2.75 ; elytron 5-5.2 ; wing 10.5-11 ; posterior femur 6-6.2 , posterior tibia 5.75-6 , ovipositor 2.9-3 (measured two females).

Remarks—The species is recorded here for the first time from India. It was described from Java on male specimen only. The

availability of female specimens provided opportunity to describe the female sex.

Subfamily ENEOPTERINAE

Genus (25) *Xenogryllus* Boliver, 1890

52. *Xenogryllus transversus* (Walker)

1869. *Platydictylus transversus* Walker, *Cat. Derm. Salt. Br. Mus.* 1 : 88.

1969. *Xenogryllus transversus* : Chopard, *Fauna India, Orth.* 2 : 310 ; Bhowmik, 1976. *Indian Mus. Bull.* 11 (1) : 46.

Distribution—Assam (Ledo) , Sikkim ; WB (Jalpaiguri) , Sylhet (Bangladesh) and Burma.

Material—U P : 9 ♂ , 6 ♀ , Chamdhar, Pausi dist. ; 20.10.73 ; A. Singh.

Additional description—Males : Frontal rostrum about one and a half times wider than first antennal segment ; clypeo-frontal suture somewhat straight. Fifth segment of maxillary palpus longer than fourth and rather strongly widened apicad. Elytron slightly shorter than abdomen, presenting a regular brown band along stridulatory vein , mediastinal vein with 17 branches. Abdomen dark, pilose. Sub-genital plate with apical margin feebly notched. Posterior tibia with 9 to 11 internal and 17 to 20 external denticles at base (before insertion of spines).

Females : Elytron decidedly shorter than abdomen (exposing at least last two tergites) , mediastinal vein with 12 branches.

Measurements—Length of body ♂ 32-34, ♀ 30-31 , interocular distance ♂ 3-3.5, ♀ 4-4.5 ; maximum width of frontal rostrum ♂ 1.5-2, ♀ 2-2.2 elytron ♂ 25-27, ♀ 22-23 , posterior femur ♂ 22-23.2, ♀ 23-24 ; posterior tibia ♂ 21-21.5, ♀ 23-24 , ovipositor 24-25.

Remarks—It is a new record for the Western Himalayas.

Subfamily **PODOSCIRTINAE**Genus (26) **Euscyrtus** Guerin, 184453. **Euscyrtus hemelytrus** (Haan)

1842. *Gryllus (Eneoptera) hemelytrus* Haan, *Temminck Verhandl. Orth.*, 213, pl. 20, fig. 2.

1931 *Euscyrtus hemelytrus*: Chopard, *Bull. Raffles Mus.*, 6 : 145 ; Bhowmik, 1970. *J Zool. Soc. India*, 22 (1 & 2) : 81 ; Bhowmik, 1976. *Indian Mus. Bull.* 11 (1) : 47.

Distribution—Found almost throughout Oriental region—India (Assam, WB ; Andaman Island) ; Sri Lanka ; Malaya ; Java, and also from North Australia.

Material—J & K : Numerous exs., H. K. Bhowmik. Other localities : Assam : 1 ♀, Raimona, Goalpara dist. ; 11.11.74 ; S. K. Gupta. Kerala : 1 ♀ ; Ednpaloya, Kottayam, 5.1.71, A. N. T. Joseph. WB : Numerous exs. including many nymphs ; Botanical Garden, Calcutta July & December, 1979 ; Hazra coll.

Remarks—Although it is one of the commonest crickets of the oriental region, it seems to be a new record from J & K. The species always abounds in succulent, moistened grasses. In Botanical Garden, Calcutta, it has been noticed that it has at least 2 generations—once in July and again in December.

SUMMARY

The present account gives a comprehensive picture of the gryllid fauna of the western Himalayas for the first time. A topographical map showing chief collection camps of the region, with a brief sketch of climate and vegetation, is given in the introduction. A total of 70 species belonging to 34 genera and 10 subfamilies of Gryllidae are reported from this interesting zone, based on records in literature and on examination of collections available in the National Collection of the ZSI. The material studied in this account includes 53 species belonging to 26 genera.

Keys have been provided whenever there are more than one category of a taxon.

A complete list of valid species of the family from this region is also provided.

21 species are recorded for the first time from the states of the Western Himalayas (vide the list of valid species). *Modicogryllus lineiceps* (Walker, 1869) and *Anaxipha venustula* (Saussure, 1878) reported from Australia, and, Malaya and Java respectively are recorded for the first time from India.

4 species, viz., *Modicogryllus tikaderi*, *Turanogryllus mitrai*, *Velarifictorus lambai* and *V. basui*, are described as new to science. The male of the species, *Teleogryllus fletcheri* (Chopard, 1935), and, females of the species *Homoeogryllus japonicus* (Haan, 1842) and *Anaxipha venustula* (Saussure, 1878) are described for the first time.

7 species have been synonymised on taxonomic assessment. *Gryllopsis pakistana* Chopard, 1969 and *Turanogryllus quadrilineatus* Bhowmik, 1969 are suggested synonymies (*Comb. Nov.*) of *T. jammuensis* Bhowmik, 1967 ; *Scleropterus lambai* Bhargava, 1981 has been combined with *S. coriaceus* (Haan, 1842); besides, *V. indicus* Tandon and Shishodia (1974) with *V. sukhadae* (Bhowmik, 1967) ; *V. jaintianus* Biswas and Ghosh (1975) with *V. bhaduri* (Bhowmik, 1967) , and, *V. lohitisensis* (Tandon and Shishodia 1972) and *V. dehradurensis* Tandon and Shishodia (1974) with *V. sikkimensis* (Bhowmik, 1967) have been synonymised

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FIGURES

EXPLANATION OF FIGURES

Brachytrypes portentosus, male.

Fig. 2. epiphallus, dorsal.

Fig. 3. epiphallus, lateral.

Modicogryllus blennus

Fig. 4. lateral field of elytron, male (H-humeral vein ; M-mediastinal vein ; 1st to 4th veins).

Fig. 5. lateral field of elytron, female (letterings as in fig. 4).

Modicogryllus lineiceps, male.

Fig. 6. phallic complex, ventral.

Modicogryllus tikaderi, male.

Fig. 7. phallic complex, dorsal.

Fig. 8. ectoparamere with its mesal lobe attachment.

Teleogryllus longipennis, male.

Fig. 9. ectoparamere with its mesal lobe attachment.

Teleogryllus fletcheri, male.

Fig. 10. ectoparamere with its mesal lobe attachment.

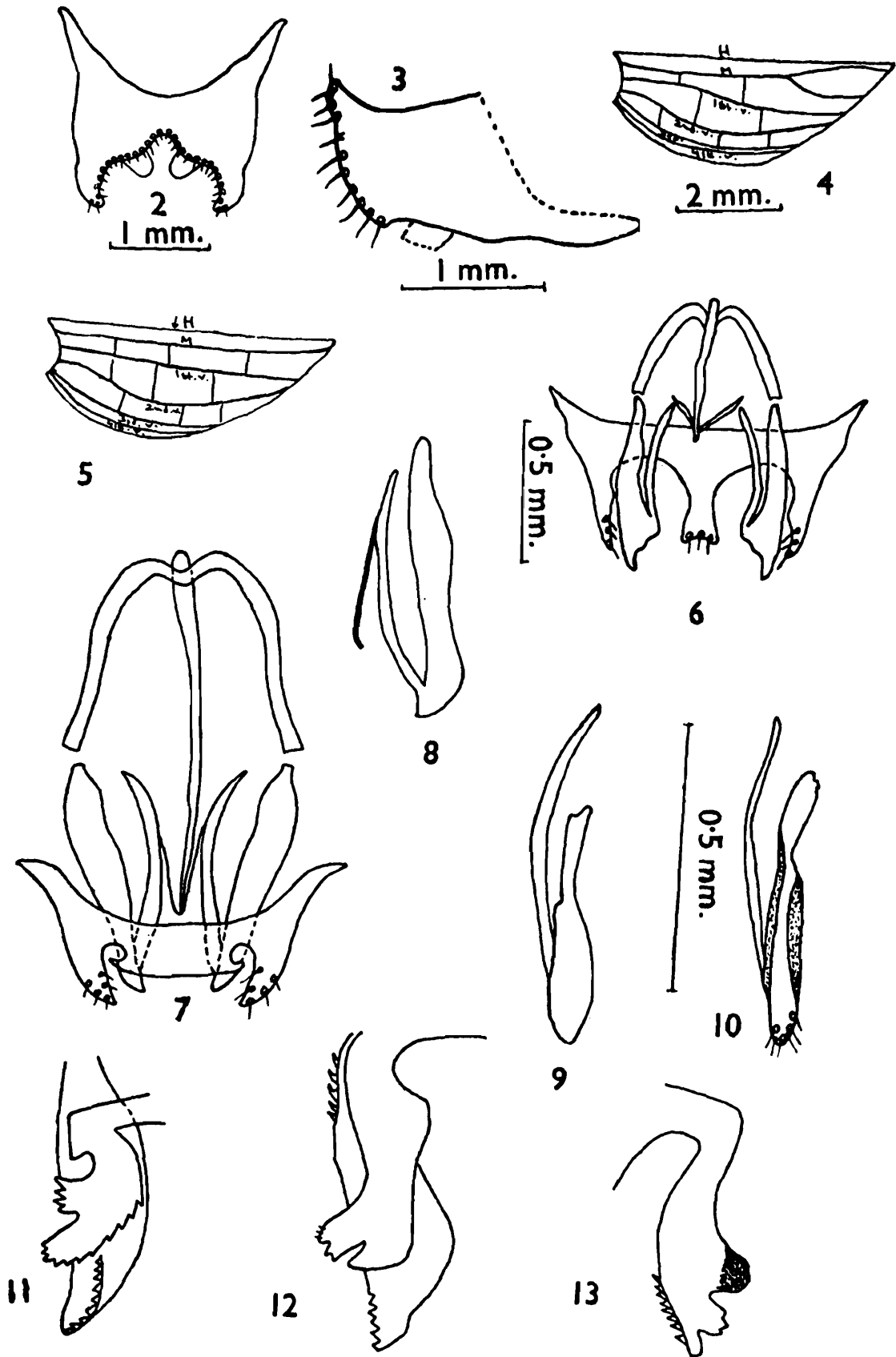
Turanogryllus dehradurensis, male.

Fig. 11. ectoparamere, ventral.

Turanogryllus mitrai, male.

Fig. 12. ectoparamere, ventral.

Fig. 13. ectoparamere, ventro—lateral.

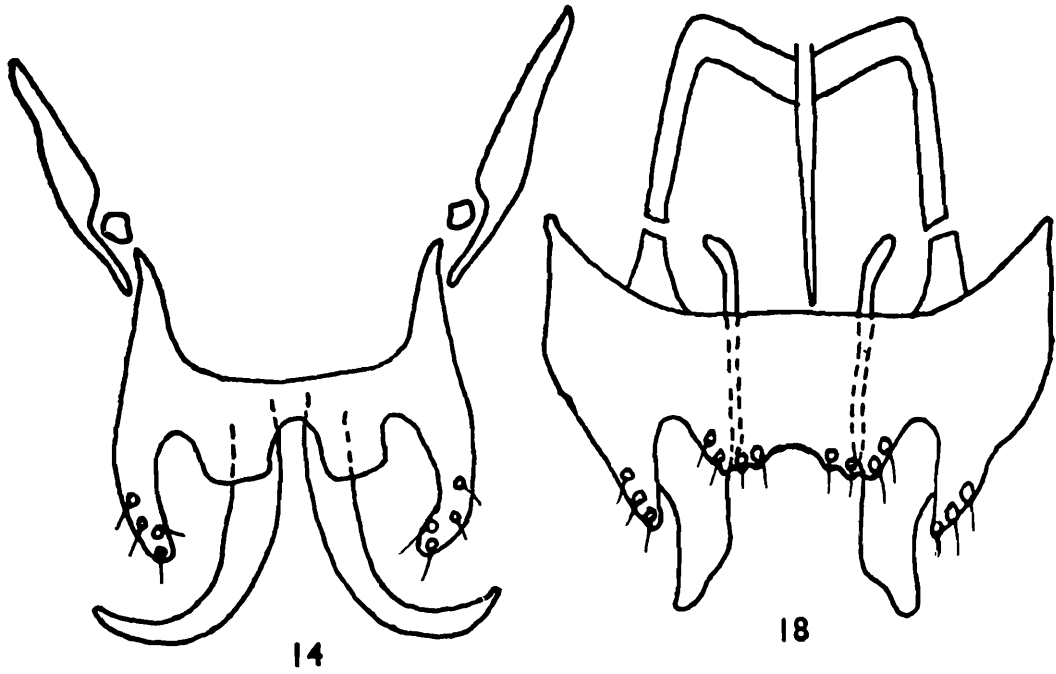


Velarifictorus lambai, male.

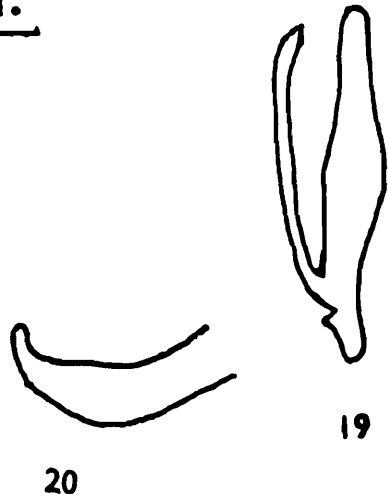
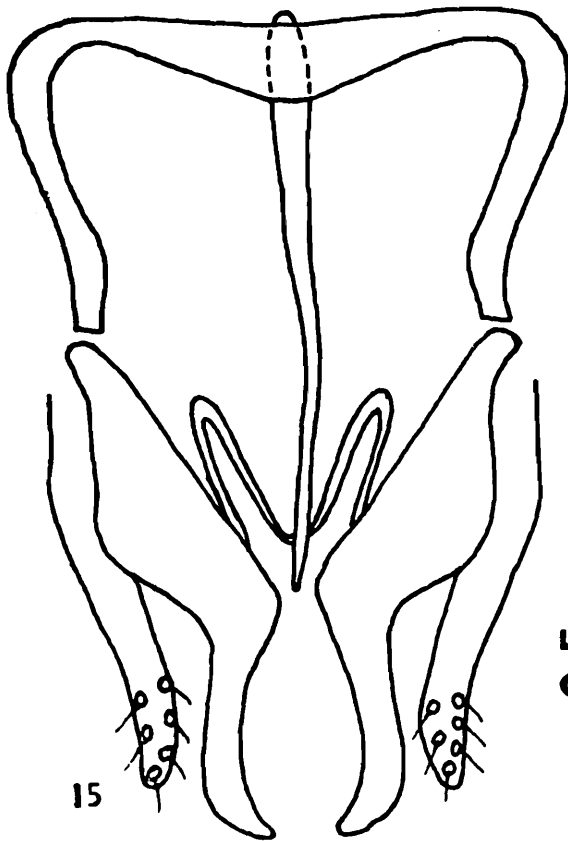
- Fig. 14. phallic complex, dorsal.
- Fig. 15. phallic complex, ventral.
- Fig. 16. apex of ectoparamere, ventral (enlarged).
- Fig. 17. apex of ectoparamere, lateral (enlarged).

Velarifictorus basui, male.

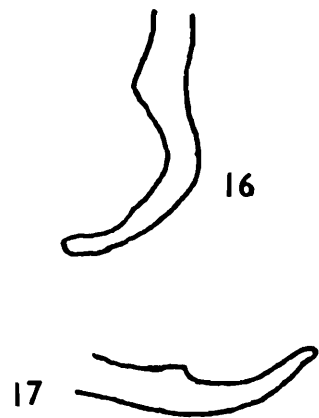
- Fig. 18. phallic complex, dorsal.
- Fig. 19. ectoparamere, ventral.
- Fig. 20. apex of ectoparamere, lateral



0.5 mm.



0.5 mm.

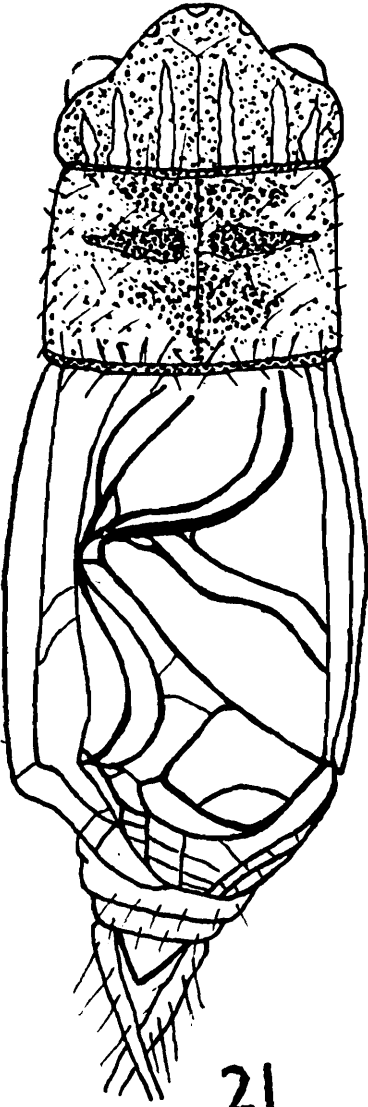


Drawing profiles of—

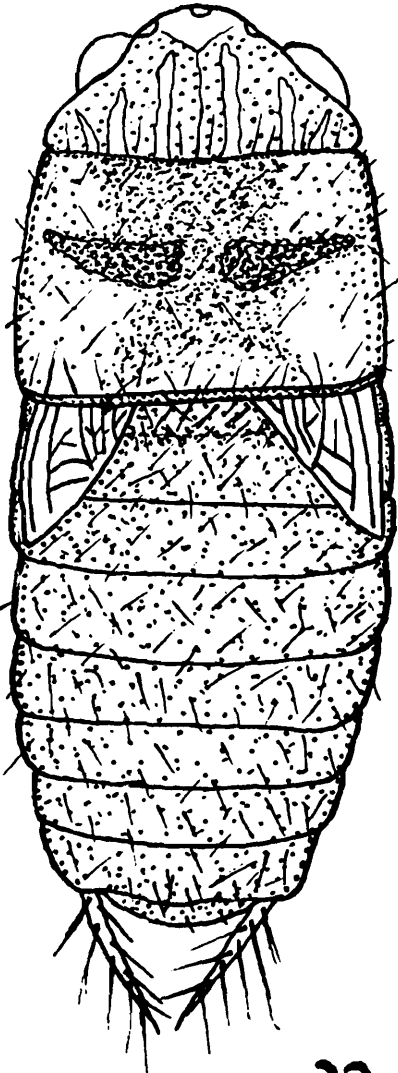
Fig. 21. *Modicogryllus tikaderi*, male.

Fig. 22. *M. tikaderi*, female.

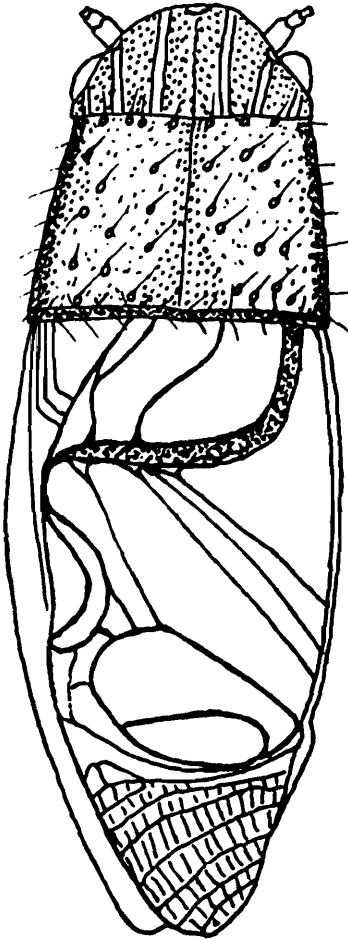
Fig. 23. *Turanogryllus jammuensis*, male.



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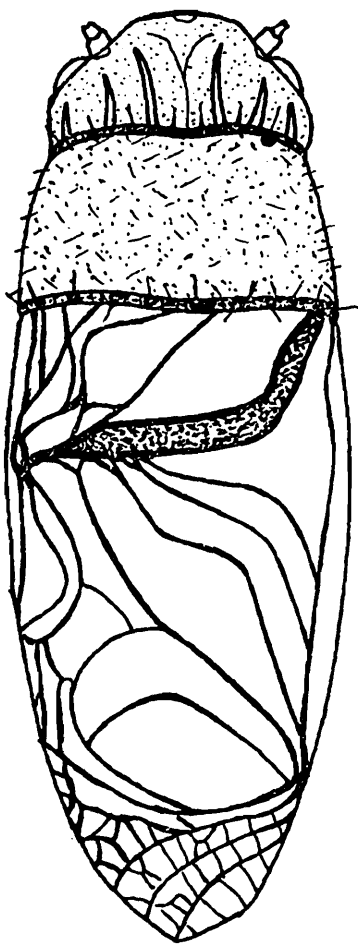
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Fig. 24. *T. mitrai*, male.

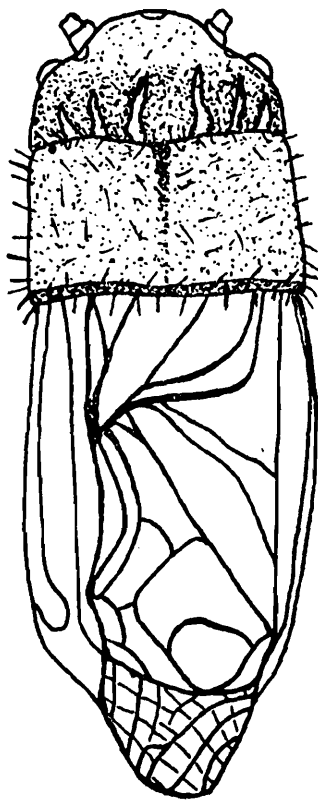
Fig. 25. *Velarifictorus parvus*, male.

Fig. 26. *V. lambai*, male.

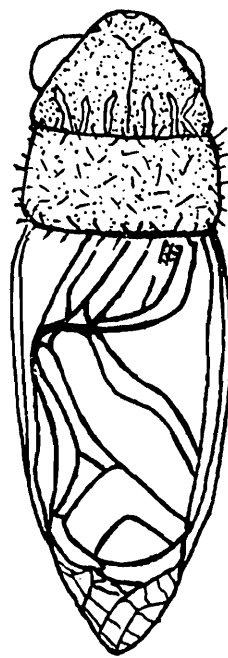
Fig. 27. *Loxoblemmus nigriceps*, male (Fig. 21 to 27, same scale).



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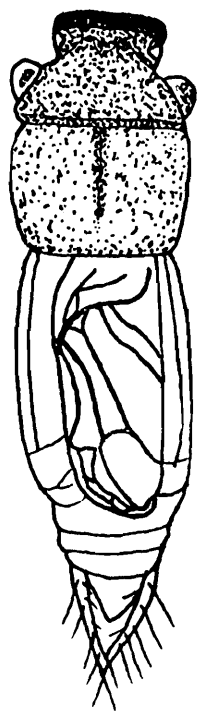


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2 mm.

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Photographic profiles of—

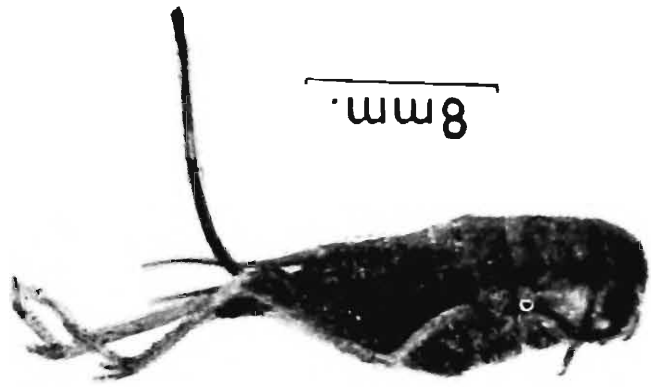
- Fig. 28. *Gymnogryllus kashmirensis*, male (holotype).
- Fig. 29. *Turanogryllus dehradurensis*, male (holotype).
- Fig. 30. *T. dehradurensis*, female (allotype).
- Fig. 31. *T. jammuensis*, female (holotype).
- Fig. 32. *T. quadrilineatus* (= *T. jammuensis*), male (holotype).
- Fig. 33. *Velarifictorus sukhadae*, male (holotype).
- Fig. 34. *V. bhaduri*, male (holotype).
- Fig. 35. *V. raychaudhuri*, male (holotype).

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PLATE I



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