

OCCASIONAL PAPER NO. 140

Records of the Zoological Survey of India

**Taxonomic and Zoogeography of the Tetrigidae
(Orthoptera : Tetrigoidea) of North Eastern India**

M. S. Shishodia

Zoological Survey of India

**RECORDS
OF THE
ZOOLOGICAL SURVEY OF INDIA**

OCCASIONAL PAPER NO. 140

**TAXONOMY AND ZOOGEOGRAPHY OF THE TETRIGIDAE
(ORTHOPTERA : TETRIGOIDEA) OF NORTH EASTERN
INDIA**

By

M. S. SHISHODIA

Zoological Survey of India, New Alipur, Calcutta



सत्यमेव जयते

Edited by the Director, Zoological Survey of India
1991

© Copyright : Government of India, 1991

Published : December, 1991

Price : *Inland* : Rs. 100·00

***Foreign* : £ 5·00 \$ 8·00**

**Printed in India by A. K. Chatterjee at Jnanodaya Press, 55B, Kabi Sukanta Sarani,
Calcutta 700 085 and published by the Director, Zoological Survey of India, Calcutta.**

RECORDS OF THE ZOOLOGICAL SURVEY OF INDIA

Occasional Paper

No. 140	1991	Pages 1-198
----------------	-------------	--------------------

CONTENTS

PREFACE	... [vii]
INTRODUCTION	... 1
HISTORICAL REVIEW	... 2
MORPHOLOGICAL DIAGNOSTIC CHARACTERS	... 5
SYSTEMATIC ACCOUNT	... 10
Key to the Subfamilies of the Family TETRIGIDAE	... 10
Subfamily I CLADONOTINAE	... 10
Key to the genera of the Subfamily CLADONOTINAE	... 10
(1) Genus <i>FIEBERIANA</i> Kirby, 1914	... 11
1. <i>F. pachymera</i> (Fieber), 1845	... 11
(2) Genus <i>EPITETTIX</i> Hancock, 1907	... 13
2. <i>E. elytratus</i> Günther, 1939	... 14
Subfamily II SCELIMENINAE	... 15
Key to the genera of the Subfamily SCELIMENINAE	... 15
(3) Genus <i>Scelimena</i> Serville, 1839	... 16
Key to the species of SCELIMENA Serville	... 17
3. <i>S. discalis</i> (Hancock), 1915	... 18
4. <i>S. kempi</i> (Hancock), 1915	... 20
5. <i>S. india</i> Hancock, 1907	... 22
(4) Genus <i>INDOSCELIMENA</i> Günther, 1938	... 23
6. <i>I. saussurei</i> (Hancock), 1915	... 24
(5) Genus <i>THORADONTA</i> Hancock, 1906	... 25

Key to the species of <i>Thoradonta</i> Hancock	...	26
7. <i>T. apiculata</i> Hancock, 1915	...	27
8. <i>T. nodulosa</i> (Stal), 1860	...	29
9. <i>T. pruthii</i> Günther, 1938	...	31
10. <i>T. lativertex</i> Günther, 1938	...	32
11. <i>T. bengalensis</i> sp. nov.	...	34
(6) Genus CRIOTETTIX Bolivar, 1887	...	35
12. <i>C. bispinosus</i> (Dalman), 1818	...	36
(7) Genus EUCRIOTETTIX Hebard, 1929	...	38
Key to the species of <i>Eucriotettix</i> Hebard	...	39
13. <i>E. pallidus</i> (Hancock), 1915	...	39
14. <i>E. dohertyi</i> (Hancock), 1915	...	41
15. <i>E. annandalei</i> Hancock, 1915	...	43
16. <i>E. grandis</i> (Hancock), 1912	...	44
(8) Genus LOXILOBUS Hancock, 1904	...	46
Key to the species of <i>Loxilobus</i> Hancock	...	47
17. <i>L. assamus</i> Hancock, 1907	...	47
18. <i>L. acutus</i> Hancock, 1904	...	50
(9) Genus SYNALIBAS Günther, 1939	...	51
Key to the species of <i>Synalibas</i> Günther	...	52
19. <i>S. vagans</i> Günther, 1939	...	52
20. <i>S. perplexus</i> (Hancock), 1915	...	54
(10) Genus HEBARDTETTIX Günther, 1938	...	56
Key to the species of <i>Hebarditettix</i> Günther	...	57
21. <i>H. triangularis</i> (Hancock), 1915	...	57
22. <i>H. quadratus</i> (Hancock), 1915	...	59
23. <i>H. lobatus</i> (Hancock), 1912	...	60
Subfamily III METRODORINAE	...	62
Key to the genera of the Subfamily METRODORINAE	...	62
(11) Genus SYSTOLEDERUS Bolivar, 1887	...	63
Key to the species of <i>Systolederus</i> Bolivar	...	64
24. <i>S. gravelyi</i> Günther, 1939	...	64
25. <i>S. cinereus</i> Brunner, 1893	...	66
26. <i>S. abbreviatum</i> sp. nov.	...	68
(12) Genus TEREDORUS Hancock, 1906	...	70
Key to the species of <i>Teredorus</i> Hancock	...	70
27. <i>T. bhattacharyai</i> sp. nov.	...	71
28. <i>T. turncatus</i> sp. nov.	...	72
29. <i>T. carmichaeli</i> Hancock, 1915	...	73
30. <i>T. frontalis</i> Hancock, 1915	...	75
(13) Genus BOLIVARITETTIX Günther, 1939	...	77

Key to the species of <i>Bolivaritettix</i> Günther	...	78
31. <i>B. singlaensis</i> (Hancock), 1915	...	79
32. <i>B. tandoni</i> sp. nov.	...	80
33. <i>B. sculptus</i> (Bolivar), 1887	...	82
34. <i>B. sikkimensis</i> (Bolivar), 1909	...	86
35. <i>B. laticeps</i> (Bolivar), 1909	...	87
36. <i>B. dubius</i> (Hancock), 1912	...	88
37. <i>B. roonwali</i> sp. nov.	...	90
38. <i>B. ghumtianus</i> (Hancock), 1915	...	92
39. <i>B. lativertex</i> (Brunner), 1893	...	93
(14) Genus XISTRELLA Bolivar, 1909	...	94
Key to the species of <i>Xistrella</i> Bolivar	...	95
40. <i>X. dromadaria</i> Bolivar, 1909	...	95
41. <i>X. siangensis</i> sp. nov.	...	97
42. <i>X. inermis</i> (Hancock), 1915	...	99
43. <i>X. arorai</i> sp. nov.	...	101
(15) Genus XISTRA Bolivar, 1887	...	103
44. <i>X. sikkimensis</i> Hancock, 1915	...	104
(16) Genus HYBOELLA Hancock, 1915	...	105
Key to the species of <i>Hyboella</i> Hancock, 1915	...	106
45. <i>H. nullipennis</i> (Hancock), 1915	...	107
46. <i>H. tumida</i> (Hancock), 1913	...	109
47. <i>H. conioptica</i> Hancock, 1915	...	111
48. <i>H. obesa</i> Hancock, 1915	...	112
49. <i>H. tentata</i> Hancock, 1915	...	116
50. <i>H. dilatata</i> (De Haan), 1842	...	118
(17) Genus MIXOHYBOELLA gen. nov.	...	121
51. <i>M. srivastavai</i> sp. nov.	...	122
(18) Genus SPADOTETTIX Hancock, 1910	...	123
52. <i>S. subansiriensis</i> sp. nov.	...	124
Subfamily IV TETRIGINAE	...	126
Key to the genera of the Subfamily TETRIGINAE	...	126
(19) Genus TETRIX Latreille	...	127
53. <i>T. bipunctata</i> (Linnaeus), 1758	...	128
(20) Genus EUPARATETTIX Hancock, 1904	...	129
Key to the species of <i>Euparatettix</i> Hancock	...	130
54. <i>E. personatus</i> (Bolivar), 1887	...	130
55. <i>E. tenuis</i> Hancock, 1912	...	133
56. <i>E. histricus</i> (Stal), 1860	...	135
(21) Genus PARATETTIX Bolivar, 1887	...	138
Key to the species of <i>Paratettix</i> Bolivar	...	139

57. <i>P. hancockus</i> (Shishodia & Varshney), 1987	...	140
58. <i>P. curtipennis</i> (Hancock), 1912	...	144
59. <i>P. cingalensis</i> (Walker), 1871	...	146
60. <i>P. hirsutus</i> Brunner, 1893	...	148
61. <i>P. rotundatus</i> Hancock, 1915	...	150
62. <i>P. alatus</i> Hancock, 1915	...	151
63. <i>P. tricarinatus</i> Bolivar, 1887	...	152
(22) Genus <i>Hedotettix</i> Bolivar, 1887	...	154
Key to the species of <i>Hedotettix</i> Bolivar	...	155
64. <i>H. costatus</i> Hancock, 1912	...	155
65. <i>H. gracilis</i> (De Haan), 1842	...	157
66. <i>H. grossus</i> Hancock, 1915	...	161
67. <i>H. attenuatus</i> Hancock, 1904	...	162
(23) Genus COPTOTETTIX Bolivar, 1887	...	164
Key to the species of <i>Coptotettix</i> Bolivar, 1887	...	164
68. <i>C. annandalei</i> Hancock, 1915	...	165
69. <i>C. tuberculatus</i> Bolivar, 1887	...	168
70. <i>C. tricarinatus</i> sp. nov.	...	169
71. <i>C. conspersus</i> Hancock, 1915	...	170
72. <i>C. manipurensis</i> sp. nov.	...	172
73. <i>C. lohitensis</i> sp. nov.	...	173
(24) Genus ERGATETTIX Kirby, 1914	...	174
Key to the species of <i>Ergatettix</i> Kirby	...	175
74. <i>E. güntneri</i> Steinmann, 1970	...	175
75. <i>E. dorsifera</i> (Walker), 1871	...	178
76. <i>E. callosus</i> (Hancock) 1915	...	180
Subfamily V BATRACHIDEINAE	...	182
(25) Genus SAUSSURELLA Bolivar, 1887	...	182
77. <i>S. cornuta</i> (De Hann), 1882	...	183
Zoogeography of North East India in relation to Oriental Fauna		185
SUMMARY	...	191
ACKNOWLEDGEMENTS	...	191
REFERENCES	...	193
LIST OF ABBREVIATIONS USED	...	199
ALPHABETICAL INDEX	...	200
ERRATA	...	204

PREFACE

The members of the family Tetrigidae are popularly known as "Grouse-Locusts". These are small to moderate sized orthopterans of variable colour, but generally they are dark brown or brown or grey. Their habits and habitats bring them in close contact with the ground or water and thus make them generally geophilous. They are commonly found to occur in meadows or swamps, or on wet rocks along the sides of streams and pools, while a few are found on or around the crops. During this study a large number of specimens have been collected from the fields of wheat, paddy, cabbage, maize, brinjal, etc., of Narendrapur (West Bengal : 24-Parganas Distt.). There are a few reports about them as pests. Most of the species of grouse-locusts are phototropic and polymorphic. These orthopterans are readily recognised from the other allied families of the order by the absence of arolium between the tarsal claws and the backward extension of pronotum, which forms a hood-like covering to the body.

INTRODUCTION

Perusal of the literature shows that not much work on 'grouse-locusts' (Fam. Tetrigidae) has been done, particularly on the taxa found in north eastern India. The only comprehensive work on this group from the Indian region (including Sri Lanka and Burma) is that of Kirby (1914) in the *Fauna of British India, Orthoptera (Acridiidae)*. The other important works from this region are Hancock (1906, 1912 and 1915), Bolivar (1918) and Hebard (1929). Günther (1938, 1939) had published a revisionary work on the group, except on the subfamilies Tetriginae and Batrachideinae. Recently, Steinmann (1970) has made a Check-List of the Oriental Tetrigidae, though incomplete (as it does not contain full references to synonyms as well as the detailed distribution of the various species). The presently available keys are by Kirby (1914) and Hancock (1915), which are quite old and obsolete.

So far as the Tetrigidae fauna of north eastern India (States of West Bengal, Sikkim, Assam, Tripura, Manipur, Meghalaya, Arunachal Pradesh and Nagaland) is concerned, only occasional references are found in the works of Kirby (1914), Hancock (1912, 1915) and Günther (1938, 1939).

Before the present work, a total of sixty eight species under twenty five genera were known from this region, out of one hundred twenty two species under thirty four genera reported from all over India, despite the fact that North Eastern India is richest in fauna in the whole of India. The author has earlier studied the Grylloidea of N.E.F.A. (now Arunachal Pradesh) (Tandon & Shishodia, 1972). The present work is based on the author's studies submitted to the Agra University, Agra (Uttar Pradesh), in 1981, on which the degree of Ph.D. was awarded (Shishodia, 1981). Appropriate updating has been made, wherever necessary. This work is based on the collections made by the author during last 20 years, as well as on other collections in the Zoological Survey of India.

Habit : Both the adult and immature forms of grouse-locusts are known to feed on mosses and other forms of vegetation. Very little is known about their economic importance, except one species is known as a pest of cabbage in India. During the course of present studies a large number of specimens were collected from the crop fields of wheat, paddy, maize, brinjal and cabbage.

HISTORICAL REVIEW

The family Tetrigidae belongs to the order Orthoptera. Originally this group was placed in the order Coleoptera by Linnaeus (1758). Thunberg (1775) considered them as Hemiptera. Latreille (1793) erected a separate order Orthoptera into which the Acridoidea and other unrelated groups were placed. Later on Latreille (1817) divided the order Orthoptera into two : Orthoptera-Cursoria (Walking Orthoptera) and Orthoptera-Saltatoria (Jumping Orthoptera). Handlirsch (1908) divided the order Orthoptera Latreille 1793 (= Saltatoria latreille 1817), into two suborders *i.e.*, Locustoidea and Acridoidea, and the only family included in the latter suborder was Acridiidae.

Ander (1939) divided the order Saltatoria into the suborders Ensifera and Caelifera. In the suborder Caelifera was placed the short horned grasshoppers. This division was unsatisfactory from the point of view of morphology as well as phylogeny (Dirsh, 1975). Beier (1955) established the superfamily Tetrigides as equal in rank to his Acridides (= Acridoidea) consisting of the families Tetrigidae, Tridactylidae and Cylindrachetidae. Dirsh (1961) has regarded Beier's superfamily Tetrigides as the suborder Tetrigoidea, equal in rank to Acridoidea. The taxon superorder Orthopteroidea was introduced by Bey-Bienko (1962). His division was also far from satisfactory, because he had not taken into account the important taxonomic characters, especially the structure of genitalia.

Recently Dirsh (1973) raised the suborder Tetrigoidea to the rank of the order, "Tetrigoidea". Since the suffix "oidea" is applicable to the superfamily, its usage for the order creates confusion to the taxonomists. So I am not following Dirsh (1973) and am using the taxon Tetrigoidea for the superfamily.

Tetrigoidea can be easily recognised from the allied superfamily Acridoidea by the following characters : the pronotum is much elongated and covers the whole or a greater part of the abdomen ; the elytra are much shortened, scale like, while the wings are fully developed except in the case of apterous species ; the anterior and middle tarsi consist of two segments and the posterior tarsus three segments ; claws of tarsi are not provided with an arolium or intermediate pad ; and the structure of phallic complex-epiphallus and cingulum are absent, the penis is directed towards the anterior end of the body and the whole phallic organ is covered above with valves.

According to Walker (1919 : 285) Tetrigidae is more primitive than Acrididae because of the absence of arolium, the extension of pro-

notum beyond the thorax and the structure of the genitalia.

Westwood (1834) was the first to describe a tetrigid—*Tripetalocera ferruginea* 1834, followed by Serville (1839). In 1842, it was De Haan who proposed a synoptical table for these insects to separate them from the other allied groups of insects. Though the table was imperfect, it was sufficient for distinguishing the small number of species known at that time.

Saussure (1861) and Walker (1871) studied the collections of Orthoptera which were present in the Geneva Museum and the British Museum respectively. Walker (1871) in his Catalogue described several Indian species which were available in the British Museum. Later on Stål (1873) described seventeen species of this group in his *Recensio Orthopterorum* 1. Bolívar (1887) under the title "Essai sur les Acridiens de la tribu des Tetrigidae" studied the family Tetrigidae and also described a number of new species. He also arranged the species under seven sections and provided keys for the sections, genera and species. Brunner von Wattenwyl (1893) classified the family Acrididae into nine subfamilies, one of which is Acrydiinae in which contains "grouse-locusts".

Bolívar (1902) studied a few species of Orthoptera including the family Tetrigidae which were available in the St. Joseph's College, "Trichinopoly" (Tamil Nadu). Hancock (1904, 1908 and 1910) described and recorded a number of species from Sri Lanka. He also studied (1907, 1909 and 1910) the collections available in the Oxford University Museum. Bolívar (1909) studied the family Acrididae along with Tetrigids which were present in the Geneva Museum. Lefroy (1909) also provided some data for the family.

Kirby (1910) prepared a Catalogue for the family Acridiidae including the subfamily Acrydiinae, in which he has provided all the references for the subfamily and the distribution of the species.

Hancock's first attempt to study the Indian Tetrigidae was in 1912 on the collection obtained from the Agriculture Research Institute, Pusa (now the Indian Agriculture Research Institute, New Delhi).

Kirby (1914) in *Fauna of British India* family Acridiidae has described five new genera and ten new species besides the already known twenty three genera and seventy three species. He has not included the species described by Hancock (1912), in the *Fauna* as the latter's work was not available to him. Because of his sudden death, Kirby could not complete the *Fauna of British India*, and the remaining work was completed by an inexperienced Orthopterist. So, numerous errors have crept in the *Fauna*. Kirby followed Hancock's classification (1906) but he suffixed "ni" at the end of the section instead "ae" and called it "group".

Hancock (1915) studied the collection from the Indian Museum (now the Zoological Survey of India). In this study he has described two new genera and thirty five new species besides the other already known sixty species. Hancock (1915) for the first time used the term subfamilies for the sections or groups of earlier workers. Bolivar (1918) also studied the collection of Orthoptera of Indian subcontinent including the family Tetrigidae. He tried to correct the errors of Kirby to a certain extent. His work provides us with the distribution of the Indian species.

Fletcher (1921) published a catalogue for the family Acrydidae (Tettigidae) in which he gave a full list of synonyms and references along with the distribution. Till 1921, the number of species known from India and the adjacent countries was one hundred and sixty nine belonging to thirty nine genera. Out of these, only one hundred and twenty six species under nineteen genera belong to India proper.

Hebard (1929) studied the South Indian Tetrigidae. He clarified the generic placings of some species and discussed their affinities and at the same time erected three new genera and five new species.

Significant contributions were made by Uvarov (1925 & 1928), Caudell (1927), Chopard (1929), Willemsse (1930 & 1931), Hebard (1932), Henry (1933) and Tinkham (1937) on Tetrigidae from Mount-Everest and Sri Lanka, Java, Samoa, Sumatra and Sunda Expd. material, Sri Lanka and Taiwan respectively.

Klaus Günther (1935-1941) revised the subfamilies of Tetrigidae except those of Batrachideinae and Tetriginae. His work on the fauna of the Oriental and the Indo-malayan regions is still very useful. Günther's work is detailed and in most of the cases it is provided with keys to genera and species.

After Günther, not much work has been carried out in India on this family, except by Grant (1966) and Steinmann (1970). Grant (1966) studied the genera of Batrachideinae of Pacific Islands, including the revision of the genus *Saussurella* Bolivar, which is found in India also. Recently, Steinmann (1964, 1969, 1970, 1971) has compiled the taxonomical work on the family Tetrigidae in the form of Check-lists, which give us a zoogeographical picture of the species of the world.

MORPHOLOGICAL DIAGNOSTIC CHARACTERS

(Plate 1 & 2 figs. 1-3 & 1-7)

Colouration : The grouse locusts are generally brown, dark brown or grey. But sometimes a mixture of brown, grey and dark brown is found. The general body colouration shows intraspecific variations.

Vestiture : The vestiture of pronotal surface is generally stable within the species and affords valuable characters for the separation of species. Normally the surface is granulose or rugulose but sometimes it is leathery or smooth as in *Xistrella dromadaria* Bolivar or tuberculose as in *Coptotettix tuberculatus* Bolivar, *Hyboella tentata* Hancock and *Bolivaritettix sikkimensis* (Bolivar) or gibbose as in *Tripetalocera ferruginea* Westwood.

Shape and size of the body : The shape and the size of the body are important characters as they can give the first clue to the species.

Head : The head comprises vertex, compound eyes, ocelli and antennae. Head proper is very important in the separation of genera and species. The term elongated is used when the eyes are located far away from the pronotum and not elongated when they are nearer. Elevation of head from the level of pronotum is another important character. In the genus *Systolederus* Bolivar, it is highly elevated above the pronotum whereas in the genus *Teredorus* Hancock it is normally not exerted.

Vertex : The Vertex lies between the two compound eyes. The size of vertex varies from species to species. The length and the breadth of the vertex are compared with that of the eyes. Vertex may be broader than an eye as in *Bolivaritettix* Günther or narrower as in *Hebarditettix* Günther and *Systolederus* Bolivar. Usually it is not produced in front of the eyes but in some cases like *Tetrix bipunctata* (Linnaeus), *Hedotettix costatus* Hancock, *Epitettix elytratus* Günther, *Spadotettix subansiriensis* sp. nov, it is produced beyond the eyes. The depression of vertex on either side of the middle carinula is called a fossula or fossa. It may be longitudinal as found in *Coptotettix* Bolivar, *Hyboella* Hancock, *Loxilobus* Hancock, etc. or merely depressed. The middle carina of the vertex is known as middle carinula and similar carinae found on either side of the compound eyes internally are called lateral carinulae. The elevation, distinctness and bend of these carinulae vary with the species. The elevation of lateral carinulae is compared with that of the eyes. The front margin of vertex is also important. It may be carinate or not, transverse or angulate or rounded.

Frontal costa : Facial carina is known as the frontal costa. It is

also an important taxonomic character used in the separation of genera and species and sometimes in the subfamilies also. Frontal costa is usually bifurcated behind the paired ocelli or sometimes in between. It may be depressed or not, protuberant or compresso-elevated between the ante-

Plate 1

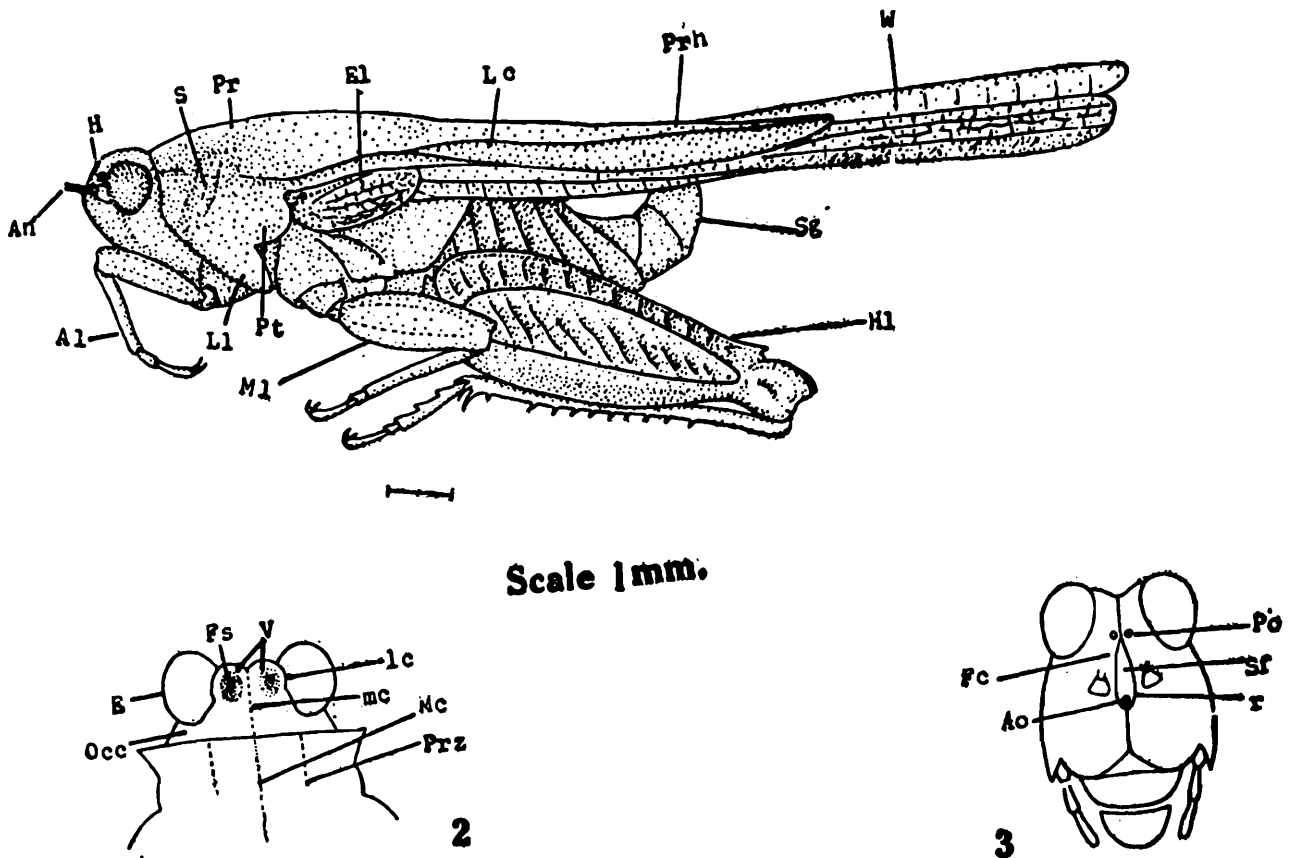


PLATE 1 : Fig. 1. Dorso-lateral view of *Paratettix rotundatus* Hancock (Male).

Fig. 2. Dorsal view of the head of Tettigidea (magnified).

Fig. 3. Front view of the head of Tettigidea (magnified).

nae or not, arcuate or sinuate. The degree of bifurcation between the paired ocelli and the antennae is quite variable. The bifurcated carinae of the frontal costa are called the 'rami'.

Paired or lateral ocelli : They are two in number and are situated between the compound eyes. The position of these ocelli vary with the species and is generally between the middle of eyes but sometimes below the middle of eyes or rarely above the middle.

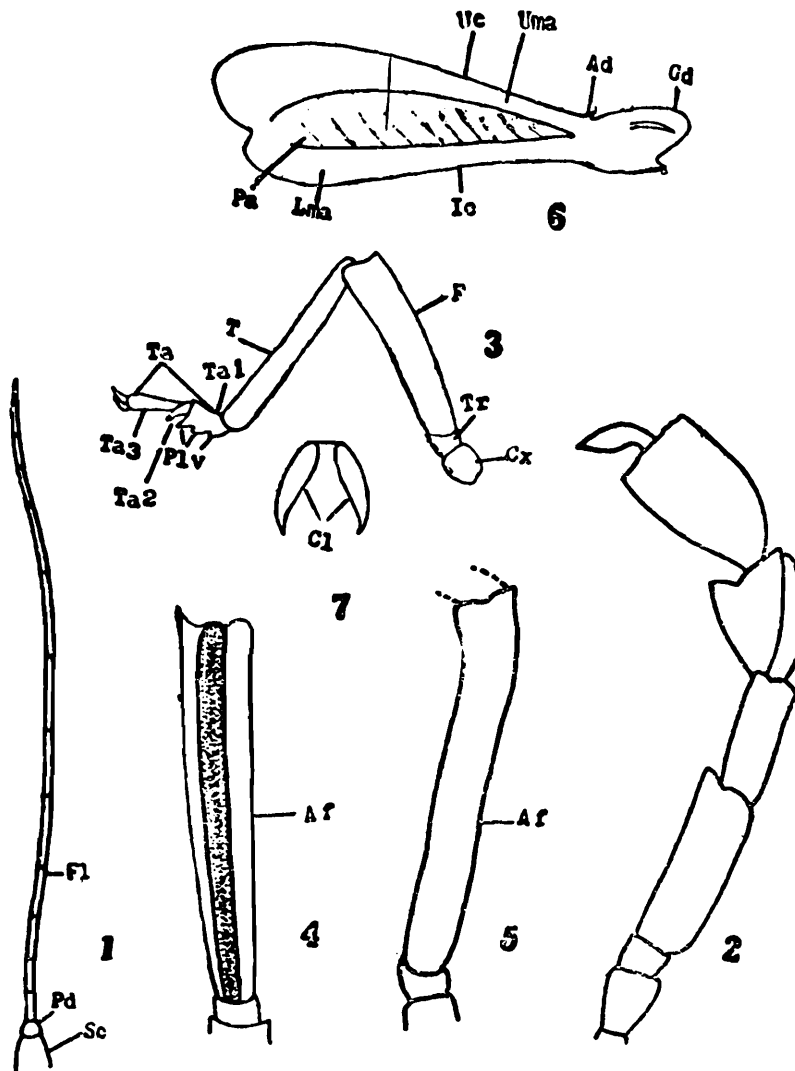
Anterior or median ocellus : It is situated anterior to the antennae always nearly in the middle. It is not very useful in the taxonomy.

Antennae : They have much significance in the taxonomy of Orthoptera. The shape and the size of the antenna is variable. It is narrow at base and apex and flattened in the middle as found in the subfamily Tripetalocerinae but commonly it is filiform. Antenna in the case

of *Spadotettix* Hancock is very short, while it is very long in *Xistrella* Bolivar.

Eyes : Eyes are placed laterally one on either side of the vertex. The elevation and the shape of eyes vary with the species. They are not

Plate 2



- PLATE 2 :** Fig. 1. Antenna of *Scelimena discalis* (Hancock) (magnified).
 Fig. 2. Antenna of *Tripetalocera ferruginea* Westwood (magnified).
 Fig. 3. Posterior leg of Tetrigid (magnified).
 Fig. 4. Top view of anterior femur of *Saussurella cornuta* (De Haan) (magnified).
 Fig. 5. Top view of anterior femur of *Loxilobus assamus* Hancock (magnified).
 Fig. 6. Posterior femur, external face (magnified).
 Fig. 7. Claw of posterior leg.

usually exerted above the vertex as in the genus *Teredorus* Hancock and *Criotettix* Bolivar or highly elevated above the vertex as in the case of *Xistrella* Bolivar.

Pronotum : This is the dorsal shield of prothorax. The pronotum in the family Tetrigidae is strongly elongated and covers a greater part or whole of the body or even the entire wings. The shape of pronotum

varies in different subfamilies. In the genus *Fieberiana* Kirby, the pronotum is compressed and foliaceous whereas it is tectiform throughout in *Mixohyboella* gen. nov. Sometimes it is tumid between the shoulders or tectiform in front of the shoulders. The anterior margin of pronotum is also quite variable in different genera and species. The anterior margin is usually truncate or rarely angulate as found in *Fieberiana pachymera* Fieber or very much extended over the vertex as in *Saussurella* Bolivar when it is called the anterior pronotal process. Normally the pronotum is cuneate or subulate behind the shoulders. The apical part of the pronotum behind the shoulders is called hind process or posterior pronotal process. The length of pronotum also varies in different genera, it is very short in *Paratettix hancockus* (Shishodia & Varshney) but very long and extended beyond the hind femora in *Scelimena discalis* (Hancock).

Dorsum of pronotum : This is the upper part of pronotum, which is either separated from the lateral lobes by the lateral carinae or gradually merging with them.

Median carina of pronotum : This is the central ridge or carina on pronotum. The elevation or the depression of the carina varies in different species and is of considerable taxonomic importance.

Lateral carinae of pronotum : They are situated on either side of the pronotum. The lateral carinae are not very important though they may be helpful in some cases.

Prozonal carinae : These are the small carinae situated on the anterior part of pronotum in front of the transverse sulci. Their presence or absence or convergence is of specific importance.

Abbreviated carinae : They are two in number and are situated on either side of the median carina between the shoulders. Sometimes they are absent.

Humeral angles of pronotum : These are obtusely rounded angles formed by the deflection of the sides of pronotum from the dorsum. The humeral angles are normally obtusely rounded or rounded but rarely absent.

Paranota : These are the lateral expansions of the thoracic tergal region (Wardle, 1936). Harz (1975) used this term for the first time to separate the genera and species. Commonly they are two but rarely one. The anterior projection is very important in taxonomy whereas the posterior projection is not of much importance. The anterior projection is called by several names, Kirby (1914) called it the lateral lobes of hinder angles of pronotum and Hancock (1915) the lateral lobes of posterior angles of pronotum. I am following Hancock in this study, but at the same time using the paranota to indicate the number of both the

projections. Posterior angles of lateral lobes of pronotum are turned downwards in the subfamily Tetriginae but turned upwards in the subfamily Scelimeninae. The apex of the lobes may be rounded, truncate or produced into a sharp pointed spine as in the genera *Scelimena* Serville, *Criotettix* Bolivar, *Eucriotettix* Hebard and *Thoradonta* Hancock.

Elytra or tegmina : The first pair of wings is known as elytra or tegmina. In the family Tetrigidae most of the workers use the term elytra, which I also follow. They are very short, scale like and partly project out from the lateral side of pronotum. The length and breadth and the structure of its apex vary in different species. Sometimes the elytra are totally absent as in the genus *Mixohyboella* gen. nov.

Wings : The posterior pair of wings are generally called wings. The presence and absence or the degree of extension of the wings are used in the taxonomy of Tetrigidae.

Legs : The anterior pair of legs is very important in separating the subfamily Batrachideinae from the rest of the families. The elongation, the compression and the undulation of the anterior femora are sometimes used in the separation of species. The middle femora are also useful in taxonomy. Normally the middle femora are comparatively more compressed in males. The posterior pair of legs has important diagnostic characters in Orthoptera as a whole. The upper and lower margins are also known as superior and inferior carinae. The external surface of femora is divided into several areas. The area below the superior carina is called upper marginal area and the area above the inferior carina is known as the lower marginal area. The area between the upper marginal area and the lower marginal area is known as the paginal area. Antegenicular and genicular denticles are also important in some cases ; the former are situated on the apex of superior margin or carina of femora and the latter between the genicular lobes.

Posterior tarsi : Posterior tarsi are segmented. The length of the first and the third segments varies in different families, genera and species. Generally the length of the first segment is compared with that of the third.

Pulvilli : The first segment of the posterior tarsi is provided with three pads underneath, called pulvilli. The length and the acuteness of these vary with the species.

Genitalia : External secondary analo-genital organs, such as the supra-anal plate and cerci are not commonly used in the taxonomy of Tetrigidae. The inner genitalia, particularly the phallic complex in males is reduced and is not of much use in this study. The pseudosternite described by Walker (1922) can not be regarded as homologous with the

epiphallus of Acridoidea and probably represents a structure of a different origin (Dirsh, 1961). No significant difference could be traced in my present investigation although Harz (1975) used epiphallus as one of the important taxonomic characters to separate the species. The subgenital plate of females is used to separate the species in one genus (*Saussurella* Bolivar) otherwise it is not of much use as it is not variable in different species. The spermatheca is a useful taxonomic character but it is not of much advantage as it is often damaged in the dry specimens.

SYSTEMATIC ACCOUNT

Key to the Subfamilies of the Family TETRIGIDAE

1. Anterior femora more or less compressed and carinate above ; pronotum not produced above the head in front ... 2
- Anterior femora sulcated above ; pronotum produced above the head in front forming a beak like structure ... *Batrachideinae*
2. Frontal costa widely forked between the ocelli, the rami strongly divergent ... *Cladonotinae*
- Frontal costa forked, but the rami divergent only a little or moderately in front, or parallel, frequently separated by a sulcus to a slight degree ... 3
3. Posterior angles of lateral lobes of pronotum acutely produced outwards and generally spined ; first segment of posterior tarsi generally longer than the third ... *Scelimeninae*
- Posterior angles of lateral lobes of pronotum rarely acutely spined ; first segment of posterior tarsi generally not longer than the third ... 4
4. Posterior angles of the lateral lobes of pronotum little produced outwards, obliquely truncate behind, very rarely acutely spinose ; first and third posterior tarsal segments nearly equal in length ... *Metrodorinae*
- Posterior angles of lateral lobes of pronotum turned downwards, more or less rounded ; first and third posterior tarsal segments unequal in length, first rather longer than the third ... *Tetriginae*

Subfamily I CLADONOTINAE

Key to the genera of the Subfamily Cladonotinae

1. Pronotum compressed, foliaceous ; vertex narrower than one of the eyes, not extended in front of eyes ... *Fieberiana*
Kirby, 1914.

- Pronotum not compressed or foliaceous ; vertex wider than one of the eyes and extended in front of eyes ... *Epitettix*
Hancock, 1907

(1) Genus : **Fieberiana** Kirby, 1914

Type species : *Plagiocephalus pachymerus* Fieber, 1845

Plagiocephalus Fieber (nec Macq.), 1845, *Abh. Konigl.—bohm. Ges. Wiss.* (5) 3 : 407.

Fieberiana Kirby, 1914, *Fauna. Brit. India, Orth.* : 14.

Smaller in size. Colour brown or dark brown.

Head short, not exserted ; vertex narrower in width to one of the eyes, slightly narrower in front, not extended in front, fossulate on either side, fossulae open in front, median carinula distinctly visible upto the posterior end of fossulae ; frontal costa bifurcate behind the paired ocelli, widely forked in front of paired ocelli ; paired ocelli placed on the inferior margin of eyes. Antennae inserted below the inferior margin of eyes.

Pronotum high, arched, cultrate, tectiform, granulated and tuberculated and extended upto the apex of abdomen ; median carina compresso-elevated and arched, a little produced over the head ; prozonal and abbreviated carinae absent ; paranota with one projection ; posterior angles of lateral lobes of pronotum turned downwards, apex generally rounded. Elytra and wings reduced ; middle femora lamellate with notched carinae ; posterior femora elongated and stouter or broad, suddenly contracted at the knee. Thorax arched.

Geographical distribution : India.

1. **Fieberiana pachymera** (Fieber), 1845

(Plate 3, fig. 1)

Plagiocephalus pachymerus Fieber, 1845, *Abh. Konigl-bohm. Ges. Wiss.* (5) 3 : 407.

Piezotettix pachymerus, Kirby, 1910, *Cat. Orth.*, 3 : 7.

Fieberiana pachymerus, Kirby, 1914, *Fauna Brit. India, Orth.* : 15.

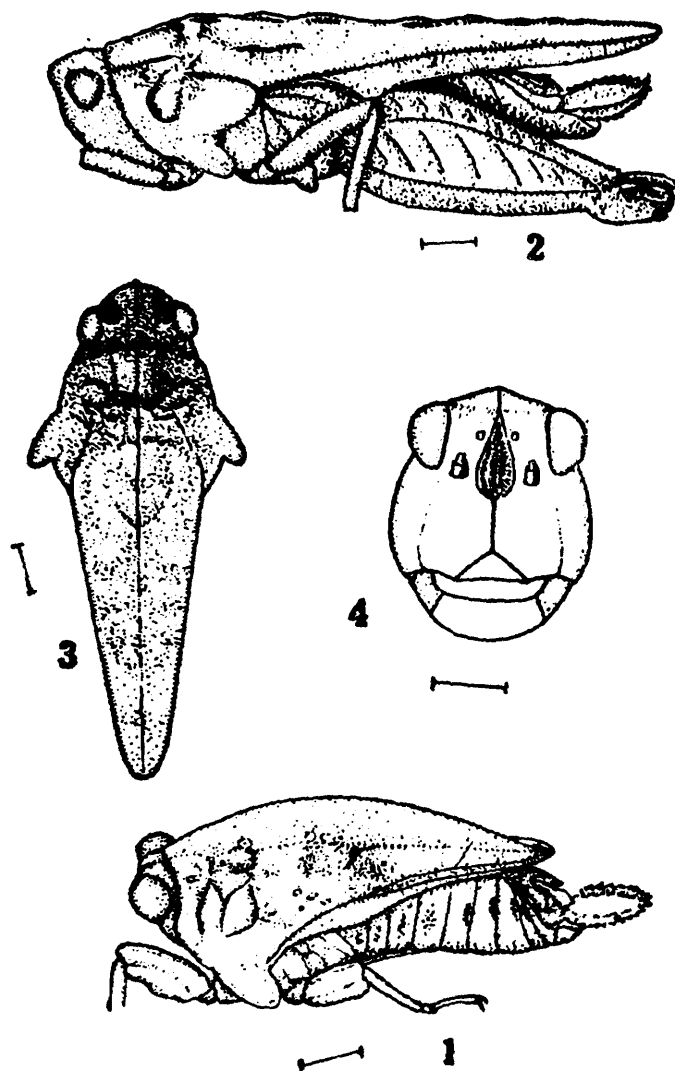
Fieberiana pachymera, Steinmann, 1970, *Acta zool. hung.*, 16 (1-2) : 217.

Smaller in size. Colour brown variegated with dark brown, anterior and middle femora with longitudinal dark brown band.

Female : Head not exerted ; vertex narrower than one of the eyes, narrowed forward, fossulate, fossulae open in front, a little ampliate behind the fossulae, extended upto the level of eyes in front, median

carinula distinctly visible and extend upto the posterior margin of fossulae, lateral carinulae elevated upto the level of eyes and not reflexed laterally, front margin lower and not bound by the carinulae ; frontal costa bifurcate behind the paired ocelli, a little compresso-elevated between the antennae, widely forked in front of paired ocelli ; paired ocelli placed on the inferior margin of eyes. Antennae filiform and inserted sufficiently below the eyes. Eyes globular and not elevated above the vertex.

Plate 3



Scale 1 mm.

- PLATE 3 : Fig. 1. Dorso-lateral view of *Fleberiana pachymera* (Fieber).
 Fig. 2. Dorso-lateral view of *Epitettix elytratus* Günther (Type).
 Fig. 3. Top view of *Epitettix elytratus* Günther (Type).
 Fig. 4. Front view of head of *E. elytratus* Günther (Type).

Pronotum with a high arch, laterally tectiform, angulated in front and slightly produced over the head, margin wavy laterally, extended upto the abdomen behind ; dorsum granulose, tuberculate and wrinkled,

convex on either side of median carina, with depression in front and behind the shoulders, pronotal apex a little elevated, narrowly rounded ; median carina strongly compresso elevated and arched all over its length, slightly produced over the head, depressed on the apex of pronotal process, lateral carinae visible behind the shoulders ; prozonal carinae and abbreviated carinae absent ; paranota with one projection ; posterior angles of lateral lobes of pronotum turned downward, apex wide and roundly produced. Elytra and wings abbreviated, very narrow, scale like ; anterior femora compressed, broadened, undulated at the inferior margin, inferior margin finely serrulated ; middle femora elongated, compressed, bicarinate, inferior margin clearly undulated with fine serrulations ; posterior femora damaged.

Measurements (in mm.) : Body length ♀ 8.5 ; Body length with pronotum 7 ; Pronotum length 6.4 ; Posterior femora length/width : damaged ; Shoulder width 2.6.

Material examined : 1 ♀, Arunachal Pradesh : Siang Division : Maghabasti, 8.x.1966, Coll. S. K. Tandon & G. S. Arora.

Geographical distribution : India.

Remarks : The genus *Fieberiana* Kirby is monotypic and appears to be related to *Piezotettix* Bolivar which occur in Borneo and Philippines. *Fieberiana pachymera* (Fieber) is the only species so far recorded from India and it is reported here for the first time from Arunachal Pradesh.

(2) Genus : *Epitettix* Hancock, 1907

Type species : *Epitettix punctatus* Hancock, 1907.

Epitettix Hancock, 1907, *Trans. R. ent. Soc. Lond.* : 216.

Moderate in size, colour rusty red brown.

Head not exserted ; vertex much wider than one of the eyes, convex, granulated, extended forward in front of the eyes like *Spadotettix* Hancock, nearly half the length of eyes or so, angulate anteriorly, middle carinula distinctly visible anteriorly, lateral carinulae lower and reflexed laterally, front margin obtusely angulated ; face oblique, frontal costa bifurcate behind the paired ocelli, slightly compresso-elevated between the antennae, widely forked in front of the paired ocelli ; paired ocelli placed below the middle of eyes. Antennae inserted on or below the inferior margin of eyes. Eyes more or less globular.

Pronotum truncate anteriorly, cuneate posteriorly with subacute apex and not extended upto the apex of posterior femora ; dorsum

smooth and densely punctate, pronotal process with or without thick callosities ; median carina percurrent, distinct and substraight, subtectiform anteriorly ; prozonal carinae distinct, parallel ; lateral carinae low ; humeral angles not distinctly visible ; paranota with two projections ; posterior angles of lateral lobes of pronotum reflexed outwards, apex obliquely truncate. Elytra and wings absent ; anterior and middle femora elongate, margins undulated or not undulated with or without serrations ; posterior femora stout, a little crassate. First article of posterior tarsi longer than the third, all the pulvilli of first article of hind tarsi more or less equal in length.

Geographical distribution : India ; Borneo ; Java.

2. *Epitettix elytratus* Günther, 1939

(Plate 3, figs. 2-4)

Epitettix elytratus Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (NF.) BDI : 306-307.

Moderate in size. Colour ferrugineous.

Female : Head not exserted above the pronotum ; vertex much wider than one of the eyes, convex, depressed on either side of median carinula anteriorly, extended forward about less than half the length of eyes, medially angulate, rough, median carinula visible anteriorly, lateral carinulae lower and obtusely reflexed laterally, front margin angularly produced in the middle ; face oblique, frontal costa bifurcate behind the paired ocelli, compresso-elevated between the antennae, depressed in front, widely forked in front of paired ocelli ; paired ocelli placed below the middle of eyes. Antennae inserted on the inferior margin of eyes. Eyes more or less globular, not elevated above the vertex.

Pronotum truncate anteriorly, cuneate posteriorly and extend upto the apex of abdomen or beyond but not upto the apices of hind femora, obtusely rounded at apex, roof like sloping between the shoulders ; dorsum rough, densely punctate, convex between shoulders, pronotal process with thick callosities ; median carina depressed in front, compresso-elevated rather swollen between the sulci, undulated with depressions behind ; lateral carinae interrupted in front of the humeral angles, lower, serrulated ; prozonal carinae distinct, parallel ; abbreviated carinae present on either side of median carina between shoulders ; humeral angles not distinctly visible ; paranota with two projection ; posterior angles of lateral lobes of pronotum turned downward, wide, obliquely truncate at apex. Elytra elongated, narrow, and narrowly

rounded at apex. Wings reduced and not visible ; anterior femora elongated, margins finely serrulated ; middle femora compressed, bicarinate, margins undulate with fine serrulations ; posterior femora stout at base, elongated, a little crassate, margins finely serrulated. (posterior tarsal segments damaged in present specimen).

Measurements (in mm.) : Body length ♀ 11 ; Body length with pronotum 11 ; Pronotum length 10 ; Posterior femora length/width 5.5/2.4 ; Shoulder width 3.2.

Material examined : Holotype ♀, West Bengal : Darjeeling distt. : Kalimpong, 182-1368 m., 24. iv.—10.v.1915, coll. F.H. Gravely, [Reg. No. of Zoological Survey of India, 1912/H5.]

Geographical distribution : India (West Bengal).

Remark : *Epitettix elytratus* Günther can be readily distinguished from the other Indian species of the genus by the more extended vertex in front of eyes which is angulated in the middle, anteriorly truncate pronotum which is obtusely rounded at apex and extend upto the apex of pronotum, the presence of rugosities and callosities on the pronotal surface, a little compresso-elevated median carina between sulci which is distinctly roof-like between shoulders but depressed behind the shoulders, undulated on and behind the shoulders, presence of abbreviated carinae between shoulders, distinctly visible lateral carinae and with one par-anotal projection.

Subfamily II SCELIMENINAE

Key to genera of the Subfamily Scelimeninae

- | | | |
|---|-----|------------------------------|
| 1. Posterior tibiae and first tarsal segment expanded | ... | 2 |
| — Posterior tibiae and first tarsal segment not expanded | ... | 3 |
| 2. Apical margin of the posterior tibiae and first segment of posterior tarsi with wide lamellar expansions; spine of lateral lobes of pronotum well developed, apex not hooked ; small tubercles present on the anterior margin of pronotum below the eyes, in front on the median carina of pronotum, on humeral angles and sometimes on the lateral carinae of pronotum also ; generally small tuberculated teeth present on the inferior margin of posterior femora | ... | <i>Scelimena</i>
Serville |
| — Apical margin of the posterior tibiae and the first segment of posterior tarsi more or less expanded but not lamellated ; spine of lateral lobes of pronotum weakly developed and hooked at apex ; tubercles weakly developed on the anterior margin below the eyes and in front the median carina of pronotum, but these are absent on humeral angles and lateral | | |

- carinae of pronotum ; inferior margin of posterior femora smooth ... *Indoscelimena*
Günther
3. Lateral margin of pronotum behind the shoulders, from the side view, distinctly angulated upward and from top view bent inwards, wider between shoulders ; generally brachypterous with strong sculpture ; spine of posterior angles of lateral lobes of pronotum distinctly projects out posteriorly or transversely ... *Thoradonta*
Hancock 4
- Lateral margin of pronotum behind the shoulders produced ... 4
4. Vertex broader than an eye or sometimes in females only just as broad as an eye but never narrower ; eyes not raised above the pronotum ... *Criotettix*
Bolivar
- Vertex narrower than an eye or sometimes in females as broad as an eye ; eyes slightly or well raised above the pronotum... 5
5. Head slightly raised above the pronotum ; vertex only a little narrower than an eye and not strongly attenuate in front ... 6
- Head distinctly raised above the pronotum ; vertex much narrower than an eye and strongly attenuate in front ... 7
6. Generally medium or large sized ; posterior angles of lateral lobes of pronotum prominent, acute or produced into a spine at the anterior margin which is more or less transverse or obliquely directed forward ... *Eucriotettix*
Hebard
- Generally small or medium sized ; posterior angles of lateral lobes of pronotum subspiniform or oblique and obtuse but without forming a lateral spines ... *Loxilobus*
Hancock
7. Paranota with one or two projections ; posterior angles of lateral lobes of pronotum rounded at apex ; lateral carina of pronotum runs towards median carina behind the shoulders which is parallel to the median carina at the apex of pronotum ... *Synalibas*
Günther
- paranota always with two projections ; apex of posterior angles of lateral lobes of pronotum provided with spine at anterior margin or truncate ; lateral carina of pronotum does not run towards median carina behind the shoulders ... *Hebarditettix*
Günther

(3) Genus : *Scelimena* Serville, 1839

Type species : *Tetrix producta* Serville, 1839

Scelimena Serville, 1839, *Ins. Orth.*, : 762.

Scelymena Saussure, 1861, *Annls Soc. ent. Fr.*, (4) 1 : 484.

Scelhymena Bolivar, 1902, *Annls Soc. ent. Fr.*, 70 : 581.

Eugavialidium Hancock, 1906 *Genera Insect.*, fasc. 48 : 21.

Scelimena, Günther, 1938, *Mitt. zool. Mus. Berl.*, 23 : 362, 381.

Body elongated and slender. Colour brown with yellowish shade on antero-lateral margin or fuscous variegated with pale.

Head not exserted ; vertex generally wider than an eye, a little oblique or inclined anteriorly, extend upto the eyes in front, slightly depressed anteriorly, median carinula visible only in front ; lateral carinulae lower to the eyes, inclined anteriorly and reflexed laterally, front margin sub-transverse and lower ; frontal costa bifurcate between the paired ocelli, protuberant between antennae, depressed in front, narrowly sulcate between paired ocelli and a little widely forked between antennae ; paired ocelli placed below the middle rather than on the inferior margin of eyes. Antennae filiform and located below the inferior margin of eyes. Eyes large, globular and elevated above the vertex.

Pronotum transverse anteriorly, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum rugose, granulose, small tubercles present on the anterior margin below the eyes and also in between, generally distinct tubercles present on the shoulders and lateral margins, sometimes raised linear callosities present on pronotal process ; median carina depressed in front, swollen between the sulci, undulated or not behind the shoulders ; lateral carinae low ; prozonal carinae distinct and parallel ; abbreviated carinae may or may not present ; paranota with two projections ; posterior angles of lateral lobes of pronotum with a strong spine projecting outwards with its apex more or less directed forwards. Elytra elongate, punctate, apex narrowly rounded. Wings extend upto the apex of pronotum ; anterior and middle femora elongate, lobate with serrulate margins ; posterior femora elongate, crassate, inferior margin frequently dentate ; hind tibiae and first joint of hind tarsi strongly lamellate ; pulvilli of first segment of hind tarsi more or less equal in length.

Geographical distribution : India ; Burma ; Taiwan ; South China ; Philippines ; Borneo ; Sulawesi ; Java ; Sumba ; West Flores.

Key to the species of *Scelimena* Serville

1. Posterior angles of lateral lobes of pronotum armed with transversely directed acute spine, apex curved forwards ... 2
- Posterior angles of lateral lobes of pronotum armed with transversely directed spine, apex straight and obtuse ; prozona with tubercles on anterior margin ... *kempi* (Hancock)
2. Pronotum angular anteriorly and provided with a tubercle in front of the median carina ; lateral carinae and humeral angles without tubercles ... *india* Hancock
- Pronotum truncate anteriorly ; median carina without tubercles in front ; lateral carinae bear a series of denticles as far

as the base of pronotal process ; humeral angles with distinct elevated tubercles ... *discalis* (Hancock)

3. *Scelimena discalis* (Hancock), 1915 (Plate 4, figs. 1-4)

Eugavialidium discalis Hancock, 1915, *Rec. Indian Mus.*, 11 : 71.

Scelimena discalis, Günther, 1938 *Mitt. zool. Mus. Berl.*, 23 : 385, 391.

Large sized. Colour dark brown or grey or greyish ferruginous.

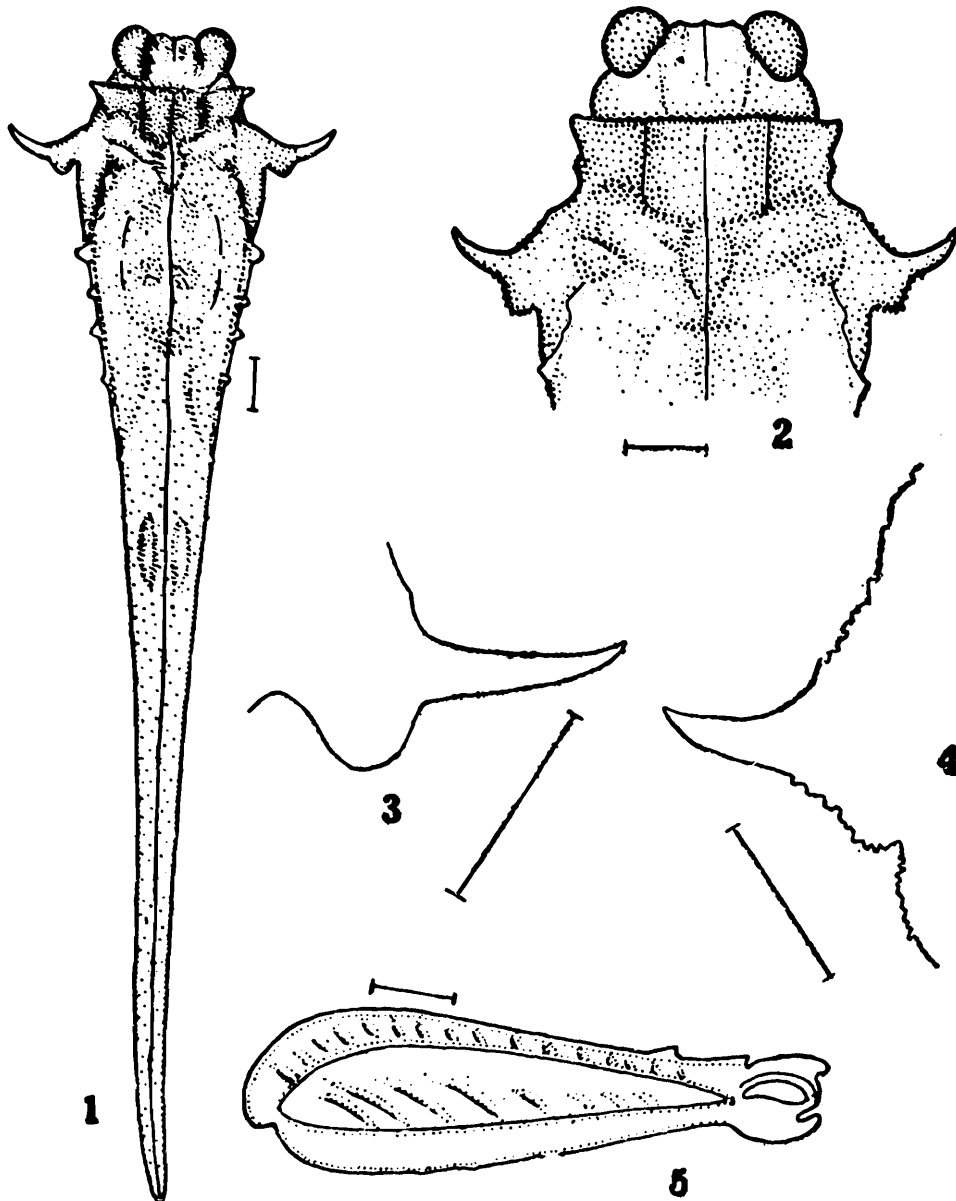
Male, female : Head not exserted ; vertex wider than an eye, a little narrower and inclined in front, extend upto the eyes anteriorly, median carinula visible anteriorly, lateral carinulae elevate in middle of eyes, low in front and reflexed laterally, front margin subtransverse ; frontal costa bifurcate between paired ocelli, protuberant between antennae, narrowly sulcate between paired ocelli, a little widely sulcate in front ; paired ocelli placed on the inferior margin of eyes. Antennae filiform, located below the eyes. Eyes globular and slightly elevated above.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apices of posterior femora (12-14 mm.) ; dorsum granulose, distinct tubercles present on the anterior margin below the eyes but without tubercles at the middle above the occiput, ampliate between shoulders and bear low and short lineate tubercles, depressed behind shoulders, four low elevations present on either side of median carina behind the shoulders ; median carina depressed in front, swollen between sulci and behind the shoulders, obscure on pronotal process ; lateral carinae bear a series of denticles often extending upto the base of the pronotal process, posterior denticles smaller in comparison with the anterior ones ; humeral angles ornate with a distinct obtusely-elevated tubercle on each side ; prozonal carinae distinct and parallel ; abbreviated carinae absent ; paranota with two projections ; posterior angles of lateral lobes of pronotum produced into long spine, curved forwards, strongly produced in male, rather stout in female. Elytra elongate, punctate, acuminate. Wings extend upto the apex of pronotum, anterior femora elongate, superior margins undulate compresso-sublobate towards base, inferior margin sub-trituberculate, superior margin serrulate ; middle femora sub trilobate on superior margin, sub-bituberculate on inferior margin ; posterior femora elongate, superior margin provided with two or three compressed denticles or lobes behind the middle, inferior margin with four denticles ; posterior tibiae and first segment of poste-

rior tarsi lamellated ; first segment of posterior tarsi longer than the third ; pulvilli of first hind tarsal segment equal in length.

Measurements (in mm.) : Body length ♂ 11-13, ♀ 17-18 ; body length with pronotum ♂ 25, ♀ 29·5-30·5 ; pronotum length ♂ 24, ♀ 28·5-

Plate 4



Scale 1 mm.

PLATE 4 : Fig. 1. Top view of *Scelimena discalis* (Hancock) (Type).

Fig. 2. Top view of *S. discalis* (Hancock) (Head and thorax magnified).

Fig. 3. Posterior angles of lateral lobes of pronotum magnified [*S. discalis* (Hancock)].

Fig. 4. Posterior angles of lateral lobes of pronotum showing variation.

29·5 ; posterior femora length/width ♂ 7·7·5/1·8-1·9, ♀ 9·2-9·5/2·4 ; shoulder width spine to spine ♂ 7·7·2, ♀ 8·3-8·5.

Material examined : "Type" ♂, N.E. Assam : Sibsagar, S.E. Peal [Reg. No. of Zoological Survey of India, 6530/14] ; 34 ♂ ♂, 49 ♀ ♀,

N.E. Assam : Sibsagar, coll. S.E. Peal [Reg. No. of Zoological Survey of India, 6455-6491/14, 6493-6495/14, 6497-651 /14, 6513-6515/14, 6517-6527/14, 6529/14, 6531-6538/14, 6014/1 and 6039/1].

Geographical distribution : India (Assam).

Remarks : This species is closely related to *Scelimena producta* (Serville) but it can be separated from the latter by the larger stature, wider shoulders, dentate humeral angles as well as lateral carinae of pronotum and tuberculate femora.

4. *Scelimena kempi* (Hancock), 1915 (Plate 5, fig. 1)

Eugavialidium kempi Hancock, *Rec. Indian Mus.*, 11 : 72-73.

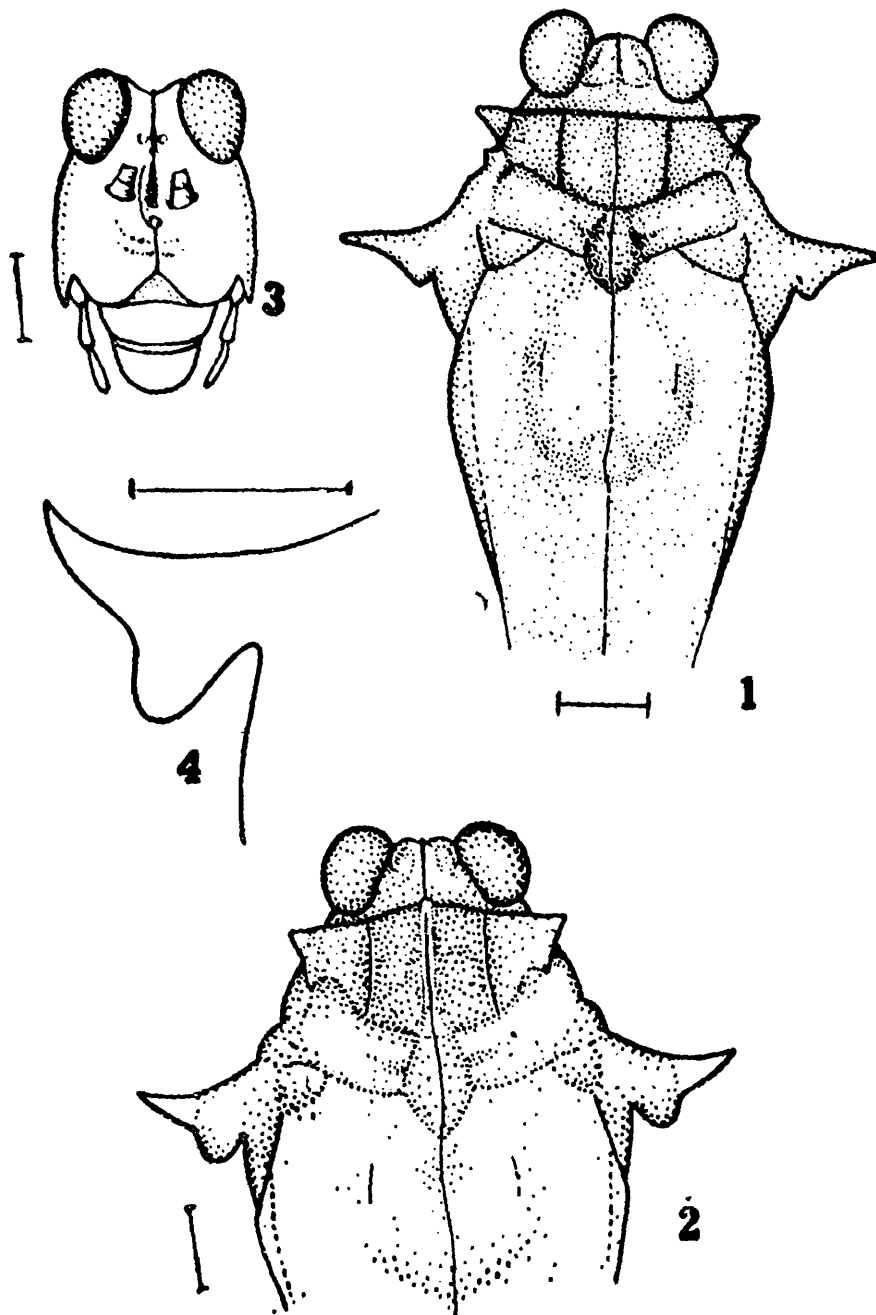
Scelimena kempi, Steinmann, 1970, *Acta zool. hung.*, 16 : 222.

Large sized. Colour greyish-fuscos, maculated with yellow, median carina of pronotum marked with irregular yellow colour.

Male : Head not exserted ; vertex as wide as an eye, narrow and inclined in front, not extend upto the eye in front, slightly depressed between the eyes, median carinula distinct and extend upto the end of depression behind, lateral carinulae elevated at middle of eyes, inclined and reflexed anteriorly, front margin low ; frontal costa bifurcate between paired ocelli, moderately sulcate, protuberant between antennae ; paired ocelli situated on the lower margin of eyes. Antennae filiform, located below the eyes. Eyes globular and elevated above the vertex and pronotum.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apices of posterior femora (9-9.5), anterior margin trituberculate ; dorsum granulose, gibbulate in the front and behind the shoulders, fossulate behind the shoulders, obtusely nodulose above the posterior femora, a pair of elevated nodes present on pronotal process posteriorly, median carina without tubercles in front, a little swollen between sulci, moderately elevate posteriorly ; lateral carinae interrupted anteriorly, sub-compressed and bear denticles on and in front of humeral angles ; prozona distinct with denticles on anterior margin, parallel and serrulate ; abbreviated raised lineal thickenings present on either side of median carina between shoulders ; paranota with two projections ; posterior angles of lateral lobes of pronotum produced into a sharp strong transverse spine, obtuse at apex. Elytra elongate, punctate, narrow at apex. Wings extend upto the apex of pronotum ; anterior femora elongate, subentire, superior margin compressed and elevate upto the

middle from base, finely serrulate, inferior margin bear two minute tubercles ; middle femora elongate, superior margin subtrilobate, inferior margin subbituberculate (damaged) ; posterior femora elongate, crassate,

Plate 5

Scale 1 mm.

PLATE 5 : Fig. 1. Top view of head and thorax of *Scelimena kempi* (Hancock).
 Fig. 2. Top view of head and thorax of *Scelimena india* Hancock.
 Fig. 3. Front view of head of *S. india* Hancock.
 Fig. 4. Posterior angles of lateral lobes of pronotum magnified (*S. india* Hancock).

superior margin with two tubercles, inferior margin with three to four minute flattened elevations, antegenicular and genicular denticles normal ;

posterior tibiae and first tarsal segment lamellated ; first segment of posterior tarsi longer than the third ; all the pulvilli equal in length.

Measurements (in mm.) : Body length ♂ 12 ; body length with pronotum ♂ 22 ; pronotum length ♂ 21 ; posterior femora length/width ♂ 8.1/1.8 ; shoulder width spine to spine ♂ 6.2.

Material examined : "Type" ♂, Abor Expedition : above Panji, 1216 m, "Rebang stream, under stones", 16. i. 1912, coll. S. W. Kemp [Reg. No. of Zoological Survey of India, 7565/19].

Geographical distribution : India (Arunachal Pradesh, Assam).

Remarks : Hancock (1915) mentioned that the description of the species is based on a female but the "Type" specimen present in the Zoological Survey of India is a male. Later on Günther (1938) has revised the subfamily and synonymised the genus *Eugavialidium* Hancock with *Scelimena* Serville and he further mentioned that probably *Eugavialidium kemp* is under *Scelimena* Serville. Recently Steinmann (1970) has placed it under *Scelimena* Serville and I also agree with him. *Scelimena kemp* (Hancock) is similar to *S. india* Hancock, but in the former the posterior angles of the lateral lobes of pronotum are produced outwards in a straight spine.

5. *Scelimena india* Hancock, 1907

(Plate 5, Figs. 2-4)

Scelimena india Hancock, 1907, *Trans R. ent. Soc. Lond.*, : 219.

Elongated and slightly broader in size. Colour fuscous, variegated with pale or brown.

Female : Head not exserted ; vertex wider than an eye, slightly narrower in front, produced more or less upto the eyes anteriorly, depressed between eyes, inclined in front, median carinula distinct upto the occiput region, lateral carinulae elevated upto the level of eyes in the middle and inclined in front, front margin more or less transverse ; frontal costa bifurcate between the paired ocelli, compresso-elevated between the antennae, depressed in front, narrowly sulcate between paired ocelli, moderately sulcate in front ; paired ocelli located below the middle of eyes. Antennae filiform and situated below the inferior margin of eyes. Eyes globular and little elevated above the vertex.

Pronotum slightly cover the occipital region and a little angular in the middle, subulate posteriorly and extend upto the apices of posterior tibiae ; dorsum granulose, tubercles present on the anterior margin below the eyes and in the middle behind the occiput, depressed and uneven

between sulci, bifossulate behind the shoulders, a pair of rounded subelevated nodules present just behind the fossule and a second pair appears just opposite to the middle of hind femora ; median carina tuberculate anteriorly, a little swollen between sulci and moderate behind, indistinct on apex of pronotal process ; lateral carinae interrupted on sulci anteriorly, low posteriorly ; abbreviated carinae present on either side of median carina between shoulders ; humeral angles unarmed ; paranota with two projections ; posterior angles of lateral lobes of pronotum a little laminate outwards and armed with a distinct, transversely directed acute spine, apex curved forward. Elytra elongate, punctate, narrow at apex. Wings extend upto the apex of pronotal lobes ; anterior femora damaged ; middle femora elongate, superior margin subentire and finely serrulate, inferior margin not undulate but serrulate ; posterior femora elongate, margin entire ; posterior tibiae and first segment of posterior tarsi with dilated margins (posterior femora damaged).

Measurements (in mm.) : Body length ♀ 13.5 ; body length with pronotum ♀ 23.00 ; pronotum length ♀ 22.00 ; posterior femora length/width ♀ (damaged) ; ♀ shoulder width 7.3.

Material examined : 1 ♀, Assam, H. H. Godwin Austen, (Reg. No. Zoological Survey of India, 6541/1).

Geographical distribution : India (Assam).

Remarks : This species is closely related to *Scelimena producta* (Serville) but it can be easily separated from the latter by the stouter stature, presence of tubercle in the middle of the anterior margin of pronotum, not so much lengthily attenuate pronotal process at apex and comparatively less dilated first segment of posterior tarsi.

(4) Genus : *Indoscelimena*, 1938

Type species : *Eugavialidium flavopictum* Bolivar, 1909

Indoscelimena Günther, 1938, *Mitt. zool. Mus. Berl.*, 23 : 371.

Large sized. Colour ferruginous or ochreous or clay brown, with dark markings.

Head not exserted ; vertex about as broad as an eye or slightly broader, a little more narrow in front, extend upto the level of eyes in front, slightly depressed on either side, median carinula extend upto the posterior end of fossulae behind and lower than the lateral carinulae, lateral carinulae elevated upto the level of eyes and reflexed laterally, front margin low and interrupted medially ; frontal costa bifurcate between the paired ocelli, compresso elevated and arched between the

antennae, depressed in front, moderately sulcate between antennae ; paired ocelli placed below the middle of eyes. Antennae filiform, located below the inferior margin of eyes. Eyes globular.

Pronotum subangular anteriorly, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum generally rough with distinct nodules on the lateral margin or pronotal process above the hind coxa and generally with irregular markings on the pronotal process, sometimes surface, smooth, tubercles present anteriorly on the lateral margin below the prozonal carinae ; median carina with an obtuse tubercle in front, depressed behind, a little compresso-elevated between sulci, uniform in the rest ; lateral carinae low, interrupted on the sulci, prozonal carinae parallel or sometimes curved inwards in the middle ; abbreviated carinae distinctly or indistinctly visible ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilate and laminate, with a sharp pointed spine, directed transversely with its apex turned upwards or not. Elytra elongate, narrow at apex. Wings extend upto the apex of pronotum ; anterior and middle femora elongate, undulate with serrulate margins ; posterior femora stouter, a little crassate, margins finely serrulate ; hind tibiae moderately expand towards apices ; first segment of hind tarsi generally longer than the third.

Geographical distribution : India ; Burma.

6. *Indoscelimena saussurei* (Hancock), 1915

Eugavialidium saussurei Hancock, 1915, *Rec. Indian Mus.*, 11 : 74.

Indoscelimona saussurei, Günther, 1938, *Mitt. zool. Mus. Berl.*, 23 : 372 ; Steinmann, 1970, *Acta zool. hung.*, 16 : 221.

Elongated and slender. Colour ferruginous, face with yellow or light brown marks.

Male : Head not exerted ; vertex subequal in width to an eye, lateral crinulae elevated in the middle of eyes, dentate on either side, not elevated above the eyes ; frontal casta bifurcate between paired ocelli, protuberant between antennae, moderately sulcate between antennae ; paired ocelli placed below the middle of eyes. Antennae located below the eyes. Eyes globular.

Pronotum bears small tubercles on either side of front margin, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum barely rugose, granulose ; median carina bears small tubercles upto the base of hind process of pronotum ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum a little acute, triangularly produced outwards and bear an apical spine. Elytra elongate, punctate, narrow at apex. Wings extend

upto the apex of pronotum ; anterior and middle femora elongate, a little compressed, margins undulate ; posterior femora elongate, slightly crassate, margins crenulate ; posterior tibiae moderately expanded towards apices ; first segment of posterior tarsi not expanded ; first pulvilli of first posterior tarsal segment small, second and third longer and equal (second and third lost in the type).

Measurements (in mm.) : Body length ♂ 14 ; body length with pronotum ♂ 20 ; pronotum length ♂ 18.5-19 ; posterior femora length ♂ 7.5.

Material examined : "Type" ♂, West Bengal : Calcutta, C.P. Stoliczka.

Geographical distribution : India (West Bengal).

Remarks : Hancock (1915) *Indoscelimena Saussurei* under *Eugavialidium* Hancock, but later on Günther (1938) placed it under *Indoscelimena* Günther on the plea that the posterior angles of lateral lobes of pronotum are without sharply pointed spines. Steinmann (1970) also included this species under *Indoscelimena* Günther. *Indoscelimena saussurei* (Hancock) can be easily recognised from the rest of the species of the genus by the dentated vertex on either side, tuberculated median carina and lack of expansion of margin of the first segment of hind tarsi.

(5) Genus : *Thoradonta* Hancock, 1908

Type species : *Thoradonta dentata* Hancock, 1908

Thoradonta Hancock, 1908, *Trans. R. ent. Soc. Lond.*, p. 407.

Smaller in size but stouter. Colour ferruginous or brown or grey.

Head not exserted ; vertex distinctly wider than one of the eyes, not narrowed anteriorly, fossulate on either side of median carinula, fossulae open in front from top view, ampliate behind, extended upto the level of eyes in front, median carinula distinctly visible anteriorly but obscure posteriorly, lateral carinulae extended upto the level of eyes, depressed anteriorly and reflexed laterally, front margin not carinated ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and strongly arched between antennae, depressed in front, narrowly sulcate between the eyes, a little widely sulcate between the antennae ; paired ocelli placed below the middle of eyes. Antennae filiform, inserted below the eyes. Eyes slightly elevated above the vertex, globular.

Pronotum truncate anteriorly, subulate posteriorly, deplanate on

the dorsum, extended upto the apex of hind femora or a little beyond ; dorsum scabrous with irregular depressions and convexities, a little dilated towards humeral angles ; median carina strongly compresso-sinuate throughout, depressed in front ; lateral carinae often slightly compressed and elevated above the elytra just behind the shoulders ; humeral angles obtuse ; prozonal carinae and abbreviated carinae distinctly present ; paranota with two projections ; posterior angles of lateral lobes of pronotum distinctly laminate, expanded and produced into a spine, subtruncate behind. Elytra elongate, punctate, apex narrowly rounded. Wings reduced or extended nearly upto the apex of pronotum ; anterior femora elongate, subundulate on inferior margin, margins not serrulated ; median femora elongate, compressed, superior margin undulate, inferior margin undulate/sublobate ; posterior femora stouter, crassate, minutely serrulate on margins, antegenicular and genicular denticles moderately produced ; first and third segments of the posterior tarsi subequal in length.

Geographical distribution : India ; Sri Lanka ; Java ; Borneo ; Sumatra ; Singapore ; Palawan ; Hainan ; Panang ; China.

Key to the species of *Thoradonta* Hancock

- | | | |
|---|-----|-----------------------------|
| 1. Vertex narrower (.64-.75 mm) | ... | 2 |
| — Vertex wider (.75-.86) | ... | 3 |
| 2. Upper lobes of posterior angles of lateral lobes of pronotum with small or medium sized spines, directed posteriorly, front margin not constricted ; upper marginal and paginal areas of posterior femora with a series of nodules | ... | <i>nodulosa</i> (Stal) |
| — Upper lobes of posterior angles of lateral lobes of pronotum with medium sized spines, directed transversely, front margin constricted ; upper marginal and paginal areas of posterior femora without nodules | ... | <i>pruthii</i> Günther |
| 3. Spine of upper lobe of posterior angles of lateral lobes of pronotum with constricted margin in front, directed transversely. | ... | 4 |
| — Spine of upper lobe of posterior angles of lateral lobes of pronotum not constricted or sinuated margin in front directed posteriorly. | ... | <i>apiculata</i> Hancock |
| 4. Vertex wider ; front margin of spine of posterior angles of lateral lobes of pronotum deeply constricted, lower lobe obtuse ; humeral angles more acutely produced ; prozonal carinae convergent posteriorly. | ... | <i>lativertex</i> Günther |
| — Vertex not so wide ; front margin of spine of posterior angles of lateral lobes of pronotum less constricted, longer in size, lower lobe acute, dorsum granulose. | ... | <i>bengalensis</i> sp. nov. |

7. *Thoradonta apiculata* Hancock, 1915

(Plate 6, figs. 3 & 4)

Thoradonta apiculata Hancock, 1915, *Rec. Indian Mus.*, 11 : 81-82.

Medium in size. Colour greyish-rufescent, or infusate, hind tibiae pale annulated.

Male, Female : Head not exerted ; vertex wider than one of the eyes, slightly narrower in front, extend upto the level of eyes in front, fossulate on either side, rough, median carinula distinct in front and extend upto the posterior end of fossulae behind, lateral carinulae elevated upto the level of eyes, front margin more or less subtransverse and without well marked carinulae ; frontal costa bifurcate behind the paired ocelli, depressed in front and behind the antennae, compresso-elevated and arched between the antennae, narrowly sulcate between the paired ocelli, gently sulcate between the antennae ; paired ocelli placed below the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes. Eyes globular.

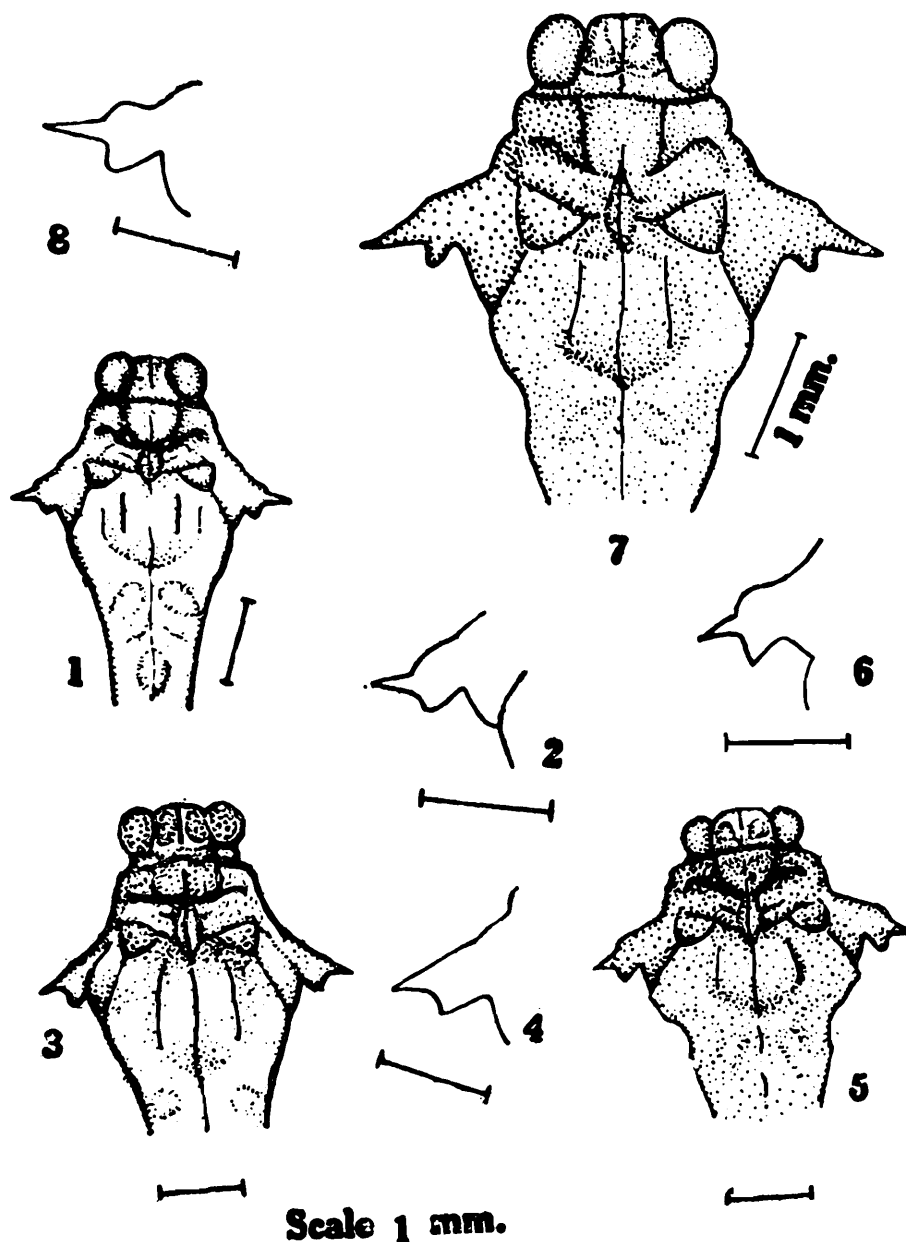
Pronotum transverse anteriorly, a little wider between the shoulders, subulate posteriorly, extend beyond the apex of hind femora ; dorsum rugose-granulose, a little depressed on either side in front and behind the shoulders, medially convex between shoulders ; median carina depressed in front, compresso-elevated and arched between the sulci, slightly depressed on the shoulders, sinuate posteriorly ; lateral carinae low, sinuated behind the humeral angles with a little elevation, finely serrulate on the pronotal process ; abbreviated carinae present on either side of median carina between shoulders ; prozonal carinae distinct and convergent behind ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum slightly dilated and laminated, upper lobe produced into a small sharp spine with a wide base, slightly directed posteriorly, margins not sinuated in front, obliquely directed, lower lobe blunt with serrated margins. Elytra small, wider in middle, rounded at apex. Wings extended upto the apex of pronotum ; anterior femora a little convex, margins undulate ; middle femora compressed, bicarinate, margins subtrilobate with serrations ; posterior femora stouter, crassate ; first tarsal segment of posterior tarsi longer than the third ; third pulvilli slightly longer than the second.

Measurements (in mm.) : Body length ♂ 6.5-7, ♀ 8.5-9 ; body length with pronotum ♂ 9.6-10, ♀ 11 ; pronotum length ♂ 9, ♀ 10 ; posterior femora length/width ♂ 4.3-4.6/1.4-1.6, ♀ 4.8/1.8 ; shoulder width ♂ 2.3-2.6, ♀ 2.7-2.8 ; vertex width ♂ 6.9-7.5, ♀ 7.5-8.1 ; eye

width ♂ 43, ♀ 54.

Material examined : Type ♀, Upper Assam, Coll. Doherty ; Type

Plate 6



- PLATE 6 : Fig. 1. Top view of head and thorax of *Thoradonta pruthii* Günther (Type).
 Fig. 2. Posterior angles of lateral lobes of pronotum of *T. pruthii* Günther.
 Fig. 3. Top view of head and thorax of *Thoradonta apiculata* Hancock (Type).
 Fig. 4. Posterior angles of lateral lobes of pronotum of *T. apiculata* Hancock.
 Fig. 5. Top view of head and thorax of *Thoradonta lativertex* Günther (Type).
 Fig. 6. Posterior angles of lateral lobes of pronotum of *T. lativertex* Günther.
 Fig. 7. Top view of head and thorax of *Thoradonta bengalensis* sp. nov. (Holotype).
 Fig. 8. Posterior angles of lateral lobes of *T. bengalensis* sp. nov.

♀, N.E. Assam ; Sibsagar, coll. S.E. Peal ; 1 ♂, Arunachal Pradesh : Tirap Divi. : Longding Road, 575 m, 5. xi. 1971, coll. G.S. Arora ; 1 ♂, Assam : Mikin Hill, 3. xi. 1974, coll. S.K. Gupta ; 1 ♂, Manipur : South Dist. : Moreh : Lockchen River. 22. ii. 1975, coll. P T. Cherian ; 1 ♂, Manipur : East Distt. : Ukhrul, 4. iii. 1975, coll. P T. Cherian ; 2 ♂♂, Meghalaya : Dainadubei (at light), 16. ix. 1975, coll. N. Muralidharan ; 1 ♀, Manipur : New Churachandpur, 912 m, 18. ix. 1975, coll. M.S. Shishodia ; 1 ♀, Manipur : Moreh : Burma border, 24. ix. 1975, coll. M S. Shishodia ; 1 ♀, West Bengal : 24 Parganas Distt. : Narendrapur, 30. viii. 1979, coll. M.S. Shishodia.

Geographical distribution : India ; Burma.

Remarks : *Thoradonta apiculata* Hancock is close to *Thoradonta sinuata* Hancock but can be distinguished from it by the much elongated pronotal process beyond the apex of posterior femora ; lower and smaller forward gibbosity in front of the shoulders ; less dilated posterior angles of lateral lobes of pronotum, abruptly contracted and posteriorly directed narrow spine of posterior angles of lateral lobes of pronotum.

8. *Thoradonta nodulosa* (Stal), 1860

Tetrix nodulosa Stal, 1860, *Eugenies Resa Orth.* : 346.

Tettix nodulosus, Stal, 1873, *Recens, Orth.*, 1 : 151.

Criotettix nodulosus, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 230.

Thoradonta nodulosa, Hancock, 1915, *Rec. Indian Mus.*, 11 : 82

Thoradonta apiculata Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 138.

Thoradonta nodulosa spiculoba, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 125-126.

Thoradonta nodulosa, Steinmann, 1970, *Acta zool. hung.*, 16 : 225.

Moderate in size. Colour cinereous or brownish or fuscous, hind tibiae pale annulated.

Male, Female : Head not exserted ; vertex generally wider than the width of an eye, extended upto the eyes in front, fossulate on either side, median carinula distinct anteriorly and obscure posteriorly, lateral carinulae slightly lower than eyes, reflexed laterally, front margin nearly transverse ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, sinuate between the eyes, narrowly sulcate between the paired ocelli and moderately sulcate in front ; paired ocelli placed slightly below the middle of eyes. Antennae filiform and situated on the inferior margin of eyes.

Pronotum transverse anteriorly, wider between shoulders, cuneate posteriorly and extend a little beyond the apices of posterior femora ; dorsum rugose, depressed in front and behind the shoulders, slightly

elevated medially between shoulders ; median carina depressed in front, gibbucose between the thoracic sulci, interrupted sinuate behind ; lateral carinae interrupted on the sulci region, distinctly visible on the humera angles, lightly elevated, compressed and sinuate behind the shoulders ; prozonal carinae short and parallel ; humeral angles distinctly carinate and obtuse, abbreviated carinae present on either side between shoulders ; paranota with two projections, posterior angles of lateral lobes of pronotum dilated and laminate at base, the upper lobe produced into a sharp spine which is directed posteriorly, lower lobe obliquely produced with pointed apex. Elytra subovate. Wings extend upto the apex of pronotum ; anterior femora elongate, convex, margins slightly sinuate ; middle femora a little compressed, inferior margin subtrilobate ; posterior femora stouter, crassate and with a series of nodules on the upper marginal and paginal areas, margins finely serrulate, antegenicular and genicular denticles moderate ; first article of posterior tarsi a little longer than the third ; all the pulvilli more or less equal in length.

Measurements (in mm.) : Body length ♂ 6.7, ♀ 6.5-7.5 ; body length with pronotum ♂ 6.2-8, ♀ 6.5-10 ; pronotum length ♂ 5.8-7.5, ♀ 6.7-9 ; posterior femora length/width ♂ 4.1-4.5/1.5-1.7, ♀ 4.8/1.8-1.9 ; shoulder width ♂ 2.1-2.4, ♀ 2.7-2.9 ; vertex width ♂ .64, ♀ .75 ; eye width ♂ .43, ♀ .43.

Material examined : 1 ♂, West Bengal : Calcutta, Maidan Tank, 27. xi. 1914, coll. C. Paiva, [Reg. No. of Zoological Survey of India. 2031/H5] ; 1 ♂, 1 ♀, West Bengal : Calcutta : Museum compound (at light), -. iii. 1925, coll. F. Ram [Reg. No. of Zoological Survey of India, 2029/H5] ; 1 ♀, Manipur : 16 miles North of Imphal on Dimapur Rd., 1064 m., 20-30. ix. 1945, coll. Maj. M. L. Roonwal ; 1 ♂, Manipur : 16 miles North of Imphal on Dimapur Rd., 1064 m., 4. x. 1945, coll. Maj. M. L. Roonwal ; 1 ♀, Manipur : Below Modbung near Imphal, 2584 m., 1. xi. 1946, coll. Maj. M. L. Roonwal ; 1 ♀ (nymph), West Bengal : Calcutta : Nilgunge, 13. xi. 1957, coll. A. P. Kapur ; 2 ♂ ♂, West Bengal : Calcutta : Botanical garden, 27. x. 1965, coll. K. R. Rao ; 1 ♀, Tripura : Ampa (F.R.H.), 19. i. 1971, coll. V. C. Agrawal ; 9 ♂ ♂, 3 ♀ ♀, West Bengal : Darjeeling distt. : Karmaktar village, 19. iv. 1973, H. S. Sharma ; 1 ♀, West Bengal : Darjeeling distt. : Rangpo : 3 kms. West of Rangpo, 7. iv. 1973, coll. H. S. Sharma ; 1 ♂, Assam : Nowgong, 4. xi. 1974, coll. S. K. Gupta ; 1 ♂, Tripura : Udaipur : Garjee, 100 m., 6. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Tripura : Teliamura : Korilong, 150 m., 13. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Tripura : Ambassa, 200 m., 17. xi. 1974, coll. M. S. Shishodia ;

1 ♀, Tripura : Ambassa, 200 m., 17. xj, 1974, coll. M. S. Shishodia ;
 1 ♂, Tripura : Ambassa : Kanchan Nagar, 200 m., 20. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Manipur : Jiribam, 13. ii. 1975, coll. P. T. Cherian ;
 3 ♂ ♂, 2 ♀ ♀, Manipur : New Churachandpur : Bungmual, 912 m., 19. ix. 1975, coll. M. S. Shishodia ; 2 ♂ ♂, Manipur : Ukhrul, 1884 m., 4. x. 1975, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Meghalaya : Rongram, 28. ix. 1975, coll. N. Muralidharan ; 1 ♂, Sikkim : Rangli, 830 m., 20. xii. 1975, coll. G. K. Srivastava ; 4 ♂ ♂, 3 ♀ ♀, West Bengal : Darjeeling Distt. : Singla, 450 m., 3. i. 1976, coll. G. K. Srivastava ; 1 ♀, Sikkim : Rangpo : River bed, 28. v. 1979, coll. M. S. Shishodia.

Geographical distribution : India ; Sri Lanka ; Singapore ; Java ; Sumatra ; Borneo ; Hainan.

Remarks : *Thoradonta nodulosa* (Stal) is allied to *Thoradonta apiculata* Hancock but it can be separated from the latter by the narrower vertex, lesser extension of pronotum beyond the apex of posterior femora and presence of a series of nodules on the upper marginal and paginal areas of posterior femora.

9. *Thoradonta pruthii* Günther, 1938

(Plate 6, figs. 1 & 2)

Thoradonta pruthii Günther, 1938, *Stettin. ent. Ztg.*, 99 : 129-30.

Size moderate. Colour brown mottled with fuscous or grey, sometimes dorsum between shoulders yellow, tibiae pale annulated.

Male : Head not exserted ; vertex wider than an eye, extend upto the level of eyes in front, fossulate on either side, rough, median carinula indistinctly visible anteriorly, lateral carinulae not elevated upto the level of eyes, laterally reflexed, front margin transverse and not carinated ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, depressed in front and behind the antennae, narrowly sulcated between the paired ocelli, moderately sulcated anteriorly ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted slightly above the inferior margin of eyes. Eyes elevated above the vertex and globular.

Pronotum transverse anteriorly, wider between shoulders, subulate posteriorly, extend beyond the apices of posterior femora ; dorsum rough, granulose, tuberculose, fossulate on either side in front and behind the shoulders, slightly ampliate between shoulders ; median carina depressed in front, a little compresso-elevated and arched between sulci, depressed on shoulders, interrupted sinuate behind ; lateral carinae interrupted on sulci region in front, slightly sinuate behind the shoul-

ders, low on pronotal process ; abbreviated carinae not much distinctly elevated ; prozonal carinae parallel in front, a little convergent behind ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilated and laminated at base, upper lobe produced into a moderate and transverse sharp spine with constricted margin in front, lower lobe obtuse. Elytra punctate, moderate, apex rounded. Wings extend upto the apex of pronotum ; anterior femora elongated, convex, margins slightly undulate behind the middle ; middle femora elongate, a little compressed, bicarinate, margins undulate ; posterior femora elongate, crassate, margins finely serrulated, antegenicular and genicular denticles short ; first article of posterior tarsi longer than the third ; all the pulvilli equal in length and acute.

Measurements (in mm.) : Body length ♂ 6.5 ; body length with pronotum ♂ 10 ; pronotum length ♂ 9 ; posterior femora length/width ♂ 4.4/1.6 ; shoulder width ♂ 2.3 ; vertex width ♂ .64 ; eye width ♂ .43.

Material examined : 1 ♂, West Bengal : 24 Parganas Distt. : Narendrapur, 30. viii. 1979, coll. M. S. Shishodia ; "Holotype" ♂, Mohgaon, Mandla distt. (Central Province now known as Madhya Pradesh), 16-17. xi. 1927, coll. H. S. Pruthi ; "Allotype" ♂, same data as stated above.

Geographical distribution : India (Madhya Pradesh, Karnataka).

Remarks : This species was described from Madhya Pradesh and Karnataka (Mudumalai) and it is recorded here for the first time from West Bengal. *Thoradonta pruthii* Günther is characterised by the narrower vertex, location of paired ocelli between the middle of eyes, origin of antennae slightly above the inferior margin of eyes, less sinuate lateral carinae of pronotum which are not serrulated on the pronotal process, less elevated median carina between sulci, much extended wing and pronotum beyond the apices of posterior femora, obscurely visible abbreviated carinae ; transverse sharp spine of posterior angles of lateral lobes of pronotum which has constricted margin in front.

10. *Thoradonta lativertex* Günther, 1938

(Plate 6, figs. 5 & 6)

Thoradonta lativertex Günther, 1938, *Stettin. ent. Ztg.*, 99 : 128-29.

Size moderate. Colour grey or ferruginous.

Male, Female : Head not exserted ; vertex wider than an eye, extend upto the level of eyes in front, fossulate on either side, median carinula visible anteriorly, lateral carinulae elevated upto the level of

eyes or slightly below and reflexed laterally, front margin transverse ; frontal costa bifurcate between the paired ocelli, compresso-elevated and arched between the antennae, depressed in front and behind the antennae, narrow between the paired ocelli and moderately divergent in front ; paired ocelli placed slightly below the middle of eyes. Antennae filiform, placed a little below the inferior margin of eyes. Eyes slightly elevated above the vertex and globular.

Pronotum transverse anteriorly, wider between the shoulders, subulate posteriorly, extend beyond the apices of posterior femora ; dorsum rough, tuberculose, depressed on either side in front and behind the shoulders, ampliate between shoulders medially ; median carina depressed in front, compresso-elevated and arched between the sulci, depressed on shoulders, interrupted sinuate behind ; lateral carinae interrupted in front of the sulci, appreciably elevated between humeral angles, sinuate behind the shoulders with an elevation, lower on the pronotal process ; prozonal carinae slightly convergent posteriorly, abbreviated carinae well marked ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilated and laminated at base, upper lobe produced into a moderate and transverse sharp spine with deeply constricted front margin, lower lobe obliquely cut and with obtuse apex. Elytra elongate with rounded apex. Wings extend upto the pronotal apex ; anterior femora compressed, undulated, middle femora compressed, bicarinate, margins lobate and serrulate ; posterior femora stouter, crassate, upper marginal area and paginal areas with a series of nodules, margins with small lobes and serrations ; first segment of posterior tarsi more or less equal or slightly longer than the third ; all pulvilli equal in length.

Measurements (in mm.) : Body length ♂ 6·8, ♀ 8·6 ; body length with pronotum ♂ 8, ♀ 10 ; pronotum length ♂ 7, ♀ 9 ; posterior femora length/width ♂ 4/1·5, ♀ 4·8/1·8 ; shoulder width ♂ 2·5, ♀ 3 ; vertex width ♂ ·86 ♀ ·86 ; eye width ♂ ·43, ♀ ·43.

Material examined : 1 ♂, Tripura : Teliamura : Korilong, 13. XI. 1974, coll. M. S. Shishodia ; 1 ♀, Assam : Kaziranga, 100 m., 25. ii. 1969, coll. S. K. Tandon.

Geographical distribution : India (H. P.)

Remarks : *Thoradonta lativertex* Günther is closely related to *T. nodulosa* (stal) but can be distinguished from it by the wider vertex posteriorly convergent prozonal carinae, more acute humeral angles, slightly more elevated and sinuated lateral carinae behind the shoulders, moderate and transverse sharp spine of posterior angles of lateral lobes of pronotum which has deeply constricted margin in front, and more or less equal first and third hind tarsal segments.

11. *Thoradonta bengalensis* sp. nov.

(Plate 6, figs. 7 & 8)

Stouter body. Colour ferruginous or grey or fuscous.

Male, Female : Head not exserted ; vertex wider than an eye, extend upto the level of eyes in front, a little depressed on either side, median carinula visible upto the middle of depressions, lateral carinulae moderate ; front margin transverse ; frontal costa bifurcate behind the paired ocelli, protuberant between the antennae, depressed in front and behind the antennae, narrowly sulcate between the paired ocelli, moderately sulcate in front ; paired ocelli placed distinctly below the middle of eyes. Antennae filiform, inserted below the inferior margin of eyes. Eyes slightly elevated above the vertex and globular in shape.

Pronotum transverse anteriorly, wider between the shoulders, subulate posteriorly, extend upto the apex of posterior femora, rarely beyond ; dorsum rough, granulose, depressed on either side in front and behind the shoulders, a little ampliate between shoulders medially ; median carina depressed in front, compresso-elevated and arched between sulci, depressed on shoulders, undulated posteriorly ; lateral carinae interrupted in front of shoulders between transverse sulci, slightly elevated between humeral angles, a little sinuate behind the shoulders, finely serrulate on pronotal process ; prozonal carinae slightly convergent posteriorly ; abbreviated carinae present ; humeral angles obtuse ; paracota with two projections ; posterior angles of lateral lobes of pronotum dilated and laminated, the upper lobe produced into a long, transverse sharp spine with wavy margin in front, lower lobe obliquely produced with acute apex. Elytra moderate in size, narrowly rounded at apex. Wings extended upto the apex of pronotum, anterior femora slightly convex, margins undulate with fine serrations ; middle femora compressed, bicarinate, margins crassate, finely serrulated at margins ; first segment of posterior tarsi equal or slightly longer than the third ; first pulvilli short and acute ; second pulvilli acute and more or less equal to third ; third pulvilli obtuse.

Measurements (in mm.) : Body length ♂ 6.5-7, ♀ 9-9.5 ; body length with pronotum ♂ 8-8.5, ♀ 10.5-11.2 ; pronotum length ♂ 6.8-7.2, ♀ 9.5-10.2 ; posterior femora length/width ♂ 4.2-4.5/1.6, ♀ 5.2-5.5/1.8 ; Shoulder width ♂ 2.4, ♀ 3 ; vertex width ♂ 0.75, ♀ 0.86 ; eye width ♂ 0.43, ♀ 0.54.

Material examined : Holotype ♂, West Bengal : 24 Parganas Distt. : Hatberia (at light), 14. viii. 1977, coll. N. K. Pramanik ; allotype ♀, same data ; paratypes 21 ♂♂, 18 ♀♀, same data ; 1 ♂,

West Bengal : 24 Parganas Distt. : Narendrapur, 22. ix. 1979, coll. M. S. Shishodia ; 1 ♂, West Bengal : 24 Parganas Distt. : Narendrapur, 16. X. 1979, Coll. M. S. Shishodia.

Remarks : *Thoradonta bengalensis* sp. nov. is related to *T nodulosa* (Stal) and *T lativertex* Günther but it can be separated easily from them by the wider vertex, extension of median carinulae of vertex upto the middle of fossulae ; position of antennae below the inferior margin of eyes ; finely granulose dorsum ; appreciably elevated median carina between sulci which is undulated posteriorly ; longer spine of posterior angles of lateral lobes of pronotum which has less constricted front margin ; extension of pronotum upto the apex of posterior femora which extends rarely beyond and bare external surface of posterior femora.

(6) Genus *Critotettix* Bolivar, 1887

Type species : *Acrydium bispinosum* Dalman, 1818 ; designated subsequently by Rehn, 1904.

Critotettix Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 222.

Acanthalobus Hancock, 1904, *Spolia zeylan.*, 2 : 131.

Body elongated and slender. Colour brown or grey or yellowish grey or fusco-ferruginous.

Head not exserted ; vertex generally as broad as an eye, narrowed in front, extends upto the level of eyes in front, depressed on either side, median carinula distinct anteriorly, lateral carinula elevated on the level of eyes and reflexed laterally in front ; frontal costa bifurcate behind the paired ocelli, compresso-elevated between the antennae, depressed in front, sinuated between the eyes, narrowly sulcate between the paired ocelli, moderately sulcate in front ; paired ocelli placed between the middle of the eyes. Antennae filiform and inserted below the middle of eyes. Eyes globular in shape.

Pronotum transverse anteriorly, subulate posteriorly, extends beyond the apices of posterior femora ; dorsum finely granulated, sometimes sparingly tuberculose, nearly flat ; median carina nearly obsolete or distinct in front, slightly swollen between the sulci behind ; lateral carinae interrupted on the sulci in front of shoulders, low behind ; prozonal carinae distinct and convergent behind ; abbreviated carinae present or not ; paranota with two projections ; posterior angles of lateral lobes of pronotum acute, straight or directed backwards or without distinct lateral spine. Elytra elongated, rounded at apex. Wings as long as pronotum ; anterior and middle femora elongated, margins

finely serrulated ; posterior tibiae normal at apex ; first segment of posterior tarsi longer than the third ; all the pulvilli equal in length.

Geographical distribution : India ; Burma ; Sri Lanka ; South China ; Phillippines ; Sumatra ; Lombok ; Borneo ; Java ; Great Sunda Island ; Malaya ; East Indies ; Japan ; New Guinea.

12. *Criotettix bispinosus* (Dalman), 1818

(Plate 7, Figs. 1 & 2)

Acrydium bispinosum Dalman, 1818, *Kongl. Vet. Akad. Handl.*, : 77.

Tettix bispinosa, Dalman, 1823, *Anal. Ent.*, : 86.

Criotettix bispinosus, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 185, 223, 226.

Tettix inornata Walker, 1871, *Cat. Derm. Salt. Brit. Mus.*, 5 : 834.

Criotettix saginatus Brunner, 1893, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 104, pl. V. fig. 38.

Acanthalobus inornatus, Kirby, 1914, *Fauna Brit. India Orth.*, : 39.

Criotettix bispinosus, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 134.

Elongated and slender, but slightly smaller than *Eucriotettix grandis* (Hancock). Colour brown or yellowish grey or fusco-ferruginous.

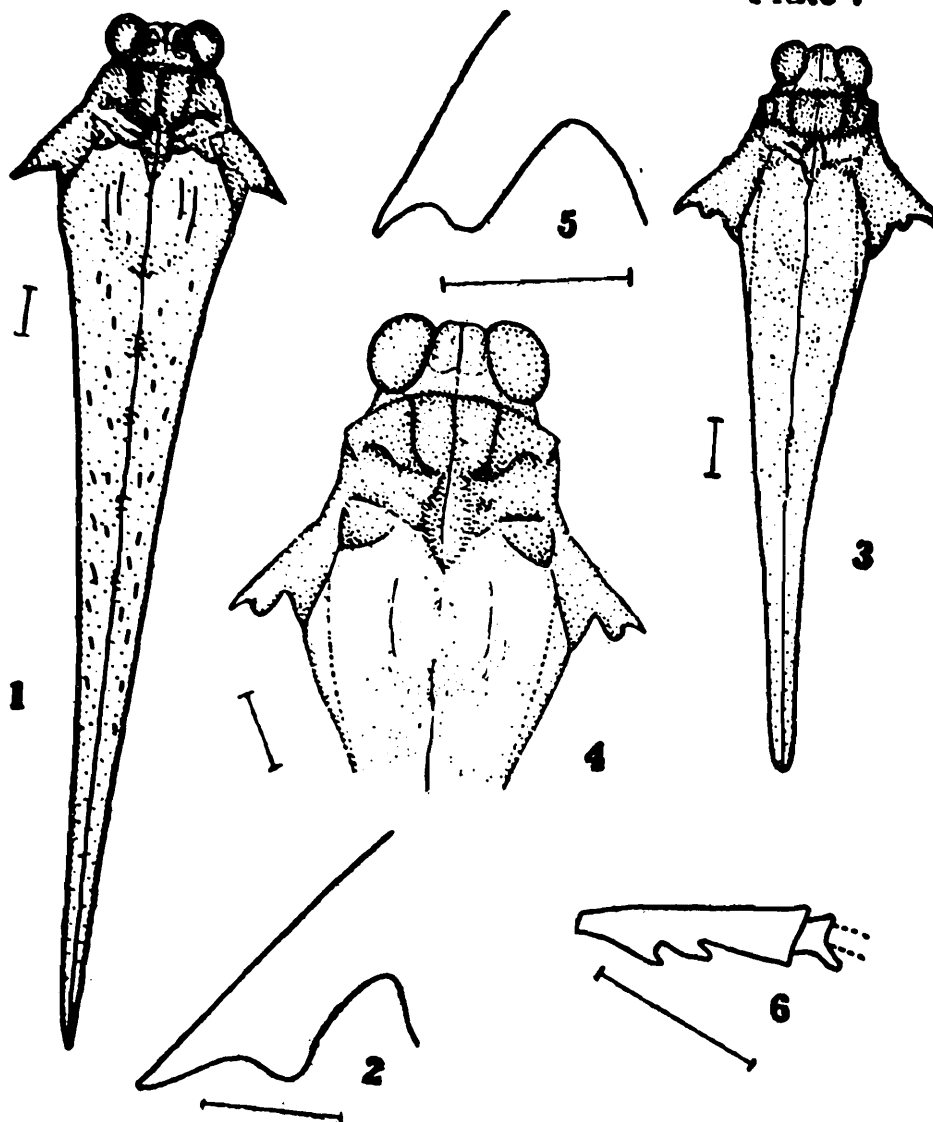
Male, female : Head not exserted ; vertex distinctly broader than an eye, slightly narrower in front, a little depressed on either side, produced upto the eyes in front, surface flat, median carinula visible anteriorly but not produced in front, lateral carinulae elevated upto the level of eyes, reflexed laterally in front, front margin transverse or truncate ; frontal costa bifurcate slightly behind the paired ocelli, a little protuberant between the antennae, slightly sinuous in front of the antennae, moderately or narrowly sulcate ; paired ocelli situated in between the middle of eyes. Antennae filiform and located on the inferior margin of the eyes. Eyes globular and not elevated above the vertex.

Pronotum truncate anteriorly, subulate posteriorly, and extends beyond the apices of posterior femora ; dorsum granulose, rugulose, a little convex between the shoulders ; lateral carinae low, interrupted in front ; prozonal carinae distinctly larger, convergent behind ; abbreviated carinae distinct, wavy ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilated and laminated, apex of anterior margin provided with a sharp pointed spine, directed distinctly backwards. Elytra elongate, punctate, apex narrowly rounded. Wings extend upto the apex of pronotum ; anterior femora elongate, a little convex, margins entire ; middle femora elongate compressed, bicarinate, margins entire ; posterior femora elongate, stout at base, superior margin finely serrulated ; first segment of posterior

tarsi longer than the third ; all the pulvilli of first segment of posterior tarsi more or less equal but sometimes the third slightly longer.

Measurements (in mm) : Body length ♂ 9-10.5, ♀ 10-13.5 ; body length with pronotum ♂ 14-17.5, ♀ 15-21 ; pronotum length ♂ 13-16.5,

Plate 7



Scale 1 mm.

- PLATE 7 :** Fig. 1. Top view of *Criotettix bispinosus* (Dalman).
 Fig. 2. Posterior angles of lateral lobes of pronotum of *C. bispinosus* (Dalman).
 Fig. 3. Top view of *Eucriotettix annandalei* (Hancock) (Type).
 Fig. 4. Head and thorax of *E. annandalei* (Hancock).
 Fig. 5. Posterior angles of lateral lobes of pronotum of *E. annandalei* (Hancock).
 Fig. 6. First and second posterior tarsal segments of *E. annandalei* (Hancock).

♀ 14-20 ; posterior femora length/width ♂ 5.9-7.6 / 1.9-2.3, ♀ 7-8.7 / 2.1-2.4 ; shoulder width ♂ 2.7-3.2, ♀ 3.3-8.

Material examined : 1 ♂, 1 ♀, West Bengal : Calcutta, 26. x.

1949, coll. A. P. Kapur ; 2 ♂♂, 3 ♀♀, Assam : North Lakhimpur (at light), 4. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Arunachal Pradesh : Siang Division : Kambang, 200 m, 14. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Arunachal Pradesh : Siang Division : Lekhabali : bank of Siji River, 2. xi. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Assam : Kaziranga, 100 m, 25. ii. 1969, coll. S. K. Tandon ; 1 ♀, Tripura : Agartala (at light), 11. x. 1969, coll. V. C. Agarwal ; 1 ♀, Tripura : Charilam, 16. xi. 1969, coll. V. C. Agarwal ; 1 ♂, Assam : Khasi Hills : Mowkdoc, 4. iii. 1970, coll. G. M. Yazdani ; 1 ♂, Assam : Kaziranga, 2. xi. 1974, coll. S. K. Gupta ; 1 ♂, Tripura : Teliamura (at light), 10. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Tripura : Ambassa (at light), 200 m, 16. xi. 1974, coll. M. S. Shishodia ; 1 ♂, Assam : Lalpani, 10. ii. 1975, coll. P. T. Cherian ; 1 ♂, Manipur : Moreh, 608 m, 25. ix. 1975, coll. M. S. Shishodia ; 1 ♂, 3 ♀♀, Tripura : Ambassa, 25. v. 1978, coll. J. K. Jonathan.

Geographical distribution : India (Assam, Bihar) ; Burma ; Taiwan ; Hainan ; China ; Sumatra ; Borneo ; Sulawesi ; Java ; Malaya ; Thailand ; Luzon.

Remarks : *Criotettix bispinosus* (Dalman) is somewhat related to *C. latifrons* Hebard from which as well as from all the remaining species under the genus, it is clearly separable by the sharply pointed spines of the posterior angles of lateral lobes of pronotum which are distinctly directed posteriorly.

(7) Genus : *Eucriotettix* Hebard, 1929

Type species : *Criotettix tricarinatus* Bolivar, 1887

Eucriotettix Hebard, 1929, *Revue suisse Zool.*, 36 : 537.

Body elongated and slender. Colour brown or dark brown.

Head a little elevated ; vertex narrower than an eye, a little narrowed in front, extends upto the level of eyes in front, fossulate on either side, median carinula well developed, lateral carinulae elevated upto the level of eyes in front laterally, front margin carinated and interrupted medially ; frontal costa bifurcated behind the paired ocelli, arcuate between antennae, narrowly sulcate between the paired ocelli and moderately sulcate in front ; paired ocelli placed between the middle of eyes. Antennae located on the inferior margin of eyes, filiform. Eyes slightly elevated above the vertex, globular in shape.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the apex of the posterior femora ; dorsum generally smooth or

finely granulose ; median carina normal ; prozonal carinae parallel ; abbreviated carinae present ; humeral angles obtuse ; paranota with two projections ; posterior angles of the lateral lobes of pronotum produced into sharp spines, which are directed outwards. Elytra normal, rounded at apex. Wings extend upto the apex of pronotum ; anterior and middle femora elongate, margins finely serrulated ; posterior femora elongate, a little crassate, margins finely serrulated ; first segment of posterior tarsi longer than the third ; all the pulvilli more or less equal in length.

Geographical distribution : India ; Burma ; Sri Lanka ; Taiwan ; Hainan ; South China ; Java ; Borneo ; Sumatra ; Bali ; Malaya (Singapore) ; Greater and Smaller Sunda Islands ; Tonkin ; New Guinea.

Key to the species of *Eucriotettix* Hebard

1. Head exserted ; vertex narrower ; posterior angles of lateral lobes of pronotum expanded, apex truncate or slightly rounded with or without angulate anterior margin ... 2
- Head slightly exserted ; vertex narrow ; posterior angles of lateral lobes of pronotum expanded, apex produced into an obliquely acute or a triangular sharp spine ... 3
2. Posterior angles of lateral lobes of pronotum triangulate at anterior margin ... *pallidus* (Hancock)
- Posterior angles of lateral lobes of pronotum truncate or slightly rounded at apex notched in the middle ... *dohertyi* (Hancock)
3. Size smaller (15-16 mm). ... *annandalei* (Hancock)
- Size larger (17-22).. ... *grandis* (Hancock)

13. *Eucriotettix pallidus* (Hancock), 1915 (Plate 8, fig. 1)

Criotettix pallidus Hancock, 1915, *Rec. Indian Mus.*, 11 : 85-86.

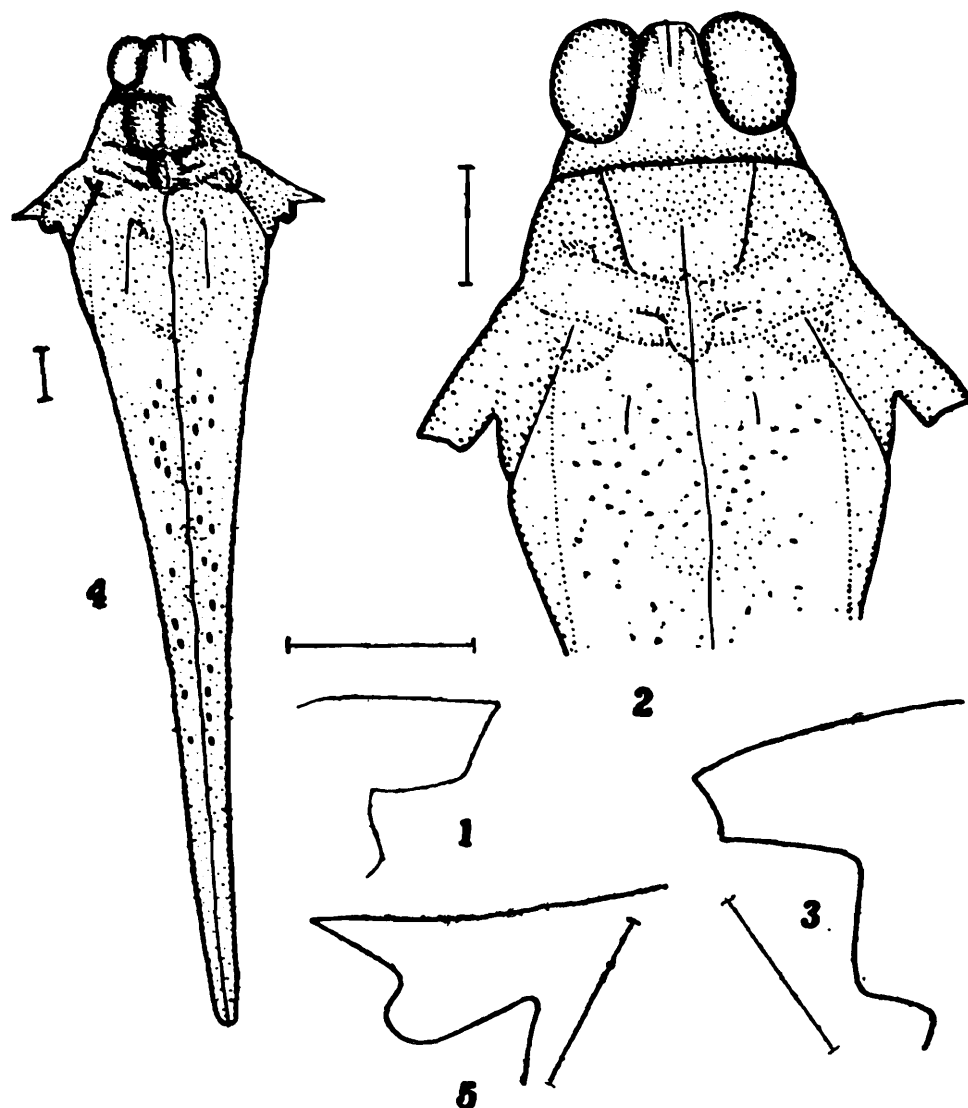
Eucriotettix pallidus, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 170.

Body elongated and slender. Colour brown or dark brown.

Male, female : Head a little exserted ; vertex narrower than an eye, still narrower in front, fossulate on either side, ampliate behind the fossulae, produced upto the eyes anteriorly, median carinula extends upto the posterior end of fossulae, lateral carinulae low, inclined forward, a little reflexed laterally, front margin subtransverse and not carinate ; frontal costa bifurcate between the paired ocelli, compresso-elevated between the antennae, declined in front, moderately sulcate ; paired ocelli situated on the middle of eyes. Antennae filiform and located on the inferior margin of eyes. Eyes globular and elevated above the vertex.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the apices of posterior femora; dorsum granulose, a little nodulose, convex between the shoulders, depressed behind the shoulders, nodulated on the pronotal process behind the depression;

Plate 8



Scale 1 mm.

- PLATE 8 : Fig. 1. Posterior angles of lateral lobes of pronotum of *Eucriotettix pallidus* (Hancock) (Type).
 Fig. 2. Head and thorax of *E. dohertyi* (Hancock) (Type).
 Fig. 3. Posterior angles of lateral lobes of pronotum of *E. dohertyi* (Hancock).
 Fig. 4. Top view of *Eucriotettix grandis* (Hancock).
 Fig. 5. Posterior angles of lateral lobes of pronotum of *E. grandis* (Hancock).

median carina depressed in front, slightly swollen between the sulci, very low and sinuous behind; lateral carinae low and interrupted anteriorly between the sulci; prozonal carinae convergent behind; abbreviat-

ted carinae present on either side of shoulders ; paranota with two projections ; posterior angles of lateral lobes of pronotum expanded, a little triangular, with its posterior margin slightly concave. Elytra ovate, rounded at apex. Wings extend upto the apex of pronotum ; anterior femora elongate, margins entire ; middle femora elongate, compressed, inferior margin slightly undulate, both margins finely serrulate ; posterior femora stouter at base, margins finely serrulate ; first segment of posterior tarsi longer than the third ; all the pulvilli generally equal in length and acute, sometimes the third pulvilli slightly longer than the third and not so acute.

Measurements (in mm.) : Body length ♂ 8.9.5, ♀ 9-11 ; body length with pronotum ♂ 11.14.5, ♀ 14.5-15.5 ; pronotum length ♂ 10.13.5, ♀ 13.5-14.5 ; posterior femora length/width ♂ 4.9.5.4/1.8-1.9, ♀ 6.1-6.2/2.2.2 ; shoulder width ♂ 2.7-2.9, ♀ 2.8-3.4.

Material examined : 1 ♀, West Bengal : Darjeeling Distt. : Pani-ghata : near Suspension Bridge, 14. i. 1971, coll. J. M. Julka ; 2 ♂ ♂, Manipur : Loktak Lake, 912 m, 20. ix. 1975, coll. M. S. Shishodia ; 1 ♂, 2 ♀ ♀, Manipur : New Churachandpur East, 21. ix. 1975, coll. M. S. Shishodia ; 1 ♀, Manipur : 3 kms Moreh West, 608 m, 25. ix. 1975, coll. M. S. Shishodia ; 1 ♂, Manipur : Moreh : Burma Border East, 608m, 26. ix. 1975, coll. M. S. Shishodia.

Geographical distribution : Burma.

Remarks : *Eucriotettix pallidus* Hancock was recorded under *Criotettix* Bolivar by Hancock (1915). Later on Hebard (1929) stated that *Criotettix pallidus* Hancock should be assigned to *Eucriotettix* Hebard. Günther (1938) was also in agreement with this. I have examined the "Type" of *E. Pallidus* (Hancock) and found that pronotum, wings and posterior femora are much longer in the Indian specimens. This species is recorded from India for the first time. It is easily separable from the rest of the known species of the genus by the the narrower vertex, exserted head, expanded posterior angles of lateral lobes of pronotum which are slightly triangular anteriorly and truncate posteriorly, and presence of nodules on the pronotal process.

14. *Eucriotettix dohertyi* (Hancock), 1915

(Plate 8, figs. 2 & 3)

Criotettix dohertyi Hancock, 1915, *Rec. Indian Mus.*, 11 : 86.

Eucriotettix dohertyi, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 170.

Body elongated and slender. Colour ferruginous or grey or brown.

Male, female : Head exserted ; vertex narrower than an eye, a little narrowed in front, produced upto the eyes in front, fossulate on either side, ampliate behind the fossulae, median carinula distinct, lateral carinulae elevated upto the eyes, front margin truncate and without carinulae ; frontal costa bifurcate behind the paired ocelli, arcuate in front, moderately sulcate ; paired ocelli situated between the middle of eyes. Antennae inserted between the lower angles of eyes and filiform. Eyes globular and a little elevated.

Pronotum truncate anteriorly, subulate posteriorly and extends beyond the apex of posterior femora ; dorsum granulose and rugulose, convex and wide between the shoulders, nodulose on the pronotal process ; median carina depressed in front, swollen between the sulci, thin and sinuous behind ; lateral carinae interrupted on the sulci in front of the shoulders ; prozonal carinae low, granulose and slightly convergent behind ; abbreviated carinae present between the shoulders ; paranota with two projections ; posterior angles of lateral lobes of pronotum expanded, truncate or slightly rounded at apex, slightly notched in the middle or rarely not. Elytra ovate or elongate, rounded at apex. Wings extended upto the apex of pronotum ; anterior femora elongate, margins finely serrulate ; middle femora elongate, compressed, bicarinate, slightly undulate on margins with fine serrations ; posterior femora stout, a little crassate, margins finely serrulate ; first segment of posterior tarsi longer than the third ; third pulvilli of the first segment of posterior tarsi slightly longer than the second, the first two pulvilli acutely spinose.

Measurements (in mm.) : Body length ♂ 8-9, ♀ 10.5-11 ; body length with pronotum ♂ 12-13, ♀ 16-17 ; pronotum length ♂ 11-12, ♀ 15-16 ; posterior femora length/width ♂ 4.8-5.5/1.7-1.9, ♀ 6.3-7.1/2-2.1 ; shoulder width ♂ 2.1-2.3, ♀ 3.2.

Material examined : "Type" ♀, Upper Assam, coll. Doherty (Reg. No. of Zoological Survey of India, 1246/9) ; 2 ♀ ♀, West Bengal : Darjeeling Distt. : Panighata : Bank near Suspension Bridge, 14.i.1971 ; coll. J. M. Julka ; 1 ♂, 2 ♀ ♀, West Bengal : Darjeeling Distt. : $\frac{1}{2}$ km South of Goka Forest Rest House, 20.iv.1973, coll. M. S. Shishodia ; 1 ♂, Manipur : Ukhrul : Kundung, 2.x.1975, coll. M. S. Shishodia ; 1 ♀, Meghalaya, Shillong : Malki Forest, 24.viii.1978, coll. M. S. Jyrwa.

Geographical distribution : India (Assam).

Remarks : *Eucrietettix dohertyi* (Hancock) is very similar to *E. pallidus* (Hancock) and so it is with difficulty they can be separated. The posterior angles of the lateral lobes of pronotum are triangular and

prominent in the latter species, whereas they are truncate or slightly rounded in the former. Both the species are found to occur in the same locality.

15. *Eucriotettix annandalei* (Hancock), 1915
(Plate 7, figs. 3-6)

Criotettix annandalei Hancock, 1915, *Rec. Indian Mus.*, 11 : 87-88.

Eucriotettix annandalei, Hebard, 1929, *Revue suisse Zool.*, 36 : 573 ; Günther, 1938, *Stettin. ent. Ztg.*, 99 : 170.

Stature smaller than *Eucriotettix grandis* (Hancock). Colour fuscous, obscurely variegated with light brown, hind femora obscurely mottled with pale.

Head not exserted ; vertex narrower than an eye, produced upto the eyes in front, fossulate on either side of the median carinula, median carinula distinctly produced behind upto the occipital region, lateral carinulae not elevated upto the level of eyes, reflexed laterally in the front, front margin subtransverse and not carinate ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, sinuous between the eyes, narrowly sulcate between the paired ocelli, moderately sulcate in front ; paired ocelli placed slightly below the middle of eyes. Antennae filiform and inserted between the lower margins of eyes. Eyes globular and a little elevated.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the apices of posterior femora ; dorsum deplanate, slightly convex between the shoulders, bifossulate behind the shoulders, pitted and tuberculose on the base of pronotal process, dull rugose-granulose ; median carina depressed in front, a little swollen between the sulci and low behind ; lateral carinae interrupted in front, low behind with finely serrulate margins ; prozonal carinae lightly expressed, granulose and more or less parallel ; abbreviated carinae present on either side of the median carinae ; paranota with two projections ; posterior angles of lateral lobes of the pronotum laminate and produced to an obliquely acute spine, posterior margin subtruncate. Elytra elongate, punctate with rounded apex. Wings extend upto the apex of pronotum ; anterior femora elongate, subentire ; middle femora elongate, slightly compressed, bicarinate, margins undulate with fine serrulations ; posterior femora stout, crassate, margins finely serrulate ; first segment of the posterior tarsi longer than the third, first and second pulvilli of the first segment of posterior tarsi acute and a little shorter than the third, third

pulvilli longer than the second and not acute.

Measurements (in mm.) : Body length ♂ 9, ♀ 13 ; body length with pronotum ♂ 15, ♀ 16 ; pronotum length ♂ 14, ♀ 15 ; posterior femora length/width ♂ damaged, ♀ 7.3/2.1 ; shoulder width ♂ 2.7, ♀ 3.2.

Material examined : "Type" ♂, West Bengal : Paresnath, 1216 m, 9. iv. 1909, coll. N. Annandale (Reg. No. of Zoological Survey of India, 9978/16) ; "Type" ♀, West Bengal : Paresnath, 1307-1336 m, 15. iv. 1909, N. Annandale (Reg. No. of Zoological Survey of India, 9985/16).

Geographical distribution : India (West Bengal).

Remarks : *Eucriotettix annandalei* (Hancock) is very near to *E. grandis* (Hancock) from which it can be easily recognised by the narrow vertex, depressed head and shorter pronotum.

16. *Eucriotettix grandis* (Hancock), 1912

(Plate 8, figs. 4 & 5)

Criotettix grandis Hancock, 1912, *Mem. Dep. Agric. Indian ent. Ser.*, 4 : 134.

Criotettix maximus Hancock, 1913, *Rec. Indian Mus.*, 8 : 311.

Criotettix gravelyi Hancock, 1915, *Rec. Indian Mus.*, 11 : 88.

Eucriotettix maximus, Hebard, 1929, *Revue suisse Zool.*, 36 : 573.

Encriotettix gravelyi, Hebard, 1929, *Revue suisse Zool.*, 36 : 573.

Eucriotettix grandis, Hebard, 1929, *Revue suisse Zool.*, 36 : 573.

Eucriotettix grandis, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 182.

Large sized. Colour variable, generally dark brown or brown or grey, eyes pale or light brown, sometimes dorsum ochreous or dark ochreous-brown, or cinereous-refescent, posterior femoral carinae maculated with pale, pagina marked with ochre.

Male, female : Head slightly exserted ; vertex narrower than an eye, depressed on either side of the median carinula, produced, upto the eyes in front, granulose, median carinula distinct and visible anteriorly, lateral carinulae lower to the eyes and reflexed laterally in front, front margin subtransverse or transverse and not carinate ; frontal costa distinctly bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, depressed in front, slightly sinuate between the eyes, narrowly sulcate between the paired ocelli, moderately sulcate in front ; paired ocelli situated more or less in between the eyes. Antennae filiform and located on the inferior margin of eyes. Eyes globular and a little elevated above the vertex.

Pronotum angularly excavate slightly in the middle, otherwise truncate anteriorly, subulate posteriorly, wider between the shoulders and extends beyond the apices of posterior femora ; dorsum granulose,

rugulose, a little convex between the shoulders, deplanate, broadly depressed behind the shoulders, generally small linear rugulae present on pronotal process ; median carina depressed in front, swollen between the sulci, depressed between the shoulders, undulate or sinuate behind, or entire ; lateral carinae interrupted between the sulci in front of the shoulders, low and serrulate behind, obscure on the pronotal process, prozonal carinae lightly expressed, granulose and parallel ; abbreviated carinae granulose ; paranota with two projections ; posterior angles of lateral lobes of pronotum laminate, deflexed, anterior margin bears distinctly triangular sharp spines directed transversely or subobliquely or rather posteriorly, posterior margin subtruncate. Elytra elongate, punctate and roundly truncate at apex. Wings extend upto the apex of pronotum ; anterior femora elongate and margins finely serrulate ; middle femora elongate, compressed, bicarinate, indistinctly undulate, margins finely serrulate ; posterior femora elongate, stouter at base, crassate, margins finely serrulate ; first segment of posterior tarsi longer than the third ; first pulvilli of first hind tarsal segment acute and smaller, second pulvilli acute and a little longer than the first, third pulvilli either equal to or slightly longer than the second, but not acute.

Measurements (in mm.) : Body length ♂ 9.5-11, ♀ 14-15 ; body length with pronotum ♂ 17-18, ♀ 19.5-22 ; pronotum length ♂ 16-17, ♀ 18.5-21 ; posterior femora length/width ♂ 6.5-7.3/1.9-2.1, ♀ 8.1-9.1/2.4-2.8 ; shoulder width ♂ 2.7-3.2, ♀ 3.7-4.

Material examined : "Type" ♀, West Bengal : Darjeeling Distt. : Ghumti, 1216m,—vii. 1911, coll. F.H. Gravely (Reg. No. of Zoological Survey of India, 1540/20) ; "Type" ♀, Sikkim, coll. L. Mandelli (Reg. No. of Zoological Survey of India, 6539/14) ; "Type" 2 ♀ ♀, Arunachal Pradesh : Janakmukh (Abor Expd.) : Bank of Dihong River (among stones), 182m, 17. xii. 1911, coll. Kemp (Reg. No. of Zoological Survey of India, 7571/19 and 7572/19) ; "Type" ♀, Arunachal Pradesh : Yambung (Abor Expd.), 134 m. 17. i. 1912, coll. Kemp (Reg. No. of Zoological Survey of India, 7561/19) ; 3 ♀ ♀, West Bengal : Darjeeling Distt. : Singla, 456 m,—iv. 1913, Lord Carmichael's Collection (Reg. No. of Zoological Survey of India, 7804-7806/20) ; 1 ♂, Arunachal Pradesh : Kameng Division : Amatulla, 8. iii. 1961, coll. K. C. Jairam ; 1 ♀, Arunachal Pradesh : Kameng Division : Bitselling village : 3000 m, 14. iii. 1961, coll. K. C. Jairam ; 1 ♀, Arunachal Pradesh : Kameng Division : Sangtichuok, 5500 m, 12. iv. 1961, coll. K. C. Jairam ; 1 ♀, Arunachal Pradesh : Kameng Division : Ankaling, 2000 m, 25. v. 1961, coll. K. C. Jairam ; 1 ♂, Arunachal Pradesh : Kameng Division : Tanga Valley : Dunn Bridge, 1524 m, 1. vi. coll. A. N. T. Joseph ; 1 ♀,

Arunachal Pradesh : Siang Division : 3 kms south of Dali village, 200 m, 10. xi. 1966, coll. S. K. Tandon & G. S. Arora ; 1 ♂, Arunachal Pradesh : Siang Division : Dali Camp, 300 m, 11. xi. 1966, coll. S. K. Tandon & G. S. Arora ; 3 ♀ ♀, Arunachal Pradesh : Subansiri Division : Pakha Camp : Daporijo, 150 m, 26. x. 1966, coll. S. K. Tandon & G. S. Arora ; 1 ♀, West Bengal : Darjeeling Distt. : Kalimpong, 9. i. 1971, coll. J. M. Julka ; 3 ♀ ♀, West Bengal : Darjeeling Distt. : Churanti Forest : Churavah, 120 m, 28. xii. 1973, coll. G. K. Srivastava and P. K. Maiti ; 3 ♀ ♀, Arunachal Pradesh : Subansiri Division : Taliha, 900 m, 18. xi. 1974, coll. J. M. Julka ; 10 ♂ ♂, 9 ♀ ♀, West Bengal : Darjeeling Distt. : Teesta Bazar, 214 m, 24. v. 1979, coll. M. S. Shishodia ; 1 ♂, 31 ♀ ♀, Sikkim : Gangtok, 1700 m, 2. vi. 1979, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Sikkim : Tapakham (Sigtam), 600 m, 15. vii. 1979, coll. M. Prashad.

Geographical distribution : India (West Bengal, Arunachal Pradesh, Assam, Meghalaya) ; Burma.

Remarks : *Eucriotettix grandis* (Hancock) is closely related to *E. annandalei* (Hancock) but can be readily told from the latter by the larger size of the body, exsertion of the head and the colouration of the body. This species is variable in colouration, in the direction of the posterior angles of lateral lobes of pronotum, and in the texture of the dorsum.

(8) Genus : *Loxilobus* Hancock, 1904

Type species : *Loxilobus acutus* Hancock, 1904

Loxilobus Hancock, 1904, *Spolia zeylan.*, 2 : 108, 134.

Body slender and medium sized. Colour grey or ferruginous or greyish brown.

Head not exserted ; vertex as wide as eyes or slightly narrower, attenuated in front, depressed on either side ; frontal costa bifurcate behind or between the paired ocelli, a little elevated between the antennae, rounded, narrowly sulcate between paired ocelli, moderately sulcate in front ; paired ocelli placed nearly between eyes. Antennae filiform, located below the middle of eyes or slightly above the inferior margin of eyes. Eyes more or less on the level of vertex and globular.

Pronotum rounded anteriorly, subulate posteriorly, and extends beyond the apices of posterior femora ; dorsum scabrous or granulated, slightly raised between shoulders ; median carina a little sinuated ; paranota with two projections ; posterior angles of lateral lobes of pro-

notum project outwards and backwards with acute or obtuse apices. Elytra oblong. Wings more or less extended upto the apex of pronotum ; anterior and middle femora elongate, margins entire ; posterior femora elongate, margins finely serrulate ; first and third segments of posterior tarsi nearly equal or sometimes the first longer than the third ; all the pulvilli either equal or the third pulvilli slightly longer than the second.

Geographical distribution : India ; Burma ; Sri Lanka ; Vietnam ; China ; Philippines ; Java ; Borneo ; Sumatra ; Sulawesi ; Malaya ; Greater and Smaller Sunda Islands ; New Guinea ; New Pommern ; Solomon Islands ; Queensland.

Key to the species of *Loxilobus* Hancock

1. Pronotum extends upto the apex of posterior femora ; vertex narrower than an eye ... *assamus* Hancock
- Pronotum extends much beyond the apex of posterior femora ; vertex slightly wider than an eye ... *acutus* Hancock

17. *Loxilobus assamus* Hancock, 1907

(Plate 9, fig. 3)

Loxilobus assamus Hancock, 1907, *Trans. R. ent. Soc. Lond.* , : 223.

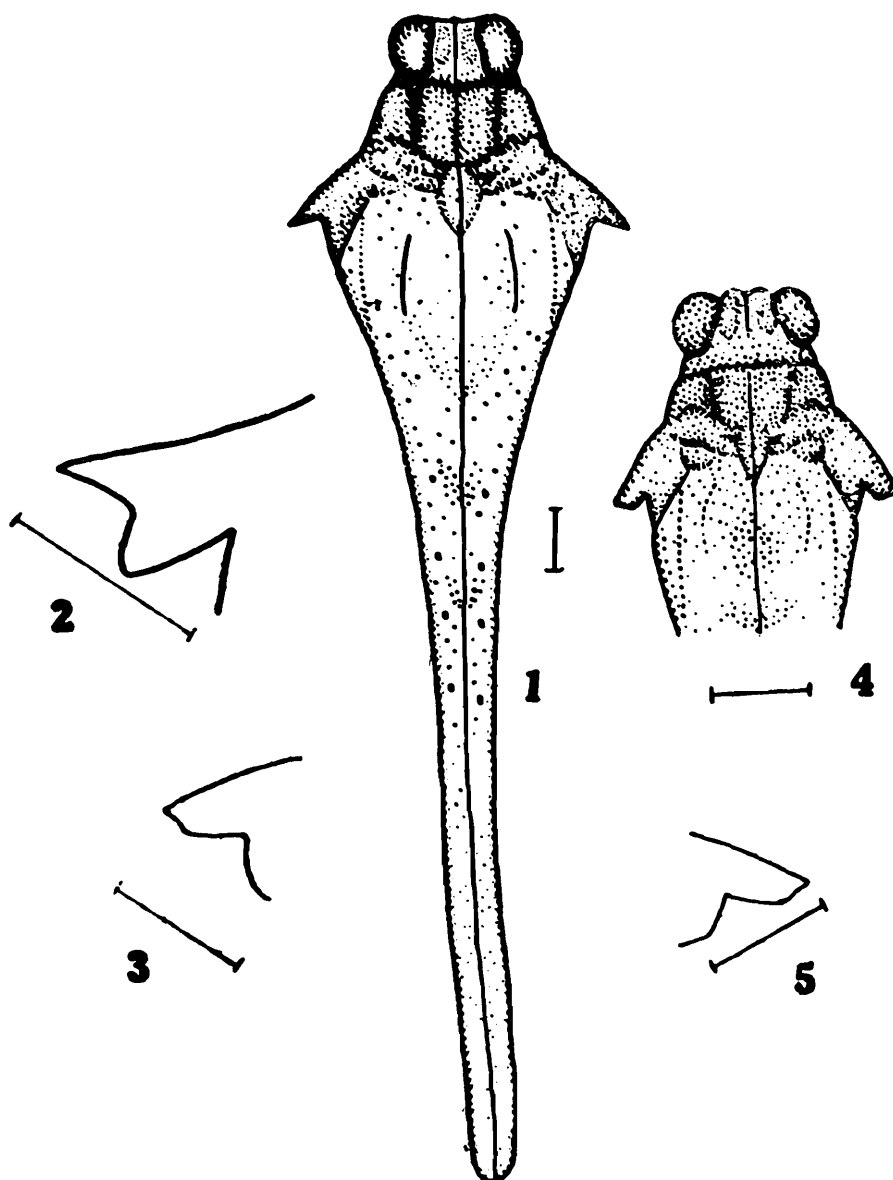
Medium sized. Colour ferruginous or cinereous often infusate on the sides and legs.

Male, female : Head not exserted ; vertex a little narrower than an eye, produced upto the eyes in front, slightly narrower forward, longitudinally sulcate on each side, median carinula distinct anteriorly, lateral carinulae elevated upto the eyes and roundly reflexed laterally, front margin truncate ; frontal costa bifurcate just behind the paired ocelli, carinae roundly produced, in profile convex, moderately sulcate ; paired ocelli placed between or slightly below the middle of eyes. Antennae filiform, located on the inferior margin of eyes. Eyes globular and not elevated above the vertex.

Pronotum truncate anteriorly, cuneate posteriorly and extends backward as far as the apices of posterior femora ; dorsum tuberculose, granulose and somewhat convex between shoulders, deplanate posteriorly ; median carina a little compresso-elevated between the sulci in front of the shoulders and in profile sinuate posteriorly ; prozonal carinae distinct and a little convergent behind ; abbreviated carinae present between the shoulders, small in size ; lateral carinae low ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral

lobes of pronotum a little laminate outwards which is subtriangular and obliquely truncate. Elytra small, punctate, apex narrowly rounded.

Plate 9



Scale 1 mm.

- PLATE 9: Fig. 1. Top view of *Criotettix gravelyi* Hancock (Type).
 Fig. 2. Posterior angles of lateral lobes of pronotum of *C. gravelyi* Hancock.
 Fig. 3. Posterior angles of lateral lobes of pronotum of *loxilobus assamus* Hancock.
 Fig. 4. Head and thorax of *L. acutus* Hancock (Top view).
 Fig. 5. Posterior angles of lateral lobes of pronotum of *L. acutus* Hancock.

Wings extend upto the apex of pronotum or a little shorter ; anterior

and middle femora elongate, margins entire ; posterior femora elongate, margins finely serrulate, antegenicular and genicular teeth normal ; first segment of posterior tarsi longer than the third ; third pulvilli of first tarsal segment longer than the first and second pulvilli, first and second pulvilli acute at apices.

Measurements (in mm.) : Body length ♂ 7-8.5, ♀ 10-10.5 ; body length with pronotum ♂ 8.5-9.5, ♀ 10-10.5 ; pronotum length ♂ 7.5-8.5, ♀ 9-9.5 ; posterior femora length/width ♂ 5.7-5.9/1.8, ♀, 6.4-7/2.2-2.1 ; shoulder width ♂ 2.2-2.2, ♀ 2.7-2.8.

Material examined : 1 ♀, Manipur : 16 miles N. of Imphal on Dimapur Road, Ca. 1064 m, 1. x. 1945, coll. Maj. M. L. Roonwal ; 1 ♂, Arunachal Pradesh : Subansiri Division : Daporijo, 150 m, 27. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Assam : Santipur, 100 m. 2. iii. 1969, coll. S. K. Tandon ; 4 ♂ ♂, 3 ♀ ♀, Assam : Kaziranga, 100m, 25. ii. 1969, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Tirap Division : Jairampur, 225 m, 27. x. 1971, coll. G. S. Arora ; 1 ♂, Arunachal Pradesh : Tirap Division : Changlong, 600 m, 30. x. 1971, coll. G. S. Arora ; 1 ♂, 1 ♀, Tripura : Ambassa Forest North, 200 m, 16. xi. 1974, coll. M. S. Shishodia ; 1 ♂, Ambassa Forest South, 200 m, 17. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Tripura : Kanchannagar, 200 m, 20. xi. 1974, coll. M. S. Shishodia ; 1 ♂, Manipur : Central Distt. : Jiribam river bank, 13. ii. 1975, coll. P.T. Cherian ; 1 ♂, 1 ♀, Manipur : South Distt. : Moreh : Lockchon river, 22. ii. 1975, coll. P. T. Cherian ; 1 ♂, Nagaland : Khujana, 7. iii. 1975, coll. P.T. Cherian ; 2 ♂ ♂, 2 ♀ ♀, East Distt. : Ukhrul, 1884 m, 4. x. 1975, coll. M. S. Shishodia ; 4 ♂ ♂, 1 ♀, West Bengal : Darjeeling Distt. : Singla : Karmaktar, 450 m, 3. i. 1976, coll. G. K. Srivastava ; 2 ♂ ♂, 1 ♀, West Bengal : Darjeeling Distt. : Kurseong, 1475 m, 15. v. 1979, coll. M. S. Shishodia ; 1 ♀, Sikkim : Gangtok, 1700 m, 1. vi. 1979, coll. M. S. Shishodia and party.

Geographical distribution : India (Assam, West Bengal).

Remarks : This species reminds immediately *Coptotettix annandalei* Hancock but in the latter the posterior angles of lateral lobes of pronotum are much dilated and obliquely truncate at apex whereas in *Loxilobus assamus* Hancock they are less dilated and subtriangular at apices. *Loxilobus assamus* Hancock can be easily separated from all the other regional species of the genus by the shorter and broader stature, slightly narrow vertex, granulose and tuberculose dorsum, sinuated and interrupted median carina of pronotum, extension of pronotal process upto the apices of posterior femora and pointed first and second pulvilli of posterior tarsi.

18. ***Loxilobus acutus* Hancock, 1904**
(Plate 9, figs. 4 & 5)

Loxilobus acutus Hancock, 1904, *Spolia zeylan.*, 2 : 134-135.

Loxilobus parvispinus Hancock, 1915, *Rec. Indian Mus.*, 11 : 90. Syn. nov.

Size medium. Colour greyish-fuscous or brown.

Male, female : Head not exserted ; vertex slightly wider than an eye or equal, a little narrowed forwards, produced upto the level of eyes in front, longitudinally fossulate on either side, median carinula distinct and extends upto the posterior end of fossulae, lateral carinulae elevated upto the level of eyes, short, and reflexed laterally, front margin truncate, not carinate ; frontal costa bifurcate between the paired ocelli, roundly arcuate in front, moderately sulcate ; paired ocelli situated between the middle of eyes. Antennae filiform, located below the middle of eyes. Eyes globular, not elevated above the vertex.

Pronotum truncate anteriorly, subulate posteriorly and extends beyond the apices of posterior femora ; dorsum granulose, interspersed with very small tubercles, sometimes rugulose, a little convex and wide between the shoulders, deplanate behind the shoulders ; median carina very low, irregularly interrupted and compressed or irregularly compresso-elevated with interruptions behind the shoulders ; prozonal carinae distinctly visible, granulose and parallel or slightly converge behind ; abbreviated carinae very low and small ; lateral carinae low ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum acutely produced outwards and is subspini-form, subtransverse behind the angle. Elytra oblong, punctate. Wings extend upto the apex of pronotum ; anterior and middle femora elongate, margins finely serrulate, middle femora a little compressed and bicarinate ; posterior femora normal ; first and third posterior tarsal segments more or less equal in length ; first and second pulvilli shorter and spinose, third pulvilli longer than first or second and flattened.

Measurements (in mm.) : Body length ♂ 7.5-8, ♀ 10 ; body length with pronotum ♂ 12-13, ♀ 14.5, pronotum length ♂ 11-12, ♀ 13.5 ; posterior femora length/width ♂ 5.4-5.6/1.9, ♀ damaged ; shoulder width ♂ 2.1-2.3, ♀ 2.7.

Material examined : 1♂, 1♀, Arunachal Pradesh : Lohit Divi. : Chowkham, 100 m, 16. iii. 1969, coll. S. K. Tandon ; 1♂, Manipur : South Distt. : Moreh, 22. ii. 1975, coll. P. T. Cherian.

Geographical distribution : India (Bihar) ; Sri Lanka.

Remarks : It is recorded for the first time from India. The original description of *Loxilobus acutus* Hancock (1904) and the subse-

quent one by Kirby (1914) tally with that of *Loxilobus parvispinus* Hancock except for the slight variations of granulation on dorsum and body colouration, both of which may be due to the ecological conditions and the age of the specimens. Since these variations appear to be of intra-specific nature, *L. parvispinus* Hancock is a synonym of *L. acutus* Hancock. *Loxilobus acutus* Hancock differs from all the other regional species of the genus in the longer pronotum and slightly wider vertex.

(9) Genus : *Synalibas* Günther, 1939

Type species : *Synalibas vagans* Günther, 1939

Synalibas Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 : (A) Zool. (N. F.) BD 1 : 323.

Small to medium sized with slender body. Colour brown to grey, obscurely variegated with fuscous.

Head exserted above the pronotal surface ; vertex narrower than an eye, still narrower in front, depressed longitudinally on either side, middle carinula distinct and extends behind upto three-fourths the distance of eyes, lateral carinulae distinctly raised upto the level of eyes and convergent in front, front margin not distinct; frontal costa bifurcate behind or between the paired ocelli, widely sulcate and elevate between the antennae, declined towards middle ocelli, arched ; paired ocelli located below the middle of eyes. Antennae moderate, filiform, distinctly inserted below the inferior margin of eyes. Eyes globular and a little exserted.

Pronotum truncate or subtruncate anteriorly, extends hardly upto the apex of abdomen posteriorly ; dorsum granulose, rugulose or tuberculose, a little convex between shoulders ; median carina entire or depressed in front, raised and swollen between sulci, depressed or entire behind shoulders and uniformly distinct in the rest ; prozonal carinae distinct, parallel ; lateral carinae distinct, low, wavy, run more or less parallel upto the middle of pronotum and then converge towards the median carina at about three-fourths the length of pronotum and then parallel at apex ; humeral angles roundly or obtusely produced ; paranaota with one or two projections ; posterior angles of lateral lobes of pronotum turned downwards, wide, subtruncate or round at apex. Elytra small, elliptical, narrow at apex. Wings wanting or double the length of elytra ; anterior and middle femora elongate, not broadened, margins entire or indistinctly wavy ; hind femora normal ; third segment of hind tarsi equal to or a little shorter than the first ; third pul-

villi longer than the first two.

Geographical distribution : India (West Bengal) ; New Guinea.

Key to the species of *Synalibas* Günther

1. Head distinctly exserted ; vertex narrow and a little more narrower towards the front, frontal costa bifurcate behind the paired ocelli, more widely sulcate between the antennae; dorsum of pronotum indistinctly arched in front ; inner projection of paranota very small or absent ; posterior angles of lateral lobes of pronotum rounded at apex ; wings present, double the length of tegmina ... *Vagans*
Günther, 1939
- Head a little exserted ; vertex not so narrow as mentioned above ; frontal costa bifurcate between the paired ocelli, not widely sulcate between antennae ; dorsum a little arched in front ; inner projection of paranota normal ; posterior angles of lateral lobes of pronotum subroundly truncate ; wings wanting or undeveloped ... *perplexus*
Hancock, 1915

19. *Synalibas vagans* Günther, 1939 (Plate 10, figs. 1-4)

Synalibas vagans Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A)
Zool. N.F. BD 1 : 324.

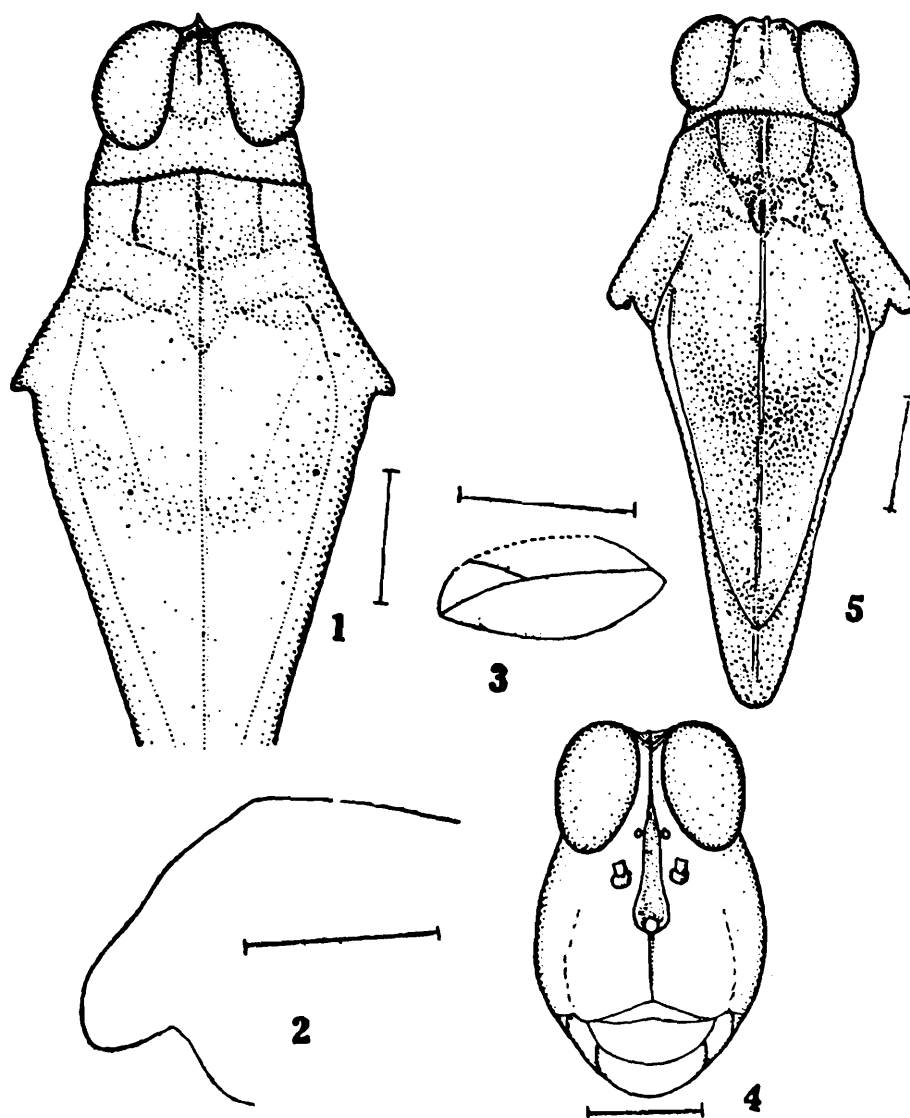
Small sized. Colour dark brown.

Female : Head distinctly exserted above the pronotum ; vertex narrower than an eye, still narrower in front, not produced in front of eyes, middle carinula distinct, and extends upto three-fourths the distance of eyes behind, lateral carinulae distinctly raised upto the level of eyes and convergent in front, front margin not visible, with longitudinal depression on either side ; frontal costa bifurcate behind the paired ocelli, widely sulcate in front of the paired ocelli, elevate between the antennae, declined in front, paired ocelli placed below the middle of eyes. Antennae (damaged in allotype) long, filiform, placed below the inferior margin of eyes. Eyes globulose, a little approximate, slightly exserted.

Pronotum subtruncate anteriorly, extends hardly upto the (damaged in allotype) apex of abdomen posteriorly ; dorsum granulose, rugulose or tuberculose, a little flate between the shoulders, a little depressed behind the shoulders or not ; median carina distinct, a little elevate in front of the shoulders, otherwise uniformly distinct ; prozonal carinae

run parallel to the outer carinae upto the middle or a little beyond, then convergent towards middle carina at about three-fourths the length of the pronotum, parallel at apex ; humeral angles obtuse-rounded ; paranota with two projections but the inner projection very small. Poste-

Plate 10



Scale 1 mm.

PLATE 10 : Fig. 1. Top view of head and thorax of *Synalibas vagans* Günther (Type).

Fig. 2. Posterior angles of lateral lobes of pronotum of *S. vagans* Günther.

Fig. 3. Elytra of *S. vagans* Günther.

Fig. 4. Front view of head of *S. vagans* Günther.

Fig. 5. Top View of *Synalibas perplexus* (Hancock),

rior angles of lateral lobes of pronotum turned downwards, rounded at apex. Tegmina small, elliptical, narrow at apex. Wings double the length of tegmina ; anterior and middle femora (damaged in allotype) elongate, margins finely serrulate ; posterior femora stout, crassate, margins finely serrulate.

Measurements (in mm.): Body length ♀ 10-10.4; body length with pronotum ♀ 6-7.5; pronotum length ♀ 5-6.5; posterior femora length/width ♀ 5.1 - 5.6/1.6-2; shoulder width ♀ 2-2.4.

Material examined: Allotype ♀, West Bengal: Darjeeling Distt. Pashok, 1520 m (5000 feet in original label), 26.v.-14.vi.1916, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 1914/H5]; 2 ♀ ♀ Sikkim: Gangtok: Burtuk, 1759 m, 30.v.1979, coll. M. S. Shishodia.

Geographical distribution: India (West Bengal).

20. ***Synalibas perplexus* (Hancock), 1915**
(Plate 10, fig. 5)

Mazarredia perplexa Hancock, 1915, *Rec. Indian Mus.*, 11: 101.

Synalibas perplexus, Günther, 1939, *Abh. Ber. Mus., Tierk. Völkerk. Dresden*, 20: 325.

Size medium. Colour brown or dark brown or grey, obscurely variegated with fuscous, in one example hind process of pronotum light yellow dorsally, posterior tibiae fuscous, annulated with white or dirty yellow colour.

Male, female: Head a little exserted; vertex narrower than an eye, narrowed forward, not produced in front of the eyes, longitudinally depressed on either side and a little ampliate behind the depression, middle carinula distinct and extends behind upto three-fourths the distance of eyes, lateral carinulae also distinct, elevated upto the level of eyes, deflexed laterally, front margin very low, deflexed laterally; frontal costa bifurcate slightly behind the paired ocelli, a little elevated between the antennae, moderately sulcate but wider below the antennae, declined below, arcuate; paired ocelli placed below the middle of eyes. Antennae filiform, moderate in size and placed below the inferior border of eyes. Eyes a little exserted above the vertex, globulose.

Pronotum truncate anteriorly, cuneately produced backwards upto three-fourths the distance of hind femora or a little beyond but never upto the last segment of abdomen; dorsum granulose, tuberculose a little depressed behind the shoulders; median carina depressed in front, swollen and elevated on the sulci, depressed-undulate between and behind the shoulder, distinctly visible on the hind process; prozonal carina distinct, parallel; dorsum laterally bicarinate, inner carinae run parallel to the outer carinae upto three-fourths of the distance of pronotum, then converge towards median carina, parallel at apex, humeral angles obtuse; paranota with two projections; posterior angles of lateral lobes of

pronotum turned downwards, moderate, subtruncately rounded at apex. Elytra small, narrow and rounded at apex. Wings abbreviated ; anterior femora elongate, indistinctly undulate, margins entire ; middle femora elongate, bicarinate, margine finely serrulate ; posterior femora wide, elongate, margins finely serrulate ; third tarsal segment a little shorter than the first ; first and second pulvilli shorter than the third, spinose, third pulvilli longer than the first two ; ovipositor long.

Measurements (in mm.) : Body length ♂ 6.4-7, ♀ 7.2-9.2 ; body length with pronotum ♂ 5.9-6.5, ♀ 7.3-8.4 ; pronotum length ♂ 5.5-5.9, ♀ 5.4-7.3 ; posterior femora length/width ♂ 4.3-4.5/1.1-1.3, ♀ 5.1-5.4/1.6-1.8 ; shoulder width ♂ 1.9-2, ♀ 2.1-2.4.

Material examined :

West Bengal : 4 ♂♂, 1 ♀, Darjeeling Distt. : Manibhanjang, 1944 m, 18. v. 1975, colls. G. K. Srivastava and P. K. Maiti ; 6 ♂♂, Darjeeling Distt. : Manibhanjang : North from Yowa Hostel, 19. v. 1975, colls. G. K. Srivastava and P. K. Maiti ; 1 ♂, 1 ♀, Darjeeling Distt. : Manibhanjang, on the way to Simana, 21. v. 1975, coll. J. K. Jonathan ; 4 ♂♂, Darjeeling Distt. : Manibhanjang, 1 Km. West from Camp, 22. v. 1975, colls. G. K. Srivastava and P. K. Maity ; 1 ♂, 1 ♀, Darjeeling Distt. : Ghombhanjang on way to Ghom, 27. v. 1975, coll. J. K. Jonathan ; 4 ♂♂, Darjeeling Distt. : Lepchajaghat, 1. vi. 1975, coll. J. K. Jonathan ; 1 ♂, Darjeeling Distt. : Lepchajaghat, 2. vi. 1975, coll. J. K. Jonathan ; 1 ♂, 1 ♀, Darjeeling Distt. : Lepchajaghat, 3. vi. 1975, coll. J. K. Jonathan ; 1 ♂, 1 ♀, Darjeeling Distt. : Lepchajaghat : Tumsong Rd., 4. vi. 1975, coll. J. K. Jonathan ; 3 ♂♂, 2 ♀♀, Darjeeling Distt. : Rangiroon, 6. vi. 1975, coll. J. K. Jonathan ; 1 ♂, 5 ♀♀, Darjeeling Distt. : Rangiroon, 8. vi. 1975, colls. G. K. Srivastava and P. K. Maiti ; 3 ♂♂, 6 ♀♀, Darjeeling Distt. : Rangiroon, 9 & 10. vi. 1975, Colls. G. K. Srivastava and P. K. Maiti ; 27 ♂♂, 18 ♀♀, Darjeeling Distt. : Tiger Hill, 2660 m, 19. v. 1979, coll. M. S. Shishodia.

Sikkim : Holotype ♂, Sikkim (Knyvett.) [Reg. No. of Zoological Survey of India, 1623/20].

Geographical distribution : India (West Bengal).

Remarks : Hancock (1915) described this species under *Mazarredia* Bolivar but later on Günther (1939) transferred it to *Synalibas* Günther because of its smaller size, narrower vertex which is still narrower towards the front and bicarinate lateral carinae of pronotum which converge towards middle carinae. The only character which is similar to *Mazarredia* (now *Bolivaritettix*) is the distinct and parallel prozonal carinae. Steinmann (1970) has placed *perplexus* under *Bolivari-*

tettix Günther along with all the Indian species described under *Mazarredia* without properly examining the characters.

Synalibas perplexus (Hancock) is easily distinguished from the other known Indian species of the genus by the less exserted head, narrower vertex, bifurcation of frontal costa between the paired ocelli which is not so widely sulcate between the antennae, not smaller inner lobe of paranota, and subroundly truncate posterior angles of the lateral lobes of pronotum.

(10) Genus : **Hebarditettix** Günther, 1938

Type species : *Bolotettix quadratus* Hancock, 1915

Heb rditettix Günther, 1938, *Stettin. ent. Ztg.*, 99 : 200-202.

Body elongate and slender, Colour yellowish mottled with fuscous or reddish ochreous, hind tibiae pale annulated.

Head distinctly exserted ; vertex narrower than an eye, still narrower towards front, extends upto the level of eyes or slightly less in front, fossulate on either side ; median carinula extends upto the posterior end of fossulae, lateral carinulae elevated upto the level of eyes and join the median carinula medially, front margin absent ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, narrowly sulcate between the paired ocelli, a little widely sulcate between antennae ; paired ocelli placed above the inferior margin of eyes. Antennae filiform and located distinctly below the inferior margin of eyes. Eyes elevated above the vertex, globular from top view.

Pronotum transverse anteriorly, subulate posteriorly, extends beyond the apex of posterior femora ; dorsum finely granulose ; median carina depressed in front, slightly swollen between sulci, uniformly low in the rest ; lateral carinae low ; prozonal carinae parallel ; abbreviated carinae present between the shoulders, join lateral carinae anteriorly ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum wide and laminate at base, truncate or acute at apex. Elytra normal with round apex. Wings extend upto the apex of pronotum ; anterior and middle femora elongated, margins entire or finely serrulated ; posterior femora narrowly elongated, margins finely serrulated ; first segment of posterior tarsi more or less equal to the third ; third pulvilli obtuse and a little longer than the first or the second.

Geographical distribution : India ; Burma.

Key to the species of *Hebarditettix* Günther, 1939

- | | | |
|---|-----|----------------------------------|
| 1. Posterior angles of lateral lobes of pronotum distinctly triangulate with acute margin in front and subsinuate truncate behind | ... | <i>triangularis</i>
(Hancock) |
| — Posterior angles of lateral lobes of pronotum not triangulate but subquadrate, a little reflexed outwards | ... | 2 |
| 2. Pronotum short (10-13.5 mm) | ... | <i>lobatus</i>
(Hancock) |
| — Pronotum longer (13.5-14 mm) | ... | <i>quadratus</i>
(Hancock) |

21. *Hebarditettix triangularis* (Hancock), 1915
(Plate 11, fig. 1)

Bolotettix triangularis Hancock, 1915, *Rec. Indian Mus.*, 11 : 80.

Hebarditettix triangularis, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 202.

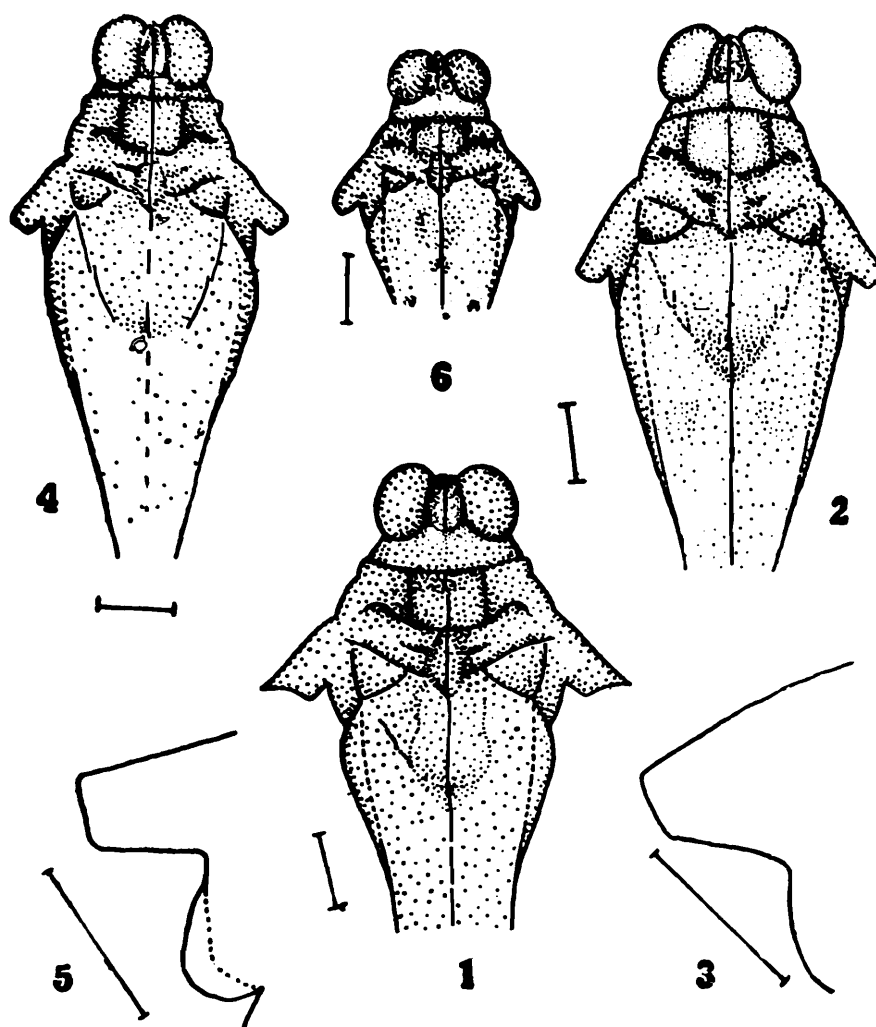
Moderately slender sized. Body brown, variegated with dark brown, or reddish ochreous, lower surface generally dark brown, femora pale yellow.

Female : Head exserted, vertex narrower than an eye, more narrowed in front, depressed, produced upto the level of eyes in front, median carinula distinct and extends behind upto the posterior end of depression and a little produced in front, lateral carinulae extend behind nearly upto the middle of eyes and join the median carinula in front, front margin absent ; frontal costa bifurcate between the paired ocelli, a little compresso-elevated and arched between the antennae, narrowly sulcate between the paired ocelli, widely sulcate between the antennae and sinuate in front of them ; paired ocelli placed below the middle of eyes. Antennae located below the inferior margin of eyes. Eyes globular from top view, raised above the pronotum and vertex.

Pronotum transverse in front, subulate posteriorly and extends beyond the apex of posterior femora ; dorsum rugulose between shoulders, granulose in the rest ; median carina depressed in front, slightly swollen between the sulci, percurrent ; lateral carinae interrupted in front between the sulci, low in the rest ; humeral angles obtuse and bicarinate ; prozonal carinae distinct and parallel ; abbreviated carinae indistinctly marked ; paranota with two projections ; posterior angles of lateral lobes of pronotum laminate, dilate laterally and distinctly triangulate, subacute, margin behind subsinuate truncate. Tegmina medium, rounded at apex. Wings extend behind upto the pronotal apex

or a little beyond ; anterior and middle femora elongate, slightly compressed, margins finely serrulated, middle femora more compressed and bicarinate ; posterior femora elongate, a little crassate and margins finely serrulate ; first segment of posterior tarsi more or less equal to

Plate 11



Scale 1 mm.

PLATE 11: Fig. 1. Top view of head and thorax of *Hebarditettix triangularis* (Hancock).

Fig. 2. Top view of head and thorax of *H. lobatus* (Hancock).

Fig. 3. Posterior angles of lateral lobes of pronotum of *H. lobatus* (Hancock).

Fig. 4. Top view of *Hebarditettix quadratus* (Hancock) (Type).

Fig. 5. Posterior angles of lateral lobes of pronotum of *H. quadratus* (Hancock).

Fig. 6. Head and thorax of *Systolederus cinereus* Brunner.

the third ; third pulvilli of first segment of posterior tarsi a little longer than the third.

Measurements (in mm.) : Body length ♀ 10 ; body length with pronotum ♀ 12.5-15.5 ; pronotum length ♀ 11.5-14.5 ; posterior femora

length/width ♀ 6.5/1.9 ; shoulder width ♀ 2.7-3.

Material examined : "Type" ♀ , Upper Assam, coll. Doherty [Reg. No. Zoological Survey of India, 1236/9] ; 1 ♀ , Arunachal Pradesh : Subansiri Divi. : Pamir bridge, 564 m, 17. v. 1966, coll. A. N. T. Joseph.

Geographical distribution : India (Assam).

Remarks : This species is quite different from the other regional species and can be recognised by the triangulate posterior angles of lateral lobes of pronotum which are acute in the front margin and sub-sinuately truncate in the hind margin.

22. *Hebarditettix quadratus* (Hancock), 1915

(Plate 11, figs. 4 & 5)

Bototettix quadratus Hancock, 1915, *Rec. Indian Mus.*, 11 : 70.

Hebarditettix quadratus, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 202.

Larger than *H. triangularis* (Hancock), Colour pale grey or yellow, more or less marked with fuscous, lower part of pronotal lobes pale, hind tibiae annulate with light and dark markings, underneath the body with black and pale variegations, posterior femora light brown or yellow on pagina, darker on upper marginal area, variegated with yellow, lower marginal area black interrupted with yellow or brown.

Male, female : Head exserted ; vertex narrower than an eye, still narrower towards the front, depressed on either side of the median carinula, produced upto the eyes in front, tricarinate anteriorly, median carinula distinct and extends upto the posterior end of the depression behind, lateral carinula joins the median carinula anteriorly ; frontal costa bifurcate before the paired ocelli, roundly compresso-elevated between antennae, sinuate in front of the antennae, narrowly sulcate between the paired ocelli, widely sulcate between the antennae ; paired ocelli situated on the inferior margin of eyes. Antennae filiform and located below the eyes. Eyes globular and elevated above the vertex and pronotum.

Pronotum truncate anteriorly, wide between the shoulders, subulate posteriorly and extends beyond the apices of posterior femora ; dorsum granulose and rugulose ; median carina depressed in front, compresso-elevated between the sulci, depressed between the shoulders, percurrent behind ; lateral carinae interrupted on the sulci region in front of the shoulders ; humeral angles sub-bicarinate ; prozonal carinae distinct, parallel ; abbreviated carinae obscurely present and discontinuous,

anterior piece sometimes joins the lateral carinae anteriorly ; paranota with two projections ; posterior angles of lateral lobes subquadrate, obliquely reflexed, truncate, punctate, apex rounded. Wings extend upto the pronotal apex or beyond ; anterior and middle femora elongate, margins finely serrulate, the latter a little compressed and bicarinate ; posterior femora elongate, margins serrulate ; first and third segments of posterior tarsi more or less equal in length ; all the pulvilli of first segment of posterior tarsi equal in length.

Measurements (in mm.) : Body length ♂ 8.7-9, ♀ 10.5-11 ; body length with pronotum ♂ 12-13.5, ♀ 14.5-15 ; pronotum length ♂ 11-12.5, ♀ 13.5-14 ; posterior femora length/width ♀ 5.4-5.8/1.6-1.7, ♀ 6.2-6.5/1.8-1.9 ; shoulder width ♂ 2.2-2.5, ♀ 3-3.2.

Material examined : "Type" ♀, West Bengal : Darjeeling Distt. : Singla, 456 m, -. vi. 1913, Lord Carmichael's collection, [Reg. No. of Zoological Survey of India, CC/864] ; "Type" ♀, Sikkim, coll. L. Mandelli, [Reg. No. of Zoological Survey of India, 6567/14] ; 1 ♂, West Bengal : Darjeeling Distt. : Ghumti, 456-1520 m, -. vi. 1914, Carmichael collection ; 1 ♂, 1 ♀, West Bengal : Darjeeling Distt. : Pashok, 608 m, 26. v.-14. vi. 1916, coll. Gravely ; 1 ♀, Arunachal Pradesh : Siang Divi. : Dali village, 200 m, 10. x. 1966, coll. S. K. Tandon & G. S. Arora ; 1 ♀ (nymph), West Bengal : Darjeeling Distt. : 1/2 km South of Goke F. R. House, Singla, 20. iv. 1973, coll. H. S. Sharma ; 1 ♀, West Bengal : Darjeeling Distt. : Mongpong, 60 m, 29. xii. 1973, coll. G. K. Srivastava & P. K. Maiti ; 2 ♂♂, 1 ♀, West Bengal : Darjeeling Distt. : Teesta Bajar, 214 m, 24. v. 1979, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal, Sikkim).

Remarks : It was originally described under the genus *Bolotettix* by Hancock (1915), but Günther (1938) brought it under *Hebarditettix* due to its well developed prozonal and abbreviated carinae of pronotum and strongly attenuate vertex which is anteriorly without front margin. Recently Steinmann (1970) has synonymised *H. quadratus* (Hancock) with *Xistrella dohrni* Günther by mistake as probably he has not seen the type. Hence *Hebarditettix quadratus* (Hancock) is a valid species at present and can be separated from the other known species of the genus by its subquadrate posterior angles of lateral lobes of pronotum which is obliquely truncate behind, and by the larger pronotum.

23. *Hebarditettix lobatus* (Hancock), 1912

(Plate 11, figs. 2 & 3)

Systolederus lobatus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 143-144.

Bolotettix lobatus, Hancock, 1915, *Rec. Indian Mus.*, 11 : 78-79.

Hebarditettix lobatus, Günther, 1938, *Stettin. ent. Ztg.*, 99 : 202.

Medium sized and slender. Colour greyish-fuscous.

Male and female : Head exserted ; vertex strongly narrower than an eye, distinctly narrowed forwards, produced upto the level of eyes in front, fossulate on either side, median carinula distinct and extend posteriorly upto the end of fossulae, lateral carinulae short, elevated upto the level of eyes, obliquely join the front margin, front margin absent or when present very short and obliterated in the middle ; frontal costa bifurcate behind the paired ocelli, compressed arcuate between the antennae, slightly depressed between the eyes, narrowly sulcate between the paired ocelli and moderately sulcate between the antennae ; paired ocelli placed far below the middle of eyes. Antennae filiform, located below the inferior margin of eyes. Eyes globular from top and elevated above the vertex.

Pronotum truncate anteriorly, subulate posteriorly and extends beyond the apices of posterior femora ; dorsum deplanate or slightly convex between the shoulders, subfossulate behind the shoulders and granulate ; median carina percurrent, a little swollen anteriorly between the sulci ; lateral carinae low, interrupted in front of shoulders ; prozonal carinae thin, granulate and parallel ; abbreviated carinae obscure ; paranota with two projections ; posterior angles of lateral lobes of pronotum a little obliquely laminate, reflexed outward and obliquely truncate behind, the angles subacute. Elytra small, punctate, widely rounded at apex. Wings extend upto the apex of pronotum ; anterior femora elongate, margins entire ; middle femora elongate, compressed, bicarinate, margins entire ; posterior femora elongate, margins finely serrulated ; first and third segment of posterior tarsi equal in length ; the three pulvilli of first segment of hind tarsi acute and subequal, the third longer than the preceding.

Measurements (in mm.) : Body length ♂ 8.8-2, ♀ 9.5-12 ; body length with pronotum ♂ 11-11.5, ♀ 12-15 ; pronotum length ♂ 10-10.5, ♀ 11-14 ; posterior femora length/width ♂ 5.5-2/1.5-1.7, ♀ 5.7-6.8/1.8-2.4 ; shoulder width ♂ 2-2.3, ♀ 2.3-3.2.

Material examined : 1 ♂, 1 ♀, West Bengal : Darjeeling Distt. : Kurseong, 1520m, 5. viii. 1908, coll. N. Annandale [Reg. No. of Zoological Survey of India, 107/17] ; 1 ♀, West Bengal : Darjeeling Distt. : Kurseong, 1428-1520 m, 26. vi. 1910, coll. N. Annandale [Reg. No. of Zoological Survey of India, 1583/20] ; 1 ♀, West Bengal : Darjeeling Distt. : Ghumti, 1216m, -. vii. 1911, coll. F. H. Gravely ; 1 ♀, West

Bengal : Darjeeling Distt. : Kalimpong, 182-1378 m, 24. iv. - 10. v. 1915, coll. F. H. Gravely ; 8 ♂♂, 10 ♀♀, Manipur : 3 kms Moreh West, 608 m, 25. ix. 1975, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal).

Remarks : This species was described under the genus *Systolederus* Bolivar by Hancock in 1912. Later on he himself (1915) brought it under *Bolotettix* Hancock and redescribed it from more examples, which were examined by me also. I have studied specimens identified by Hancock and Günther too. It is seen that *Hebarditettix lobatus* (Hancock) and *H. quadratus* (Hancock) are similar to each other except for the length of their pronotum. Therefore, *H. quadratus* (Hancock) is probably the synonym of *H. lobatus* (Hancock). As the type of *H. lobatus* is not available to me, I am retaining this species as such for the present.

Hebarditettix lobatus (Hancock) is very closely related to *H. quadratus* (Hancock) and can be differentiated from the latter by the shorter pronotum. Specimens from Manipur are slightly narrower and smaller.

Subfamily III METRODORINAE

Key to the genera of Subfamily Metrodorinae

1. Vertex process, in profile, drawn out upto about half the length of eyes in front, front margin of vertex, in top view, forms an obtuse angle, paired ocelli always placed below the middle of eyes. Flight organs always present ... *Spadotettix*
Hancock
- Vertex process, in profiles not drawn out, paired ocelli placed not always below the middle of eyes. Flight organs present or not. ... 2
2. Vertex, from top view, not broader than one of the basal segments of antennae at the anterior margin, its basal width not more than two-fifths the width of an eye ; head not extended ... 3
- Vertex, in top view, broader than one of the basal segment of antennae at front and especially at its base, rarely half wide as an eye or usually wider ; head strongly extended :... 4
3. Head exserted above the pronotal surface ; big and globular eyes approximate and raised above the pronotum ... *Systolederus*
Bolivar
- Head not exserted above the pronotal surface ; eyes bigger and approximate, especially at the anterior and thus making the vertex triangular ; pronotum not ascended or rarely in females weakly developed ... *Teredorus*
Hancock
4. Eyes strongly exserted above the pronotal surface ; head often extended and thus making the posterior margin of eyes more or less wide ... 5

- Eyes slightly exserted above the pronotal surface or not ; head not extended in front ... 6
- 5. Vertex, from front view, narrowly truncate, deeply depressed between the eyes, vertex horn project out high above the eyes or not ; antennae inserted on the inferior margin of eyes or slightly below ; pronotum between the shoulders not elevated like an obtuse gibbosity ... *Xistra* Bolivar
- Vertex, from front view, not narrowly truncate, depressed between the eyes, vertex horn drawn out or not ; antennae clearly inserted below the inferior margin of eyes and considerably long ; pronotum between the shoulders strongly elevated to an obtuse gibbosity or slightly elevated on the posterior part of shoulders ... *Xistrella* Bolivar
- 6. Flight organs completely absent or minute elytra and wings present ; pronotum shorter ... 7
- Flight organs present, only rarely reduced ; pronotum longer, body robust ; frontal costa, in profile, alway clearly sinuous ; pronotum surface rough, usually with strongly developed ridges or carinae ; vertex much wider between the eyes and with fossulae on either side which are open in front ... *Bolivaritettix* Günther
- 7. Body smooth ; dorsum tectiform all over ; median carina uniformly compresso-elevated ; lateral carinae of pronotum obscurely visible throughout ; paranota with one projection only ; elytra and wings absent ... *Mixohyboella* gen. nox.
- Body strongly crassate ; dorsum strongly or moderately widened, arched and uplifted in the front part of pronotum ; median carina, in the lateral view, uniformly and often moderately raised in front of the shoulders and may or may not undulate behind the shoulders ; lateral carinae of pronotum low but distinctly visible ; paranota with two projections ; elytra generally present, wings commonly extend upto the pronotal apex, rarely beyond ... *Hyboella* Hancock

(11) Genus : *Systolederus* Bolivar, 1887

Type species : *Systolederus haani* Bolivar, 1887

Systolederus Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 185, 194, 234.

Small to medium sized with slender body. Colour brown or light brown.

Head considerably elevated above the pronotum surface ; vertex narrow, eyes draw to each other in front giving the triangular shape to vertex, front margin absent or indistinctly visible, lateral carinulae

directly join with the median carinula obliquely ; ocelli placed below the middle of eyes. Antennae filiform, situated below the inferior margin of eyes. Eyes globular, approximating above and higher than the vertex.

Pronotum rounded anteriorly, acuminate posteriorly and extend beyond the apex of posterior femora ; dorsum smoothly granulose, a little broader on shoulders ; median carina low, a little compresso-elevated just in front of shoulders ; abbreviated carinae on shoulders absent ; prozonal carinae short and parallel ; paranota with two projections but the posterior projection smaller than the anterior projection ; posterior angles of lateral lobes of pronotum widely rounded or roundly truncate at apex. Elytra small, punctate, oblong. Wings extend upto the apex of pronotal process or beyond it ; four front legs simple ; hind femora very finely serrulate ; first and third hind tarsal segments nearly equal in length ; third pulvilli may or may not be equal in length to the second pulvilli.

Geographical distribution : India (West Bengal, Tamil Nadu, Kerala) ; Burma ; Sri Lanka ; Philippines ; Mindanao ; Borneo ; Sulawesi ; Java ; Thailand ; Lombok.

Key to the species of *Systolederus* Bolivar

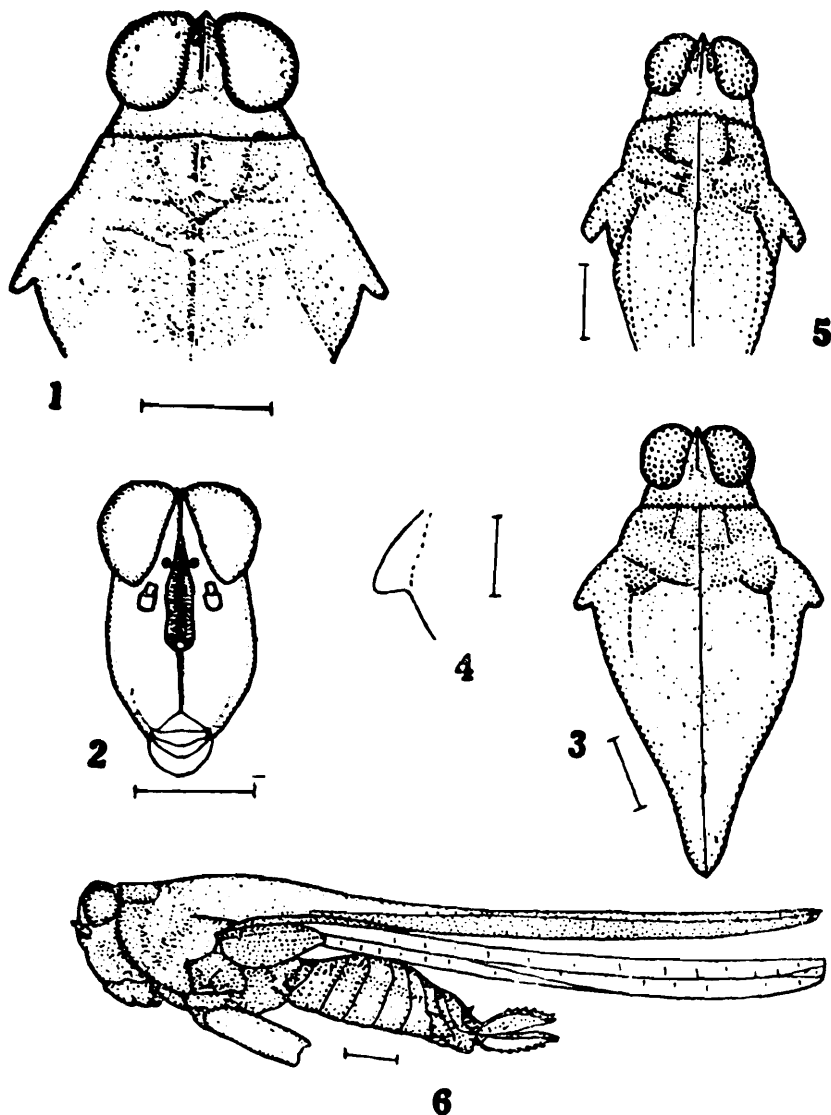
- | | | |
|---|-----|--------------------------------|
| 1. Pronotum shorter (4.3-5.6 mm) ; paranota with one projection ; third pulvilli of first segment of hind tarsi always longer than the second | ... | <i>abbreviatum</i>
sp. nov. |
| — Pronotum longer (6.8-8.8 mm) ; paranota with two projections ; third pulvilli of first segment of hind tarsi may be longer than or equal to the second | ... | 2 |
| 2. Frontal sulcus very narrow between the paired ocelli ; posterior angles of lateral lobes of pronotum widely rounded ; wings extend beyond the apex of pronotal process and the third pulvilli as long as the combined length of first and third pulvilli ... | | <i>gravelyi</i>
Günther |
| — Frontal sulcus moderately broader between the paired ocelli ; posterior angles of lateral lobes of pronotum roundly truncate ; wings extend up to the apex of pronotal process and the third pulvilli equal in length to the second | ... | <i>cinereus</i>
Brunner |

24. *Systolederus gravelyi* Günther, 1939 (Plate 12, figs. 1 & 2)

Systolederus gravelyi Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N. F.) BD 1 : 164.

Narrowly slender species of smaller size. Colour brown, both legs and elytra light brown, abdomen black except the last four segments which are yellow.

Plate 12



Scale 1 mm.

- PLATE 12 : Fig. 1. Top view of head and thorax of *Systolederus gravelyi* Günther.
 Fig. 2. Front view of head of *S. gravelyi* Günther.
 Fig. 3. Top view of *Teredorus bhattacharyai* sp. nov.
 Fig. 4. Posterior angles of lateral lobes of pronotum of *T. bhattacharyai* sp. nov.
 Fig. 5. Top view of head and thorax of *T. truncatus* sp. nov.
 Fig. 6. Dorso-lateral view of *T. carmichaeli* Hancock (Type).

Male : Head exserted above the pronotal surface ; vertex very narrow, triangular, longitudinally fossulate, not produced upto the level of eyes in front, median carinula distinctly visible, lateral carinulae low, small, join the median carinula obliquely towards front, front margin absent ; frontal costa bifurcate behind the paired ocelli, moderately arched between the antennae, declined in front, very narrowly sulcate

between the paired ocelli while the rest moderately sulcated ; paired ocelli placed below the middle of eyes. Antennae (damaged) filiform, placed below the inferior margin of eyes. Eyes globular, in top view draw to each other anteriorly, raised above the surface of vertex.

Pronotum rounded anteriorly, subulate posteriorly and extend beyond the apex of posterior femora ; dorsum smoothly granulose, convex between shoulders, depressed between sulci ; median carina depressed in front, interrupted on the sulci, uniformly low on the rest ; lateral carinae low, interrupted in front ; abbreviated carinae between shoulders absent ; prozonal carinae indistinctly visible, small, parallel ; humeral angles obtuse ; paranota with two projections but the posterior projection is smaller than the *Systolederus cinereus* Brunner ; posterior angles of lateral lobes of pronotum turned downwards, widely round at apex. Elytra small, punctate, narrowly rounded at apex. Wings extend beyond the pronotal apex (1.8 mm) ; anterior femora elongate, a little convex, bicarinate, margin entire ; middle femora damaged ; posterior (damaged) normal with very small pointed antegenicular and genicular teeth ; first and third segments of hind tarsi equal in length ; third pulvilli obtuse, longer than the first two pulvilli.

Measurements (in mm.) : Body length ♂ 7 ; body length with pronotum ♂ 11 ; pronotum length ♂ 8.8 ; posterior femora length/width ♂ 4.5 ; shoulder width ♂ 1.9.

Material examined : Holotype ♂, West Bengal : Darjeeling Distt. : Pashok, 608 m. 26. v.—14. vi. 1916, coll. F. H. Gravely.

Geographical distribution : India (West Bengal).

Remarks : *Systolederus gravelyi* Günther is easily distinguished from the other species of the genus by the very narrow frontal sulcus between the paired ocelli, less broader shoulders, widely rounded posterior angles of lateral lobes of pronotum, extension of wings beyond the pronotal apex and the elongated third pulvilli which is longer than the combined length of first and second pulvilli.

25. *Systolederus cinereus* Brunner, 1893

(Plate 11, fig. 6)

Systolederus cinereus Brunner, 1893, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 105.

Small and slender species. Colour of pronotum brown with two small dark brown spots behind the shoulders, head dark brown, eyes dirty brown with dark brown spots, all tibiae brown or light yellow,

annulated with two dark brown bands.

Male : Head exserted above the pronotal surface ; vertex very narrow, drawing the eyes towards each other specially anteriorly giving the triangular shape, longitudinally fossulate, not produced upto the level of eyes in front, median carinula distinctly visible and a little extend forward, lateral carinulae low, small, and connect the eyes with median carinula anteriorly, front margin not present ; frontal costa bifurcate a little behind the paired ocelli, not sinuate between the eyes, a little arched between the antennae, declined anteriorly, moderately sulcate ; paired ocelli placed below the middle of eyes. Antennae (damaged) filiform, placed below the inferior margin of eyes. Eyes globulose and slightly raised above the surface of vertex, drawing towards each other in front.

Pronotum rounded anteriorly, subulate posteriorly and extend a little beyond the apex of posterior femora ; dorsum smoothly granulose, broader on shoulders, a little flat between shoulders ; median carina slightly compresso-elevated on sulci, rest uniformly low ; lateral carinae low, interrupted in front ; abbreviated carinae absent ; prozonal carinae short, parallel ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, roundly truncate at apex. Elytra small, elongate, punctate, narrowly rounded at apex. Wings extend upto the apex of pronotal process ; anterior femora elongate, a little compressed, margins entire ; middle femora elongate, compressed, bicarinate, very finely granulose ; posterior femora (right femur damaged) elongate, margins finely serrulated ; first and third hind tarsal segments more or less equal in length ; all the pulvilli acute and equal in length.

Measurements (in mm.) : Body length ♂ 5.8 ; body length with pronotum ♂ 7.6 ; pronotum length ♂ 6.8 ; posterior femora length/width ♂ 4.3/1.7 ; shoulder width ♂ 1.8.

Material examined : 1 ♂, Manipur : South Distt. : Moreh, 23. ii. 1975, coll. P. T. Cherian.

Geographical distribution : Burma ; Malaya.

Remarks : *Systolederus cinereus* Brunner is characterised by the triangular vertex, shorter pronotum, roundly truncate posterior angles of lateral lobes of pronotum, wider shoulders and extension of the wings only upto the pronotal apex. This species is closely related to *S. graveleyi* Günther in regard to the shape of vertex and the elevated head but differs from the latter by the characters mentioned above. It has also resemblance with *S. ridleyi* Hancock but the former species is differentiated from the latter by the smaller size of body, pronotum and posterior

femora and equal length of all the pulvilli of first segment of posterior tarsi. It is recorded here from India for the first time. The specimen from Manipur (Moreh) is shorter than those from Burma.

26. *Systolederus abbreviatum* sp. nov.

(Plate 34, fig. 1)

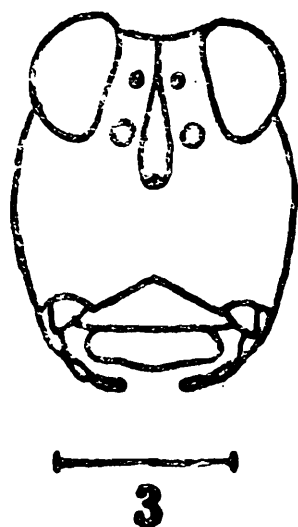
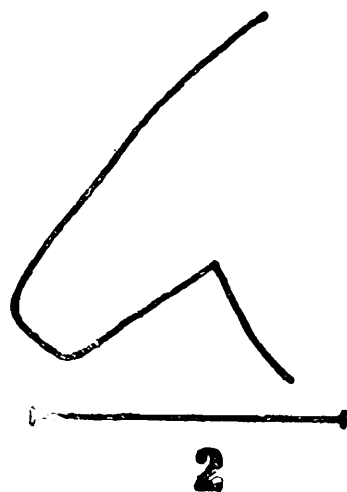
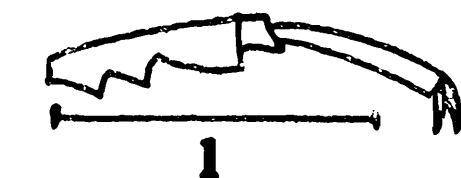
Smaller in size. Colour grey dorsally, pale variegated with fuscous on the lateral sides of body and legs, black spots on eyes in Holotype, hind tibiae dark brown with light yellow annulation at the basal part of tibiae.

Male, female : Head distinctly exserted above the pronotal surface ; vertex very narrow, a little narrower in front, depressed on either side, not extend upto the front margin of eyes, median carinula extend upto three-fourths distance behind the eyes, well marked, lateral carinulae visible only anteriorly, very small, obliquely join the median carinula, front margin absent ; frontal costa bifurcate behind or between the paired ocelli, sinuous between the eyes, compresso-elevated and gently arched between the antennae, depressed in front, narrowly sulcated between the paired ocelli, widely sulcated in front ; paired ocelli placed below the middle of eyes. Antennae elongated, filiform, placed below the inferior margin of eyes (right antenna damaged). Eyes globular, approximate, especially anteriorly.

Pronotum transverse anteriorly, broader between shoulders, subulate posteriorly and extend beyond the middle of posterior femora but never upto its apex ; dorsum finely granulose with scattered round head tubercles ; median carina depressed throughout except between sulci in front of the shoulders where it is little swollen ; lateral carinae very low, granulose ; prozoal carinae smaller, parallel ; abbreviated carinae obscurely visible or absent ; humeral angles not distinctly marked ; paranota with one projection ; posterior angles of lateral lobes of pronotum turned downwards, roundly produced at apex. Elytra very small, punctate and ovate. Wings extend upto the apex of pronotum ; anterior femora elongated, a little compressed, margins finely serrulated ; middle femora elongated, compressed, bicarinated, margins finely serrulated ; posterior femora elongated, stouter, crassate, margins finely serrulated ; first and third tarsal segments of posterior tarsi more or less equal in length ; third pulvilli of first segment of posterior tarsi longer than the second, obtuse ; second pulvilli shorter than the third but slightly longer than the first and obtuse.

Measurements (in mm) : Body length ♂ 5.6, ♀ 7.0 ; body length with pronotum ♂ 5.0, ♀ 6.6 ; pronotum length ♂ 4.3, ♀ 5.6 ; posterior femora length/width ♂ 4.3/1.4, ♀ 5.6/1.9 ; shoulder width ♂ 1.6, ♀ 2.0.

Plate 34



Scale 1 mm.

PLATE 34 : Fig. 1. Tarsal segments of hind leg of *Systolederus abbreviatum* sp. nov.

Fig. 2. Posterior angles of lateral lobes of pronotum of *Coptotettix manipurensis* sp. nov.

Fig. 3. Front view of head of *Coptotettix lohitis* sp. nov.

Material examined : Holotype ♂, West Bengal : Darjeeling Distt. : Teesta Bajar, 214 m, 24. v. 1979, coll. M. S. Shishodia ; Allotype ♀, W. Sikkim : Samdeng, 1091 m, 30. iii, 1959, coll. A. G. K. Menon.

Remarks : *Systolederus abbreviatum* sp. nov. is smaller than the other species described here. It is easily distinguished from the rest of the species by the shorter pronotum, absence of paranota, longer third pulvilli and grey colouration of pronotum.

(12) Genus : **Teredorus** Hancock, 1906

Type species : *Teredorus stenofrons* Hancock, 1906

Teredorus Hancock, 1906, *Genera Insect.*, Fasc. 48 : 51-52.

Size medium. Colour varying from ashy to brown and dark brown. Body with smooth granulations.

Male, female : Head a little or not elevated above the pronotal surface ; vertex very strongly narrowed in front forming a triangular shape, median carinula distinct and not advanced in front of the eyes, the front margin a little carinate ; face slightly oblique ; frontal costa bifurcate just behind the paired ocelli, elevated and compressed between the antennae, sinuate in front, moderately sulcate ; paired ocelli situated below the middle of the eyes. Antennae filiform, located below the eyes. Eyes more or less globose or pear-shaped, a little or not elevated above the pronotal surface, drawing antero-medially to each other.

Pronotum sub-cylindrical anteriorly, attenuate posteriorly and extend beyond the apex of hind femora ; dorsum very finely granulate, convex and wide between shoulders ; median carina depressed or indistinct in front, a little raised and swollen between the sulci behind, indistinctly visible in the rest ; lateral carinae low ; prozonal carinae obscure ; humeral angles obtusely angulate ; posterior angles of lateral lobes of pronotum turned downwards, wide and subtruncately rounded at apex ; paranota with two projections. Elytra elongate, oblong with acuminate apex. Wings extended beyond the pronotal apex ; anterior femora elongate, a little broadened, very finely serrated ; middle femora elongate, broadened, bicarinate, margins finely serrated ; posterior femora elongate, a little crassate, margins finely serrated ; first and third articles of hind tarsi equal in length, first pulvilli a little smaller than the second and third, second and third pulvilli equal in length.

Geographical distribution : India (H. P., West Bengal) ; S. America (Peru).

Key to the species of *Teredorus* Hancock

1. Elytra and wings absent ; body smaller ; vertex a little narrower behind ; pronotum extend upto the middle of hind femora ; paranota with one projection

... *bhattacharyai*
sp. nov.

- Elytra and wings present ; body longer ; vertex not so smaller behind as mentioned above ; pronotum extend beyond the apices of hind femora ; paranota with two projections ... 2
- 2. Posterior angles of lateral lobes of pronotum truncate ; third pulvilli of hind tarsi a little longer than the second ... *truncatus*
sp. nov.
- Posterior angles of lateral lobes of pronotum subtruncate or rounded ; third pulvilli of hind tarsi equal to second pulvilli ... 3
- 3. Head not exerted above the pronotum surface ; vertex strongly contracted forward ; elytra large ; pronotum extend much behind the hind femoral apices ... *carmichaeli*
Hancock
- Head a little exerted above the pronotum surface or not ; vertex not strongly contracted forward ; elytra smaller ; pronotum less extend behind the hind femoral apices ... *frontalis*
Hancock

27. *Teredorus bhattacharyai* sp. nov.

(Plate 12, figs. 3 & 4)

Size smaller. Colour dark brown, apex of posterior angles of lateral lobes of pronotum brown, posterior femora of right side dark brown at basal half and knee, while the rest brown, hind tibiae brown and annulated with dark brown band at middle and apex.

Female : Head a little exerted above the level of pronotum; vertex narrower than one of the eyes, more narrower in front, smaller, not produced in front of the eyes, median carinula distinct and extend behind upto the posterior end of eyes, lateral carinulae very short; frontal costa bifurcate between the paired ocelli, arcuately produced, moderately sulcated ; paired ocelli situated below the middle of eyes. Antennae placed below the lower margins of eyes (flagellum broken). Eyes oval, drawing to each other in front and approximated.

Pronotum truncate anteriorly, attenuate posteriorly and extend upto the middle of hind femora, apex rounded; dorsum smoothly granular, wide between shoulders ; median carina indistinctly visible throughout, lateral carinae visible only at hind process ; abbreviated carinae absent; prozonal carinae feebly produced, parallel; humeral angles roundly produced; paranota with only one projection; posterior angles of lateral lobes of pronotum turned downwards, moderate, round at apex. Elytra and wings absent ; anterior femora elongate, a little convex, margins entire; middle femora elongate, a little compressed, bicarinate on external pagina, margins finely serrulate; posterior femora elongate, wide, a little crassate, margins finely serrulate with a small spine at the

apex of superior margin ; first and third tarsal segments of hind tarsi equal in length ; first and second pulvilli small, third pulvilli longer.

Measurements (in mm.) : Body length ♀ 7.5 ; body length with pronotum ♀ 6.4 ; pronotum length ♀ 5.2 ; posterior femora length/width ♀ 4.8/1.8 ; shoulder width ♀ 1.9.

Material examined : Holotype ♀, Arunachal Pradesh : Kameng Divi. : Pinjali minor camp, 700 m, 24. xii. 1965, coll. S.K. Bhattacharya and A.N.T. Joseph.

Remarks : *Teredorus bhattacharyai* sp. nov. is a very interesting species and differs from all the other known regional species of the genus by the exserted head, little narrow hind part of vertex, indistinct median carina, rounded humeral angles, shorter pronotum which is not extended beyond the middle of hind femora, apically spinose superior carina of hind femora, absence of elytra and wings and the third pulvilli which is longer than the second. This species is intermediate between the genera *Systolederus* Bolivar and *Teredorus* Hancock. This newly erected species has also similarity with *Systolederus* Bolivar in the elevation of head and approximation of eyes.

28. *Teredorus truncatus* sp. nov.

(Plate 12, fig. 5)

Size medium. Colour brown to dark brown.

Female : Head a little exserted; vertex narrower than one of the eyes, strongly narrowed in front, not produced in front of the eyes, median carinula distinct and produced behind upto the middle of eyes, lateral carinulae low, extend behind upto one-fourth of eyes; frontal costa bifurcate just between the paired ocelli, arcuate between antennae, declined in front, the rami gradually forked in front ; paired ocelli placed below the middle of eyes. Antennae (left antenna broken) filiform, located below the eyes. Eyes globose, drawing near to each other in front.

Pronotum subtruncate anteriorly, attenuate posteriorly and extend beyond the hind femoral apex ; dorsum smoothly granulate, a little wide between the shoulders ; median carina indistinct or depressed in front, swollen and elevated between sulci, indistinctly visible in the rest; abbreviated carinae absent ; prozonal carinae distinct and parallel ; lateral carinae low and finely granulated ; humeral angles obtuse ; paranaota with two projections ; posterior angles of lateral lobes of pronotum

moderate, truncate at apex with a little rounded on the anterior face when viewed in profile. Elytra small, less reticulate, apex narrow and round. Wings extend upto the pronotal apex ; anterior femur (left femur broken) elongate, a little convex, undulate on antero-inferior margin, both margins finely serrate ; middle femur (left femur broken) elongate, compressed, bicarinate, margins finely serrulate; posterior femur (left femur broken), elongate, wide, a little crassate, margins finely serrulate ; first and second tarsal segments equal in length ; first and second pulvilli acute and equal in size ; third pulvilli not acute, longer than the second.

Measurements (in mm.) : Body length ♀ 9; body length with pronotum ♀ 11 ; pronotum length ♀ 10 ; posterior femora length/width ♀ 5.9/2 ; shoulder width ♀ 2.1.

Material examined : Holotype ♀, Manipur : New Churachandpur East, 21. ix. 1975, coll. M.S. Shishodia.

Remarks : This species is very similar to *Teredorus frontalis* Hancock but differs from it by the less contracted eyes in front, less wider vertex behind, truncate apex of posterior angles of lateral lobes of pronotum, pronotal process which is not extending beyond the apex of posterior femora and slightly larger third pulvilli of hind tarsi.

29. *Teredorus carmichaeli* Hancock, 1915

(Plate 12 & 14, figs. 6 & 1-3)

Teredorus carmichaeli Hancock, 1915, *Rec. Indian Mus.*, 11 : 110.

Size larger than *Teredorus frontalis* Hancock. Colour ashy grey with pale variegations or brown or dark brown, hind tibiae fuscous annulated with white or dirty yellow.

Male, female : Head a little or not exserted ; vertex small, strongly narrowed in front, triangular, not elevated above the pronotal surface, median carinula distinct ; frontal costa bifurcate behind the paired ocelli, sinuate below the antennae, moderately sulcate ; paired ocelli placed below the middle of eyes. Antennae filiform, inserted below the eyes. Eyes pear to globular in shape, drawing antero-medially to form a triangular vertex. (Eyes in Holotype shrunk making it pear shaped and with yellow spots).

Pronotum sub-cylindrical anteriorly, attenuate posteriorly and extend beyond the hind femoral apices ; dorsum smooth, granular,

convex and wide between shoulders ; median carina depressed in front, indistinctly visible in the rest ; lateral carinae indistinct ; prozonal carinae indistinctly visible in front, merely doted behind, parallel ; humeral angles obtuse ; abbreviated carinae absent on shoulders ;

Plate 14

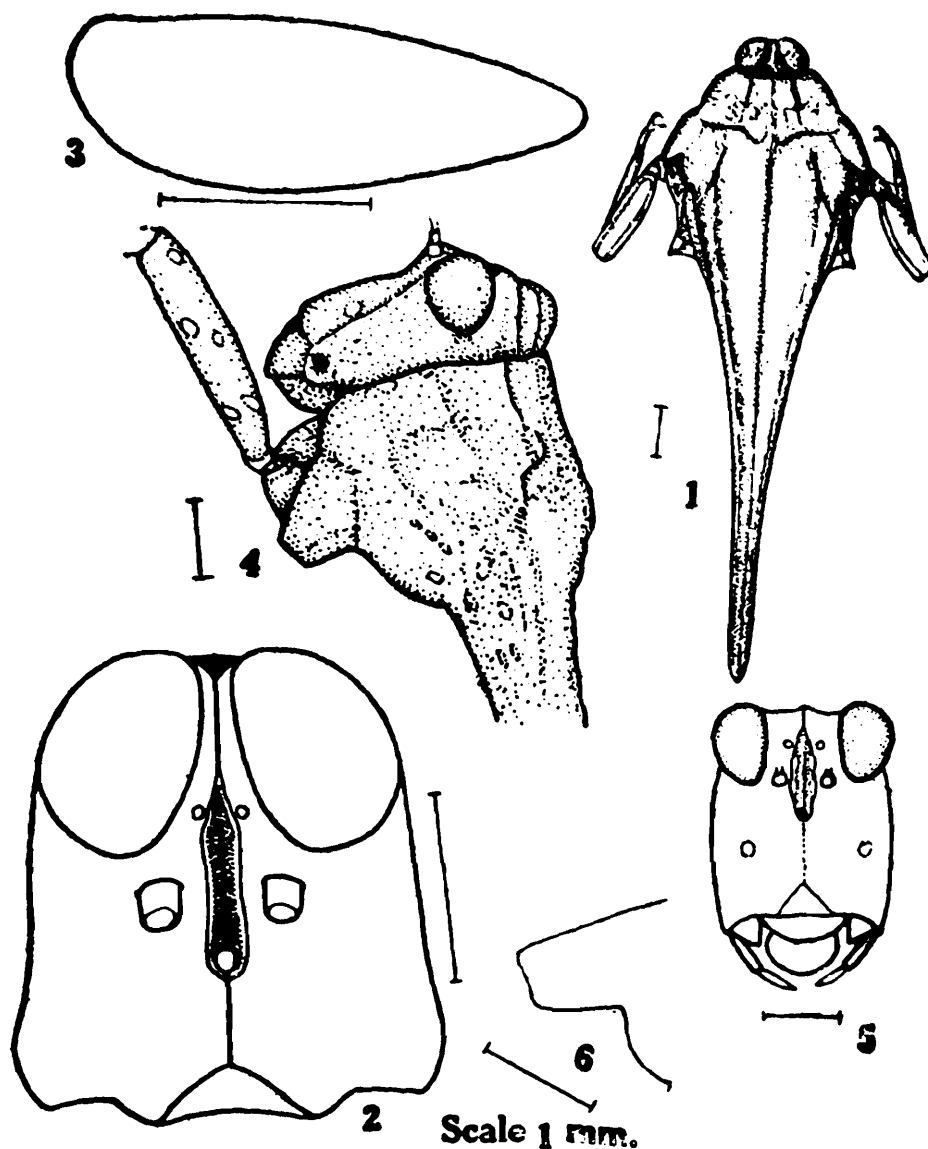


PLATE 14 : Fig. 1. Top view of *Teredorus carmichaeli* Hancock.

Fig. 2. Front view of head of *T. carmichaeli* Hancock.

Fig. 3. Elytra of *T. carmichaeli* Hancock.

Fig. 4. Dorso-lateral view of head and thorax of *Bolivaritettix tandoni* sp. nov.

Fig. 5. Front view of head of *B. tandoni* sp. nov.

Fig. 6. Poster angles of lateral lobes of pronotum of *B. tandoni* sp. nov.

paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, the apices round to subtruncate. Elytra elongate, reticulate, wide between middle, acuminate at apex. Wings extend upto or beyond the pronotal apices ; anterior femora elongate, a little compressed, margins finely serrulate ; middle femora

compressed, with bicarinate external pagina, a little or not undulate on shoulder margins, both margins finely serrulate; posterior femora wide, elongate, a little crassate, margins finely serrulate: the first and third tarsal segments equal in length, all the pulvilli more or less equal in length.

Measurements (in mm.): Body length ♂ 8-9, ♀ 10.5-11; body length with pronotum ♂ 12.5-13, ♀ 14-16; pronotum length ♂ 11.5-12.5, ♀ 13.5-14; posterior femora length/width ♂ 5.4-5.9/1.9, ♀ 5.9-7/1.9-2.2; shoulder width ♂ 2.1-2.2, ♀ 2.3-3.

Material examined: Holotype ♀, West Bengal: Darjeeling Distt.: Singla, 456 m,—. iv. 1913, coll. Lord Carmichael, [Reg. No. of Zoological Survey of India, 1225/H5]; 1 ♂, West Bengal: Darjeeling Distt.: Rombi, 364 m, 6. i. 1974, coll. G.K. Srivastava and P. K. Maiti; 1 ♀, Meghalaya: Jaintia Hills: Sonapardi: Jowai Road, 28. viii. 1974, coll. A.R. Lahiri; 1 ♂, Manipur: 3 kms Moreh West, 25. ix. 1975, coll. M.S. Shishodia; 2 ♂♂, 2 ♀♀, Manipur: Moreh: Burma Border east, 608m, 26. ix. 1975, coll. M.S. Shishodia.

Geographical distribution: India (West Bengal).

Remarks: *Teredorus Carmichaeli* Hancock is near to *Teredorus stenofrons* Hancock, a south American species, but can be distinguished easily from the other known Indian species of the genus by the larger size, ashy grey to pale variegated colouration, not elevated vertex, strongly drawing eyes in front, large elytra and long pronotum which extend much beyond the femoral apices.

30. *Teredorus frontalis* Hancock, 1915 (Plate 13, figs. 1-5)

Teredorus frontalis Hancock, 1915, *Rec. Indian Mus.*, 11: 110.

Size medium to large. Colour variable fuscous, variegated with ochre or brown, the under parts fusco variegated, lower half of the lateral lobes of the pronotum pale ochre or concolorous.

Male, female: Head a little exerted from the surface of pronotum; vertex strongly narrowed in front, more or less triangular in shape, not produced in front of the eyes, median carinula distinct; frontal costa bifurcate behind the paired ocelli, sinuate between the antennae, moderately sulcated; paired ocelli placed between the middle of eyes. Antennae inserted below the eyes. Eyes oval in shape, drawing anteromedially thus shortening the vertex and making it triangular.

Pronotum sub cylindrical anteriorly, attenuate posteriorly and extend beyond the hind femoral apices; dorsum smooth with fine

granulations, convex and wide between the shoulders ; median carina depressed in front, compresso-elevated between sulci and finely visible in the rest ; lateral carinae low ; prozonal carinae faintly visible in front but visible in dots behind, parallel ; abbreviated carinae absent ;

Plate 13

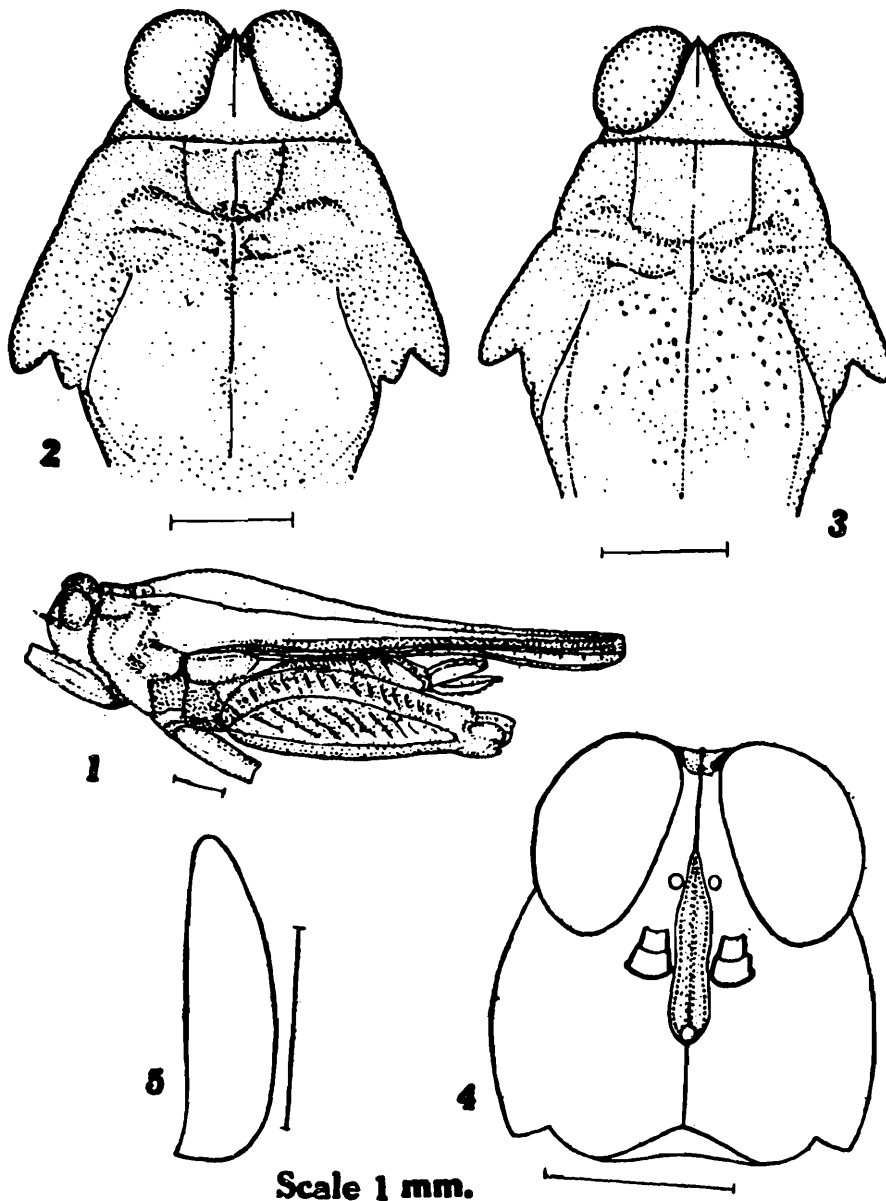


PLATE 13 : Fig. 1. Dorso-lateral view of *Teredorus frontalis* Hancock (Type).
 Fig. 2. Top view of *T. frontalis* Hancock (Head and thorax).
 Fig. 3. Top view of head and thorax of *T. frontalis* Hancock showing variation.
 Fig. 4. Front view of head of *T. frontalis* Hancock.
 Fig. 5. Elytra of *T. frontalis* Hancock.

humeral angles obtuse ; posterior angles of lateral lobes of pronotum turned downwards, moderate and subtruncately round at apex ; paranota with two projections. Elytra a little smaller, less reticulate, punctate, apex narrow. Wings extend upto the pronotal apex ; anterior femora elongate, a little compressed, minutely serrate on margins ; middle

femora compressed, bicarinate, a little wavy on inferior margin at apex, finely serrulate on both margins ; posterior femora stouter, elongate, a little crassate, finely serrulate on margins ; the first and the second hind tarsal segments equal in length ; all the pulvilli equal in length.

Measurements (in mm.) : Body length ♂ 7.5-8.6, ♀ 9.7-11 ; body length with pronotum ♂ 11-13, ♀ 11-14.5 ; pronotum length ♂ 10.5-12, ♀ 10.5-13.5 ; posterior femora length/width ♂ 4.8-5/1.5-1.7, ♀ 5.7-6.4/1.8-2.1 ; shoulder width ♂ 2.1-2.4, ♀ 2.7-3.2.

Material examined : 2 ♀ ♀, Arunachal Pradesh : Kameng Divi. : Tippi, 175m, 20. iii, 1973, coll. S. K. Tandon and party ; 3 ♂♂, 1 ♀, Meghalaya : Jaintia Hills : Sonapardi : Jowai Road, 28. viii. 1974, coll. A.R. Lahiri ; 1 ♂, Manipur : Central Distt. : Makru, 12. ii. 1975, coll. P.T. Cherian ; 1 ♀, Manipur : South Distt. : Moreh, 23. ii. 1975, coll. P.T. Cherian ; 1 ♂, 1 ♀, Manipur : South Distt. : Moreh, 24. ii. 1975, coll. P.T. Cherian ; 1 ♂, 1 ♀, West Bengal : Darjeeling Distt. : Kurseong, 1475m, 15. v. 1979, coll. M. S. Shishodia ; 2 ♂♂, 1 ♀, West Bengal : Darjeeling Distt. : Teesta Bajar, 214m, 24. v. 1979, coll. M. S. Shishodia ; 1 ♀, Sikkim : Gangtok, 2. vi. 1979, coll. M. S. Shishodia ; 1 ♀, Assam : Cachar Distt. : Indra nagar, 2. x. 1975, coll. N. Muralidharan.

Geographical distribution : India (West Bengal).

Remarks : This species is very close to *Teredorus carmichaeli* Hancock from which it is easily separated by the smaller size, slightly raised head above the pronotum surface, not strongly contracted vertex in front, smaller and punctate elytra, less subulate hind process of pronotum and the extension of the wings upto the pronotal apex.

(13) Genus : *Bolivaritettix* Günther, 1939

Type species : *Bolivaritettix sculptus* (Bolivar), 1887 |

Mazarredia Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 185, 194, 236, 237.

Bolivaritettix Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N.F.) BD 1 : 57.

Robust built, mostly larger and with fairly broad shoulders. Colour brown or grey or fuscous or brown variegated with fuscous.

Head a little exserted above the pronotal surface or not ; vertex generally broader than one of the eyes, a little or not narrowed in front, produced forward upto the level of eyes or rarely beyond, a little depressed on either side of middle carinula or not, middle carinula distinctly visible, lateral carinulae raised upto the level of eyes or not, reflexed laterally ; frontal costa bifurcate before the paired ocelli,

sinuate, strongly arched between the antennae, declined in front, moderately sulcate. Antennae filiform, inserted below the inferior margin of eyes, rarely a little below. Eyes globose, moderate in size.

Pronotum truncate anteriorly, subulate posteriorly and extends beyond the apex of hind femora; dorsum granulose, rough with irregular longitudinal tubercles and rugosity, with or without fossae behind the shoulders; abbreviated semi-lateral carinae on either side of median carina generally distinct, rarely indistinct; median carina in front depressed or not, compresso elevated behind on the sulci, depressed on the shoulders and distinctly visible behind on the pronotal process; prozonal carinae distinct in front, granulated, convergent behind; lateral carinae interrupted on the sulci region, granulated, bicarinate at the humeral angles; humeral angles obtuse angulate; paranota with two projections; posterior angles of lateral lobes turned downwards, wide, laminate, subtruncate or truncate at apex. Elytra elongate, reticulate, broadly or narrowly rounded at apex. Wings generally present, extend upto the pronotal apex, rarely entirely absent; anterior and middle femora elongate, granulose, margins generally entire; posterior femora long and broad with distinct or indistinct ridges on the external pagina, nodules present or absent on the upper marginal area, margins finely serrulate, short antegenicular and genicular denticles present; first and third hind tarsal segments generally equal in length; normally all the pulvilli of first tarsal segment equal in length.

Geographical distribution : India; Burma; Taiwan; South China; Vietnam; Kampuchea; Palawan; Philippines; Borneo; Sumatra; Java; Greater-Sunda-Island.

Key to the species of *Bolivariettix* Günther, 1939

- | | | |
|--|-----|---------------------------------|
| 1. Dorsum of pronotum behind the shoulders with deep seated fossulae | ... | 2 |
| — Dorsum of pronotum behind the shoulders with less deep seated fossulae | ... | 5 |
| 2. Dorsum of pronotum between the shoulders unequal, rather a little elevated | ... | <i>singlaensis</i>
(Hancock) |
| — Dorsum of pronotum between the shoulders either low or depressed but never elevated | ... | 3 |
| 3. Pronotum subangulate in front, median carina strongly compresso-elevated on the sulci which is not depressed in front, posterior angles of lateral lobes of pronotum truncate and notched in middle | ... | <i>tandoni</i> sp. nov. |
| — Pronotum truncate in front, median carina not strongly compresso-elevated on the sulci which is depressed in front, | | |

posterior angles of lateral lobes of pronotum truncate but not notched in middle	...	4
4. Lateral carinulae of vertex raised above the level of eyes which is roundly reflexed laterally, median carinula a little extended beyond the front margin, median carina of pronotum not depressed in front	...	<i>sculptus</i> (Bolivar)
— Lateral carinulae of vertex not raised above the level of eyes, median carina of pronotum depressed in front	...	<i>sikkimensis</i> (Bolivar)
5. Vertex nearly twice the width of an eye	...	8
— Vertex never twice the width of, but broader than an eye	...	6
6. Vertex distinctly narrowed in front, eyes distinctly exerted, very short and sharp isolated tubercles present on the surface of pronotal process	...	<i>laticeps</i> (Bolivar)
— Vertex not distinctly narrowed in front, eyes moderately exerted, without scattered isolated linear tubercles on pronotal process	...	7
7. Frontal costa strongly protuberant between the antennae	...	<i>dubius</i> (Hancock)
— Frontal costa not strongly protuberant between the antennae	...	<i>roonwali</i> sp. nov.
8. Pronotal process not reaching to the apex of posterior femora	...	<i>ghumtianus</i> (Hancock)
— Pronotal process subulate and surpass the apex of posterior femora	...	<i>lativertex</i> (Brunner)

31. *Bolivaritettix singlaensis* (Hancock), 1915

Mazarredia singlaensis Hancock, 1915, *Rec. Indian Mus.*, 11 : 99.

Bolivaritettix singlaensis, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool (N. F.) BD 1 : 58.

The Type material present in the Zoological Survey of India is badly damaged : head is missing, while the abdomen and one hind leg are kept in a separate capsule. Other example of the Type material is deposited in the Geneva Museum and is not available to me for study. Hence the description given below is from the damaged specimen as well as from the original description.

Medium sized. Colour brownish-grey. sparingly marked with fuscous.

Vertex very little wider than an eye, subnarrowed forward, not at all produced at the middle, imperfectly marginate, longitudinal fossulate on each side of median carinula ; frontal costa not sinuate between the

eyes but depressed, protuberant between the antennae, bifurcate behind the paired ocelli, sinuate in front the antennae, widely sulcate. Antennae inserted a little below the eyes.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apex of posterior femora ; dorsum deplanate, moderately dilated between the shoulders, fossulate behind the shoulders, coarsely granulose and sparingly tuberculate ; median carina depressed in front, compresso-elevated in a rough gibbosity between the sulci, strongly and abruptly sinuate behind ; lateral carinae low and finely serrulate ; prozonal carinae convergent behind ; abbreviated carinae highly elevated and curved ; paranota with two projections ; posterior angles of lateral lobes of pronotum expanded laminate, obliquely truncate at apex. Elytra sub-elliptical, punctate, narrowly rounded at apex. Wings extend upto the apex of pronotum ; anterior femora compressed, margins undulate with serrulations ; middle femora compressed, bicarinate, margins subtrilobate with fine serrulations ; posterior femora stout, crassate, margins finely serrulated ; first and second pulvilli of first segment of posterior tarsi smaller than the third, third pulvilli longer than the second.

Measurements (in mm.) : Body length ♀ 8.5 ; body length with pronotum ♀ 8.5 ; pronotum length ♀ 5.7 ; femora length/width ♀ 5.2 ; shoulder width ♀ (damaged).

Material examined : Holotype ♀ , West Bengal : Darjeeling Distt. : Singla, 1500 ft.,— vi. 1913, coll. Lord Carmichael.

Geographical distribution : India (West Bengal).

Remarks ; This species is easily distinguished from other species of the genus by the strongly unequal and a little elevated dorsum of pronotum in front and between the shoulders, the deep seated fossulae behind the shoulders, the entire frontal costa between the eyes, the strongly gibbose-crenulate median carina of pronotum in front of the shoulders and the undulate pronotal process behind.

32. *Bolivaritettix tandoni* sp. nov.

(Plate 14, figs 4 6)

Size large. Colour rusty brown or dark brown with light brown tubercles on dorsum and femora, and face with two light brown spots on lateral sides below the eyes ; in one example the whole body dark brown except the head, prozonal area and eyes, face maculated with light yellow ; maxillary palp yellow, antennae with light brown and dark brown segments.

Male, female : Head not exserted ; vertex broader than one of the eyes, a little or not narrowed in front, not advanced beyond the eyes in front, fossulate on either side, median carinula distinctly visible upto the middle of vertex, a little projected out in front, lateral carinulae raised upto the level of eyes, granulose, reflexed laterally, front margin not distinct ; frontal costa bifurcate behind the paired ocelli, sinuate between the eyes, strongly arched between antennae, declined in front, moderately sulcate ; paired ocelli placed between the middle of eyes. Antennae long, filiform placed on the inferior margin of eyes. Eyes globulose, upper surface of eyes raised above the vertex.

Pronotum subangulate or subtruncate anteriorly, subulate posteriorly and extend beyond the apex of posterior femora; dorsum granulose, rugulose with one depression on either side of shoulders in front and other behind the shoulders, irregular raised tubercles and rugulae present on hind process ; abbreviated and granulose carina present on either side of shoulders ; prozonal carinae distinct, granulose, convergent posteriorly ; median carina strongly compresso-elevated in front of the shoulders which gradually decreases forward and without depression in front, a little depression on shoulders, uniformly raised on the hind process except at the extreme apex where it is slightly low ; lateral carinae low, granulose, interrupted on sulci in front, bicarinate on humeral angles ; humeral angles obtusely rounded ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, wide, truncate, notched in the middle. Elytra small, elongate with rounded apex. Wings extended upto the apex of pronotum ; anterior femora elongate, convex, margins granulose ; middle femora elongate, compressed, bicarinate, margins indistinctly with granulations ; posterior femora elongate, upper marginal area and external pagina crassate especially the upper marginal area more prominently crassate, margine finely serrated, genicular and antegenicular denticles normal ; first and third hind tarsal segments equal in length, first and second pulvilli obtuse and little shorter, third pulvilli obtuse and slightly longer than third.

Measurements (in mm.) : Body length ♂ 12.2, ♀ 14-15 ; body length with pronotum ♂ 19, ♀ 18 ; pronotum length ♂ 18, ♀ 17 ; posterior femora length/width ♂ 8.8/2.2, ♀ 8.5-8.8/2.5-2.7 ; shoulder width ♂ 3.4, ♀ 3.1-3.3.

Material examined : Holotype ♀ , Arunachal Pradesh : Lohit Divi. : M. T. Forest, 100 m, 17. iii. 1969, coll. S. K. Tandon ; Allotype ♂, Manipur : Central Distt. : Makru, 12. ii. 1975, coll. P. T. Cherian ; Paratype 1 ♀ , Arunachal Pradesh : Chardwar forest, 125 m, 24. iii.

1973, coll. S. K. Tandon.

Remarks : This species is near to *B. sikkimensis* (Bolivar) but it is clearly separated by the strongly arched frontal costa between the antennae, angulate pronotum anteriorly, strongly compresso-elevated median carina in front of the shoulders which gradually decreases in height but never depressed in front, truncate and notched apex of posterior angles of lateral lobes of pronotum and presence of yellow granules on the dorsum of pronotum as well as on the external surface of femora. The last character is present only in the Holotype which may be an intraspecific variation.

33. Bolivaritettix sculptus (Bolivar), 1887
(Plates 15, 16 & 17, figs. 1 : 1, 3 & 6, 7)

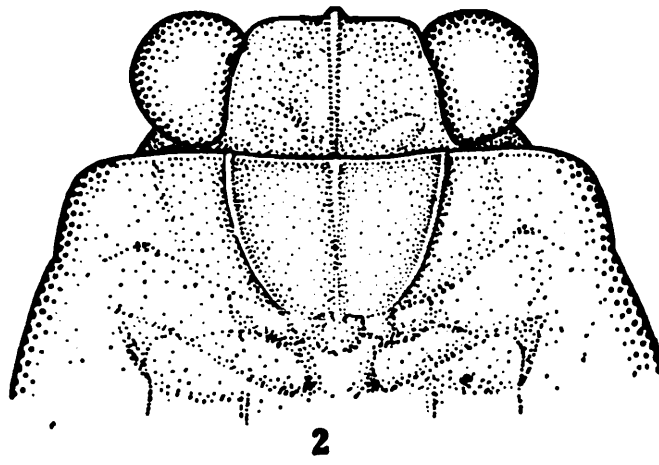
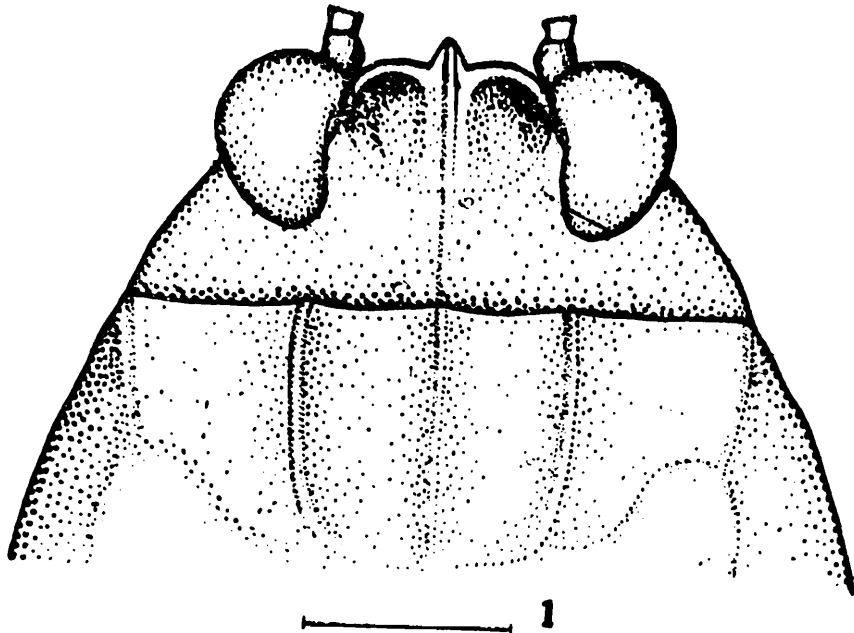
Mazarredia sculpta Bolivar, 1887, *Annls. Soc. ent. Belg.*, 31 : 238.

Bolivaritettix sculptus, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N.F.) BD 1 : 59

Male, female : Head not exserted above the pronotal surface ; vertex equal or a little broader than one of the eyes, somewhat narrowed in front, depressed on either side, median carinula distinct, a little produced in front and roundly meet the frontal costa, lateral carinulae not or a little elevated upto the level of eyes, reflexed laterally, front margin low and roundly reflex laterally ; frontal costa bifurcate behind the paired ocelli, sinuate, strongly arched between the antennae, declined in front, moderately sulcate between paired ocelli which gradually widen in front. Antennae filiform, longer than head, inserted on the inferior margin of eyes. Eyes globose, moderate in size.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apex of hind femora ; dorsum granulose, tubercles linear, fossae present behind the shoulders ; abbreviated semi-lateral carinae distinctly present ; prozonal carinae distinct, granulose, convergent behind ; median carinae a little raised in front, slightly depressed behind, compresso-elevated on the sulci, depressed on shoulders and distinctly visible behind ; lateral carinae interrupted on the sulci anteriorly, bicarinate on humeral angles, low and granulose behind ; humeral angles obtuse angulate ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, dilated and the apex truncate. Elytra small, ovate, broadly round at apex. Wings extend upto the apex of pronotal process ; anterior femora elongate, moderately broadened, margins entire or serrulated ; middle femora

elongate, compressed, broadened, bicarinate, margins undulate or wavy with serrulations ; posterior femora elongate, wide, crassate with longitudinal ridges on the pagina, nodules present on the upper marginal area, margins serrulated, with short pointed antegenicular and genicular

Plate 15

Scale 1 mm.

PLATE 15 : Fig. 1. Top view of head and thorax of *Bolivaritettix sculptus* (Bolivar).

Fig. 2. Top view of head and thorax of *Bolivaritettix lativertex* (Brunner).

denticles ; first and third hind tarsal segments equal in length ; all the pulvilli equal in length.

Measurements (in mm.) : Body length ♂ 10-12, ♀ 12-14.5 ; body length with pronotum ♂ 15.5-16, ♀ 17.5-18 ; pronotum length ♂ 14-15, ♀ 16.5-17 ; posterior femora length/width ♂ 6.8-7.5/2.2-3 ; ♀ 7.7-8.8/2.4-2.7 ; shoulder width ♂ 2.8-3.2, ♀ 3.2-3.8.

Material examined : 1 ♀, West Bengal : Darjeeling Distt. : Sukna,

304 m, —. v. 1913, coll. Lord Carmichael [Reg. No. of Zoological Survey of India, 7807/20] ; 1 ♀, Arunachal Pradesh : Subansiri Divi. : Kimin, 198 m, 9. v. 1966, coll. A. N. T. Joseph ; 1 ♂, 2 ♀♀, Tripura : Teliamura 150 m, 12. xi. 1974, coll. M. S. Shishodia ; 5 ♂♂, 5 ♀♀, Tripura : Manu : Jamir Cherra, 25. xi. 1974, coll. M. S. Shishodia.

Plate 16

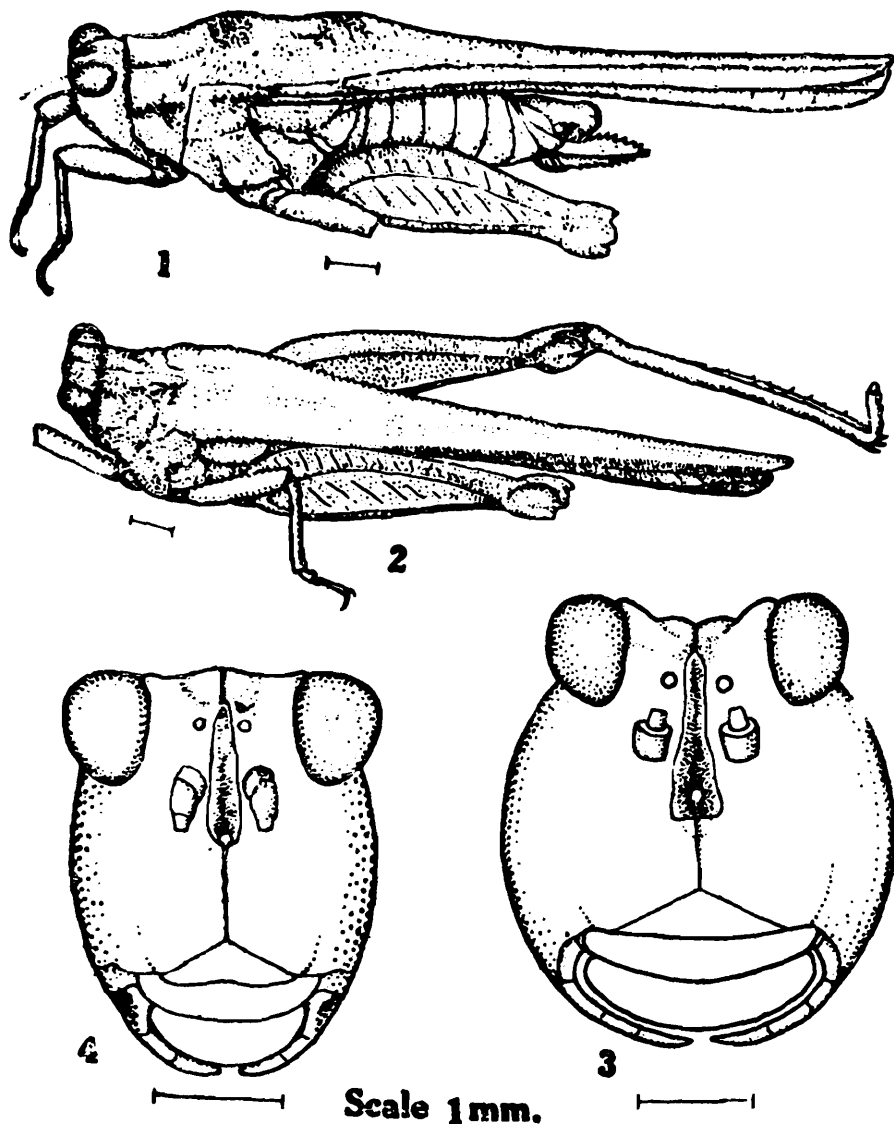


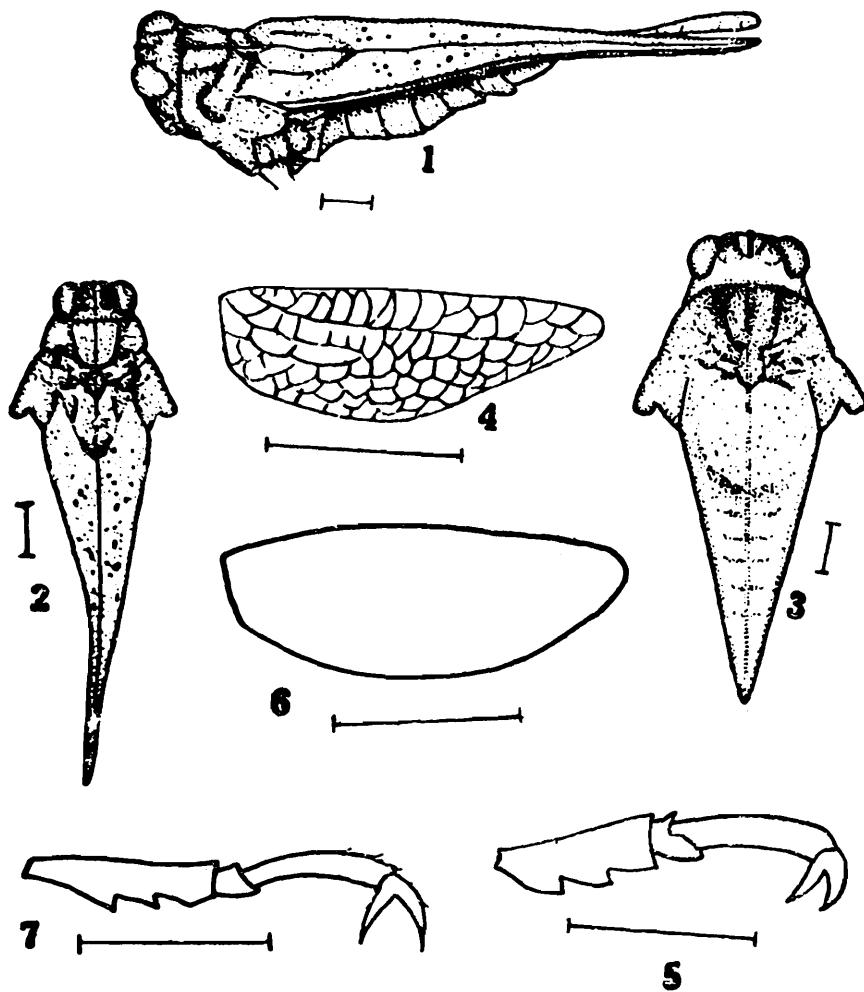
PLATE 16 : Fig. 1. Dorso-lateral view of *Bolivaritettix sculptus* (Bolivar).
 Fig. 2. Dorso-lateral view of *B. lativertex* (Brunner).
 Fig. 3. Front view of head of *B. sculptus* (Bolivar).
 Fig. 4. Front view of head of *B. lativertex* (Brunner).

Geographical distribution : India (West Bengal, Assam) ; Burma.

Remarks : *Bolivaritettix sculptus* (Bolivar) was originally described under *Mazarredia* Bolivar in 1887. Kirby (1914) also redescribed the species under the genus *Mazarredia*. Later on Günther in 1939 established a new genus *Bolivaritettix* and almost all the species of *Mazarredia* Bolivar including *sculptus* were transferred to *Bolivaritettix*. Subsequently

in 1941 Günther stated that the figure of *Mazarredia sculpta* of Kirby (1914 : 51, fig. 48) is similar to *Ergatettix dorsiferus* (Walker). Recently, Steinmann (1970) has not included *B. sculptus* (Bolivar) in his Check-List of Tetrigidae of Oriental Region. The present study of the material as well as the identified specimens of Hancock as *B. sculpta* is a valid

Plate 17



Scale 1mm.

- PLATE 17 :** Fig. 1. Dorso-lateral view of *Bolivaritettix laticeps* (Bolivar).
 Fig. 2. Top view of *B. laticeps* (Bolivar).
 Fig. 3. Top view of *B. sikkimensis* (Bolivar).
 Fig. 4. Elytra of *B. lativertex* (Brunner) (Type).
 Fig. 5. Posterior tarsal segments of *B. lativertex* (Brunner) (Type).
 Fig. 6. Elytra of *B. sculptus* (Bolivar).
 Fig. 7. Posterior tarsal segments of *B. sculptus* (Bolivar).

species, which can be clearly distinguished from the other species of the genus by the narrowed vertex in front, which is slightly raised above the level of eyes and the roundly reflexed lateral carinulae of vertex, the low dorsum of pronotum between shoulders, the moderately fossulate dorsum behind the shoulders, the depressed median carina in front, and the truncate apex of posterior angles of lateral lobes of pronotum.

34. *Bolivaritettix sikkimensis* (Bolivar), 1909
(Plate 17, fig. 3)

Mazarredia sikkimensis Bolivar, 1909, *Real. Soc. Espan.*, 9 : 398.

Bolivaritettix sikkimensis, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N.F.) BD 1 : 65.

Since the head of the available specimen of *B. sikkimensis* is lost, the description of the head is taken from *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N.F.) BD 1 : 65-67, while that of the rest is from the specimen present in the Zoological Survey of India.

Female : Head not exerted above the pronotal surface ; vertex broader than one of the eyes, produced upto the level of eyes in front, median carinula distinct at the anterior one-fourths distance of vertex and extend a little in front, lateral carinulae elevated upto the level of eyes and laterally reflexed, front margin low ; frontal costa bifurcate behind the paired ocelli. Antennae filiform and placed below the inferior margin of eyes. Eyes globular and indistinctly raised.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apex of posterior femora ; dorsum granulose, rough, irregular linear tuberculae, a little convex between shoulders and moderately fossulate behind shoulders ; median carina depressed but visible in front, compresso-elevated between sulci, depressed on shoulders and moderately elevated on posterior process behind ; with one or two tubercles prozonal carinae distinct, convergent behind semi-lateral broken abbreviated carinae present on either side of median carina ; lateral carinae interrupted on the sulci, bicarinate on humeral angles, serrulated specially on the posterior process ; paranota with two projections posterior angles of lateral lobes of pronotum wide, truncate at apex. Elytra elongate narrow, punctate, apex narrowly round. Wings extend upto the apex of pronotal process ; anterior femora elongate, convex, margins finely serrulate ; middle femora elongate, compressed, bicarinate, margins wavy with serrulations ; posterior femora missing.

Measurements (in mm.) : Body length ♀ 12 ; body length with pronotum ♀ 17 ; pronotum length ♀ 16 ; posterior femora length/width ♀ 8 (after Günther, 1939 : 66) ; shoulder width ♀ 3.8.

Material examined : 1 ♀, Sikkim : Knywett [Reg. No. of Zoological Survey of India, 1551/20] ; 1 ♀, West Bengal : Darjeeling to Soom, 2128-1520, 14. vi. 1914, coll. F. H. Gravely.

Geographical distribution : India (Sikkim, Assam) ; Taiwan ; Hainan ; China.

Remarks : The species was erected by Bolivar in 1909, but his

description is not adequate. Unfortunately the Holotype (♂) is not available to me and the identified specimens present in the Zoological Survey of India are damaged. One example collected from Sikkim is without head and hind legs while in the other the hind tarsal segments are missing. The latter example was identified by Klaus Günther but he was not sure about the identity of the genus and so he wrote in his own hand writing the identification label as *Bolivaritettix ? sikkimensis* Bolivar. Both examples differ from each other in regard to the length of pronotum, sculptures of dorsum, elevation of arch in front of the shoulders, absence of abbreviated carinae on either side of shoulders and the size of elytra. Dr. Günther also figured the specimen (1939 : 66, fig. 32). But according to me this specimen is *Bolivaritettix ghumtianus* Hancock.

Bolivaritettix sikkimensis (Bolivar) is near to *B. singlaensis* (Hancock) and *B. sculptus* (Bol.) especially with the latter but can be easily distinguished from both of them by the less elevated lateral carinulae above the eyes, the anteriorly depressed median carina of pronotum and the longer length of pronotum which is between 14-16 mm.

35. *Bolivaritettix laticeps* (Bolivar), 1909 (Plate 17, figs. 1 & 2)

Mazarredia laticeps Bolivar, 1909, *Real. Soc. Espan.*, 9 : 399.

Bolivaritettix laticeps, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N. F.) BD 1 : 76.

Size medium. Colour dark brown or light brown variegated with dark brown.

Male, female : Head not exserted above the pronotal surface ; vertex broader than one of the eyes, a little narrowed in front, not produced forward beyond the eyes, depressed on either side, middle carinula distinctly visible in front and extend one-fourth the distance behind, front margin indistinct, lateral carinulae distinct, elevated upto the level of eyes and reflexed laterally ; frontal costa bifurcate a little behind the paired ocelli, sinuate between the eyes, arched between the antennae, declined in front, moderately sulcate. Antennae filiform, situated slightly below the eyes. Eyes globose, not or a little elevated above the vertex.

Pronotum truncate in front, subulate posteriorly and extend beyond the apex of hind femora ; dorsum granulose, small and sharp tubercles scattered especially on the hind process of pronotum, a little elevate before the shoulders, not fossulate behind ; median carina low

in front, a little compresso-elevated on sulci, slightly low on shoulders and gradually decrease behind ; prozonal carinae distinct, convergent behind ; semi-lateral abbreviate carinae present, low in height ; humeral angles obtuse ; lateral carinae interrupted in front of the shoulders, indistinctly bicarinate on humeral angles ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, truncate at apex. Elytra small, not broader than middle femur, round at apex. Wings extend upto the apex of pronotal process ; anterior femora elongate, margins finely serrulate ; middle femora elongate, a little compressed, bicarinate, margins finely serrulate ; posterior femora elongate and wide, longitudinal ridges present on external pagina, nodules on upper marginal area distinct, margins finely serrulate, small fine genicular tooth present ; first and third hind tarsal segments equal in length (damaged in the specimens studied) or first segment slightly longer ; third pulvilli a little longer than the first two pulvilli.

Measurements (in mm) : Body length ♂ 9.9-1, ♀ 9 ; body length with pronotum ♂ 13, ♀ 11.8-12 ; pronotum length ♂ 12, ♀ 10.6-11 ; posterior femora length/width ♂ 5.3-5.4/1.7, ♀ 6/ ; shoulder width ♂ 2.1-2.2, ♀ 2.4-2.9.

Material examined : 1 ♂, 2 ♀ ♀, West Bengal : Darjeeling Distt. : Soom, 1216-1520m, 16. vi. 1914, coll. F. H. Gravely ; 1 ♀, Arunachal Pradesh : Siang Divi. : Pading village, 300m, 11. x. 1966, coll. S. K. Tandon and G. S. Arora ; 2 ♂ ♂, Arunachal Pradesh : Siang Divi. : Tappi : Dulla, 500m, 22. x. 1966, coll. S. K. Tandon and G. S. Arora.

Geographical distribution : India (Assam, West Bengal).

Remarks : *Bolivaritettix laticeps* (Bolivar) is distinguished from the other species of *Bolivaritettix* by the slightly elevated eyes from the surface of pronotum ; a little depressed vertex on either side of the middle carinula ; very short and sharp isolated and scattered tubercles on the surface of pronotum especially on the hind process ; obtuse, sharply pointed posterior angles of lateral lobes of pronotum which are turned outward. This species somewhat resembles *Eucriotettix* Hebard 1929 and *Criotettix dohertyi* Hancock but the head in the case of *Criotettix dohertyi* Hancock is not exerted and both the anterior pulvilli of hind tarsi are sharply spinose.

36. *Bolivaritettix dubius* (Hancock), 1912

Mazarredia dubia Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 141.

Bolivaritettix dubius, Steinmann, 1970, *Acta zool. hung.*, 16 : 227.

Large in size. Colour grey, pale variegated or brownish rufescent.

Male, female : Head not or a little exserted ; vertex equal or a little wider than one of the eyes deplanate and ampliate backward, middle carinula distinct, lateral carinulae not elevated above the eyes, front margin obliquely curved laterally, depressed on either side of middle carinula ; frontal costa distinctly arcuate, protuberant between the antennae, a little sinuate between the eyes, moderately sulcate ; paired ocelli placed between the middle of eyes. Antennae filiform, placed below the middle of eyes. Eyes globulose, a little or not elevated above the vertex.

Pronotum subtruncate or truncate anteriorly, lengthily subulate posteriorly and extend beyond the hind femoral apices (over 4 mm.) ; dorsum deplanate above, granulose, tuberculose, transversely convex between the shoulders ; median carina slightly sinuate in front, barely elevated on the sulci, straight backwards ; prozonal carinae distinct in front, convergent behind ; abbreviated carinae present on either side of shoulder, which meet the middle carina by dots ; humeral angles bicarinate ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, a little deflexed, obtusely angulate, obliquely truncate behind. Elytra elongate, subroundly truncate at apex. Wings extended upto the pronotal apex ; anterior femora elongate, margins substraight ; middle femora elongate, margins subundulate ; posterior femora elongate, crassate, bearing a series of large tubercles, carinae entire ; all the pulvilli equal in length.

Measurements (in mm.) : Body length ♂ 11, ♀ 12 ; body length with pronotum ♂ 14.5, ♀ 16.5 ; pronotum length ♂ 13.5, ♀ 15.5 ; posterior femora length ♂ 6.5, ♀ 7.00.

Material examined : "Type" ♀, West Bengal : Darjeeling Distt. : Lebong, 1520 m, —. ix. 1908, coll. H. M. L., Type No. H. 699 ; Allotype ♂, West Bengal : Darjeeling Dist. : Lebong : Phoobsering, —. iv. 1908, coll. H. M. L. [Hebard Cln.]. Both specimens received from Academy Natural Science Philadelphia, U. S. A. for study and return.

Distribution : India (West Bengal).

Remarks : *Mazarredia dubius* Hancock was described by Hancock in 1912. Later on Günther (1939) transferred the species under *Bolivari-tettix* and synonymised it with *B. javanicus* (Bolivar) but he was not sure about this synonym as appears from the question marks put in front of as well as after the species, without mentioning any cause. It was Steinmann (1970) who gave it a species status. Unfortunately I could not compare the type of *Mazarredia dubius* with *Mazarredia javanicus* Bolivar as the latter is not available to me. At present I am following

Steinmann. This species is separated from other species of the genus by the subwider vertex, strongly protuberant frontal costa between the antennae, moderately exserted eyes, granulose dorsum of pronotum and irregular lineate tubercles of the posterior process of pronotum.

37. *Bolivaritettix roonwali* sp. nov.

(Plate 18, figs. 3 & 4)

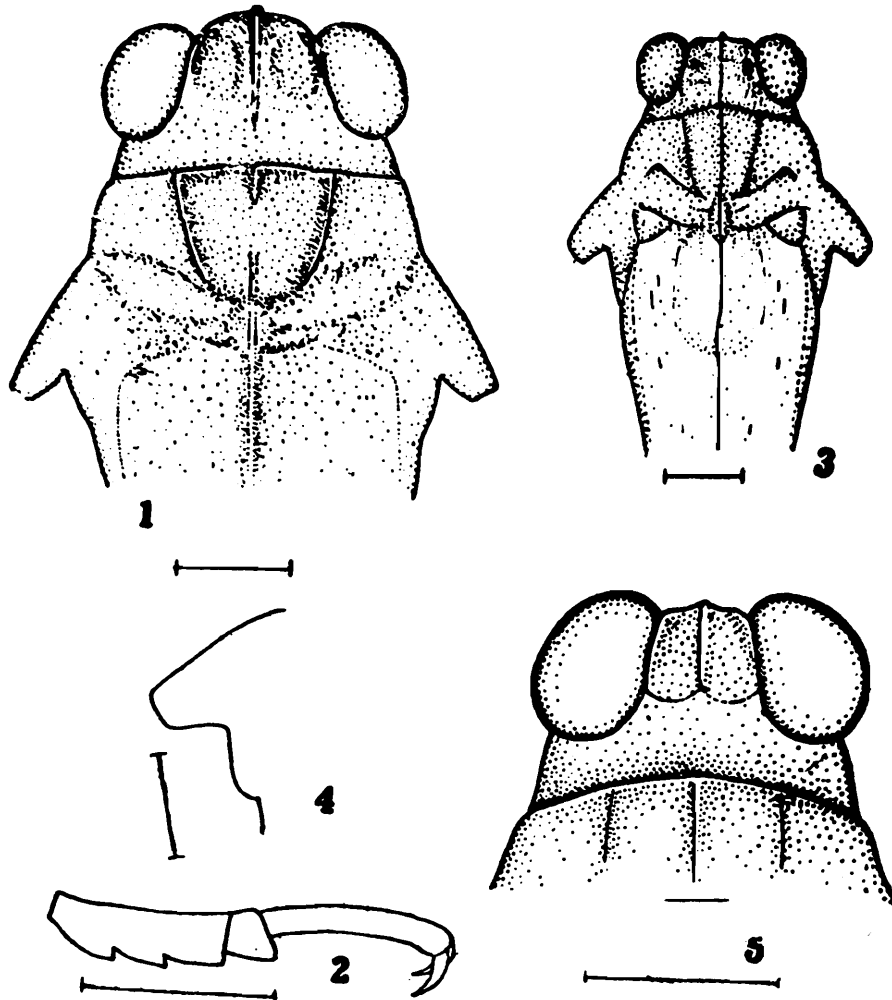
Medium sized. Colour wholly rusty brown or variegated with fuscous.

Male, female : Head not exserted above the surface of pronotum ; vertex equal or slightly broader than one of the eyes, not narrowed in front, fossulate on either side, produced beyond the eyes in front, median carinula distinctly visible upto the middle of vertex and join the frontal costa in front, lateral carinulae raised upto the level of eyes and roundly reflexed laterally ; frontal costa bifurcate behind the paired ocelli, sinuate between the eyes, gently arched between the antennae, declined in front, moderately sulcate ; paired ocelli located between the middle of eyes. Antennae filiform, placed on the inferior margin of eyes. Eyes globulose, elevated above the vertex.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apex of hind femora ; dorsum granulose, rugulose, a little depressed in front and behind the shoulders but the latter depression is indistinctly visible ; median carina granulose, depressed in front, compresso-elevated between the sulci posteriorly, slightly low on shoulders, rest uniformly raised ; abbreviated carinae present on shoulders ; prozonal carinae distinct, granulose, convergent behind ; lateral carinae granulose, low, interrupted in front, bicarinate on humeral angles ; humeral angles roundly produced ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, moderately wide, truncate. Elytra small, elongate, rounded at apex. Wings extended upto the apex of pronotum ; anterior femora elongate, convex, margins granulose ; middle femora elongate, compressed, bicarinate, margins granulose ; posterior femora elongate, crassate on marginal area and external pagina, margins finely serrated, genicular and antegenicular denticles normal ; first and third tarsal segments of hind tarsi equal in length ; all the pulvilli obtuse and equal in length.

Measurements (in mm.) : Body length ♂ 10, ♀ 12 ; body length with pronotum ♂ 14, ♀ 15 ; pronotum length ♂ 13, ♀ 14 ; posterior femora length/width ♂ 6.4/2.1, ♀ 6.4/2.1 ; shoulder width ♂ 2.7, ♀ 2.7.

Material examined : Holotype ♂, Sikkim : Gangtok : Burtuk, 1759 m, 30. v. 1979, coll. M. S. Shishodia ; Allotype ♀, Manipur : 16 miles north of Imphal on Dimapur Road, C 2584 m, 18. x. 1945, coll. Maj. M. L. Roonwal ; Paratype ♀, Manipur : 16 miles north of Imphal on Dimapur Road, C 2584 m, 4. x. 1945, coll. Maj. M. L. Roonwal.

Plate 18

Scale 1 mm.

PLATE 18 : Fig. 1. Top view of head and thorax of *Bolivaritettix ghumtianus* (Hancock).

Fig. 2. Tarsal segments of *B. ghumtianus* (Hancock).

Fig. 3. Top view of head and thorax of *B. roonwali* sp. nov.

Fig. 4. Posterior angles of lateral lobes of pronotum of *B. roonwali* sp. nov.

Fig. 5. Top view of head and thorax of *Xistrella dohrni* Günther (Type).

Remarks : *Bolivaritettix roonwali* sp. nov. is near to *B. laticeps* (Bolivar) but it is easily differentiated from the latter by the larger size of body and pronotum, flat vertex which is not narrowed in front, by the

absence of tubercles and the presence of irregular raised linear thickenings on the hind process of pronotum.

38. *Bolivaritettix ghumtianus* (Hancock), 1915
(Plate 18, figs. 1 & 2)

Mazarredia ghumtiana Hancock, 1915, *Rec. Indian Mus.*, 11 : 100.

Bolivaritettix ghumtianus, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk, Dresden*, 20 (A) *Zool. (N. F.)* BD 1 : 78.

Size medium. Colour ferrugineous or fuscous.

Male, female : Head not exserted above the pronotal surface ; vertex broader than one of the eyes, horizontal, fossulate on either side of middle carinula, a little or not advanced in front of eyes, the lateral carinulae raised upto the level of eyes, reflexed laterally, middle carinula distinctly visible upto the middle of eyes, front margin not visible ; frontal costa bifurcate a little behind the paired ocelli, arched between the antennae, declined in front, sulcus gradually widened from behind to the front. Antennae filiform, inserted on or slightly below the inferior margin of eyes. Eyes globular, the upper surface of eyes a little exserted above the vertex.

Pronotum truncate anteriorly, transversely rounded before the shoulders, cuneately produced posteriorly and not extended upto the apex of abdomen ; dorsum smoothly granulose, rugulose on hind process, deplanate, slightly convex between shoulders, a little depressed behind the shoulders ; median carina depressed in front, a little compressed and elevated on the sulci, very low on the rest ; prozonal carinae not distinctly visible, granulose, convergent behind ; lateral carinae low, indistinct in front, bicarinate behind the shoulders ; abbreviated semi-lateral carinae not visible ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, wide, apex truncate, sometimes anterior and posterior angles roundly truncate. Elytra narrowly elongate, apices rounded. Wings not extended upto the pronotal apex ; anterior femora elongate, convex, margins finely serrulate ; median femora elongate, compressed, bicarinate, margin subentire with granulose ; posterior femora elongate, wide, crassate, margins finely serrulate, genicular and antegenicular teeth small, pointed ; first and third hind tarsal segments nearly equal in length ; all the pulvilli of hind tarsi more or less equal in length, subobtuse.

Measurements (in mm.) : Body length ♂ 9·8-10, ♀ 12-13·5 ; body length with pronotum ♂ 9·5-9·8, ♀ 11-11·5 ; pronotum length ♂ 8·4-

8.7, ♀ 10-10.5 ; posterior femora length/width ♂ 6.8/2.2-1, ♀ 7.3-7.8/2.5-2.9 ; shoulder width ♂ 2.7-2.8, ♀ 3.2 - 3.5.

Material examined : "Type" ♀ , West Bengal : Darjeeling Distt. : Ghumti, 760 m, 27. iii. 1910, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 130/17] ; 1 ♂ , West Bengal : Darjeeling : 2½ kms north of Takda, 21. iii. 1973, coll. H. S. Sharma ; 1 ♂ , West Bengal : Darjeeling Distt. : Rangiroom : on way to tea garden, 10. vi. 1975, coll. G. K. Srivastava and P. K. Maiti ; 1 ♀ , West Bengal : Darjeeling Distt. : Lepong, 18. v. 1979, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal).

Remarks : This species is easily distinguished from the remaining species of the genus by the smoothly granulose dorsum of pronotum, lack of gibbosity in front of shoulders, presence of low median carina throughout its length, not so extended pronotal process, indistinct prozonal carinae, absence of abbreviated carinae on either side, and less deep fossulae behind the shoulders.

39. *Bolivaritettix lativertex* (Brunner), 1893

(Plate 15, 16 & 17, figs. 2 ; 2 & 4 ; 4 & 5)

Mazarredia lativertex Brunner, 1893, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 106, 108, pl. 5, fig. 41.

Mazarredia latifrons Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 139.

Mazarredia latifrons, Steinmann, 1970, *Acta zool. hung.*, 16 : 227.

Bolivaritettix lativertex, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk, Dresden*, 20 (A) Zool. (N. F.) BD 1 : 62.

Medium sized. Colour dull brown or dark brown variegated with brown.

Female : Head not exserted above the pronotum surface ; vertex nearly twice as broad as one of the eyes, very little narrowed in front, fossulate on either side, produced upto the level of eyes in front, median carinula visible upto the middle of vertex and slightly produced in front, lateral carinulae low, reflexed laterally, frontal carinulae indistinctly visible and low ; frontal costa bifurcate behind the paired ocelli, sinuate between the eyes, arched between antennae, moderately sulcate ; paired ocelli placed between the middle of eyes. Antennae filiform, placed on or below the inferior margin of eyes. Eyes globulose.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the posterior femoral apices ; dorsum rough, granulose, hind process rugulose, low depression present behind the shoulders ; median carina depressed in front, compresso-elevated on sulci and uniformly

low on the rest ; lateral carinae low, granulose, interrupted on lateral sulci in front, bicarinate on humeral angles ; abbreviated semi-lateral carinae present ; prozonal carinae distinct, granulose, convergent posteriorly ; humeral angles roundly obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, truncate at apex. Elytra elongate, small, round at apex. Wings extended upto the pronotal apex ; anterior femora elongate, a little convex, margins granulose, middle femora elongate, compressed, bicarinate, margins granulose ; posterior femora elongate, crassate on upper marginal area and external pagina, finely serrated ; first and third hind tarsal segments equal in length ; all the pulvilli of the first segment of hind tarsi obtuse and equal in length.

Measurements (in mm.) : Body length ♀ 14 ; body length with pronotum ♀ 16-17 ; pronotum length ♀ 15-16 ; posterior femora length/width ♀ 7.5-8.2/2.3-2.5 ; shoulder width ♀ 3-3.1.

Material examined : 1 ♀, North Sikkim : Riskikhola, 994 m, 8. iv. 1959, coll. A. G. K. Menon ; 1 ♀, North Sikkim : Singhik, 1300m, 11. iv. 1981, coll. R. K. Varshney.

Geographical distribution : India (West Bengal) ; Burma ; China ; Tonkin ; Perak ; Malaya ; Java ; Sumatra.

Remarks : *Bolivarietettix lativertex* (Brunner) is very near to *B. ghumtianus* (Hancock) but can be easily separated from the latter by the larger pronotum, much wider frontal sulcus between the antennae and median ocelli.

(14) Genus : *Xistrella* Bolivar, 1909

Type species : *Xistrella dromadaria* Bolivar, 1909

Xistrella Bolivar, 1909, *Bol. Real. Soc. Espan.*, 9 : 400-401.

Generally moderately elongate, narrow and smooth. Colouration uniformly dark brown.

Head a little exserted above the pronotal surface ; vertex narrower than or equal to the width of an eye, a little narrower in front, depressed on either side, produced upto the level of eyes in front, middle carinula distinct or not, lateral carinulae visible in the form of vertex horn, front margin not well marked ; frontal costa bifurcate behind the paired ocelli, arched and more elevated between the bases of antennae ; paired ocelli placed on the inferior margin of eyes. Antennae long, filiform, inserted below the inferior margin of eyes. Eyes oval to globular in shape, a little elevated above the vertex.

Pronotum rounded or transverse anteriorly, subulate posteriorly and extends beyond the apex of posterior femora ; dorsum generally smooth, convex in the middle between the shoulders ; median carina compresso-elevated in the form of a hump between the shoulders ; lateral oblique carinae visible on either side of middle carina between the shoulders which join the lateral carinae anteriorly ; prozonal carinae short and parallel ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, roundly truncate at apex. Elytra elongate, round at apex. Wings extend upto the apex of pronotal process ; anterior and middle femora slightly compressed, margins finely serrated ; posterior femora elongate, margins finely serrulated ; first and third tarsal segments of the posterior tarsi equal in length ; all the pulvilli of first tarsal segment equal in length.

Geographical distribution : India ; Sri Lanka ; Burma ; Palawan ; Java ; Borneo ; Sumatra.

Kes to the species of *Xistrella* Bolivar

- | | | |
|---|-----|-------------------------------|
| 1. Median carina of pronotum compresso-elevated and arched between the shoulders like a hump, dorsum of pronotum smooth | ... | <i>dromadaria</i>
Bolivar |
| — Median carina depressed on the shoulders, dorsum of pronotum smooth or granulose or granulose and rugulose | ... | 2 |
| 2. Pronotum extended beyond the middle of hind tibiae, dorsum of pronotum granulose and rugulose, third pulvilli of hind tarsi longer than the second | ... | <i>siangensis</i>
sp. nov. |
| — Pronotum extended upto the the middle of hind tibiae or beyond, dorsum of pronotum smooth or finely granulose | ... | 3 |
| 3. Pronotum extended upto the middle of hind tibiae, oblique lateral lines join the median carina behind the shoulders | ... | <i>inermis</i>
(Hancock) |
| — Pronotum extended beyond the middle of hind tibiae, oblique lateral lines run parallel between the shoulders and join the lateral carinae anteriorly and are obscurely visible behind the shoulders | ... | <i>arorai</i> sp. nov. |

40. *Xistrella dromadaria* Bolivar, 1909 (Plate 19, figs. 1-4)

Xistrella dromadaria Bolivar, 1909, *Bol. Real. Soc. Espan.*, 9 : 401.

Moderately elongated. Colour dark brown mottled with brown or vice versa.

Male, Female : Head exserted above the pronotal surface ; vertex equal to the width of an eye, narrowed in front, depressed on either

Plate 19

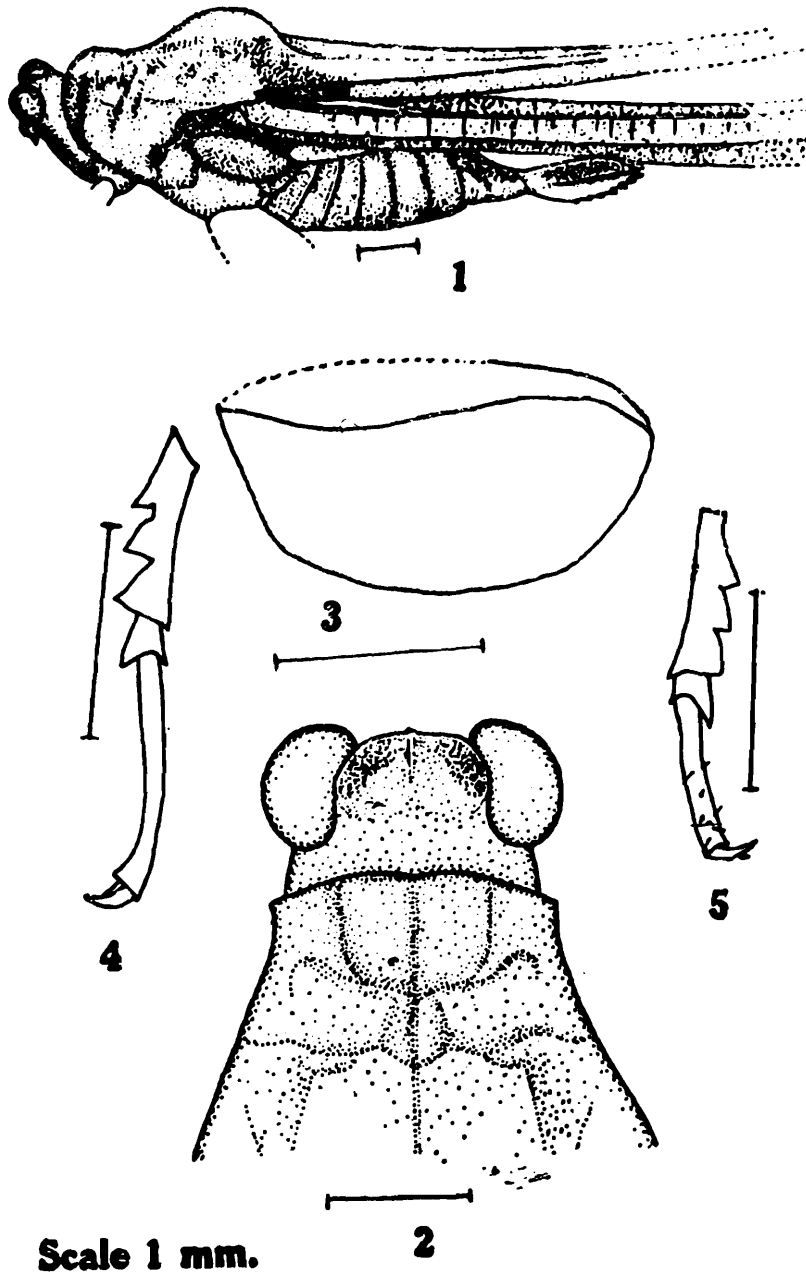


PLATE 19 : Fig. 1. Dorso-lateral view of *Xistrella dromadaria* Bolivar.

Fig. 2. Dorsal view of head and thorax of *Xistrella dromadaria* Bolivar.

Fig. 3. Elytra of *X. dromadaria* Bolivar.

Fig. 4. Posterior tarsal segments of *X. dromadaria* Bolivar.

Fig. 5. Posterior tarsal segments of *X. inermis* (Hancock).

side, produced upto the level of eyes in front, middle carinula distinct in front, obscure behind, lateral carinulae low, roundly join the middle

carinula, vertex horn not distinct, front margin low ; frontal costa bifurcate behind the paired ocelli, compresso-elevated between the bases of antennae, depressed in front, moderately sulcate ; paired ocelli placed on the lower margin of eyes. Antennae long, filiform, inserted below the lower margin of eyes. Eyes globular.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the apex of posterior femora ; dorsum smooth, convex medially between the shoulders ; median carina depressed in front, slightly swollen between the sulci, compresso-elevated between the shoulders in the form of a hump, very low on the posterior process ; prozonal carinae short and parallel ; lateral oblique carinae present on either side of middle carina between shoulders which joins the lateral carinae anteriorly ; lateral carinae low, interrupted anteriorly ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, dilated, roundly truncate at apex. Elytra elongate, wider in the middle, punctate, narrowly rounded at apex. Wings extend upto the apex of pronotum ; anterior and middle femora compressed, finely serrulated ; posterior femora elongate, a little crassate, margins finely serrulated ; first and third hind tarsal segments equal in length ; all the pulvilli obtuse and equal in length.

Measurements (in mm.) : Body length ♂ 9.8, ♀ 12.5-13.0 ; body length with pronotum ♂ 16.5, ♀ 18 ; pronotum length ♂ 15.5, ♀ 17 ; posterior femora length/width ♂ damaged, ♀ 7.7/2.1 ; shoulder width ♂ 3.00, ♀ 3.2-3.4.

Material examined : 1 ♀, Sikkim [Reg. No. of Zoological Survey of India, 1581/20] ; 1 ♀, West Bengal : Darjeeling Distt. : Soom, 1216-1520 m, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 2026/H5] ; 1 ♂, Sikkim ; 1 ♀, N. Sikkim : Chungthang, 1551 m, 17. v. 1959, coll. A. G. K. Menon.

Geographical distribution : India (West Bengal, Sikkim).

Remarks : *Xistrella dromadaria* Bolivar is clearly distinct from the other regional species of the genus by the larger size of body and pronotum, convexity of pronotum between shoulders, smoothness of dorsum, indistinctly visible oblique lateral line on either side of median carina of pronotum and distinctly compresso-elevated and arched median carina between shoulders like a hump.

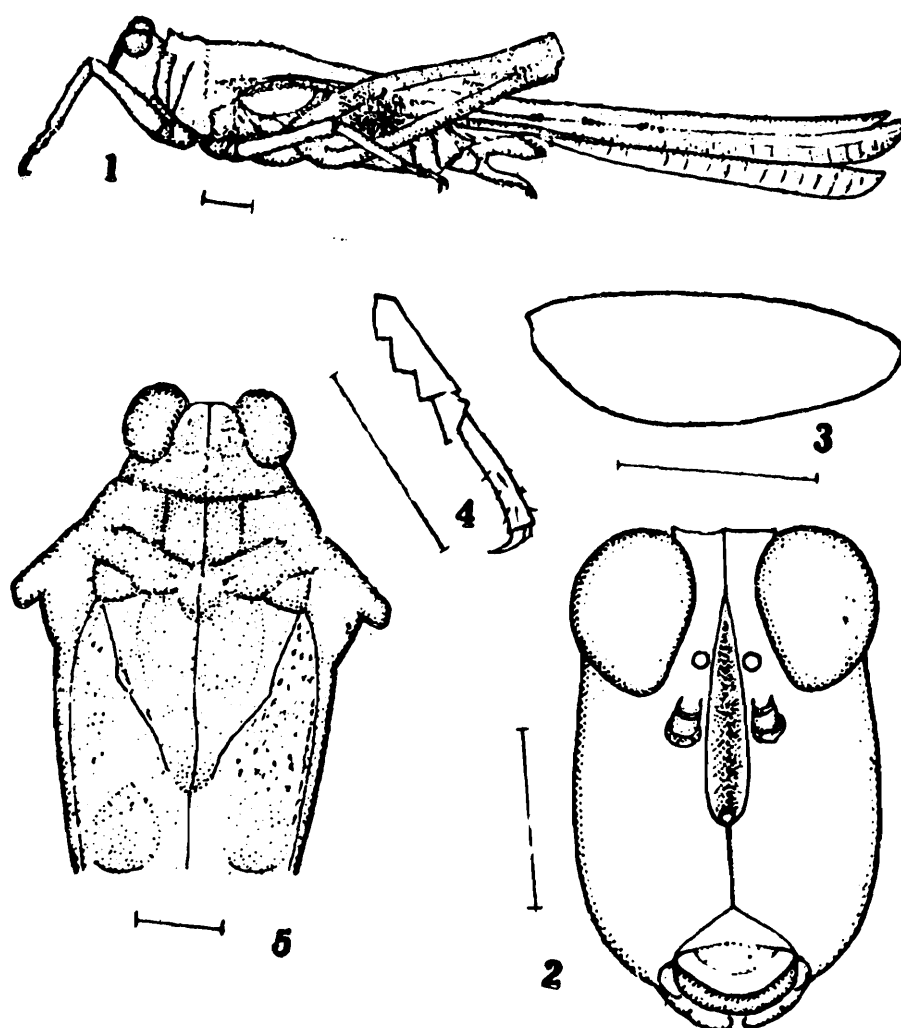
41. *Xistrella siangensis* sp. nov.

(Plate 20, fig. 5)

Moderately elongated. Colour ferrugineous, sides of body light

yellow, legs light yellow mottled with dark brown, antennae dark brown, joints of segments yellow, abdomen dark brown with yellow spots laterally.

Plate 20



Scale 1 mm.

PLATE 20 : Fig. 1. Dorso-lateral view of *Xistrella dohrni* Günther. (♀ Type).

Fig. 2. Front view of head of *X. dohrni* Günther.

Fig. 3. Elytral of *X. dohrni* Günther.

Fig. 4. Posterior tarsal segments of *X. dohrni* Günther.

Fig. 5. Top view of head and thorax of *Xistrella siangensis* sp. nov.

Female : Head little exserted ; vertex slightly narrower than an eye, narrowed forward, not extends upto the level of eyes in front, depressed, ampliate behind the depression, middle carinula low and extends behind upto the apex of depression, lateral carinulae not elevated upto the level of eyes and lower in front, join the middle carinula ; frontal costa bifurcate behind the paired ocelli, compresso-elevated between the antennae, depressed in front, moderately sulcate ; paired ocelli placed on the inferior margin of eyes. Antennae long, filiform, placed below the inferior margins of eyes. Eyes globular, elevated above

the vertex.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the middle of posterior tibiae; dorsum granulose, posterior process rugulose, a little elevated behind the shoulders like a hump; median carina depressed in front, swollen on the sulci, depressed on the shoulders, slightly elevated behind the shoulders, low in the rest; lateral carinae interrupted in front, normal in the rest; prozonal carinae short, granulose, parallel; oblique lateral line present on either side of median carina which join the lateral carinae anteriorly and median carina posteriorly; humeral angles roundly produced; paranota with two projections; posterior angles of lateral lobes of pronotum turned downwards, roundly truncate at apex. Elytra elongate, punctate, rounded at apex. Wings extend upto the apex of pronotum; anterior femora elongate, a little compressed, margins finely serrulated; middle femora elongate, compressed, bicarinate, finely serrulated; posterior femora elongate, crassate, margins finely serrulated, antegenicular and genicular denticles sharp; first and third tarsal segments of posterior tarsi equal in length; first and second pulvilli of first segment of posterior tarsi obtuse and shorter than the third, third pulvilli obtuse.

Measurements (in mm.): Body length ♀ 11.5; body length with pronotum ♀ 16.5; pronotum length ♀ 15.5; posterior femora length/width ♀ 7.1/2.3; shoulder width ♀ 3.1.

Material examined: Holotype ♀, Arunachal Pradesh: Siang Divi.: Tappi, 600m, 23. x. 1966, coll. S. K. Tandon and G. S. Arora.

Remarks: *Xistrella slangensis* sp. nov. is very close to *Xistrella inermis* (Hancock) but can be separated from the latter by the slightly more robust body, presence of granules and linear irregular thickenings on the pronotal process and larger third pulvilli of posterior tarsi.

42. *Xistrella inermis* (Hancock), 1915 (Plates 19 & 21, figs. 5; 1-3)

Bolotettix inermis Hancock, 1915, *Rec. Indian Mus.*, 11: 77-78.

Xistrella inermis, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N. F.) BD 1: 151.

Size medium. Dorsum fuscous, sides and legs brown variegated with fuscous, posterior femora mottled with yellow and brown, posterior tibiae dark brown biannulated with brown, elytra dark brown with brown apex.

Male, female: Head a little exserted; vertex as wide as an eye

or a little narrow, distinctly narrower towards the front, depressed on either side, extended upto the level of eyes in front, middle carinula low and extended upto three-fourths the distance of eyes, lateral carinulae a little prominent behind, low in front and reflexed laterally, front marginal carinulae very low ; frontal costa bifurcate behind the paired ocelli, compresso-elevated between the antennae, depressed behind the antennae, depressed and sinuate in front of the antennae, narrowly sulcate between the paired ocelli, widely sulcate between antennae ; paired ocelli placed on the inferior margin of eyes. Antennae long, filiform, inserted below the inferior margin of eyes. Eyes globular, a little elevated above the vertex.

Pronotum transverse anteriorly, subulate posteriorly and extends beyond the apices of posterior femora ; dorsum smooth, lightly swollen on shoulders posteriorly ; median carina depressed in front, a little compresso-elevated and arcuate between the sulci, slightly depressed in the middle between the shoulders, a little raised behind the shoulders, low in the rest ; lateral carinae interrupted in front, obscurely visible between humeral angles, low in the rest ; prozonal carinae distinct, parallel ; oblique lateral line present between the shoulders which join the lateral carinae anteriorly ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, apex rounded. Elytra small, ovate, apex broadly rounded. Wings extend a little beyond the apex of pronotal process ; anterior femora elongate, a little compressed, margins entire ; middle femora elongate, compressed, bicarinate, margins entire ; posterior femora elongate, crassate, a little stout, superior margin finely serrulate, antegenicular and genicular denticles normal ; first and third tarsal segments of hind tarsi equal in length ; all the pulvilli of first hind tarsal segment equal in length.

Measurements (in mm.) : Body length ♂ 7.8-8, ♀ 10-11 ; body length with pronotum ♂ 11.5-12, ♀ 12-12.5 ; pronotum length ♂ 10.5-11, ♀ 11 ; posterior femora length/width ♂ 4.8-5.4/1.6-1.7, ♀ 5.4-5.9/1.8-2.1 ; shoulder width ♂ 2-2.3, ♀ 2.4-2.9.

Material examined : Type ♀, West Bengal : Darjeeling Distt. : Ghumti, 1216m, -. vii. 1911, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 1530/20] ; 1 ♂, West Bengal : Darjeeling Distt. : Mahanuddy, 1255m, 18. vi. 1914, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 2027/H5] ; 1 ♂, West Bengal : Darjeeling Distt. : Pashok, 1064m, 26. v. - 14. vi. 1916, coll. F. H. Gravely ; 1 ♂, Arunachal Pradesh : Siang Divi. : Dutta Tappi, 500m, 22. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Assam : Nowgong, 4. xi. 1974, coll. S. K. Gupta ; 2 ♂ ♂, 2 ♀ ♀, West Bengal : Darjeeling Distt. :

Rangiroom, 9 & 10. vi. 1975, coll. G. K. Srivastava and P. K. Maiti ; 1 example (last segments of abdomen damaged), Sikkim : Gangtok, 1759m, 31. v. 1979, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal).

Remarks : Hancock (1915) described *Bolotettix inermis* under the genus *Bolotettix* Hancock. But Günther (1939) placed it under the genus *Xistrella* Bolivar. Recently Steinmann (1970) has followed Hancock in placing the species under *Bolotettix* itself, with which I can not agree as the species under consideration has wider vertex, longer antennae which are placed appreciably below the inferior borders of eyes, paired ocelli located on the inferior borders of eyes and a compresso-elevated median carina just behind the shoulders. Since the above mentioned characters are well represented in the genus *Xistrella* Bolivar, I am following Günther (1939). *Xistrella inermis* (Hancock) is characterised by the shortness of body, convexity of dorsum between the shoulders, depression and compresso-elevated of the median carina between and behind the shoulders, and presence of an oblique lateral line on either side of median carina.

43. *Xistrella arorai* sp. nov.

(Plate 21, fig. 4)

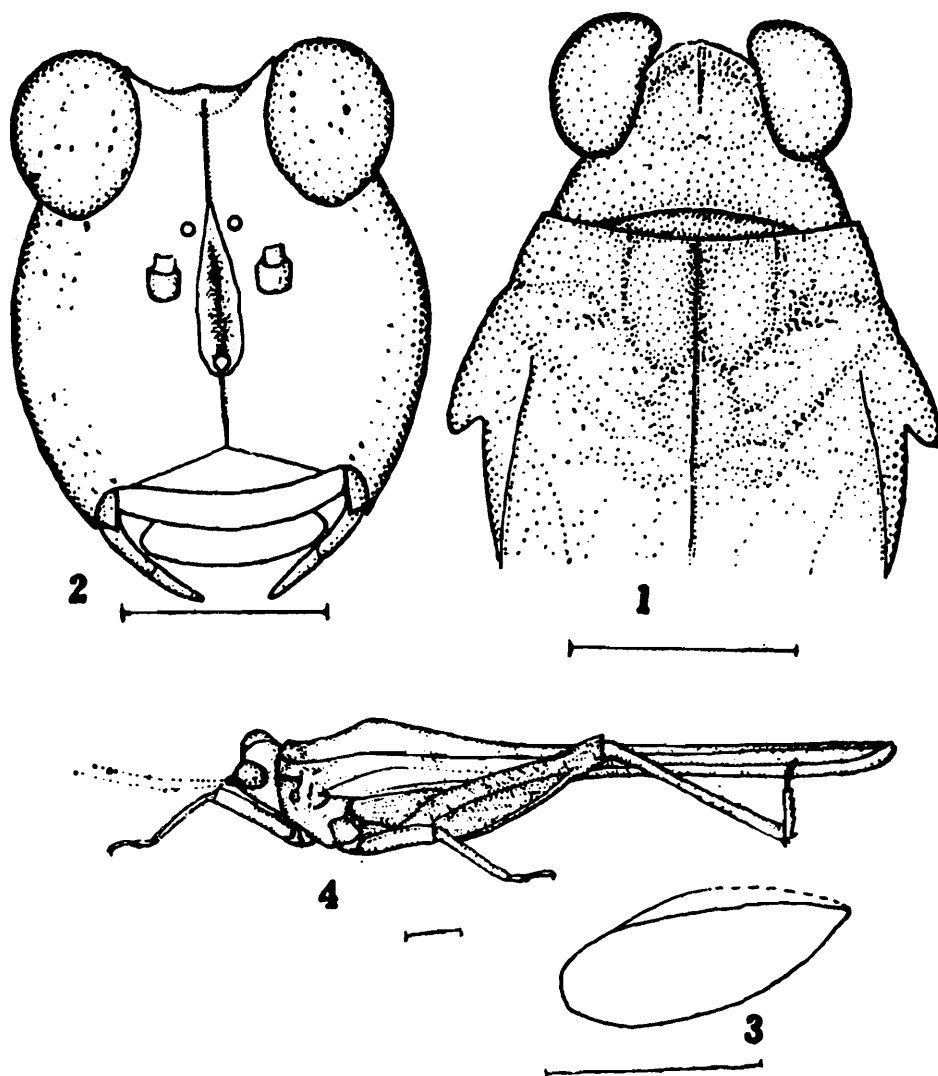
Moderately long species. Colour fuscous or grey dorsally, dirty yellow on the sides and legs, posterior femora light yellow with one or two dark brown spots on the marginal areas, antennae brown basally, dark brown apically, tarsal segments generally dark brown, in one example of Denling Forest, dorsal surface of pronotum and vertex light yellow.

Male, female : Head exserted above the pronotal surface ; vertex as broad as an eye, narrowed in front, depressed, extended upto the level of eyes in front, median carinula low, lateral carinulae lower to the eyes, which is more lower towards the front, reflexed laterally, vertex horn not visible, front margin low, smoothly granulose ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, depressed in front, sinuated between the paired ocelli, moderately sulcated ; paired ocelli placed on or below the inferior margin of eyes. Antennae long, filiform, placed below the inferior margin of eyes. Eyes globulose, elevated above the vertex, a little approximate in front.

Pronotum transverse in front, subulate posteriorly and extends

beyond the apices of posterior tibiae ; dorsum smoothly granulose, convex between the middle of shoulders, a little elevated in front of the sulci ; median carina depressed in front, slightly swollen on sulci, depressed on shoulders, a little elevated behind the shoulders ; prozonal

Plate 21



Scale 1 mm.

- PLATE 21: Fig. 1. Top view of head and thorax of *Xistrella inermis* (Hancock).
 Fig. 2. Front view of head of *X. inermis* (Hancock).
 Fig. 3. Elytra of *X. inermis* (Hancock).
 Fig. 4. Dorso-lateral view of *X. arorai* sp. nov.

carinae granulose, parallel ; lateral carinae interrupted anteriorly, bicarinate on humeral angles, finely serrulate on the pronotal process ; oblique lateral lines run parallel on either side of median carina which join the lateral carinae anteriorly, and are obscurely visible behind the shoulders ; humeral angles obtusely produced ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, apex widely rounded. Elytra elongate, punctate, apex rounded. Wings extend upto the pronotal apex ; anterior femora elon-

gate, a little compressed, margins entire ; middle femora elongate, compressed, bicarinate, margins finely serrulate ; posterior femora elongate, crassate, margins finely serrulate, antegenicular denticles not pointed, genicular lobe pointed ; first and third segments of posterior tarsi equal in length ; all the pulvilli more or less equal in length.

Measurements (in mm.) : Body length ♂ 7.5- 8, ♀ 10 ; body length with pronotum ♂ 11.5-12, ♀ 14-15.5 ; pronotum length ♂ 10.5-11, ♀ 13-14.5 ; posterior femora length/width ♂ 4.5- 4.8/1.5, ♀ 5.3-5.8/1.5 1.7 ; shoulder width ♂ 2.00, ♀ 2.3-2.4.

Material examined : Holotype ♂, Arunachal Pradesh : Siang Divi. : Kambang, 200 m, 15. x. 1966, coll. S. K. Tandon and G. S. Arora ; Allotype ♀, same data as above ; 10 ♂♂, 3 ♀♀, Paratypes, same data as above ; 1 ♀, Arunachal Pradesh : Kameng Divi. : Denling Forest, 229 m, 5. v. 1966, coll. A. N. T. Joseph ; 1 ♂, Arunachal Pradesh : Subansiri Divi. : Kimin, 198 m, 9. v. 1966, coll. A. N. T. Joseph ; 1 ♂, 1 ♀ (abdomen damaged), Arunachal Pradesh : Siang Divi. : New Jining, 200 m, 19 & 20. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Manipur : Moreh west, 27. x. 1975, coll. M. S. Shishodia ; 1 ♂, Arunachal Pradesh : Siang Divi. : Lekhabali : Bank of Sili river, 50 m, 2. xi. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, West Bengal : Darjeeling : Rupong, 29. iii. 1973, coll. H. S. Sharma.

Remarks : *Xistrella arorai* sp. nov. is closely related to *Xistrella inermis* (Hancock) but can be easily separated by the more elongated body and pronotum, the absence of depression on the median carina of pronotum on the shoulders which is also not compresso-elevated behind the shoulders, oblique lateral lines on either side of median carina which join the lateral carinae anteriorly and at the same time obscurely visible on the pronotal process.

(15) Genus : *Xistra* Bolivar, 1817

Type species : *Xistra gogorzae* Bolivar, 1887

Xistra Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 186, 194, 242.

The genus *Xistra* was erected by Bolivar in 1887. Subsequently many species were added to it erroneously and the genus became a heterogeneous one. In 1939 Günther revised the genus and excluded most of the species from it. *Xistra* Bolivar is closely related to *Xistrella* Bolivar but can be differentiated by the much deeper or depressed vertex between the eyes which is not narrowed in front ; low elevated median and lateral carinulae of vertex ; not visible vertex horn on lateral carinulae ;

moderately wider and smoothly sinuated frontal costa throughout its length which is not appreciably compresso-elevated between the antennae, position of antennae below the inferior margin of eyes ; elongate pronotum which is not narrowed between the shoulders ; moderately developed median and lateral carinae ; downwardly directed posterior angles of lateral lobes of pronotum which are rounded at apex ; ovate elytra ; extension of wings upto the apex of pronotum or beyond ; elongated legs, and equal length of first and third segments of posterior tarsi.

Geographical distribution : India ; Philippines.

44. *Xistra sikkimensis* Hancock, 1915

Xistra sikkimensis Hancock, 1915, *Rec. Indian Mus.*, 11 : 102-103.

The Holotype female, described from Sikkim, is badly damaged. So in the following redescription I am giving the available characters from the Holotype and rest from the original description (Hancock, 1915 : 102-103).

Moderately elongate, rather slender, Colour pale ochraceous above with two black markings behind the shoulders.

Female : Head a little exserted above the pronotal surface ; vertex equal in width to an eye, not narrowed forward, well depressed, produced upto the level of eyes anteriorly, truncate in front ; median carinula distinctly marked and extend upto the posterior end of the depression ; lateral carinae elevated upto the level of eyes, lower in front and roundly reflexed laterally ; vertex horn not distinctly visible, front margin visible ; frontal costa bifurcate behind the paired ocelli, moderately sulcate, sinuate between antennae, not appreciably compresso-elevated between antennae ; paired ocelli placed between or slightly below the middle of eyes. Antennae inserted a little below the inferior margin of eyes. Eyes a little elevated above the vertex, globular in shape.

Pronotum transverse in front, subulate behind and extend beyond the apex of hind femora ; dorsum punctate and granulose ; median carina depressed in front, a little swollen between sulci, slightly depressed between the shoulders, a little crested behind the shoulders, lower on the pronotal process ; abbreviated carinae or oblique lateral line absent ; prozonal carinae distinct, parallel ; lateral carinae lower ; paranota with two projections ; posterior angles of lateral lobes turned downwards, the apex narrowly rounded. Elytra ovate, apices rounded. Wings extend upto the apex of pronotum ; anterior and posterior femora

damaged, middle femora elongate, a little compressed, margins entire.

Measurements (in mm.): Body length ♀ 10 ; body length with pronotum ♀ 14 ; pronotum length ♀ 13 ; posterior femora length/width ♀ (damaged) ; shoulder width ♀ 2·7-2·8,

Material examined: Holotype ♀, Sikkim, coll. L. Mandelli [Reg. No. of Zoological Survey of India, 6598/14].

Geographical distribution: India (Sikkim).

Remarks: It seems from the description of Hancock (1915 : 102-103) that the Holotype was not complete as he had not described the legs except the middle one. I also studied the Holotype and found that the left middle femur is attached with gum while rest of the legs are missing. *Xistra sikkimensis* Hancock has much similarity with the genus *Paratettix* Bolivar as has also been mentioned by Hancock. Moreover the Holotype bears a label on which *Paratettix scaber* is written. Günther (1939) at the time of the revision of Metrodorinae has not made any remark about the species though it was sent to him for study. Recently Steinmann (1970) has included it in his Check-list under the genus *Xistra* and I also agree with him. This species can be differentiated from the other species of the genus by the characters mentioned above.

(16) Genus : *Hyboella* Hancock, 1915

Type species : *Hyboella tentata* Hancock, 1915

Hyboella Hancock, 1915, *Rec. Indian Mus.*, 11 : 104.

Stouter stature. Colour brown or dark brown.

Head not exserted above the pronotal surface ; vertex equal or broader than one of the eyes, a little narrowed forward, granulose, slightly depressed on either side, not extended beyond the eyes in front, median carinula elevated and extend posteriorly upto the middle of eyes, lateral carinulae short, very little elevated, slightly reflexed laterally, front margin not distinctly defined ; frontal costa bifurcate behind the paired ocelli, rarely or not sinuous between eyes, compresso-elevated between the antennae, declined in front, narrowly sulcated between the paired ocelli, widely sulcate between antennae and middle ocelli ; paired ocelli placed between the middle of eyes. Antennae filiform, moderate in length, inserted below the middle of eyes. Eyes not broad, generally not conoidal.

Pronotum subtruncate or subconvex anteriorly and barely produced at the middle, hind process cuneate or subulate posteriorly and

not extended beyond the apices of hind femora, flat ; the dorsum tectiform in front, depressed or planate behind the shoulders, surface rugose, convex between shoulders ; median carina of pronotum compressed and elevated in front of the shoulders, undulate behind the shoulders ; lateral carinae low, interrupted on the sulci ; humeral angles roundly or obtusely produced ; abbreviated carinae on either side of median carina on shoulders indistinct ; prozonal carinae short, convergent behind ; paranota with two projections ; posterior angles of lateral lobes of pronotum laminate, dilated, turned outside, subtruncate at apex. Elytra and wings absent or when present the elytra elongate, narrow and narrowly rounded at apex while the wings abbreviated or produced beyond the pronotal apex ; anterior femora elongate, margins entire ; middle femora elongate, compressed, bicarinate, margins entire or undulate with fine serrations ; posterior femora strongly widened, crassate on marginal and external pagina, margins finely serrulated ; first joint of hind tarsi longer than the third.

Geographical distribution : India ; Burma ; Tibet ; Thailand ; Java ; Malaya ; Sumatra ; Key Islands.

Key to the species of *Hyboella* Hancock, 1915

- | | | |
|--|-----|---------------------------------|
| 1. Elytra and wings absent, vertex twice the width of an eye, pronotum rounded or subrounded anteriorly, pronotal process notched at apex | ... | <i>nullipennis</i>
(Hancock) |
| — Elytra always present, wings reduced or extended upto the pronotal apex | ... | 2 |
| 2. Size smaller, less broader between the shoulders, dorsum behind the shoulders deplanate | ... | 3 |
| — Size larger, more broader between the shoulders, dorsum behind the shoulders depressed | ... | 4) |
| 3. Vertex more wider between the eyes, more broader and convex between the shoulders, pronotum subangulate anteriorly, dorsum with thick brilliant scattered tubercles, median carina compresso-elevated in front of shoulders, prozonal carinae very short and visible anteriorly | ... | <i>tumida</i>
(Hancock) |
| — Vertex less wider between the eyes, less broader and convex between the shoulders, pronotum nearly rounded anteriorly, dorsum smooth, hind process with thick linear rugosity, median carina not compresso-elevated in front of shoulders, prozonal carinae distinct, widely separated in the middle, convergent posteriorly | ... | <i>conioptica</i>
Hancock |
| 4. Vertex slightly produced in front of eyes, twice the width of an eye, superficially depressed on either side | ... | <i>obesa</i>
Hancock |

- Vertex not produced in front of eyes, less than twice the width of an eye, depressed on either side ... 5
- 5. Posterior angles of lateral lobes of pronotum widely dilated and obliquely truncate at apex with sharply pointed superior margin ... *tentata*
Hancock
- Posterior angles of lateral lobes of pronotum not widely dilated, roundly truncate at apex ... *dilatata*
(De Haan)

45 *Hyboella nullipennis* (Hancock), 1913
(Plate 22, fig. 1 & 2)

Coptotettix nullipennis Hancock, 1913, *Rec. Indian Mus.*, 8 : 314, pl. 15, figs. 2 and 2a.

Hyboella nullipennis, Hancock, 1915, *Rec. Indian Mus.*, 11 : 106.

Medium in size. Colour fuscous, obscurely pale or brown mottled on the sides, posterior femora (damaged) bearing a pale longitudinal fascia on the pagina, tibiae pale, biannulate with black.

Male, female : Head not exserted, vertex distinctly broader, rather twice the width of the eye, depressed on either side, produced upto the level of eyes or slightly more in front, granulose, median carinula distinct in front, not visible behind, lateral carinulae low, reflexed laterally, front margin not distinctly marked ; frontal costa bifurcate behind the paired ocelli, sinuate between the eyes, copresso-elevated and arched between the antennae, depressed in front, frontal sulcus narrower behind the antennae, a little wider between and in front of the antennae ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes. Eyes not elevated above the vertex, globulose in shape.

Pronotum rounded or subrounded anteriorly, extended upto the apex of abdomen posteriorly or not, notched at apex ; dorsum deplanate, granulose, rugulose on the posterior process, transversely convex between the shoulders ; median carina slightly elevated in front, depressed between the middle of prozonal area, compresso-elevated rather subarcuate between the sulci, undulated with interruptions behind ; abbreviated carinae between the shoulders absent ; prozonal carinae not much distinct, granulose, a little convergent behind ; lateral carinae not distinct between the shoulders, low on the posterior process, granulose ; humeral angles roundly sloping downwards ; paranota with one projection ; posterior angles of lateral lobes of pronotum turned downwards, moderately expanded laterally, truncate at apex. Elytra

and wings absent ; anterior femora elongate, inferior margin slightly subundulate, both carinae finely serrulate ; middle femora elongate, compressed, bicarinate, margins subundulate with serrations ; posterior

Plate 22

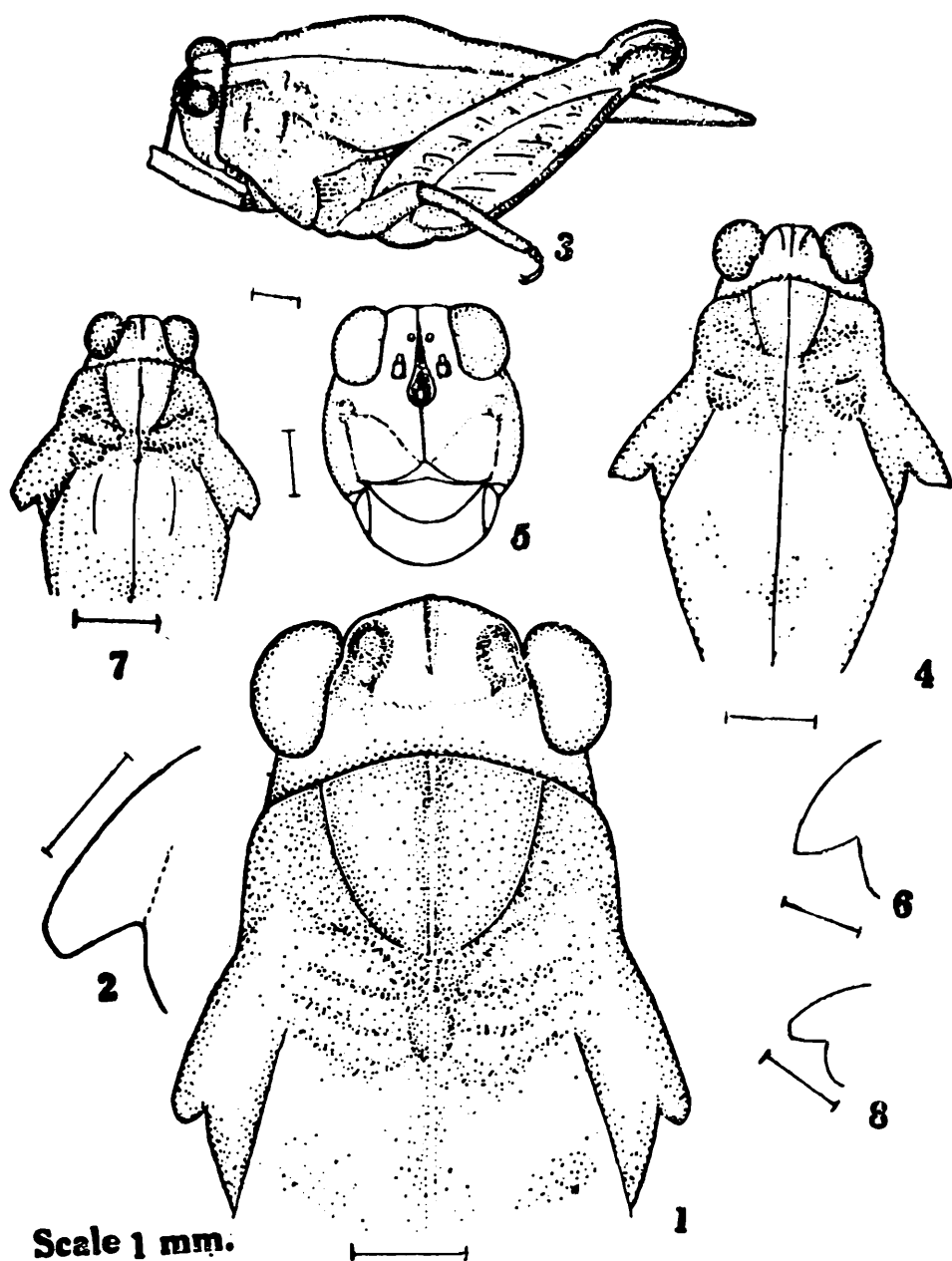


PLATE 22 : Fig. 1. Top view of head and thorax of *Hyboella nullipennis* (Hancock) (Type).

Fig. 2. Posterior angles of lateral lobes of pronotum of *H. nullipennis* (Hancock).

Fig. 3. Dorso-lateral view of *H. tumida* (Hancock).

Fig. 4. Top view of head and thorax of *H. tumida* (Hancock) (Type).

Fig. 5. Front view of head of *H. tumida* (Hancock) (Type).

Fig. 6. Posterior angles of lateral lobes of pronotum of *H. tumida* (Hancock).

Fig. 7. Top view of head and thorax of *H. conioptica* Hancock (Type).

Fig. 8. Posterior angles of lateral lobes of pronotum of *H. conioptica* Hancock.

femora (damaged in both specimens) very stout, margins serrulated, antegenicular and genicular denticles present ; the third pulvilli of the first joint of posterior tarsi longer than the third.

Measurements (in mm.) : Body length ♂ 11, ♀ 14 ; body length with pronotum ♂ 10, ♀ (damaged) ; pronotum length ♂ 9, ♀ 10 ; posterior femora length/width ♂ (missing), ♀ 8.5/ (missing) ; shoulder width ♂ 3.2, ♀ 4.8.

Material examined : Holotype ♀, Arunachal Pradesh : Janakmukh, 182 m, 17. xii. 1911, coll. S. W. Kemp (Abor Expedition), [Reg. No. of Zoological Survey of India, 7566/19] ; 1 ♂, Arunachal Pradesh : Lohit Divi. : Roing : Deopani, 350 m, 6. iii. 1969, coll. S. K. Tandon.

Geographical distribution : India (Arunachal Pradesh).

Remarks : *Hyboella nullipennis* (Hancock) is characterised by the wider vertex, obscurely visible prozonal carinae which is convergent behind, anteriorly subrounded or rounded pronotum and posteriorly subulate pronotum which is notched at apex, deplanate dorsum, elevated median carina of pronotum in front which is depressed between the prozonal area behind, obliquely truncate or roundly truncate posterior angles of lateral lobes of pronotum, and absence of elytra and wings. This species superficially resembles to the genus *Mazarredia* Bolivar, specially to *Mazarredia aptera* Rehn (Hancock, 1913 : 314).

46. *Hyboella tumida* (Hancock), 1913

(Plate 22, figs. 3-6)

Coptotettix tumidus Hancock, 1913, *Rec. Indian Mus.*, 8 : 313-314.

Hyboella tumida, Hancock, 1915, *Rec. Indian Mus.*, 11 : 106.

Size medium. Colour dark brown with light brown mottle, hind tibiae light yellow or cinereous.

Male, female : Head not exserted ; vertex wider than one of the eyes, a little retracted under the pronotum, a little narrowed in front, not produced upto the level of eyes in front, fossulate on either side, margins of fossulae granulose, ampliate behind the fossulae, median carinula low, extended upto the middle of eyes behind, lateral carinulae very low, granulose, reflexed laterally, front margin not distinct ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arcuate between the antennae, depressed in front, narrowly sulcate between the paired ocelli, widely forked in front of the antennae ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes. Eyes not exserted above the vertex, globulose,

Pronotum subtruncate or subobtusely angulate anteriorly, wider between shoulders, subulate behind the shoulders and extend backwards upto the apices of hind femora or not ; dorsum granulose, tuberculose, tumid, wider and convex between shoulders with slopes on either side, not depressed behind the shoulders but deplanate ; median carina compressed and elevated in front of shoulders which is arcuate, slightly produced over the head anteriorly, depressed on shoulders and very low with undulations posteriorly ; lateral carinae obscurely visible, interrupted in front ; abbreviated carinae absent ; prozonal carinae distinct anteriorly, represented by scattered granules in the rest, convergent posteriorly ; humeral angles subrounded ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilated or expanded laterally, obliquely truncate at apex. Elytra elongate, elliptical. Wings not extended upto the apex of pronotum ; anterior femora elongate, granulose ; middle femora elongate, compressed, bicarinate, margins entire with slight undulations ; posterior femora stout, crassate on marginal and paginal areas, superior carinae serrulate, the antegenicular and genicular denticles not prominent ; the first joint of hind tarsi longer than the third ; first and second pulvilli of hind tarsi acute and shorter than the third ; the third pulvilli not acute, slightly longer than the second.

Measurements (in mm.) : Body length ♂ 10-11, ♀ 14 ; body length with pronotum ♂ 10.5-11, ♀ 13.2 ; pronotum length ♂ 9.5-10, ♀ 12.2 ; posterior femora length/width ♂ 7.3-7.5/3, ♀ 9.3/3.4 ; shoulder width ♂ 3.4-3.7, ♀ 4.8.

Material examined : "Type" ♂ (as indicated on the label but not mentioned in the original description), N. E. Assam : Dibrugarh, 17-19. xi. 1911, coll. S. W. Kemp (abor exped.) [Reg. No. of Zoological Survey of India, 7576/19] ; 1 ♂, Arunachal Pradesh : Lohit Divi. : Sadiya Road, 300 m, 8. iii. 1969, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Lohit Divi. : Namsai, 100 m, 15. iii. 1969, coll. S. K. Tandon ; 1 ♀, Arunachal Pradesh : Lohit Divi. : Chaukham, 100 m, 16. iii. 1969, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Tirap Divi. : Jairampur, 225 m, 27. x. 1971, coll. G. S. Arora.

Geographical distribution : India (Assam).

Remarks : *Hyboella tumida* (Hancock) has a little resemblance with *H. dilatata* (De haan) but it can be at once distinguished from the latter by the less undulated median carina of pronotum, not depressed dorsum behind the shoulders, deplanate posterior process of pronotum, obliquely truncate apex of posterior angles of lateral lobes of pronotum,

47. *Hyboella conioptica* Hancock, 1915
(Plate 22, figs. 7 & 8)

Hyboella conioptica Hancock, 1915, *Rec. Indian Mus.*, 11 : 109.

Hyboella (?) *conioptica*, Günther, 1939, *Abh. Ber. Mus. Tierk. Völkerk. Dresden*, 20 (A) Zool. (N. F.) BD 1 : 220-221.

Small sized. Colour grey or dark brown.

Head not exserted ; vertex wider than an eye, narrowed forward, granulose, produced upto the eyes in front, fossulate on either side, fossulae open in front, convex, a little elevated above the eyes, median carinula distinct upto the middle of eyes, lateral carinulae elevated upto the eyes and reflexed laterally, front margin subtransverse, not carinate ; frontal costa bifurcate behind the paired ocelli, sinuate between the eyes, a little compresso-elevated between the antennae, declined in front, moderately sulcated ; paired ocelli placed between the middle of eyes. Antennae filiform, located below the middle of eyes. Eyes globular and not elevated.

Pronotum truncate anteriorly, cuneate or subulate posteriorly, extended beyond the apices of posterior femora or not ; dorsum granulose, small tubercles sparsely scattered, tectiform forward, depressed or planate behind the shoulders ; median carina depressed in front, compresso-elevated between the sulci, depressed on the shoulders, undulate behind the shoulders ; lateral carinae interrupted or obscure between the sulci, low behind and serrulated ; prozonal carinae indistinct, granulose and convergent behind ; abbreviated carinae short and granulose ; paranota with two projections ; posterior angles of lateral lobes of pronotum laminate dilated, subtransversely truncate behind. Elytra elongate lanceolate, narrowed towards apex. Wings extended upto the apex of pronotum ; anterior femora elongate, margins entire ; middle femora elongate, compressed, bicarinate, undulate, margins finely serrulate ; posterior femora distinctly crassate, stouter, margins finely serrulated ; first segment of posterior tarsi longer than the third ; third pulvilli longer than the second and obtuse.

Measurements (in mm.) : Body length ♂ 9 ; body length with pronotum ♂ 11.5 ; pronotum length ♂ 10.6 ; posterior femora length/width ♂ 6.2/2.2 ; shoulder width ♂ 2.9-3.

Material examined : Holotype ♂, West Bengal : Darjeeling Distt. : Singla, 456 m, .iii. 1913, Lord Carmichael's collection [Reg. No. of Zoological Survey of India, 7809/20] ; 1 example (abdomen damaged) : Assam, coll. H. H. Godwin-Austen [Reg. No. of Zoological Survey of India, 6603/14].

Geographical distribution : India (West Bengal, Assam).

Remarks : *Hyboella conioptica* Hancock is intermediate between the genera *Coptotettix* Bolivar and *Hyboella* Hancock. It resembles to *Coptotettix* Bolivar, by the narrower vertex which is more narrowed in front, longitudinally fossulate vertex on either side which is closed or limited in front, less wider thorax between shoulders. At the same time in the shape of the posterior angles of lateral lobes of pronotum, shoulders and frontal costa, it is similar to *Hyboella* Hancock. Dr. Günther (1939 : 220) was also in doubt whether this species actually belongs to *Hyboella* or not. I have studied the holotype (♂) and found that the *Hyboella conioptica* Hancock has more similarity with *Hyboella* Hancock and hence placed it under *Hyboella*.

Hyboella conioptica Hancock can be easily separated from the rest of the species of the genus by the narrow vertex which is more narrowed in front and longitudinally fossulate on either side, gently sulcate frontal costa, convex dorsum between the shoulders which is subtectiform in front, the low median pronotal carinae a little elevated, arcuated between the sulci and depressed sinuate behind the shoulders, and the truncate apex of posterior angles of lateral lobes of pronotum.

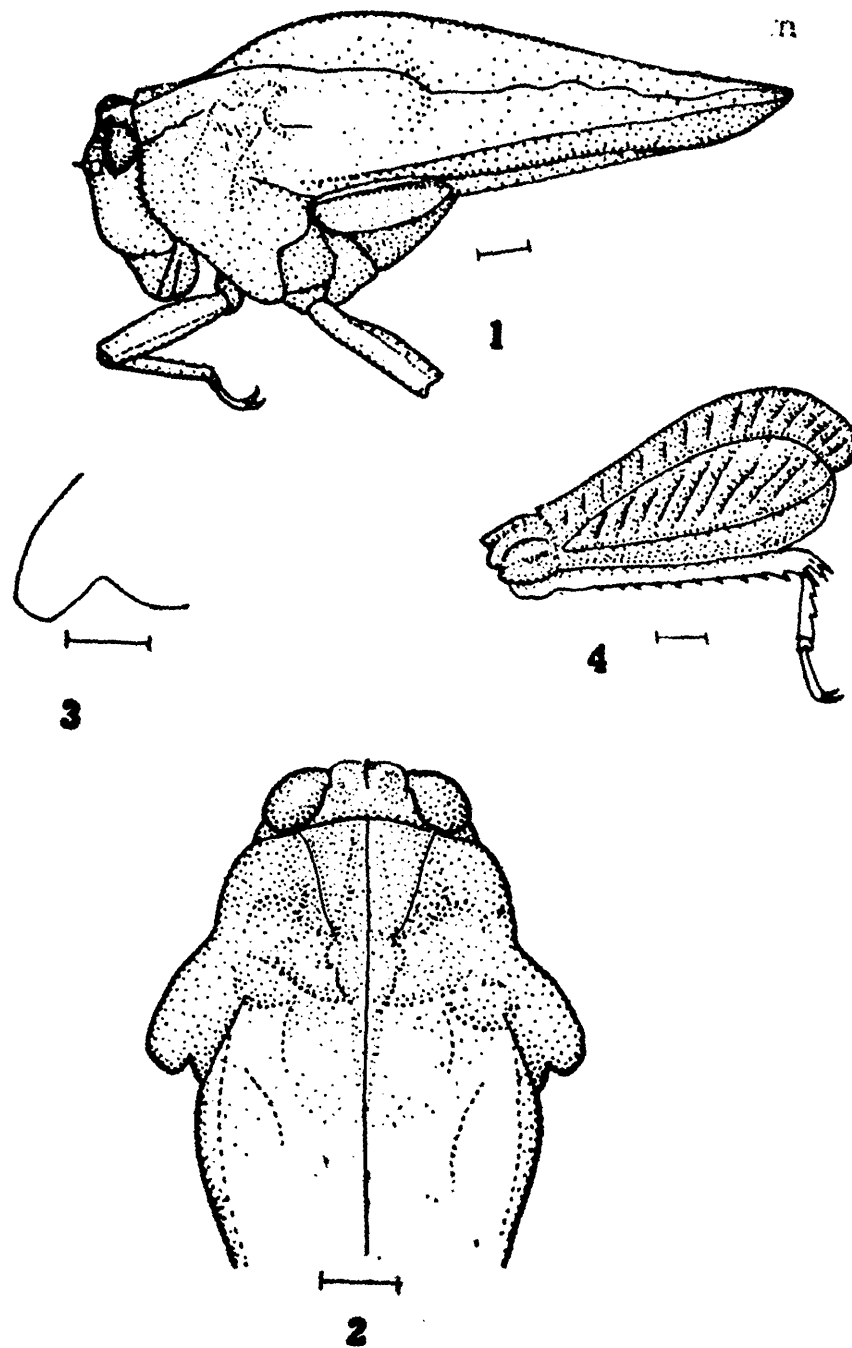
48. *Hyboella obesa* Hancock, 1915 (Plate 23, figs. 1-4)

Hyboella obesa Hancock, 1915, *Rec. Indian Mus.*, 11 : 107-108.

Stouter stature. Colour dark brown, variegated with dull yellow or grey ; posterior tibiae generally black, annulated with pale colour before the middle.

Male, female : Head not exserted, a little retracted under the pronotum. Vertex wider than one of the eyes, a little or sufficiently retracted under the pronotum, more or less flate, granulose, slightly or not narrowed in front, extended a little beyond the anterior margins of eyes, a little fossulate on each side, median carinula low and small, lateral carinulae very low and rather depressed, roundly reflexed laterally, front margin low, indistinct, obscurely emarginate on either side of median carinula ; frontal costa bifurcate behind the paired ocelli, a little compresso-elevated and arched between the antennae, depressed between eyes and in front of antennae, narrowly sulcate between eyes, gently sulcate between antennae ; paired ocelli placed in between the middle of eyes. Antennae filiform and placed on the inferior margin of eyes. Eyes strongly conoidal in profile, not elevated above the vertex surface.

Pronotum obtusely angulate in front, wide between shoulders, cuneate behind the shoulders, extended upto the apex of hind femora or surpasses a little beyond them ; dorsum granulose, crassate or a little rugose, convex and swollen between shoulders, tectiform in front,

Plate 23

Scale 1 mm.

- PLATE 23 :** Fig. 1. Dorso-lateral view of *Hyboella obesa* Hancock.
 Fig. 2. Top view of head and thorax of *H. obesa* Hancock.
 Fig. 3. Posterior angles of lateral lobes of pronotum of *H. obesa* Hancock.
 Fig. 4. Posterior femur of *H. obesa* Hancock (external face).

depressions present on either side in front and behind the shoulders and posterior process of pronotum ; median carina of pronotum compresso-elevated and arched in front of shoulders, strongly and irregularly depressed and sinuate behind ; lateral carinae granulose, depressed on humeral angles, a little compressed on posterior process ; prozonal carinae distinct, granulose, divergent in front of the middle, constricted medially, parallel posteriorly ; abbreviated carinae absent between shoulders ; humeral angles roundly obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, widely dilated, truncate at apex. Elytra elongate, widened at middle, acuminate at apex. Wings extended upto the apex of pronotum ; anterior femora elongate, granulose, margins finely serrulated ; middle femora elongate, granulose, some granules more distinct and arranged in rows, slightly compressed, obscurely bicarinate, margins undulate with fine serrulations ; posterior femora stouter and wider at base, crassate on marginal and paginal areas, superior margins finely serrulate behind the middle ; first joint of hind tarsi distinctly longer than the third, the first and second pulvilli of the first joint of hind tarsi acute, and the second pulvilli a little longer than the first, the third pulvilli more or less equal to the second pulvilli and not acute, in the case of "type" (as written on the specimen label) specimen the third pulvilli a little longer than the second.

Measurements (in mm.) : Body length ♂ 12-14, ♀ 15-16 ; body length with pronotum ♂ 13-17.5, ♀ 14-16 ; pronotum length ♂ 12-16.5, ♀ 13-15 ; posterior femora length/width ♂ 7.5-8.5/3.2-3.6, ♀ 7.7-8.6/3.4-3.7 ; shoulder width ♂ 4.3-5.2, ♀ 5.4,

Material examined : "Type" ♀, West Bengal : Darjeeling Distt. : Ghumti, 1216m (4,000 ft.),—, vii. 1911, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 1471/20] ; 1 ♂, 1 ♀, same data as above mentioned [Reg. No. of Zoological Survey of India, 1467/20, 1468/20] ; 1 ♀, West Bengal : Darjeeling Distt. : Tindharia, 850m, —, vii. 1911, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 1552/20] ; 1 ♂, West Bengal : Darjeeling Distt. : D. H. Ry., 608 m, —, vii. 1911, coll. F. H. Gravely [Reg. No. of Zoological Survey of India 1510/20] ; 1 ♂, 1 ♀, West Bengal : Darjeeling Distt. : Ghumti, 456-1520m, —, vi. 1914, coll. Lord Carmichael [Reg. No. of Zoological Survey of India, 5483/H5] ; 1 ♀, West Bengal : Darjeeling Distt. : Pashok, 1064m, 26. v. — 14. vi. 1916, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 2017/H5] ; 1 ♀, West Bengal : Darjeeling Distt. : Mangpa : Sureil, 1520m,—, iv v.- 1917, coll. S. W. Kemp [Reg. No. of Zoological Survey of India, 2018/H5] ; 1 ♂, Sikkim : Gangtok, 912m,

-. v. 1928, coll. F. M. Bailey [Reg. No. of Zoological Survey of India, 2016/H5] ; 1 ♀, West Bengal : Darjeeling Distt. : Chongtong, 1488m, 16. iv. 1959, coll. B. K. Tikadar [Reg. No. Zoological Survey of India, 3067/H5] ; 1 ♂, Sikkim : Gangtok, 1688m, 16. viii. 1959, coll. A. G. K. Menon ; 1 ♀, West Bengal : Lingsoka, 11. ix. 1959, coll. B. K. Tikadar [Reg. No. of Zoological Survey of India, 3066/H5] ; 1 ♀, W. Sikkim : Gazing, 1520m, 28. ix. 1959, coll. B. K. Tikadar ; 1 ♂, Arunachal Pradesh : Subansiri Divi. : Didi camp : Chukru, 1128m, 22. v. 1966, coll. A. N. T. Joseph ; 1 ♂, Arunachal Pradesh : Subansiri Divi. : Godak, 975m. 23. v. 1966, coll. A. N. T. Joseph ; 1 ♂ (nymph), Arunachal Pradesh : Siang Divi. : Rimi Bridge, 300m, 11. x. 1966, coll. S. K. Tandon ; 1 ♂ (nymph), 1 ♀ (nymph), Arunachal Pradesh : Lohit Divi. : Sunpur, 100m, 3. iii. 1969, coll. S. K. Tandon ; 2 ♀ ♀, Sikkim : Rangpo, 450m. 15. iv. 1976, coll. A. R. Bhowmik ; 1 ♂, West Bengal : Darjeeling Distt. : Teesta Bajar, 214m, 24. v. 1979, coll. M.S. Shishodia ; 4 ♀ ♀, Sikkim : Gangtok, 1700m, 2. vi. 1979, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal, Sikkim).

Remarks : *Hyboella obesa* Hancock was described from Ghumti (West Bengal : Darjeeling Distt.) by Hancock (1915). Later on Günther (1939) recorded it from Tindharia, Pashok, Sureil, Ghongtong, Lingsoka (all from Darjeeling Distt.) and Gangtok (Sikkim). I have studied all the examples mentioned above as well as other specimens which were subsequently collected either from Darjeeling District or from Sikkim. It is recorded here for the first time from Arunachal Pradesh. *Hyboella obesa* Hancock has similarity with *Hyboella dilatata* (De Haan), in regard to the posterior angles of lateral lobes of pronotum which is dilated and roundly truncate behind, but differs from the latter by the wider and flat vertex which is superficially depressed on either side, deeply depressed dorsum behind the shoulders, compresso-elevated median carina in front of shoulders which is not undulated on the posterior process of pronotum, not extended pronotal process beyond the apices of posterior femora (except in one male from Chukru it is extended beyond the apices of hind femora). Dr. Hancock (1915) has not mentioned about the number and type category except for "male" and "female" and he further adds that "a series of adults and larvae (present) in the Indian Museum" (*Rec. Indian Mus.* 11 : 108). At the time of revision of Metrodorinae, Dr. Günther (1939 : 214) studied the types present in the Zoological Survey of India along with other materials and he stated "Co-typen" for one male and two females, which bear the same data as mentioned by Hancock. I examined this material and found that only one example bears "Type" label while the other two are

without any "Type" label. The specimen labelled "Type" has lost its head. Hence, I designate the male specimen as the lectotype and Hancock's "Type" as well as the remaining female as the paralectotypes.

49. *Hyboella tentata* Hancock, 1915
(Plate 25, figs. 1-4)

Hyboella tentata Hancock, 1915, *Rec. Indian Mus.*, 11 : 106-7.

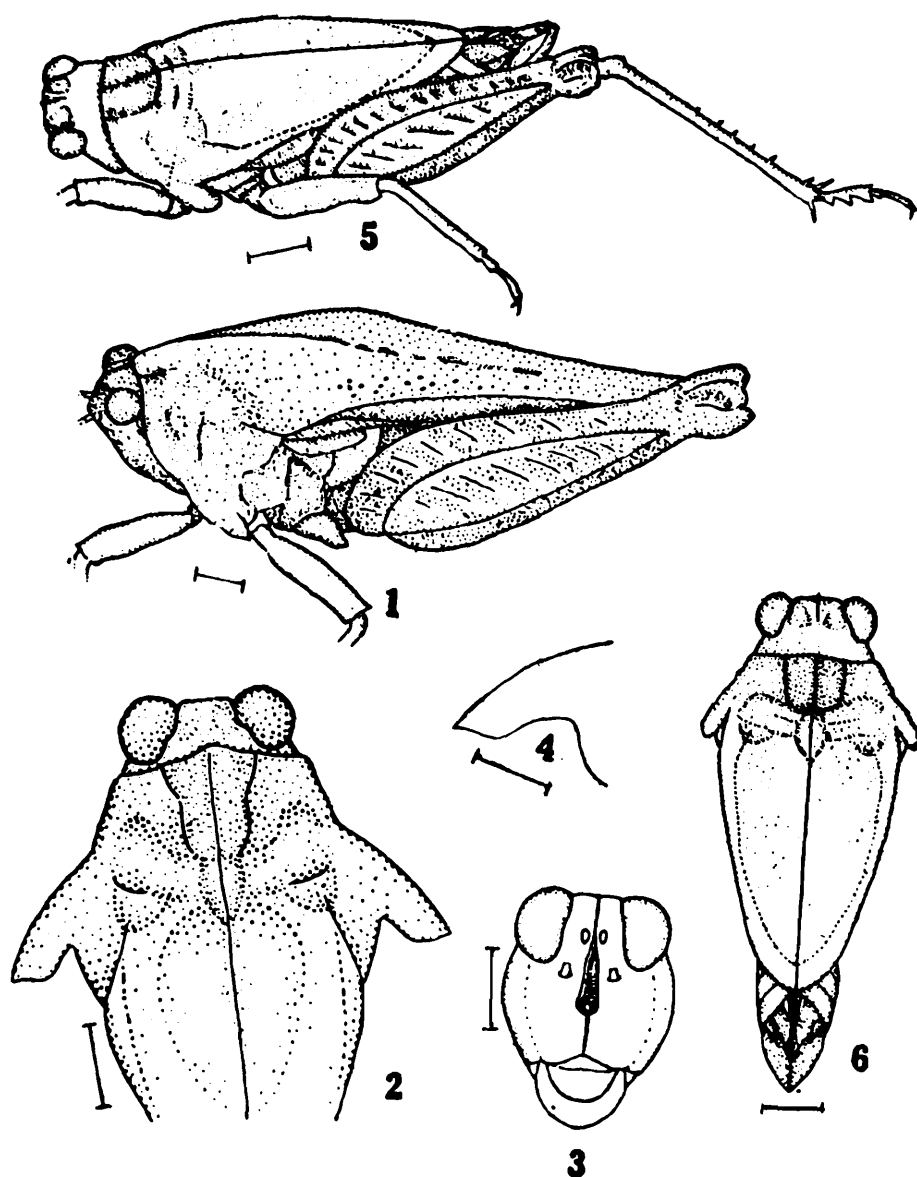
Stouter stature. Colour yellowish-ferruginous or grey.

Male, female : Head not exserted above the pronotum surface ; vertex a little broader than one of the eyes, slightly narrowed forward, fossulate on either side, anterior end of fossulae produced beyond the front margin towards anterior, produced upto the level of eyes anteriorly, subampliate posteriorly middle carinula distinct, lateral carinulae low, short, a little reflexed laterally, front margin not marked ; frontal costa bifurcate behind the paired ocelli, not sinuous between eyes, compresso-elevated and arched between antennae, declined anteriorly, frontal sulcus narrow between paired ocelli, widely sulcated between antennae and median ocelli ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes. Eyes not raised above the vertex surface, moderate in size, globular in shape.

Pronotum subtruncate anteriorly and barely produced in the middle, cuneately acute and not extended upto the apex of hind femora posteriorly, apex of pronotum narrowly truncate ; dorsum tectiform anteriorly, tumidus between shoulders, planate behind shoulders, surface granulose and tuberculose ; median carina of pronotum obtusely produced over the occiput in front, compresso-elevated and arcuate in front of shoulders and undulate behind the shoulders with low margin ; lateral carinae low, interrupted on sulci ; humeral angles roundly produced ; abbreviated carinae on shoulders absent ; prozonal carinae distinct, short, convergent behind ; paranota with two projections ; posterior angles of lateral lobes of pronotum dilated, wide, turned outside, obliquely truncate, the antero-superior angle sharp. Elytra elongate, narrow or wide in middle depending on the exposure below the pronotum, apex narrowly rounded. Wings not extended upto the apex of pronotal apex ; anterior femora elongate, convex, margins entire ; middle femora elongate, compressed, bicarinate, undulate with fine serrulations ; posterior femora strongly widened towards base, crassate on upper marginal and paginal areas, margins finely serrulated, subbidentate towards knees, the antegenicular spine not much sharp ; first

segment of hind tarsi distinctly longer than the third ; the third pulvilli longer than the first and second pulvilli ; first and second pulvilli spinose and shorter than the third.

Plate 25



Scale 1 mm.

- PLATE 25 : Fig. 1. Dorso-lateral view of *Hyboella tentata* Hancock (Type).
 Fig. 2. Top view of head and thorax of *H. tentata* Hancock.
 Fig. 3. Front view of head of *H. tentata* Hancock.
 Fig. 4. Posterior angles of lateral lobes of pronotum of *H. tentata* Hancock.
 Fig. 5. Dorso-lateral view of *Mixohyboella srivastavai* sp. nov.
 Fig. 6. Top view of *Mixohyboella srivastavai* sp. nov.

Measurements (in mm.) : Body length ♂ 11·8-12, ♀ 15-18 ; body length with pronotum ♂ 12·5-12·7, ♀ 14·5-15·5 ; pronotum length ♂ 10·7-11, ♀ 14-14·5 ; posterior femora length/width ♂ 8·5-8·8/2·9-3·5, ♀ 10·11/3·7-4 ; shoulder width ♂ 3·5-3·7, ♀ 4·5-5·1,

Material examined: Holotype ♂, N. E. Assam : Sibsagar, coll. S. E. Peal [Reg. No. of Zoological Survey of India, 6569/14] ; 3 ♂♂, 13 ♀♀, N. E. Assam : Sibsagar, coll. S. E. Peal [Reg. Nos. of Zoological Survey of India, 6571-3/14, 6576/14, 6579/14, 6580/14, 6583-6/14, 6588-9/14] ; 2 ♀♀, Upper Assam, coll. W. Doherty [Reg. Nos. of Zoological Survey of India, 1262/9 and 1264/9] ; 1 ♀, Arunachal Pradesh : Siang Divi. : Dali village, 200 m, 10. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Assam : Talpani, 10. ii. 1975, coll. P. T. Cherian.

Geographical distribution : India (Assam).

Remarks : It is the genotype and is distinguished from the other known species of the genus by the widely dilated and obliquely truncate lateral lobes of pronotum at apex with sharp pointed antero-superior margin, strongly tectiform pronotum in front of shoulders which is subangulate in front, and presence of big shining granules on dorsum. Two examples collected from the same locality have depressed dorsum behind the shoulders as visible in *Hyboella dilatata* (De Haan) but the posterior angles of lateral lobes of pronotum clearly separate them from it. All the registered specimens were identified and kept under *Acrydium dilatatum* De Haan in the Zoological Survey of India but on examination it is found that these have been either wrongly identified or misplaced.

50. *Hyboella dilatata* (De Haan), 1842

(Plate 24, figs. 1-4)

Acridium (Tetrix) dilatatum De Haan, 1842, *Temminck, Verhandel., Orth.* pp. 167, 169, pl. 22, fig. 12.

Tettix dilatatus, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31: 187, 257, 260.

Coptotettix inflatus, Krauss, 1903, *Denkschr. Med. Nat. Ges. Jena*, 8 : 758.

Acrydium dilatatum, Kirby, 1910, *Cat. Orth.*, 3: 45.

Hyboella dilatata, Hancock, 1915, *Rec. Indian Mus.*, 11 : 107.

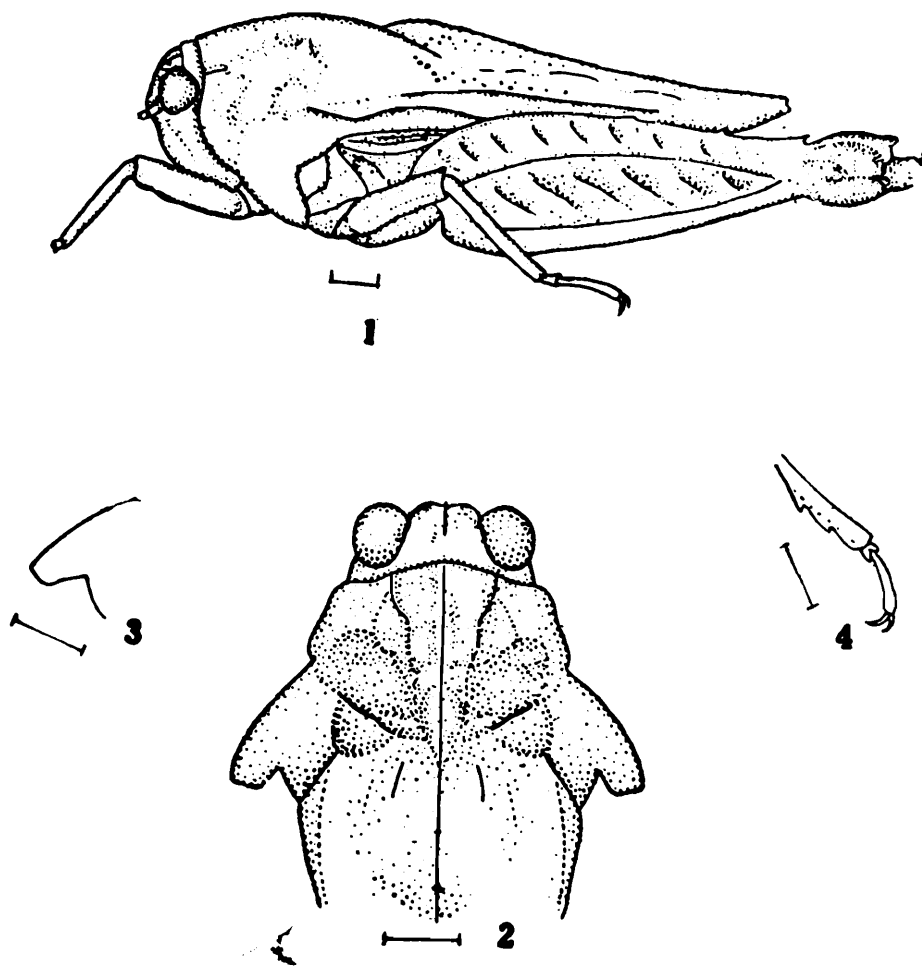
Stouter stature. Colour ferruginous or grey or dark brown.

Male, female : Head not exserted ; vertex wider than an eye, convex, produced upto the eyes in front, fossulate on either side, fossulae open in front, median carinula distinct and slightly elevated posteriorly, lateral carinulae small, elevated upto the eyes, reflexed laterally in front, front margin subtransverse and not carinated ; frontal costa bifurcate between the paired ocelli, a little compresso-elevated and arcuate between the antennae, narrowly sulcate between the paired ocelli and gently forked in front ; paired ocelli situated below the middle of eyes.

Antennae filiform and situated on or slightly below the inferior margin of eyes. Eyes globulose and not elevated above the vertex.

Pronotum angulated anteriorly, wider between the shoulders, cuneate posteriorly, and extend upto the apex of posterior femora ;

Plate 24



Scale 1 mm.

PLATE 24 : Fig. 1. Dorso-lateral view *Hyboella dilatata* (De Haan).

Fig. 2. Top view of head and thorax of *H. dilatata* (De Haan).

Fig. 3. Posterior angles of lateral lobes of pronotum of *H. dilatata* (De Haan).

Fig. 4. Posterior tarsal segments of *H. dilatata* (De Haan).

dorsum a little tectiform in front of the middle of pronotum, planate behind the shoulder, surface granulose and tuberculose ; median carina compresso-elevated and a little arcuate in front of the middle of pronotum and undulate behind the middle with depressions ; lateral carinae obscure at the humeral angles, absent between sulci and low behind the humeral angles ; prozonal carinae short, visible anteriorly and obscure behind ; abbreviated carinae absent ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards and

dilated apex truncated. Elytra elongated, punctate, narrow at apex. Wings abbreviated, not extended upto the apex of pronotum ; anterior femora elongate, granulose, margins finely serrulated ; posterior femora stout, crassate, superior margins indistinctly bidentate towards knees, both margins finely serrulated ; first segment of hind tarsi longer than the third ; third pulvilli longer than the second.

Measurements (in mm.) : Body length ♂ 11-12, ♀ 14.5-15 ; body length with pronotum ♂ 10.5-11, ♀ 12.5-15 ; pronotum length ♂ 9.5-11, ♀ 11.5-14 ; posterior femora length/width ♂ 7.5-8/3.3-2, ♀ 9.3-9.5/3.5-3.7 ; shoulder width ♂ 3.3-3.7, ♀ 4.3-4.8.

Material examined : 1 ♂, Assam : Sonai Rupai Forest, 343 m, 29. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 1 ♂, 1 ♀ (nymph), Arunachal Pradesh : Siang Divi. : Pading village, 330 m, 11. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Arunachal Pradesh : Siang Divi. : New Jining, 100 m, 19. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Assam : Santipur, 100 m, 2. ii. 1969, coll. S. K. Tandon ; 3 ♂♂, 1 ♀, Assam : Kaziranga, 100 m, 24 & 25. ii. 1969, coll. S. K. Tandon ; 1 ♂, 1 ♀, Arunachal Pradesh : Lohit Divi. : Sadiya Road, 300 m, 8. iii. 1969, coll. S. K. Tandon ; 2 ♂♂, 3 ♀♀, Arunachal Pradesh : Lohit Divi. : Tezu, 150 m, 10. iii. 1969, coll. S. K. Tandon ; 1 ♀, Arunachal Pradesh : Lohit Divi. : Hayliaunz Road, 700 m, 12. iii. 1969, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Lohit Divi. : Namsai, 100 m, 15. iii. 1969, coll. S. K. Tandon ; 1 ♂, 2 ♀♀, Arunachal Pradesh : Lohit Divi. : Chaukham Road, 100 m, 16. iii. 1969, coll. S. K. Tandon ; 1 ♀, Arunachal Pradesh, Lohit Divi. : M. T. Forest, 100 m, 17. iii. 1969, coll. S. K. Tandon ; 2 ♂♂, 1 ♀, Arunachal Pradesh : Tirap Divi. : Jairampur, 225 m, 27. x. 1971, coll. G. S. Arora ; 1 ♀ (nymph), Arunachal Pradesh : Tirap Divi. : Changlong, 600 m, 30. x. 1971, coll. G. S. Arora.

Geographical distribution : Burma ; Java.

Remarks : *Hyboella dilatata* (De Haan) was described under the genus *Acridium* (*Tetrix*) by De Haan in 1842 but Bollvar (1887) transferred it under *Tetrix* Charpentier. Later on Kirby (1910 & 1914) kept it under *Acrydium* Fabricius due to the tectiform pronotum but due to the heterogenous assemblage of species under *Acrydium* Fabricius and *Coptotettix* Bolivar, Hancock (1915) erected a new genus *Hyboella* to which some species of *Acrydium* and *Coptotettix* were transferred and *Acrydium dilatatum* is one of them. Günther (1939) revised the genus and stated that *Hyboella dilatata* (De Haan) is distributed in Java and rather rarely in Burma. But I have found the species also in North-eastern India, especially in Arunachal Pradesh, these tally with the

characters by which Günther has separated *Hyboella tentata* Hancock from *Hyboella dilatata* (De Haan). *Hyboella dilatata* (De Haan) has very close resemblance with *H. tentata* Hancock but in the former the posterior angles of lateral lobes of pronotum is less dilated, less directed outwards, more or less roundly truncate and oblique, and the antero-superior margin of lobes not sharply pointed. These specimens are larger in size but the pronotum width is slightly less.

(17) Genus ; *Mixohyboella* Gen. nov.

Mixohyboella Gen. nov. resembles with *Hyboella* Hancock on one hand and with *Epitettix* Hancock on the other and is comparatively closer to the former. But these two genera are quite different and belong to two different subfamilies. *Mixohyboella* is also related to *Hyperhyboella* Günther with regard to the absence of elytra and wings, but otherwise a quite distinct genus. The present genus is similar to *Epitettix* Hancock in the shape of pronotum except for the notch at apex, and the presence of a depression on tectiform pronotum behind the shoulders and the wide vertex. Similarly it resembles with *Hyboella* Hancock in the vertex which is wider than an eye, the presence of a depression on either side of median carinula, the pronotum which is not extended beyond the abdomen, direction of posterior angles of lateral lobes of pronotum towards outside which are obliquely truncate at apex. But these characters are not sufficient to place it under *Hyboella* Hancock. Hence a new genus is erected.

Head not exserted ; vertex very wide, nearly twice the width of an eye, slightly narrowed in front, depressed on either side, produced upto the level of eyes in front, all the carinulae distinct, front margin transverse ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae, moderately sulcated ; paired ocelli placed between the middle of eyes. Antennae (Right antenna lost, apical segments of left antenna damaged) filiform and inserted on the inferior margin of eyes. Eyes not elevated above the vertex.

Pronotum truncate in front, obtusely rounded behind the apex, tectiform all over, extended upto the middle of posterior femora ; dorsum smooth, sloping laterally ; median carina uniformly compresso-elevated ; Prozonal carinae parallel or slightly convergent ; lateral carinae obscure ; humeral angles indistinct ; paranota with one projection ; posterior angles of lateral lobes of pronotum moderate, directed slightly outwards, obliquely truncate at apex. Elytra and wings absent ; anterior and middle femora elongate, bicarinate, lower carinula undu-

late behind the middle ; posterior femora stout, slightly crassate, margins entire ; first segment of posterior tarsi longer than the third ; first pulvilli shorter than the second ; second and third pulvilli equal in length.

Type species : *Mixohyboella srivastavai* sp. nov.

Geographical distribution : India (West Bengal : Darjeeling Distt.).

51. *Mixohyboella srivastavai* sp. nov.

(Plate 25, figs. 5 & 6)

Small in size. Colour brown mottled with dark brown, tarsal segments and apices of anterior tibiae dark brown, face and eyes darker.

Male : Head not exserted ; vertex nearly twice the width of an eye, slightly narrowed in front, convex, deeply depressed on either side, depression open in front and ampliate behind, produced upto the level of eyes in front, finely granular, median carinula distinct anteriorly, obscure posteriorly, lateral carinulae small, elevated upto the level of eyes behind, inclined in front, reflexed laterally, front margin transverse ; frontal costa bifurcate a little behind the paired ocelli, sinuous between the eyes, compresso-elevated and arched between the antennae, depressed in front, moderately sulcate ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes. Eyes not elevated above the vertex, globular.

Pronotum truncate in front, obtusely rounded behind the apex, tectiform all over, extends upto the middle of posterior femora ; dorsum smooth or finely granulose, sloping laterally ; median carina uniformly compresso elevated ; prozonal carinae distinct, parallel, slightly convergent posteriorly ; abbreviated carinae on either side of median carina absent ; lateral carinae low, obscurely visible, join to each other before the apex of pronotum, interrupted or absent on the sulci ; humeral angles not visible ; paranota with one projection ; posterior angles of lateral lobes of pronotum moderate, directed slightly outwards, obliquely truncate at apex. Elytra and wings absent ; anterior femora elongate, a little convex, bicarinate, lower carinula prominent, superior margin undulate behind the middle ; middle femora elongate, slightly convex, bicarinate, lower carinula prominent undulate on margins behind the middle ; posterior femora elongate, stout, slightly crassate, margins entire, antegenicular and genicular denticles moderate ; first segment of posterior tarsi longer than the third ; first pulvilli obtuse, slightly shorter than the second ; second and third pulvilli obtuse, more or less equal in length.

Measurements (in mm.) : Body length ♂ 9 ; Body length with pronotum ♂ 8 ; Pronotum length ♂ 7 ; Posterior femora length/width ♂ 5.4/1.7 ; Shoulder width ♂ 3.

Material examined : Holotype ♂, West Bengal : Darjeeling Distt. : Rangiroom, 10. vi. 1975, coll. G. K. Srivastava and P. K. Maiti.

Geographical distribution : India (West Bengal).

Remarks : *Mixohyboella* gen. nov. is monotypic.

(18) Genus : *Spadotettix* Hancock, 1910

Type species : *Spadotettix fletcheri* Hancock, 1910

Spadotettix Hancock, 1910, *Spolia zeylan.*, 6 : 146.

Size medium. Colour uniformly rusty red brown.

Head not exserted ; vertex broader than the width of an eye, granulose, drawn out nearly one-fourth or half the length of eyes in front, expand broadly forward, longitudinally depressed on either side, median carinula distinct anteriorly, lateral carinulae low and roundly reflexed laterally, front margin a little elevated, face very oblique, frontal costa bifurcate behind the paired ocelli, narrowly sulcate, paired ocelli placed below the middle of eyes. Antennae filiform, extended above beyond the front margin of vertex nearly half of its length. Eyes not elevated above the vertex, linear or conical in shape.

Pronotum subroundly or transversely produced in front, subulate posteriorly and extend upto or beyond the apex of hind femora, almost or entirely produced over the vertex and more or less lies very close to the eyes ; dorsum finely granulose or tuberculose and rugulose, a little convex between shoulders or flat ; median carina low throughout or undulated ; lateral carinae obscurely or distinctly visible at the humeral angles ; abbreviated carinae on either side of median carina between shoulders may or may not present ; prozonal carinae obscurely or distinctly visible, parallel or convergent behind ; humeral angles roundly or obtusely produced ; paranota with two projections ; posterior angles of lateral lobes of pronotum widely or moderately dilated, turned downwards or reflexed laterally towards outside, apex round or obliquely truncate, medially notched. Elytra and wings generally present, rarely absent, elytra when present elongate, rounded at apex. Wings when present extend upto the apex of pronotal process or not ; anterior and middle femora elongated, a little compressed, margins finely serrulated ; posterior femora elongate, stouter, a little crassate, margins finely serrulated ; first tarsal segment of the posterior tarsi longer or rarely

shorter than or equal to the third segment ; all the pulvilli of first hind segment more or less equal in length.

Geographical distribution : India ; Sri Lanka ; Celebes ; Hainan.

52. *Spadotettix subansiriensis* sp. nov.

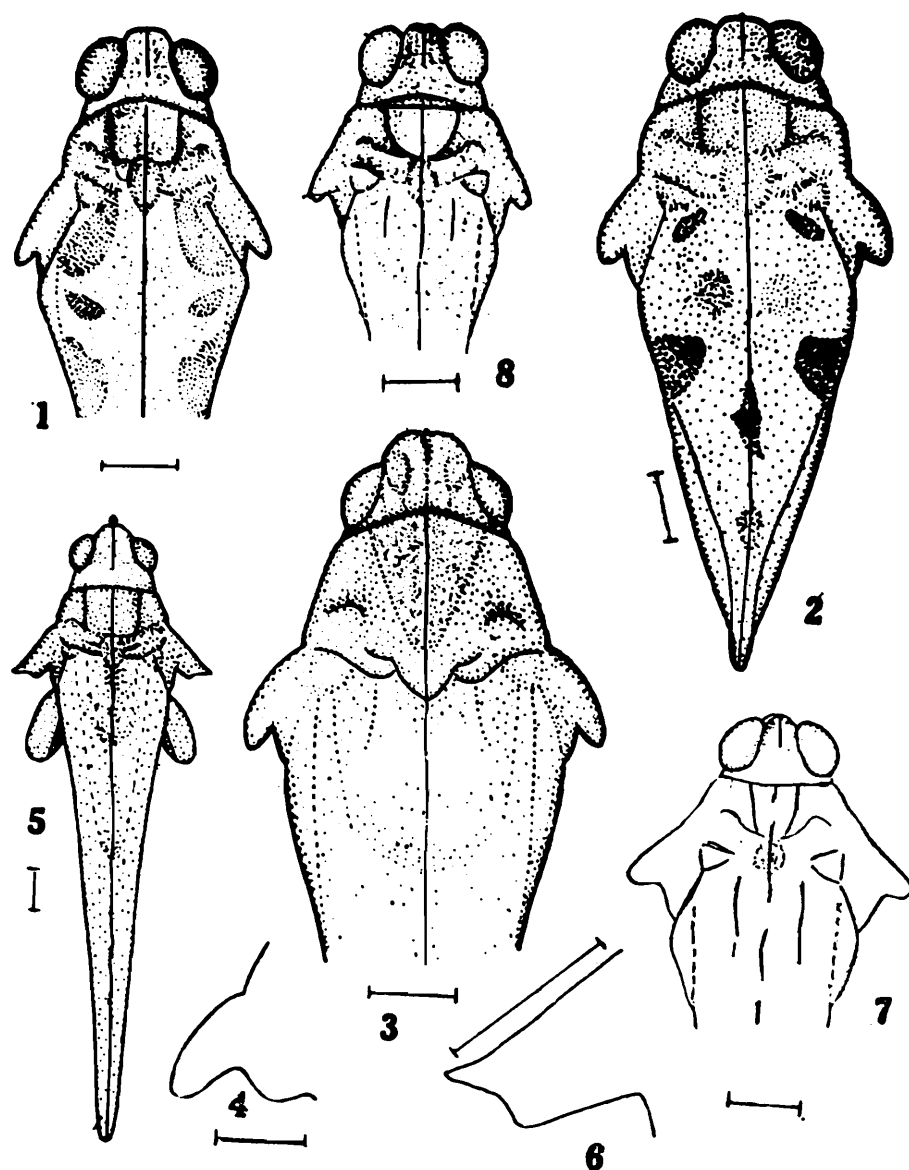
(Plate 26, figs. 3 & 4)

Medium sized. Colour brown except antennae, apex of tibiae and tarsal segments of first and second legs dark brown, antennae light yellow basally and dark brown apically.

Male : Head not exserted above the pronotal surface, vertex distinctly broader, rather double the width of an eye, not narrowed in front, expand broadly towards the anterior, rather lamellate, produced in front of the eyes (approx. .5 mm), longitudinally depressed on the side towards the eyes, convex midally, granulose, median carinula distinctly visible anteriorly with a round knob-like stricture, obscure posteriorly, lateral carinae depressed to the level of vertex, roundly reflexed laterally, front margin a little raised, notched on either side of median carinula ; face decidedly oblique, frontal costa bifurcate behind the paired ocelli, carinae of frontal costa forking gradually, frontal sulcus very narrow between antennae, a little broader around the middle ocelli ; paired ocelli placed slightly below the middle of eyes, very close to antennal socket. Antennae short, filiform, placed on the inferior margin of eyes. Eyes widely separated, conoidal angle of cone directed dorsally.

Pronotum subangulate, bent towards vertex anteriorly, subulate posteriorly, extend beyond the apex of posterior femora ; dorsum of pronotum heavily granulose, convex in front and also in between the shoulders, scattered tubercles present on the hind process ; median carina, granulose, low, interrupted on and behind shoulders at three places ; lateral carina low, granulose, obscure in front as well as in between the shoulders, serrulated on the posterior process of pronotum ; prozonal carinae indistinct, granulose, convergent posteriorly and indistinctly merge into the median carina ; abbreviated carinae not visible ; humeral angles roundly obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum widely rounded at apex. Elytra elongate (2.5 mm length), linear, punctate, narrowly rounded at apex. Wings extend upto the pronotal apex ; anterior femora elongate, convex, margins entire ; middle femora elongate, compressed, bicarinate, margins entire ; posterior femora elongate, crassate on marginal and

external paginal areas, margins very finely serrulated, antegenicular and genicular teeth small ; first segment of hind tarsi longer than the third,

Plate 26

Scale 1 mm.

- PLATE 26 :** Fig. 1. Top view of head and thorax of *Tetrix bipunctata* (Linnaeus).
 Fig. 2. Top view of *Tetrix bipunctata* (Linnaeus).
 Fig. 3. Top view of head and thorax of *Spadotettix subansiriensis* sp. nov.
 Fig. 4. Posterior angles of lateral lobes of pronotum of *S. subansiriensis* sp. nov.
 Fig. 5. Top view of *S. provertex* Hancock.
 Fig. 6. Posterior angles of lateral lobes of pronotum of *S. provertex* Hancock.
 Fig. 7. Top view of head and thorax of *Coptotettix tricarinatus* sp. nov.

serrulate on superior margins ; third pulvilli of first segment of hind tarsi longer and obtuse,

Measurements (in mm.) : Body length ♂ 12.5 ; body length with pronotum ♂ 15.5 ; pronotum length ♂ 13.5 ; posterior femora length/width ♂ 7.2/2.5 ; shoulder width ♂, 3.5.

Material examined : Holotype ♀, Arunachal Pradesh : Subansiri Divi. : Didi Camp : Chukru, 1128m, 22. v. 1966, coll. A. N. T. Joseph.

Remarks : *Spadotettix subansiriensis* sp. nov. is very interesting as it exhibits intermediate characters between the genera *Rostella* Hancock and *Spadotettix* Hancock. Due to the lack of sufficient material it is kept under *Spadotettix* Hancock, for the time being. *Spadotettix* includes two Indian species both of which occur in South India. *S. subansiriensis* has close resemblance with *Spadotettix gravelyi* Günther but can be differentiated by the less extension of vertex in front of eyes, position of paired ocelli above the middle of eyes, anterior subangulate pronotum, heavily granulose dorsum of pronotum, interrupted median carina on and behind the shoulders of pronotum and widely rounded posterior angles of lateral lobes of pronotum.

Subfamily IV TETRIGINAE

Key to the genera of the subfamily Tetriginae

- | | | |
|--|---|--------------------------------|
| 1. Vertex, viewed in profile, not at all produced in front of eyes ... | 2 | |
| — Vertex, viewed in profile, produced before the eyes, angulate, viewed from above, wider than an eye, not narrowed in front... | | <i>Tetrix</i>
Latreille |
| 2. Vertex and eyes obviously raised above the level of pronotum, antennae inserted between the lower border of eyes ... | 3 | |
| — Vertex and eyes very little or not at all raised above the level of the pronotum, antennae scarcely placed below the middle of eyes ... | 4 | |
| 3. Vertex narrower than an eye and truncate, frontal costa arcuately produced between the middle of the eyes, antennae inserted below the middle of eyes, median carina of pronotum not undulated, posterior femora with less conspicuous nodosities on the external pagina ... | | <i>Euparatettix</i>
Hancock |
| — Vertex still narrower than an eye, antennae inserted distinctly below the inferior margin of eyes, median carina of pronotum a little or very well undulated, posterior femora with distinct nodosities on external pagina ... | | <i>Ergatettix</i>
Kirby |
| 4. Body generally smooth or a little granulose, vertex equal to or a little narrower than an eye, generally expanded, subtransverse or triangularly carinated in front, abbreviated carinae distinctly present, median carina of pronotum percurrent, not at all interrupted ... | | <i>Hedotettix</i>
Bolivar |

- Body generally granulose or tuberculose, vertex not expanded in front, abbreviated carinae indistinctly present, median carina of pronotum not percurrent ... 5
- 5. Vertex narrower and more narrowed in front, the frontal carinulae interrupted internally or recurved, dorsum of pronotum a little rugose, often bearing round or abbreviated lineate tubercles, median carina very fine and wavy or not ... *Coptotettix Bolivar*
- Vertex narrower or equal or rarely wider than an eye, but not narrowed in front, with a concavity on either side, median carina a little raised but not wavy ... *Paratettix Bolivar*

(19) Genus : *Tetrix* Latreille, 1802Type species : *Gryllus subulatus* Linnaeus, 1761*Acrydium* Geoffroy, 1762, *Hist. Ins.*, 1 : 390.*Bulla* Schrank, 1781, *Enum. Ins. Austr.*, : 242.*Acridium* Schrank, 1801, *Fauna Boica*, 2 : 30.*Tetrix* Latreille, 1802, *Hist. Nat. Crust. Ins.*, 3 : 281.*Tettix* Charpentier, 1841, *Germ. Zeitschr. Ent.*, 3 : 315.*Acrydium*, Kirby, 1910, *Cat. Orth.*, 3 : 35.*Tetrix*, Hebard, 1929, *Revue suisse Zool.*, 36 : 585.

Size medium. Colour brawn or dark brown, brown or dark brown spots may or may not present.

Head not exserted ; vertex generally equal to or a little broader than an eye, with the sides more or less sinuated, carinated, subangulately rounded, distinctly produced in front of the eyes ; frontal costa generally sinuated behind the antennae, moderately sulcate ; antennae shorter, generally shorter than the head, and inserted in the inferior border of eyes.

Pronotum truncate or obtuse angular anteriorly, cuneate posteriorly, extend upto the apex of abdomen or beyond upto the hind femora ; dorsum smooth or a little granulose, a little expanded between the shoulder ; median carina compresso elevated, a little arched in front, rarely depressed ; humeral angles distinctly obtuse ; prozonal carinae distinct, parallel or a little convergent behind ; lateral carinae low ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, generally round at apex. Elytra normal. Wings extend upto the apex of pronotal process or surpass beyond ; anterior and middle femora normal, margins entire, rarely waved ; posterior femora normal, margins finely serrulate ; first joint of hind tarsi

distinctly longer than the third ; third pulvilli longer than the second or not.

Geographical distribution : Cosmopolitan.

53. ***Tetrix bipunctata* (Linnaeus), 1758**
(Plate 26, figs. 1 & 2)

- Gryllus Bulla bipunctatus* Linnaeus, 1758, *Syst. Nat.* (ed. X.) : 427.
Acrydium scutellatum De Geer, 1773, *Mem. Ins.*, 3 : 483, pl. 23, fig. 15.
Acrydium bipunctatum, Herbst, 1786, *Fuess Arch.*, : 189, pl. 52, fig. 1.
Acrydium opacum Herbst, 1786, *Fuess. Arch.*, : 190, pl. 52, fig. 2.
Acrydium gibbum Olivier, 1791, *Enc. Meth. Ins.*, 6 : 233.
Tetrix bipunctata, Serville, 1839, *Ins. Orth.* : 765.
Tettix schrankii Fieber, 1843, *Abhandl. Bohm Ges.*, (5) 3 : 412, pl. 10, figs. 17-19.
Tettix bipunctatus, Brunner, 1882, *Prodr. Eur. Orth.*, : 234, 235.
Tetrix bipunctata, Jacobs and Bianchi, 1902, *Prem. Lozhn. Ross. Imp.*, : 174, 209, pl. 7.
Tettix bipunctatus, Bolivar, 1902, *Annls Soc. ent. Fr.*, 70 : 585.
Tetrix bipunctata, Hancock, 1910, *Trans. R. ent. Soc. Lond.*, 1910 : 359.
Acrydium bipunctatum, Kirby, 1910, *Cat. Orth.*, 3 : 39.
Tetrix bipunctatus, Lucas, 1920, *Brit. Orth.*, : 212-217, pl. 21, fig. 1.
Tetrix bipunctata, Steinmann, 1971, *Folia ent. hung.*, 24 : 329.

Size medium. Colour brown, one small dark brown spot present in front of the shoulders and another bigger one behind the shoulders, several very small dots present on the hind process of pronotum.

Male, female : Head not exserted ; vertex equal to or a little broader than an eye, slightly angulately produced in front of the eyes, depressed on either side of median carinula, median carinula distinctly raised and extend behind upto two-thirds the distance of eyes and bend downwards in front to meet the frontal costa, lateral carinulae a little elevated, reflexed laterally, front margin not raised, interrupted by median carinula and reflexed laterally ; frontal costa bifurcate behind the paired ocelli, sinuate, arcuate, elevated and widely sulcate between the antennae ; paired ocelli placed between the middle of eyes. Antennae (damaged) situated on the inferior margin of eyes. Eyes not elevated above vertex, globulose in shape.

Pronotum obtusely angulate anteriorly, cuneate posteriorly, extend upto the apex of abdomen, apex notched ; dorsum wide between shoulders, finely granulose, flat on the hind process ; median carina compresso-elevated on shoulders, arched in front, gradually declined posteriorly ; lateral carinae low ; indistinct oblique carinae run behind the posterior black spot towards middle carina upto more than three-fourth the distance of it and then run parallel ; prozonal carinae distinct, a

little convergent or parallel behind ; humeral angles obtuse ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, subtruncately or widely rounded at apex. Elytra elongate, not wide in middle, rounded at apex. Wings not extend upto the apex of pronotum ; anterior femora elongate, margins entire ; middle femora elongate, compressed, bicarinate, margins entire ; posterior femora elongate, wide at base, crassate, margins finely serrated ; first tarsal segment of posterior tarsi more or less equal to the third segment ; first and second pulvilli small, spinose, third pulvilli longer than the first or second pulvilli.

Measurements (in mm.) : Body length ♂ 8.1-8.4, ♀ 9-9.2 ; body length with pronotum ♂ 8.6-8.8, ♀ 9-9.2 ; pronotum length ♂ 7.6-7.8, ♀ 8.1-8.3 ; posterior femora length/width ♂ 5.1-5.4/1.8, ♀ 5.9/1.6 ; shoulder width ♂ 2.3-2.4, ♀ 2.7-2.8.

Material examined : 2 ♀ ♀, Sikkim, coll. L. Mandelli ; 2 ♂ ♂, 3 ♀ ♀, Manipur : Ukhrul, 30. ix. 1975, coll. M. S. Shishodia ; 4 ♂ ♂, 4 ♀ ♀, Manipur : Ukhrul : Hundung, 2. x. 1975, coll. M. S. Shishodia.

Geographical distribution : India ; Europe ; N. America ; N. W. Asia.

Remarks : *Tetrix bipunctata* (Linnaeus) is a predominantly European species which is recorded by Bolivar (1902), Kirby (1914) and Hancock (1915) from Kodaikanal (S. India : Tamilnadu) and Sikkim. The specimens reported here have the vertex less angulated in front, frontal costa a little more widely sulcated between antennae, and the median pronotal carina highly elevated on the shoulders than that of the European specimens (identified by Hancock), these appear to be of intraspecific variations.

(20) Genus : *Euparatettix* Hancock, 1904

Type species : *Paratettix personatus* Bolivar, 1887

Euparatettix Hancock, 1904, *Spolia zeylan.*, 2 : 145.

Size medium to large. Colour variable, often brown or dark brown or grey, with or without dark brown spots behind the shoulders ; two-third hind tibiae at apex light brown or dense black.

Head exserted ; vertex narrower than one of the eyes and elevated forward, carinated in the middle ; frontal costa bifurcate before the paired ocelli, more or less convex or arcuate produced, declivous towards the base, moderately or narrowly sulcated ; paired ocelli placed nearly between the middle of eyes. Antennae moderately long, filiform, located

on the lower border of eyes. Eyes globular and raised above the level of vertex.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apex of hind femora ; dorsum with or without convexity between shoulders, granulose ; median carina depressed in front, compresso-elevated behind, low or depressed on shoulders and distinct or indistinctly visible behind the shoulders ; abbreviated carinae on either side of shoulders indistinct ; lateral carinae low ; prozonal carinae distinct, converge posteriorly ; humeral angles obtuse ; posterior angles of lateral lobes of pronotum turned downwards, narrow, round at apex ; paranota with two porojections. Elytra moderately produced, rounded at apex. Wings long, extended beyond the pronotal apex ; anterior femora almost entire, with or without hairs below ; middle femora a little flattened, more flattened in male, margins very finely serrulated or entire, sometimes indistinctly undulated on margins ; posterior femora elongate, margins finely serrulate, external pagina without protuberant tubercles ; first segment of posterior tarsi generally longer than the third ; first and second pulvilli short, third pulvilli longer than the first two.

Geographical distribution : India ; Pakistan ; Bangladesh ; Nepal ; Sri Lanka ; Burma ; Java ; Borneo ; Philippines ; Taiwan ; New Guinea ; N. Australia ; N. Caledonia.

Key to the species of *Euparatettix* Hancock, 1904

- | | | |
|---|-----|--------------------------------|
| 1. Hind tibiae dense black with white annulation just behind the knees ; frontal costa generally narrowly sulcate | ... | <i>Personatus</i>
(Bolivar) |
| — Hind tibiae subunicoloured or obscurely marked but never dense black ; frontal costa generally moderately sulcate | ... | 2 |
| 2. Stature very slender ; head exserted ; pronotum narrow between shoulders ; median carina of pronotum substraight percurrent | ... | <i>tenuis</i>
Hancock |
| — Stature more robust and larger ; head a little exserted ; pronotum moderately dilated between shoulders ; median carina of pronotum arcuate forward, often little undulate before the shoulders, low on shoulders and straight behind | ... | <i>histricus</i>
(Stal) |

54. *Euparatettix personatus* (Bolivar), 1887

Paratettix personatus Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 278.

Euparatettix personatus, Hancock, 1904, *Spolia Zeylan.*, 2 : 145-146.

Medium in size. Colour brown or dark brown or ferruginous or grey, dark brown spot of variable size behind the shoulders, which in some examples is bound by a narrow line of light brown colour or light brown band, light brown band is also found in some examples on the shoulders just in front of the dark brown band, hind tibiae dense black with one or two white or light yellow annulations just behind knees and another one at the apical third of hind tibiae, hind femora dark brown on the externo-inferior area.

Male, female : Head a little exserted above the level of pronotum ; vertex subequal than one of the eyes, a little narrower forward, extend in front as far as the eyes, the front margin low, subtruncate, reflex laterally, lateral carinulae extend upto one-fourth distance of eyes, low, middle carinula distinct ; frontal costa bifurcate behind the paired ocelli, arcuately produced, declivous towards base, moderately or narrowly sulcate ; paired ocelli placed between the middle of eyes. Antennae long, filiform, a little compresso-flattened apically, located on the lower border of eyes. Eyes globular, raised above the level of pronotum and vertex.

Pronotum truncate in front, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum a little flattened, slightly convex, wide, granulose and rugulose ; median carina depressed in front, compresso-elevated behind, straight on shoulders, indistinctly sinuate on hind process of pronotum ; abbreviated carinae on either side of shoulders indistinct ; prozonal carinae short, convergent posteriorly ; lateral carinae low, very finely serrulate posteriorly ; humeral angles roundly obtuse ; posterior angles of lateral lobes of pronotum turned downwards, narrow, rounded at apex ; paranota with two projections. Elytra oblong, apex rounded. Wings long, extended beyond the pronotal apex (2-3 mm) ; anterior femora elongate, a little compressed, margins entire ; middle femora elongate, slightly compressed, margins entire with few hairs on inferior margins ; posterior femora elongate, crassate, one or two distinct oblique lines behind the middle of external pagina, margins finely serrulated ; first segment of posterior tarsi a little longer than the third ; first and second pulvilli short, acute, third pulvilli longer than the first two.

Measurements (in mm.) : Body length ♂ 6.6-5, ♀ 8-9 ; body length with pronotum ♂ 9-10, ♀ 10.5-12 ; pronotum length ♂ 8-9, ♀ 10-11 ; posterior femora length/width ♂ 4.3-4.5/1.3-1.5, ♀ 4.7-5.4/1.5-1.9 ; shoulder width ♂ 2-2.2, ♀ 2.3-2.8.

Material examined :

West Bengal : 2 ♂♂, 1 ♀, Calcutta, 25-26.xi.1926, coll, H. S,

pruthi ; 1 ♀, Calcutta, 8.xii.1926, coll. H. S. Pruthi ; 15 ♂♂, 13 ♀♀, Calcutta, 26.x.1949, coll. A. P. Kapur ; 2 ♂♂, 10 ♀♀, Calcutta, 10.x.1950, coll. A. P. Kapur ; 2 ♂♂, Calcutta, 4.xii.1955, coll. A. Suroto and S. Ali ; 4 ♂♂, 3 ♀♀, Calcutta, 1.vii.1959, coll. A. P. Kapur ; 1 ♂, Calcutta : Eden Garden, 25.x.1960, coll. A. P. Kapur ; 1 ♂, ♀, Calcutta : Tollygung, Jubilee Park, 24.xi.1964, coll. K. S. Pradhan ; 1 ♂, Calcutta : Salt Lake, 27.xii.1964, coll. K. S. Pradhan ; 1 ♀, Calcutta : Hastings, 4.iii.1965, coll. M. S. Shishodia ; 1 ♂, Calcutta : B. Garden, 27.x.1965, coll. M. S. Shishodia ; 1 ♂, Calcutta : B. Garden, 27.x.1965, S. K. Tandon ; 1 ♀, 24-Parganas Distt. : Diamond Harbour, 31.xii.1965, S. K. Tandon ; 1 ♂, 1 ♀, 24-Parganas Distt. : Khardah, 9.x.1966, coll. S. B. Roy and T. K. Chakraborty ; 2 ♂♂, 24-Parganas Distt. : Budge Budge, 24.i.1967, coll. K. R. Rao ; 2 ♂♂, 1 ♀, Calcutta : Datta Pukur, 8.ii.1967, coll. K. R. Rao ; 1 ♂, Hooghly Distt. : Baidyabati, 8.xii.1977, coll. M. S. Shishodia ; 1 ♂, 24-Parganas Distt. : Narendrapur, 13.xi.1979, coll. M. S. Shishodia.

Tripura : 1 ♂, Charilam, 16.xi.1969, coll. V. C. Agarwal ; 2 ♀♀, Bishalgarh, 20.xi.1969, coll. V. C. Agarwal ; 1 ♀, Garjee, 25.xi.1969, coll. V. C. Agarwal ; 4 ♂♂, Barpathari (Abhwaya), 4.xii.1969, coll. V. C. Agarwal ; 1 ♂, Hathalia, 5.xii.1969, coll. V. C. Agarwal ; 1 ♂, Ampa, 20.i.1972, coll. V. C. Agarwal ; 1 ♂, Saydibari, 29.xii.1972, coll. V. C. Agarwal ; 1 ♂, 3 ♀♀, Agartala : Pratapgarh, 25 m, 29.x.1974, coll. M. S. Shishodia ; 1 ♂, Agartala : Bhangashola, 25m, 2.xi.1974, coll. M. S. Shishodia ; 1 ♂, Udaipur : Garjeechara Forest, 100m, 5. xi. 1974, coll. M. S. Shishodia ; 7 ♂♂, 4 ♀♀, Teliamura : F. R. House, 150m, 14.xi.1974, coll. M. S. Shishodia ; 1 ♀, Ambassa : Kanchan Nagar, 200m, 20. xi. 1974, coll. M. S. Shishodia ; 3 ♂♂, 3 ♀♀, Ambassa, 25.v.1978, J. K. Jonathan.

Manipur : 1 ♂, New Churachandpur : Bungmual, 912m, 19. ix. 1975, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Loktak Lake, 912m, 20.ix.1975. coll. M. S. Shishodia.

Arunachal Pradesh : 1 ♂, 1 ♀, Tīrap Distt. : Jairampur, 225m, 27.x.1971, coll. G. S. Arora ; 1 ♀, Kameng Divi. : Assam Foot Hills, 2.iii.1973, coll. S. K. Tandon ; 1 ♀, Lohit divi. : Alubari, 242m, 23.xi.1969, coll. J. M. Julka.

Assam : 2 ♂♂, 4 ♀♀, Sonai Rupai Forest, 343m, 29.xi.1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 1 ♂, 1 ♀, Missamari, 343m, 1.xii.1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 2 ♀♀, Kaziranga, 100m, 25.ii.1969, coll. S. K. Tandon ; 1 ♂, 1 ♀, Khasi Hills : Mowkdok, 4.iii.1970, coll. G. M. Yazdani ; 1 ♀, Goalpara Distt. : Gosaingaon, 8.xi.1974, coll. S. K. Gupta ; 1 ♀, Cachar Distt. :

Indranagar, 2.x.1975, coll. N. Muralidharan ; 1 ♀, Garo Hills : Tura Road : Rongrongiri, 13.xi.1978, coll. K. P. Singh.

Meghalaya : 1 ♂, 2 ♀♀, Dainadubi : Inspection Bunglow (at light), 14.ix.1975, coll. N. Muralidharan ; 1 ♂, Songsak I. B. (at light), 21.ix.1975, coll. N. Muralidharan ; 1 ♀, Rongram, 25.ix.1975, coll. N. Muralidharan ; 1 ♂, 1 ♀, Rongram : 1 Km. N. E. of I. B., 28.ix.1975, coll. N. Muralidharan ; 2 ♀♀, Darugiri Rd., 29.xi.1977, coll. K. R. Rao.

Geographical distribution : India ; Bangladesh ; Pakistan ; Sri Lanka ; Burma ; Java ; Philippines ; Taiwan.

Remarks : Hancock (1904) transferred *Paratettix personatus* to *Euparatettix* due to compresso-elevated exserted head and the location of antennae on the inferior border of eyes. Subsequently Hancock (1906, 1907, 1909, 1910), Kirby (1910), Hancock (1912), Kirby (1914) Hancock (1915), Fletcher (1921) and Günther (1935, 1943) retained it under *Euparatettix* but Steinmann (1970) synonymised *Paratettix personatus* with *Euparatettix parvus* Hancock. Since the type material of both the species are not available it is not possible for me to determine the position of the species. So I am retaining the species under consideration for the present in *Euparatettix* after Hancock (1904).

This species can be distinguished from the remaining species of *Euparatettix* dealt with here by the narrow frontal sulcus, exserted head, narrow vertex, subflattened and broad shoulders, indistinctly undulate median carina on the hind process of pronotum and dense black hind tibiae with one or two white annulations.

55. *Euparatettix tenuis* Hancock, 1912

Euparatettix tenuis Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 153.

Slender large sized species. Colour variable, often greyish or brown or dark brown with a longitudinal light yellow stripe on the dorsum and hind process of pronotum, generally with a dark spot behind the shoulders, rarely with a small additional dark brown spot on the shoulders, hind tibiae dirty light brown or light yellow coloured.

Male, female : Head and eyes exserted ; vertex narrower than one of the eyes, fossulate on either side, ampliate behind the fossulae, front margin low truncate, roundly reflexed laterally, lateral carinulae elevated upto the level of eyes, extend one-fourth distance of eyes behind, middle carinula distinctly raised and extend upto the end of eyes behind ; frontal costa bifurcate behind the paired ocelli, arcuately produced,

moderately sulcated, rami moderately elevated ; paired ocelli placed between the middle of eyes. Antennae filiform, placed on the lower border of eyes. Eyes globular, raised above the level of vertex and pronotum.

Pronotum truncate in front, subulate posteriorly and extend beyond the middle of the posterior tibiae ; dorsum finely granulose, a little or not at all convex between shoulders, narrowly slender between shoulders and acuminate posteriorly ; median carina nearly straight, compressed, percurrent, entire, a little low on the hind process of pronotum ; prozonal carinae short, parallel ; humeral angles of lateral lobes roundly angulate ; posterior angles of lateral lobes of pronotum turned downwards, narrow, apex rounded ; paranota with two projections. Elytra oblong, apex rounded. Wings extended beyond the apex of pronotal process (2.5-3.5 mm) ; anterior femora elongate, margins very finely serrulate with thinly set hairs ; middle femora elongate, compressed, in male a little more wide and compressed, margins finely serrulate, with thinly set hairs, sometimes margins indistinctly wavy ; posterior femora elongate, pagina rough, margins finely serrulate ; the first article of posterior tarsi more or less equal or a little larger than the third ; first and second pulvilli of hind tarsi short and acute, the third longer than the previous two.

Measurements (in mm.) : Body length ♂ 6.5-7, ♀ 8-8.5 ; body length with pronotum ♂ 10-11.5, ♀ 12-13 ; pronotum length ♂ 9-10.5, ♀ 11-12 ; posterior femora length/width ♂ 4.3-4.8/1.3-1.6, ♀ 5-5.5/1.7-1.8 ; shoulder width ♂ 1.7-2, ♀ 2.1-2.2.

Material examined : *West Bengal* : 6 ♂♂, 2 ♀♀, Calcutta, 26. x. 1949, coll. A. P. Kapur ; 11 ♂♂, 6 ♀♀, Calcutta, 10. x. 1950, coll. A. P. Kapur ; 2 ♂, Calcutta, 30. x. 1957, Coll. A. P. Kapur ; 1 ♀, Calcutta : Tollygunge : Jubilee Park, 24. x. 1964, coll. K. S. Pradhan ; 1 ♂, 1 ♀, Calcutta : Hastings, 4. ii. 1965, coll. M. S. Shishodia ; 1 ♂, Calcutta : Hastings, 9. iii. 1965, coll. M. S. Shishodia ; 1 ♀, Calcutta : Alipur, Horticulture garden, 14. ix. 1965, coll. J. C. Das and B. K. Majumdar ; 1 ♂, Calcutta : Botanical garden, 27. x. 1965, coll. K. R. Rao ; 1 ♀, Burdwan Distt. : Ambika Kalna, 11. ii. 1966, coll. S. B. Roy and party ; 2 ♂♂, Calcutta : Deodar street, 14. ii. 1966, coll. S. K. Tandon ; 1 ♂, 24-Parganas Distt. : Datta Pukur, 8. ii. 1967, coll. K. R. Rao and party.

Sikkim : 1 ♂, Mayabazar, 1000m, 28. iii. 1959, coll. A. G. K. Menon.

Tripura : 1 ♀, Agartala : Pratapgarh, 25m, 29. x. 1974, coll. M. S. Shishodia ; 1 ♂, Agartala : M. P. college campus, 25 m, 1. xi.

1974, coll. M. S. Shishodia ; 1 ♂, Agartala : Bhangashala, 25 m, 2. xi.
 1974, coll. M. S. Shishodia ; 1 ♂, Ambassa (at light), 200 m, 19. xi.
 1974, coll. M. S. Shishodia.

Manipur : 1 ♀, 16 miles N. of Imphal on Dimapur Road, 1064 m, 8. x. 1945, coll. Maj. M. L. Roonwal ; 1 ♀, 16 miles N. of Imphal on Dimapur Road, 2584 m, 14. x. 1945, coll. Maj. M. L. Roonwal ; 2 ♂ ♂, 2 ♀ ♀, 16 miles N. of Imphal on Dimapur Road, 2584 m, 18. x. 1945, coll. M. L. Roonwal ; 2 ♂ ♂, New Churachandpur : C. R. P. camp, 18. ix. 1975, coll. M. S. Shishodia ; 3 ♂ ♂, 6 ♀ ♀, New Churachandpur : Bungmual, 912 m, 19. ix. 1975, coll. M. S. Shishodia ; 1 ♀, Ukhrul : Horticulture Farm, 30. ix. 1975, coll. M. S. Shishodia.

Meghalaya : 1 ♀, Shillong : Risa Colony, 11. ix. 1963, coll. S. N. Prasad ; 1 ♀, Shillong : Risa Colony, 4. x. 1963, coll. S. N. Prasad ; 1 ♀, Dainadubi I. B. (at light), 14. ix. 1975, coll. N. Muralidharan ; 2 ♀ ♀, Rongram, 28. ix. 1975, coll. N. Muralidharan.

Assam : 1 ♂, Tezpur : Majgaon, 79 m, 30. v. 1966, coll. A. N. T. Joseph ; 7 ♂ ♂, 3 ♀ ♀, Kaziranga, 100 m, 24 & 25. ii. 1969, coll. S. K. Tandon ; 1 ♀, Goalpara Distt. : Gosaingaon, 18. vi. 1973, coll. R. P. Mukherjee ; 1 ♂, Cachar Distt. : Indranagar, 2. x. 1975, coll. N. Muralidharan ; 2 ♂ ♂, Assam Foot Hills, 2. iii. 1973, coll. S. K. Tandon and A. N. T. Joseph.

Arunachal Pradesh : 1 ♂, Kameng Divi. : Shaitan Bridge, 1524 m, 23. iv. 1966, A. N. T. Joseph ; 1 ♀, Subansiri Divi. : Ziro, 1585 m, 13. v. 1966, coll. A. N. T. Joseph ; 1 ♂, Subansiri Divi. : Wakro, 1700 m, 1. xii. 1969, coll. J. M. Julka.

Geographical distribution : India (U. P., Bihar, West Bengal, Assam) ; Bangladesh ; Burma.

Remarks : It is a very slender species and is closely related to *E. histricus* (Stal), but can be easily distinguished from *E. histricus* by the exserted head, narrow pronotum between the shoulders, and compressed and percurrent median carina of pronotum which is more or less substraight on dorsum.

56 *Euparatettix histricus* (Stal), 1860

Tetrix histrica Stal, 1860, *Freg. Eugenes Resa Orth.*, : 347.

Tettix histricus, Stal, 1873, *Reoens. Orth.*, 1 : 149.

Paratettix histricus, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 188, 271, 279.

Paratettix variabilis Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 276 (partim) ;

Günther, 1937, *Revue suisse zool.*, 44 : 133.

Euparatettix corpulentus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 153. *Syn. nov.*

Size medium to large, colour variable, often brown or dark brown or grey, sometimes dark brown on the dorsum with a medio-longitudinal brown or dirty yellow stripe in the middle which covers the whole hind process of pronotum dorsally, in one example the whole dorsal surface of pronotum very light brown or dirty white except the lateral black spot behind the shoulders, with or without dark brown spot behind the shoulders, hind tibiae light yellow or dirty brown.

Male, female : Head a little exserted ; vortex narrower than one of the eyes, slightly narrower in front, fossulate on either side, front margin a little elevated, truncated, reflexed laterally, lateral carinulae raised upto the level of eyes and extend one-fourth distance of eyes behind, middle carinula low but distinct ; frontal costa bifurcate behind the paired ocelli, low arcuately produced, declivous towards base ; paired ocelli situated in the middle of eyes. Antennae filiform, situated on the lower border of eyes. Eyes ovate.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the middle of hind tibiae ; dorsum smooth or finely granulose, convex and wide between shoulders, with or without indistinct abbreviated markings ; median carina distinct, low, depressed in front, a little elevated and compressed on the sulci behind, substraight on the shoulders and straight on the hind process ; prozonal carinae distinct and parallel ; humeral angles obtuse ; posterior angles of lateral lobes of pronotum turned downwards, moderate in size and rounded at apex ; paranota with two projections ; Elytra elongate, a little wide in the middle, rounded at apex. Wings lengthily extended beyond the pronotal apex (2-3.5 mm) ; anterior femora elongate, convex, entire ; middle femora elongate, compressed, margins finely serrulate, in males more wide with or without undulations ; posterior femora elongate, margins serrulated ; first segment of hind tarsi longer than the third ; first and second pulvilli short and acute, third longer than the previous two.

Measurements (in mm.) : Body length ♂ 7-8, ♀ 10-11 ; body length with pronotum ♂ 10-10.5, ♀ 13-14 ; pronotum length ♂ 9-9.5, ♀ 12-14 ; posterior femora length/width ♂ 4.5-5.5/1.5-1.8, ♀ 5.4-7/1.7-2 ; shoulder width ♂ 2-2.1, ♀ 2.4-3.2.

Material examined : West Bengal : 1 ♂, Calcutta : B. I. Steamer in Hooghly river (at light), 23. vi. 1914, coll. F. H. Gravely ; 1 ♀, Calcutta : Salt Lake : Dakhindali, -. v. 1926, coll. B. N. Chopra ; 1 ♂, Calcutta, 26. xi. 1926, coll. H. S. Pruthi ; 1 ♂, Calcutta, 6. i. 1927, coll. H. S. Pruthi ; 2 ♀ ♀, Calcutta : University campus, 1948 ; 18 ♂ ♂, 9 ♀ ♀, Calcutta, 26. x 1949, coll. A. P. Kapur ; 1 ♂, Calcutta, 20. viii.

1950, coll. A. P. Kapur ; 3 ♂♂, Calcutta : Basdhani, 4. xii. 1955, coll. A. Suroto and S. Ali ; 1 ♀, Calcutta : Eden garden, 25. xii. 1956, coll. A. P. Kapur ; 1 ♀, 24-Parganas Distt. : Sonarpur, 28. xi. 1961, coll. R. K. Varshney ; 1 ♀, Calcutta : Santoshpur, 21. xi. 1962, coll. K. R. Rao and party ; 1 ♂, 1 ♀, Calcutta : Tollygunge : Jubilee Park, 24. xi. 1964, coll. K. S. Pradhan ; 7 ♂♂, 3 ♀♀, Calcutta : Hastings, 4. ii. 1965, coll. M. S. Shishodia ; 1 ♂, 24-Parganas Distt. : Barasat : Madhumumli, 20. v. 1965, coll. M. S. Shishodia and B. K. Bhattacharya ; 2 ♀♀, Nadia Distt. : Krishnanagar, 13. viii. 1965, coll. S. P. Chakraborty and K. D. Chatterjee ; 1 ♀, 24-Parganas Distt. : Kankinara, 18. viii. 1965, coll. K. Rai ; 1 ♀, Calcutta : Behala, 25. xi. 1965, coll. G. S. Arora ; 4 ♂♂, 2 ♀♀, 24-Parganas Distt. : Diamond Harbour, 31. xii. 1965, coll. S. K. Tandon and party ; 1 ♀, Burdwan Distt. : Ambika—Kalna, 11. ii. 1966, coll. S. B. Roy and party ; 2 ♂♂, 1 ♀, 24-Parganas Distt. : Khardah, 9. xi. 1966, coll. S. B. Roy ; 1 ♂, 1 ♀, Kalighat, 8. i. 1968, coll. M. S. Shishodia ; 2 ♂♂, 3 ♀♀, Howrah Distt. : Santragachi, 10. vi. 1970, coll. R. K. Singh ; 1 ♂, 2 ♀♀, Murshidabad Distt. : Berhampur : C. S. R. S. camp, 3 & 4. xi. 1974, coll. A. K. Hazra ; 1 ♂, 1 ♀, Darjeeling Distt. : Singla, 400m, 2. i. 1976, coll. G. K. Srivastava ; 1 ♀, Calcutta Air Port, 2. xi. 1977, coll. L. C. Pande ; 7 ♀♀, Hooghly Distt. : Baidyabati, 8. xii. 1977, coll. M. S. Shishodia ; 1 ♀, Darjeeling Distt. : Teesta Bajar, 24. v. 1979, coll. M. S. Shishodia ; 1 ♂, 1 ♀, 24-Parganas Distt. : Narendrapur, 22. ix. 1979, coll. M. S. Shishodia.

Tripura : 2 ♂♂, 4 ♀♀, Agartala : Pratapgarh, 25m, 29. x. 1974, coll. M. S. Shishodia ; 1 ♂, Udaipur : Garjee, 100m, 4. xi. 1974, coll. M. S. Shishodia ; 3 ♀♀, Ambassa, 25. v. 1978, coll. J. K. Jonathan.

Assam : 1 ♀, Kaziranga, 100m, 25. ii. 1969, coll. S. K. Tandon ; 1 ♂, Khasi Hills : Umsning, 16. v. 1963, coll. V. D. Srivastava [Reg. No. 16287].

Meghalaya : 1 ♀, Dainadubi I. B. (at light), 16. ix. 1975, N. Muralidharan ; 1 ♂, 1 ♀, Darugiri Road, 29 xi. 1977, coll. K. R. Rao.

Manipur : 1 ♂, 16 miles N. of Imphal on Dimapur Road, 1064m, 20-30. ix. 1945, coll. Maj. M. L. Roonwal ; 1 ♀, New Churachandpur : C. R. P. camp, 912m, 18. ix. 1975, coll. M. S. Shishodia ; 1 ♂, Ukhrul : Horticulture Farm, 30. ix. 1975, coll. M. S. Shishodia.

Arunachal Pradesh : 1 ♀, Kameng Divi. : Dirong Dzong : 1601m, 31. vii. 1961, coll. B. Biswas ; 3 ♂♂, Subansiri Divi. : Ziro, 1585m, 13 & 14. v. 1966, coll. A. N. T. Joseph ; 1 ♂, 1 ♀, Lohit Divi. Sonpur, 100m, 3. iii. 1969, coll. S. K. Tandon ; 1 ♂, 1 ♀, Lohit Divi. : Digaru Road, 130 m, 11. iii. 1969, coll. S. K. Tandon ; 1 ♀, Lohit Divi. :

Choukham Road, 100 m, 16. iii. 1969, coll. S. K. Tandon ; 1 ♂, Tirap Divi. : Deomali Forest, 250m, 11. xi. 1971, coll. G. S. Arora ; 1 ♀ Tirap Divi. : Deomali, 200m, 12. xi. 1971, coll. G. S. Arora ; 1 ♂, Kameng Divi. : Tippi, 175m, 20. iii. 1973, coll. S. K. Tandon.

Geographical distribution : India ; Pakistan ; Nepal ; Burma ; Sri Lanka ; Java ; Philippines ; Malaya Island ; N. Caledonia ; Mindanao ; Celebes ; Borneo ; Sumatra ; South China ; Taiwan ; Queensland ; N. Australia ; Holland.

Remarks : Hancock (1915) distinguished *Euparatettix corpulentus* Hancock from *Euparatettix variabilis* (Bolivar) only by its larger stature and he was of the opinion that they might cross, producing hybrids. Later on Hebard (1929) compared the Type (female) material of *E. corpulentus* with *E. variabilis* (Bolivar) and found that it is very close to the other, differing only in its slightly more swollen pronotum between the shoulders than in any one of the specimens of his series of *E. variabilis* and concluded that this difference has little value and it may be synonymous with the latter. Subsequently Günther (1939 & 1941) also found the similarity between *E. corpulentus* Hancock and *E. histricus* (Stal) and he synonymised *E. variabilis* with *E. histricus* (Stal). Since I thought that *E. corpulentus* Hancock is synonymous with *E. histricus* (Stal), I sought the opinion of late Dr. Klaus Günther. He then kindly sent me the material of *E. histricus* for comparison and now I have found that they are synonymous. This species is closely related to *Euparatettix tenuis* Hancock, and can be recognised by its larger size, a little exserted head, convex dorsum and less elevated median carina on shoulders.

(21) Genus : *Paratettix* Bolivar, 1887

Type species : *Tetrix meridionalis* Rambur, 1839

Paratettix Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 270.

Size medium to large. Colour brown or dark brown or ferruginous or grey or rarely dirty yellow.

Head a little or not at all exserted ; vertex narrower or wider than or equal to an eye, carinate or not in the middle, with a depression or concavity on either side, front margin sinuous, and scarcely produced between the eyes, lateral carinulae raised upto the level of eyes and extend upto one fourth the distance of eyes behind ; frontal costa between the antennae curved, declined towards base, rarely sinuate ;

paired ocelli placed between the middle of eyes. Antennae filiform, long, located at the inferior margin of eyes. Eyes globular.

Pronotum truncate anteriorly, subulate posteriorly and extend upto the apex of abdomen or produced beyond the apices of hind femora ; dorsum flattened, granulose, or slightly rugose ; median carina a little raised ; abbreviated carinae on shoulders absent ; prozonal carinae distinct, parallel in front, convergent behind ; lateral carinae low, finely serrulated ; humeral angles obtusely angulated ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, the apex subrounded. Elytra oblong, punctate, apex rounded. Wings generally extend beyond the pronotum apex. Anterior femora elongate, carinate above ; middle femora elongate, compressed, margins finely crenulate ; posterior femora elongate or stout, crassate, margins serrulated ; first article of posterior tarsi elongate, longer than the third ; third pulvilli generally longer than the first two.

Geographical distribution : Cosmopolitan.

Key to the species of *Paratettix* Bolivar, 1887

1. Elytra minute ; wings abbreviated or absent	...	* <i>hancockus</i> (Shishodia & Varshney)
— Elytra medium ; wings not abbreviated but extended upto or beyond the pronotal apex	...	2
2. Pronotum extended beyond the apex of posterior femoral apices	...	3
— pronotum not extended beyond the apex of posterior femoral apices ; frontal costa widely sulcate ; dorsum of pronotum deplanate ; shoulders wide	...	<i>curtipennis</i> Hancock
3. Median carina of pronotum compressed, raised and generally arched in front	...	<i>cingalensis</i> (Walker)
— Median carina of pronotum not compressed, raised as in <i>cingalensis</i> , not arched in front	...	4
4. Vertex broader than one of the eyes, dorsum wide between the shoulders	...	5
— Vertex equal or slightly narrower than one of the eyes ; dorsum not wide between the shoulders	...	6
5. Vertex a little wider than one of the eyes ; dorsum of pronotum rugulose, slightly scabrous ; median carina of pronotum not undulate, posterior femora above strongly serrulate towards the apices, bearing an acute elevated denticle	...	<i>hirsutus</i> Brunner

* New Combination proposed *Vide* Shishodia (1987),

- Vertex fairly wider than one of the eyes ; dorsum rugose, tuberculose, subtumid forward ; the front border obtusely angulated ; median carina of the pronotum compressed, subgibbose forward behind the front border, and depressed just before the shoulders ; hind femoral carinae above minutely subserrulate towards the knees, antegenicular denticle a little prominent ... *rotundatus*
Hancock

- 6. Vertex not narrowed forward ; frontal costa widely sulcate, dorsum of pronotum deplanate ; shoulders wide ; posterior angles of lateral lobes of pronotum wide, rounded at apex ; superior carina of posterior femora at the apical third serrulately lobate, antegenicular lobe acute, spinose ... *alatus*
Hancock

- Vertex narrowed forward ; frontal costa not widely sulcate ; dorsum of pronotum not deplanate ; posterior angles of lateral lobes of pronotum narrow and narrowly rounded at apex ; superior carina of posterior femora normal. ... *tricarinatus*
Bolivar

57. *Paratettix hancockus* (Shishodia & Varshney) (Plate 30, figs. 1-3)

Coptotettix parvulus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 (No. 2) : 145-146.

Coptotettix hancockus Shishodia and Varshney. *J. Bombay nat. Hist. Soc.* -in press (Preoccupied by *C. parvulus* Hancock, 1908).

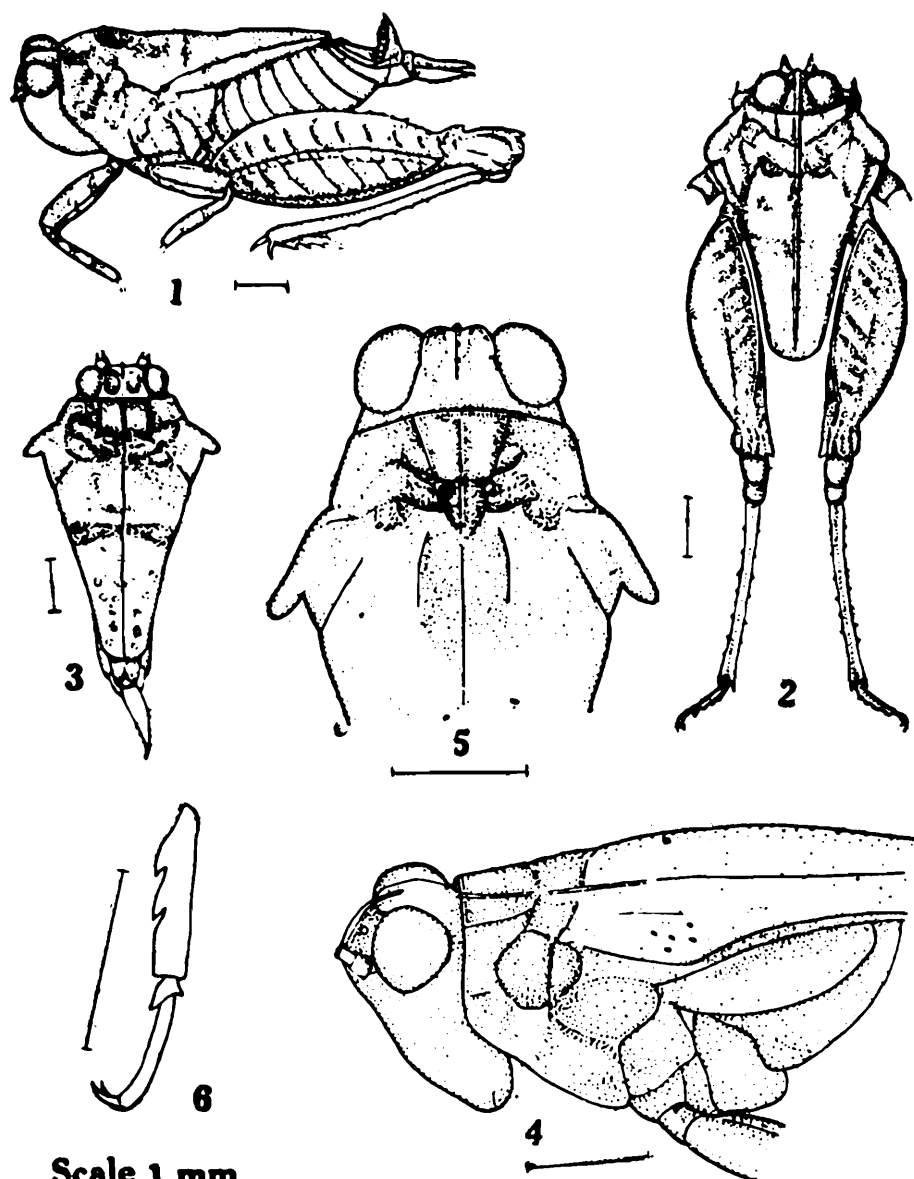
Size small. Colour brown or fuscous, with a brown or dark brown spot or band on either side behind the shoulders ; posterior tibiae annulated with yellow and dark brown colour.

Male, female : Head slightly or not exserted above the pronotum ; vertex as broad as or slightly narrow than one of the eyes, fossulated on either side of the median carinula, ampliate behind the fossulae, produced in front as far as eyes, front margin transverse, low, reflexed laterally, middle carinula visible half way, lateral carinulae distinct upto one-fourth distance of eyes ; frontal costa bifurcated behind the paired ocelli, and narrowly sulcated between them but widely sulcated in front, gently arcuate between the antennae ; paired ocelli placed more or less between the middle of eyes. Antennae filiform and inserted at the base of eyes. Eyes globular and more or less on the level of vertex surface.

Pronotum subtruncate anteriorly, extend upto the middle of hind femora (not reaching upto the apex of abdomen) posteriorly, the apex widely rounded ; dorsum finely granulose or rugose and tuberculose, wide and convex or little convex between shoulders, depressed or not depr-

essed behind the shoulders, brown or dark brown patch or band present behind shoulders ; median carina compressed, a little arcuate forward, straight on shoulders and slopping backward ; humeral angles obtuse

Plate 30



Scale 1 mm.

PLATE 30 : Fig. 1. Dorso-lateral view of *Paratettix hancockus* (Shishodia & Varshney).

Fig. 2. Top view of *Paratettix hancockus* (Shishodia & Varshney).

Fig. 3. Top view of *Paratettix hancockus* (Shishodia & Varshney).

Fig. 4. Dorso-lateral view of head and thorax of *Coptotettix artolobus* Hancock (Type).

Fig. 5. Top view of head and thorax of *C. artolobus* Hancock (Type).

Fig. 6. Posterior tarsal segments of *C. artolobus* Hancock (Type).

carinate ; lateral carinae visible and to the level of median carina behind ; sometimes indistinct lateral line runs obliquely from lateral

carina, which joins median carina before the apex ; posterior angles of lateral lobes of pronotum wide and roundly produced ; paranota with one projection. Elytra minute and elongate. Wings abbreviated or absent ; anterior femora hairy, widened, finely crenulated on superior margin, a little lobate behind the middle on inferior margin ; middle femora also hairy, widened, in male more widened and compressed, a little wavy behind the middle on inferior margin ; posterior femora very stout, crassate and finely crenulate on superior margin with one angular lobe before the knees ; hind tibiae fuscous with yellow band ; first tarsal segment of hind tarsi longer than third ; first and second pulvilli of posterior tarsi acute, small, third longer.

Measurements (in mm.) : Body length ♂ 6.5-7, ♀ 8-8.5 ; body length with pronotum ♂ 4.9-5.9, ♀ 5.9-6.4 ; pronotum length ♂ 4.5-5, ♀ 4.5-5.5 ; posterior femora length/width ♂ 4.5-5/2, ♀ 5.5/2.1 ; shoulder width ♂ 2.1-2.3, ♀ 2.6-2.9.

Material examined : Tripura : 5 ♂♂, 4 ♀♀, Teliamura : Burma Chara, 150 m, 10. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Ambassa, 200 m, 17. xi. 1974, coll. M. S. Shishodia.

West Bengal : 1 ♀, Darjeeling Distt. : Rhinock, 6. ix. 1959, coll. B. K. Tikader ; 1 ♂, Calcutta : B. garden, 31. viii. 1965, coll. K. S. Pradhan & K. V. L. Narayan ; 1 ♂, 1 ♀, 24-Parganas Distt. : Diamond Harbour, 31. xii. 1965, coll. S. K. Tandon ; 2 ♂♂, 24-Parganas distt. : Barasat, 5. i. 1966, coll. J. R. Singh ; 1 ♂, Howrah Distt. : Uluberia, 19. iii. 1966, coll. M. S. Shishodia & B. K. Bhattacharya ; 1 ♀, 24-Parganas Distt. : Datta Pukur, 6. xii. 1966, coll. A. N. T. Joseph ; 2 ♂♂, Darjeeling Distt. : Rangpo, 7. iv. 1973, coll. H. S. Sharma ; 1 ♂, Darjeeling Distt. : Singla, 16. iv. 1973, coll. H. S. Sharma ; 1 ♂, 24-Parganas Distt. : Hatberia, 1. viii. 1977, coll. N. K. Pramanik ; 1 ♂, Hooghly Distt. : Baidyabati, 8. xii. 1977, coll. M. S. Shishodia ; 1 ♀, Darjeeling Distt. : Kurseong, 1475 m, 15. v. 1979, coll. M. S. Shishodia ; 2 ♀♀, Darjeeling Distt. : Lebong, 1759 m, 18. v. 1979, coll. M. S. Shishodia ; 2 ♀♀, Darjeeling Distt. : Teesta Bazar, 24. v. 1979, coll. M. S. Shishodia ; 1 ♂, 24-Parganas Distt. : Narendrapur, 30. viii. 1979, coll. M. S. Shishodia.

Manipur : 2 ♂♂, Jiribam river bank, 13. ii. 1975, P. T. Cherian ; 1 ♀, Central Distt. : Praboth Hill : Keibul Sanctuary, 19. ii. 1975, coll. P. T. Cherian ; 1 ♀, Southern Distt. : Lockchan river bank, 22. ii. 1975, coll. P. T. Cherian ; 1 ♂, Southern Distt. : Moreh, 23. ii. 1975, coll. P. T. Cherian ; 2 ♂♂, 2 ♀♀, Ukhrul, 4. iii. 1975, coll. P. T. Cherian ; 1 ♂, 1 ♀, Moreh : Burma border, 600 m, 26. ix. 1975, coll.

M. S. Shishodia.

Arunachal Pradesh : 1 ♂, 1 ♀, Kameng Divi. : Bhaluk Pung : Elephant flat, 700 m, 23. xii. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 1 ♀, Siang Divi. : Lekhabali : around camp, 7 x. 1966, coll. S. K. Tandon and G. S. Arora ; 2 ♂♂, 5 ♀♀, Siang Divi. : New Jining, 100 m, 18 & 19. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Subansiri Divi. : Daporijo : Pakha camp, 26. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Siang Divi. : Bame village, 600 m, 30. xi. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, Lohit Divi. : Sadiya Road, 300 m, 8. iii. 1969, coll. S. K. Tandon ; 1 ♀, Lohit Divi. : Tezu, 150 m, 10. iii. 1969, coll. S. K. Tandon ; 1 ♀, Lohit Divi. : Namsai : M. T. Forest, 100 m, 17. iii. 1969, coll. S. K. Tandon ; 1 ♂, Daphabum Expd., Subansiri Divi. : Tihum, 4160 ft., 14. xii. 1969, coll. J. M. Julka ; 1 ♀, Daphabum Expd., Subansiri Divi. : Kharang, 2900 ft., 11. i. 1970, coll. J. M. Julka ; 1 ♂, 1 ♀, Tirap Divi. : Deomali Forest, 250 m, 9-10. xi. 1971, coll. G. S. Arora.

Assam : 2 ♂♂, 2 ♀♀, Sonai Rupai Forest, 343 m, 30. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 2 ♂♂, Assam Forest Hills, 2. iii. 1973, coll. S. K. Tandon and A. N. T. Joseph ; 1 ♂, Goalpara Distt. : Raimona, 11. xi. 1974, coll. S. K. Tandon.

Sikkim : 1 ♂, 1 ♀, Rangli, 830 m, 20 & 23. xii. 1975, coll. G. K. Srivastava ; 1 ♀, Gangtok : Deer Park, 1759 m, 31. v. 1979, coll. M. S. Shishodia ; 1 ♂, Gangtok, 1700 m, 2. vi. 1979, coll. M. S. Shishodia ; 5 ♂♂, 3 ♀♀, Rangpo : Martham (Middle camp), 7. iv. 1981, coll. R. K. Varshney.

Geographical distribution : India (Bihar, West Bengal, Arunachal Pradesh, Assam, Sikkim) ; Bangladesh.

Remarks : *Coptotettix parvulus* Hancock has been renamed as *Coptotettix hancockus* (Shishodia & Varshney, 1987). Later on this species transferred to *Paratettix* (Shishodia, 1987) due to its more similarity with the latter.

About 100 examples are studied here and it is found that the species show variations in colouration, compressed elevation of pronotum towards front, tuberculations or granulations, frontal sulcus and vertex. The extent of dark markings behind the shoulders varies from lateral spots or patches to light transverse band thus superficially resembling *Coptotettix pusillus* Hebard of South India. A little less than half of the specimens have a little compressed elevation of pronotum in front of shoulders and fine granulations on surface of dorsum of pronotum. All the three specimens collected from Sonai Rupai Forest, Assam, are without frontal compression and elevation, with very fine granulations,

vertex more narrow forward and frontal sulcus not widely divergent anteriorly. It is seen that the compressed elevation and granulation of pronotum depend upon the age of specimens as they grow older, the granulation and elevation become distinct.

58. *Paratettix curtipennis* (Hancock) 1912

(Plate 27, figs. 1-4)

Coptotettix curtipennis Hancock, 1912, *Mem. Dep. Agric. India ent Ser.*, 4 : 146.

Paratettix curtipennis, Hancock, 1915, *Rec. Indian Mus.*, 11 : 113.

Size medium but robust. Colour brown or dark brown or grey, variegated with white, sometimes dull yellow, always with a dark spot on either side behind the shoulders.

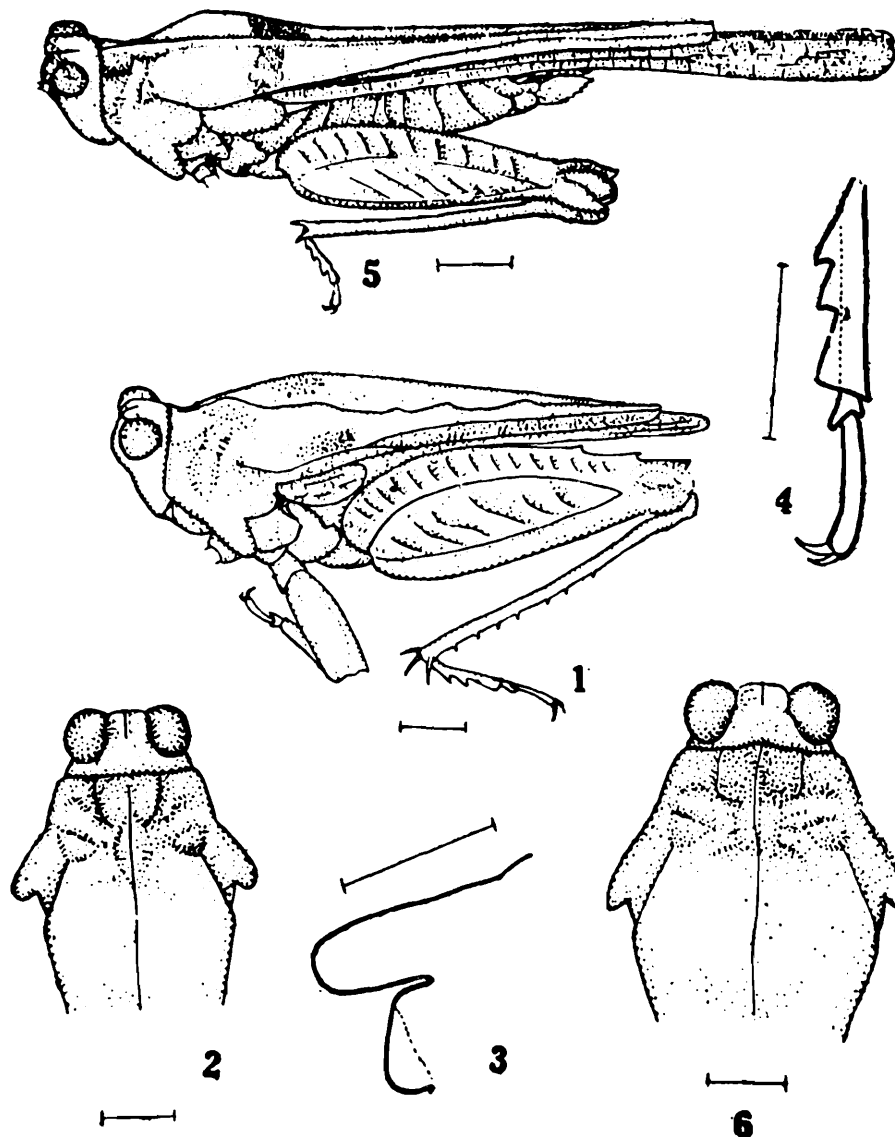
Male, Female : Head slightly exserted above the pronotum ; vertex narrower than one of the eyes, fossulate on either side, ampliate behind the fossulae, produced in front as far as eyes, front margin transverse, low, reflexed angularly at the sides, lateral carinulae extend upto one-fourth the distance of eyes, raised upto the level of eyes, middle carinulae distinct, elevated, extend upto the two-thirds of eyes behind ; frontal costa bifurcate behind the paired ocelli, widely sulcate, the rami divergent, in profile more elevated between the antennae, low in front ; paired ocelli located between the middle of eyes or slightly lower. Antennae filiform, situated on the lower margin of eyes or a little below. Eyes globular from top, subconoidal in profile.

Pronotum truncate in front, cuneate posteriorly and extend upto the apex of abdomen or a little shorter ; dorsum convex, wide and deplanate between shoulders, gibbucose between the sulci in front, granulate and rugulose with a depression on either side behind the shoulders ; median carina arcuate forward between the sulci, low in front, depressed on shoulders, undulated or not ; abbreviated carinae on the shoulders absent ; prozonal carinae distinct, convergent behind ; lateral carinae low, finely serrulate ; humeral angles obtusely angulate ; posterior angles of lateral lobes of pronotum wide, rounded at apex ; paranota with two projection. Elytra of moderate size, oblong, rounded at apex. Wings extend upto the apex of pronotum or a little surpass ; anterior femora elongate, compressed, margins subentire ; middle femora elongate, appreciably compressed, wide, setose or hirsute below ; posterior femora stout, crassate margins, especially the distal half, distinctly serrulate with angular lobe before the knees ; first article of the posterior tarsi longer than the third ; the first and second pulvilli

small, the third pulvilli longer than the first two.

Measurements (in mm.) : Body length ♂ 8.8-10, ♀ 10.2-11 ; body length with pronotum ♂ 8.6-10. ♀ 9.5-10 ; pronotum length ♂ 7.5-9,

Plate 27



Scale 1 mm.

PLATE 27 : Fig. 1. Dorso-lateral view of *Paratettix curtipennis* (Hancock).

Fig. 2. Top view of head and thorax of *Paratettix curtipennis* (Hancock).

Fig. 3. Posterior angles of lateral lobes of pronotum of *P. curtipennis* (Hancock).

Fig. 4. Posterior tarsal segments of *P. curtipennis* (Hancock).

Fig. 5. Dorso-lateral view *P. cingalensis* (Walker).

Fig. 6. Top view of head and thorax of *P. rotundatus* (Hancock).

♀ 8.3-9.1 ; posterior femora length/width ♂ 5.4-6/1.8-2.4, ♀ 6.4-7/2.5-2.9 ; shoulder width ♂ 2.4-3, ♀ 3.5-3.7.

Material examined : 2 ♂♂, 1 ♀ and 4 nymphs, West Bengal : Darjeeling Distt. : Ghumti, 1216 m, -. vii. 1911, coll. F. H. Gravely

[Reg. Nos. of Zoological Survey of India, 1511/20, 1514/20, 1516/20, 1520/20, 1523/20 and 1525/20] ; 2 ♂♂, 4 ♀♀, Assam : Sonai Rupai Forest : Missamari, 105 m, 29. xi. 1965, coll. S. K. Bhattacharya ; 1 ♀, Arunachal Pradesh : Lohit Divi. : Namsai, 100 m, 15. iii. 1966, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Siang Divi. : Lekhabali : bank of Siji river, 140 m, 2. x. 1966, coll. S. K. Tandon ; 1 ♂, Arunachal Pradesh : Tirap Divi. : Jairampur, 225 m, 27. x. 1971, coll. G. S. Arora ; 1 ♂, West Bengal : Darjeeling Distt. : Singla, 16. iv. 1973, coll. H. S. Sharma ; 2 ♀♀, Darjeeling Distt. : Singla : Karmaktar, 450 m, 3. i. 1976, coll. G. K. Srivastava ; 1 ♂, West Bengal : Darjeeling 2123 m, 17. v. 1979, coll. M. S. Shishodia ; 1 ♂, 2 ♀♀, Sikkim : Gangtok : Burtuk, 1759 m, 30. v. 1979, coll. M. S. Shishodia.

Geographical distribution : India (West Bengal, Meghalaya) ; Burma ; Vietnam ; Laos ; South China ; Taiwan.

Remarks : This species is short winged and can be readily separated from all the other known species under the genus by its robust size, deplanate dorsum of shoulders, widely sulcate frontal costa, and not always undulate and interrupted median carina of pronotum.

59. *Paratettix cingalensis* (Walker), 1871 (Plate 27, fig. 5)

Tettix cingalensis Walker, 1871, *Cat. Derm. Salt. Brit. Mus.*, 5 : 827.

Euparatettix cingalensis, Kirby, 1910, *Cat. Orth.*, 3 : 31.

Paratettix cingalensis, Kirby, 1914, *Fauna Brit. India, Orth.* 63.

Medium in size. Colour brown or ferruginous or grey, variegated with white, sometimes the dorsal surface of pronotum in front of shoulders and the vertex dark brown, while the pronotal process and the lateral sides brown, dorsum behind the shoulders with a triangular dark brown spot, sometimes a curved dark brown narrow band present on either side of shoulders.

Male, female : Head a little exserted ; vertex equal to or a little broader than an eye, a little elevated in front, not narrowed anteriorly, frontal carinae truncate, lateral carinulae prominent upto one-fourth the distance of eyes, elevated upto the level of eyes or a little more, roundly join the front margin, middle carinula lower than lateral carinulae, distinct upto the occipital region, with a depression on either side ; frontal costa bifurcate before the paired ocelli, gradually diverge in front, a little wide between antennae, sloping towards the base in front ; paired ocelli placed in between the eyes. Antennae filiform, placed below

the middle of eyes. Eyes globular.

Pronotum truncate or subtruncate anteriorly, attenuate posteriorly, extend beyond the hind femoral apices ; dorsum granulated or punctate ; median carina compressed, a little or well raised, generally arched in front, low behind ; prozonal carinae distinct, a little converge behind ; abbreviated carinae on either side of shoulders absent ; lateral carinae distinct but lower than median carina ; humeral angles obtusely angulated ; posterior angles of lateral lobes of pronotum turned downwards, wide, roundly truncate at apex ; paranota with two projections. Elytra elongate, rounded at apex. Wings extended beyond the pronotal apex (1.1-1.5 mm) ; anterior femora elongate, granulate, finely crenulate on margins ; middle femora elongate, granulate, compressed, finely crenulate ; posterior femora elongate, a little crassate, crenulated on margins ; first segment of posterior tarsi longer than the third ; first and second pulvilli acute, shorter than third, third pulvilli longer than the first two and not acute.

Measurements (in mm.) : Body length ♂ 7.5-8.8, ♀ 9-9.5 ; body length with pronotum ♂ 9-12.5, ♀ 11 ; pronotum length ♂ 8.8-11.5, ♀ 10 ; posterior femora length/width ♂ 4.5-5/1.6-2, ♀ 5.1-5.7/1.9-2.3 ; shoulder width ♂ 1.9-2.3, ♀ 2.5-2.7.

Material examined : 1 ♂, Arunachal Pradesh : Subansiri Divi. : Pakha camp : Daporijo, 150 m, 26. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♂, 1 ♀, Meghalaya : Jaintia Hills : Sonapardi : Jowai Road, 28. viii. 1974, coll. A. R. Lahiri ; 1 ♂, Manipur : Central Distt. : Toya Hill : Keibul Sanctuary, 18. ii. 1975, P. T. Cherian ; 2 ♂♂, Meghalaya : Dainadubi I. B. (at light), 16. ix. 1975, coll. N. Muralidharan ; 1 ♂, 1 ♀, Manipur : New Churachandpur : C R. P camp, 912 m, 18. ix. 1973, coll. M. S. Shishodia ; 2 ♂♂, 1 ♀, Manipur : Loktak Lake, 20. ix. 1975, coll. M. S. Shishodia ; 2 ♀♀, Manipur : Moreh : Burma Border, 24. ix. 1975, coll. M. S. Shishodia ; 1 ♂, Assam : Cachar Distt. : Indranagar, 2. x. 1975, coll. N. Muralidharan ; 1 ♂, Sikkim : Rangpo, 28. v. 1979, coll. M. S. Shishodia ; 1 ♂, Sikkim : Gangtok : near Deer Park, 31. v. 1979, coll. M. S. Shishodia ; 2 ♂♂, 2 ♀♀, Sikkim : Pagla Khola, 750 m, 19. vii. 1979, coll. M. Prasad.

Geographical distribution : India ; Sri Lanka ; Taiwan ; Hainan ; Sumatra ; Borneo ; Malaya ; Mindanao.

Remarks : *Paratettix cingalensis* (Walker) differs from the remaining species of *Paratettix* studied here by its compressed and raised median carina which is generally arched in front. North-East Indian specimens have their median carina less elevated in comparison with

that of the South Indian specimens. Most of the specimens examined here are larger than those described by Walker (1871), Hancock (1904) and Kirby (1914).

60. **Paratettix hirsutus** Brunner, 1893

(Plate 28, figs. 1-3)

Paratettix hirsutus Brunner, 1893, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 110.

Paratettix hirsutus, Kirby, *Fauna Brit. India, Orth.* : 65, fig. 57.

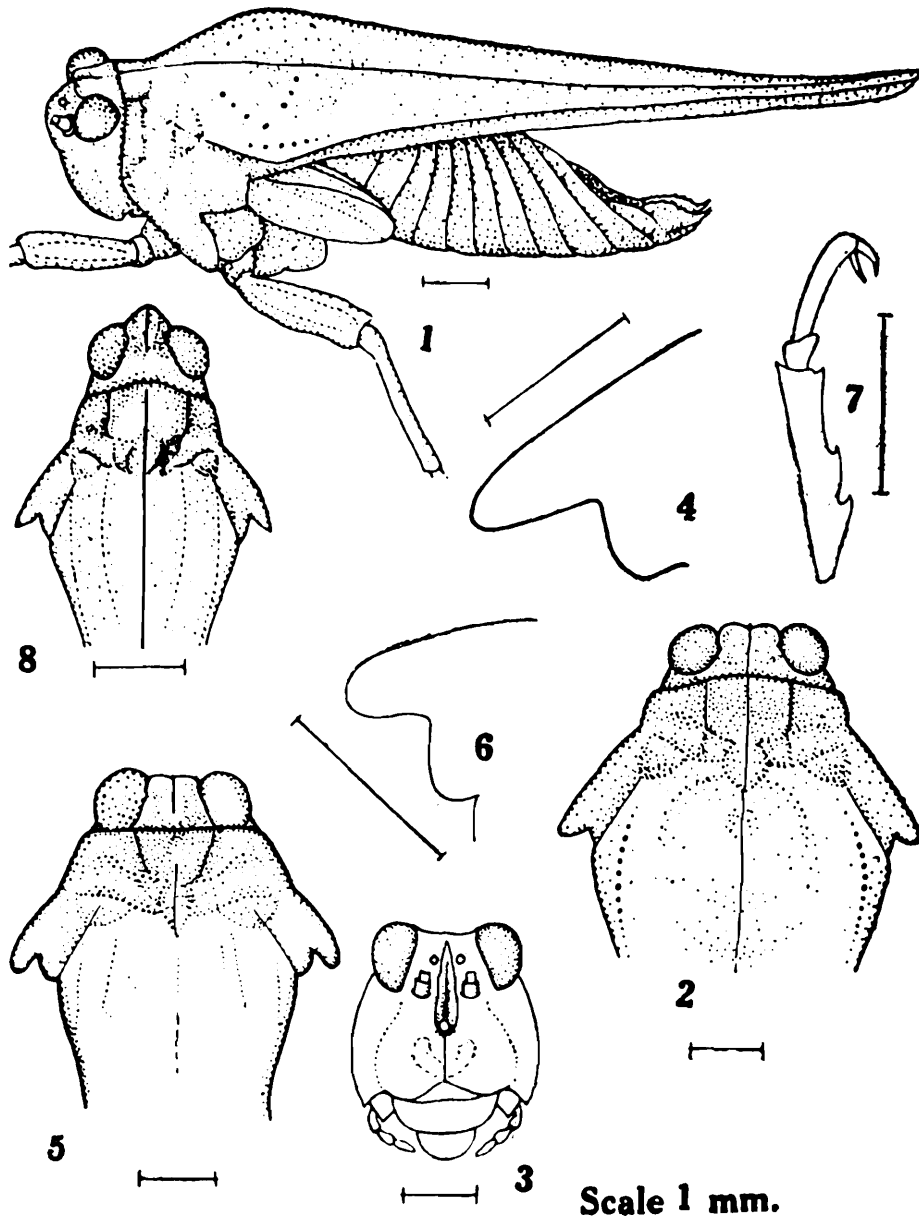
Brunner (1893) described this species from Burma, and Hancock (1915) recorded it for the first time from India (Assam : Sibsagar). I have examined the specimen present in the Zoological Survey of India collection, which was determined by J. L. Hancock.

Body moderately stout. Colour ferruginous, hind tibiae with two whitish bands.

Male, female : Head not exserted ; vertex as wide as an eye, depressed on either side of the middle carinula, ampliate behind the depression, produced upto the eyes in front, not elevate above the pronotum, median carinula a little produced in front, distinctly visible upto the end of depression, lateral carinulae elevate upto the level of eyes, reflexed laterally in front, front margin truncate or subtruncate ; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arcuate between the antennae, moderately sulcate ; paired ocelli placed between the middle of eyes or slightly below them. Antennae filiform and located on the inferior margin of eyes. Eyes globular, not elevated above the pronotum.

Pronotum subtruncate or truncate anteriorly, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum granulose, wider and convex between the shoulders, depressed behind ; middle carina compresso-elevated and arcuate in front of the shoulders, a little depressed behind ; prozonal carinae parallel ; abbreviated carinae absent ; humeral angles obtuse, lateral carinae slightly compressed on the base of pronotal process and finely serrulate at apex ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards and rounded at apex. Elytra wider in the middle, apex narrowly rounded. Wings extend beyond the apex of pronotum ; anterior femora elongate, compressed, hirsute, margins entire ; middle femora elongate, compressed, bicarinate, hirsute, margins finely serrulate ; posterior femora stout, crassate, antegenicular denticle strongly

spinose and elevate, margins finely serrate ; first segment of posterior tarsi longer than the third ; third pulvilli of first segment of posterior tarsi longer than the second,

Plate 28

- PLATE 28 :** Fig. 1. Dorso-lateral view of *Paratettix hirsutus* Brunner.
 Fig. 2. Top view of head and thorax of *P. hirsutus* Brunner.
 Fig. 3. Front view of head of *P. hirsutus* Brunner.
 Fig. 4. Posterior angles of lateral lobes of pronotum of *P. alatus* Hancock.
 Fig. 5. Top view of head and thorax of *P. alatus* Hancock.
 Fig. 6. Posterior angles of lateral lobes of pronotum of *P. alatus* Hancock.
 Fig. 7. Posterior tarsal segments of *P. alatus* Hancock.
 Fig. 8. Top view of head and thorax of *Hedotettix costatus* Hancock.

Measurements (in mm.) : Body length ♂ 9, ♀ 11 ; body length with pronotum ♂ (damaged), ♀ 14 ; pronotum length ♂ (damaged),

♀ 13 ; posterior femora length/width ♂ (missing), ♀ (missing) ; shoulder width ♂ 3.2, ♀ 4.0.

Material examined : 1 ♂, 1 ♀, Assam : Sibsagar, coll. S. E. Peal ; 1 ♂, Assam : Tezpur : Majgaon, 79m, 30. v. 1966, coll. A. N. T. Joseph ; 1 ♂, Tripura : Agartala : M. B. College campus, 25m, 1. xi. 1974, coll. M. S. Shishodia ; 1 ♀, Assam : Dubri, 10. xi. 1974, coll. S. K. Gupta ; 2 ♀ ♀, Tripura : Ambassa, 25. v. 1978, coll. J. K. Jonathan ; 1 ♂, Meghalaya : Daina dubi I. B. (at light), 16. ix. 1975, coll. N. Muralidharan ; 1 ♂, Meghalaya : Songsak I. B. (at light), 21. ix. 1975, N. Muralidharan ; 1 ♂, 1 ♀, Meghalaya : Rongram, 25. ix. 1975, coll. N. Muralidharan.

Geographical distribution : India (Assam) ; Burma.

Remarks : This species can be identified easily by the wide and deplanate pronotum in between the shoulders which is also depressed behind, unwaved median carina, upper carina of posterior femora which is strongly serrulate towards the knees and the more strongly elevated and acute antegenicular denticles.

61 *Paratettix rotundatus* Hancock, 1915

(Plate 27, fig. 6)

Paratettix rotundatus Hancock, 1915, *Rec. Indian Mus.*, 11 : 112.

Body moderately stout and hirsute below. Colour ferruginous.

Male : Head not exserted ; vertex wider than an eye, not produced in front of the eyes, fossulate on either side, a little ampliate behind the fossae, median carinula distinct behind upto the end of fossae, lateral carinulae elevate upto the level of eyes, roundly reflexed laterally, front margin truncate, not carinate and interrupted medially ; frontal costa bifurcate between the paired ocelli, moderately arcuate between the antennae, gently sulcate ; paired ocelli placed between the middle of eyes or slightly below. Antennae filiform and situated nearly on the inferior margin of eyes. Eyes globular and not elevate above the pronotum.

Pronotum a little obtusely angulate anteriorly, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum tumid between the shoulders, planate behind, granulose, tuberculose ; median carina compressed and a little arcuate, subgibbose in front of the shoulders and depressed between them, a little compressed behind ; humeral angles depressed, obtuse ; lateral carinae slightly compressed on the base of pronotal process ; prozonal carinae moderate and parallel behind ;

abbreviated carinae absent ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards and rounded at apex. Elytra elongate, a little wider in the middle, narrow at apex. Wings extend beyond the apices of posterior femora ; anterior femora elongate, bicarinate, hirsute on margins, margins entire ; posterior femora stout, crassate, antegenicular denticle prominent, margins finely serrulate ; first segment of posterior tarsi longer than the third ; all the pulvilli of first segment of posterior tarsi spinose, the third pulvilli a little longer than the second.

Measurements (in mm.) : Body length ♂ 9-10 ; body length with pronotum ♂ 11.5-12 ; pronotum length ♂ 10-11 ; posterior femora length/width ♂ 6.2-6.4/2.7-2.9 ; shoulder width ♂ 2.9-3.4.

Material examined : 1 ♂, Arunachal Pradesh : Siang Divi. : Lekhabali, 7. x. 1966, coll. S. K. Tandon and G. S. Arora.

Geographical distribution : India (Assam).

Remarks : *Paratettix rotundatus* Hancock, *P. alatus* Hancock and *P. hirsutus* Brunner are the three similar regional species under the genus. Out of these, *P. rotundatus* is closely similar to *P. hirsutus* in spite of the wider vertex, compressed subgibbose median carina of pronotum in front, wider sulcated frontal costa and the minutely serrulated superior carina of posterior femora. I agree with Hancock's (1915) remark that this species may be a variety of *P. hirsutus*. These two species appear to me synonyms but it is not being done for want of their types. The species under consideration differs from *P. alatus* Hancock by the narrow frontal sulcus, narrower posterior angles of lateral lobes of pronotum and two white and two black annulations on posterior tibiae.

62. *Paratettix alatus* Hancock, 1915

(Plate 28, figs. 4-7)

Paratettix alatus Hancock, 1915, *Rec. Indian Mus.*, 11 : 113-114.

Body moderately stout and hirsute below. Colour ferruginous.

Head exserted ; vertex equal to an eye, not elevated above the pronotum, extend upto the eyes in front, fossulate on either side of median carinula, a little ampliate behind the fossae, median carinula distinct throughout its length, lateral carinulae elevated upto the eyes, front margin truncate ; frontal costa bifurcate behind the paired ocelli, compresso-elevated between the eyes, moderately sulcate behind the

antennae and widely sulcate in front the antennae ; paired ocelli situated slightly below the middle of eyes. Antennae filiform and located below the inferior margin of eyes. Eyes globular and not raised above the pronotum.

Pronotum truncate anteriorly, subulate posteriorly and extend beyond the apices of posterior femora ; dorsum granulose, rugulose, a little tumid between the shoulders and planate behind them ; median carina depressed in front, swollen between sulci or compressed and a little arcuate subgibbose, depressed between the shoulders and subundulate behind ; humeral angles obtusely depressed ; lateral carinae posteriorly depressed on the base of the pronotal process and serrulate at apex ; prozonal carinae distinct and slightly convergent behind ; abbreviated carinae absent ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, rounded at apex. Elytra wider in the middle and narrow at apex. Wings extend beyond the apex of pronotum ; anterior and middle femora elongate, compressed, hirsute, margins subentire ; middle femora bicarinate ; posterior femora elongate, stout, crassate, antegenicular denticle prominent and sharp, a small lobe present on the superior margin before the denticle, superior margin finely serrulate ; first segment of posterior tarsi longer than the third ; third pulvilli of first segment of posterior tarsi longer than the second.

Measurements (in mm.) : Body length ♀ 11 ; body length with pronotum ♀ 13 ; pronotum length ♀ 12 ; posterior femora length/width ♀ 7/2.5 ; shoulder width ♀ 3.2.

Material examined : 1 ♀ , West Bengal : Darjeeling Distt. : Darjeeling 2128 m, 18. vi. 1914, coll. F. H. Gravely [Reg. No. of Zoological Survey of India, 1998/H5] ; 1 ♀ , N. Sikkim : Rongiroom, 8. vi. 1975, coll. G. K. Srivastava and P. K. Maiti ; 1 ♀ , Meghalaya : Daru Giri Forest Rest House (at light), 14. v. 1979, coll. S. B. Roy.

Geographical distribution : India (West Bengal).

Remarks : Hancock (1915) stated that his *Paratettix alatus* may be the long winged form of *Paratettix curtipennis* (Hancock). Subsequently Klaus Günther (1941) synonymised it with *P. curtipennis* but Steinmann (1970) had separated it from *P. curtipennis* and given specific rank. Since I have not examined the type of *P. alatus*, it is difficult for me to come to a definite conclusion. This species is caudate and can be distinguished from *P. curtipennis* (Hancock), by the long subulate hind process of pronotum which extends beyond the hind femoral apices.

63. *Paratettix tricarinatus* Bolivar, 1887

Paratettix tricarinatus Bolivar, 1887, *Annls Soc. ent. Bleg.*, 31 :28.

Size medium. Colour brown or ferruginous or dark brown or grey with a medio-longitudinal light yellow or brown stripe which covers the whole hind process of pronotum dorsally, but in one example the dorsum between and behind the shoulders light pink, which is dark brown in front of the shoulders, a dark brown spot of variable size present behind the shoulders, posterior tibiae dirty brown.

Male, female : Head a little or not at all exserted above the surface of pronotum ; vertex narrower than one of the eyes, narrowed forward, fossulate on either side, a little elevated in front, front margin truncate, low, angularly reflexed laterally, lateral carinulae raised upto the level of eyes and extend behind upto one-fourth the distance of eyes, middle carinula distinct and extend behind upto the end of fossulae ; frontal costa bifurcate behind the paired ocelli, a little arcuate, not sinuate ; paired ocelli placed before the middle of eyes. Antennae long, filiform, located below the middle of eyes. Eyes globular.

Pronotum truncate in front, acuminate posteriorly and extend beyond the apices of posterior femora ; dorsum convex on shoulders, granulose, with one indistinct oblique line on either side of shoulders which meet the lateral carinae anteriorly ; median carina depressed in front, compressed, elevated behind, straight on shoulders and hind process ; lateral carinae low ; prozonal carinae distinct and parallel ; humeral angles obtusely angulated ; paranota with two projections ; posterior angles of lateral lobes of pronotum wide, apex narrowly rounded. Elytra elongated, apex not narrowed. Wings surpass the pronotal apex (1.6-3 mm.) ; anterior femora elongate, convex, margins entire ; middle femora elongate, compressed, margin a little undulate and finely serrulate ; posterior femora elongate, a little crassate, margins finely serrulate ; first tarsal segment of posterior tarsi longer than the third ; third pulvilli longer than the first two.

Measurements (in mm.) : Body length ♂ 6.5-7, ♀ 7.5-8 ; body length with pronotum ♂ 9-10.8, ♀ 11-12 ; pronotum length ♂ 8.9-8, ♀ 10-11 ; hind femora length/width ♂ 4.6-4.8/1.5-1.7, ♀ 4.9-6.4/1.6-1.7 ; shoulder width ♂ 1.9-2.1, ♀ 2.1-2.8.

Material examined :

Tripura : 1 ♀, Charilam, 18. xi. 1969, coll. V. C. Agarwal ; 1 ♂, 1 ♀, Garjee, 25. xi. 1969, coll. V. C. Agarwal ; 1 ♂, Barpathari (Abh-way), 4. xii. 1969, coll. V. C. Agarwal ; 1 ♂, Ambassa, 3.i.1973, coll. V. C. Agarwal ; 7 ♂♂, 1 ♀, Teliamura : F. R. House, 150 m, 14.xi. 1974, coll. M. S. Shishodia.

West Bengal : 1 ♀, Calcutta, 23.i.1965, coll. M. S. Shishodia ; 2 ♂♂, 1 ♀, Hooghly Distt. ; Baidyabati, 8.xii.1977, coll. M. S. Shisho-

dia ; 1 ♀, Hooghly Distt., Baidyabati, 20.i.1978, coll. M. S. Shishodia.

Geographical distribution : Philippines ; Taiwan ; Mindanao ; Sulawesi ; Sumatra ; Malaya ; Papua.

Remarks : Bolivar (1887) described *Paratettix tricarinatus* from Philippines, and it is recorded here for the first time from India. Günther in 1941 brought it under *Euparatettix* but later on Steinmann (1970) brought it back to *Paratettix*. I agree with Steinmann because the head and vertex are a little or not exserted above the pronotum surface and the antennae are situated below the middle of eyes. *P. tricarinatus* Bolivar can be easily distinguished from the rest of the species of its genus by the narrower vertex, distinct and raised middle carina, convexity of dorsum on the shoulders, indistinct oblique line on the dorsum, compressed and elevated median carina in front of the shoulders, which is straight and low on shoulders and hind process, and presence of a dark brown spot behind the shoulders.

(22) Genus : **Hedotettix** Bolivar, 1887

Type species : *Acridium (Tetrix) gracile* De Haan, 1842

Hedotettix Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 283.

Body medium to large, sometimes small ; nearly smooth or slightly granulated. Colour dark brown, grey, brown or brown with dark brown patches of variable sizes on dorsum.

Head not exserted above the pronotum surface ; vertex equal to or narrower than one of the eyes, carinate in the middle, generally expanded and subtransverse or triangular in front, front margin carinate and roundly meet the lateral carinulae, lateral carinulae extend upto one-fourth the distance of eyes ; frontal costa arched between the antennae and not sinuated between the eyes. Antennae filiform, inserted below the middle of eyes. Eyes globular.

Pronotum truncate or obtusely angulate in front, extend behind upto the apex of abdomen or upto the apex of hind femoral apices or beyond it, narrowly rounded ; median carina slightly or well compressed, carinate, arched or not in front and sloping or substraight behind ; two abbreviated distinct or indistinct carinae present between the shoulders on the dorsum ; humeral angles obtusely rounded ; prozonal carinae distinct, not divergent posteriorly ; posterior angles of lateral lobes of pronotum very narrowly rounded or truncate or slightly pointed ; paranota with two projections. Elytra medium, elongate, rounded at the

tip, rarely pointed. Wings generally extended upto the pronotum or slightly beyond ; anterior femora elongate, entire or indistinctly undulate ; middle femora elongate, compressed, carinate, widened in male ; posterior femora stout, elongate, a little crassate, finely serrulate ; hind tibiae regularly spined ; first joint of hind tarsi long, the third joint shorter than the first.

Geographical distribution : India ; Nepal ; Sri Lanka ; Burma ; Thailand ; Java ; Vietnam ; Philippines ; Borneo ; Sumatra ; Celebes ; Mindanao ; Australia ; Africa ; Madagascar.

Key to the species of *Hedotettix* Bolivar, 1887

- | | | |
|---|-----|------------------------------|
| 1. Vertex angulate in front ; frontal costa strongly produced before the eyes ; front of head oblique ; median carina of pronotum very low, compressed a little or not | ... | <i>costatus</i>
Hancock |
| — Vertex not angulate in front ; frontal costa not produced as above ; median carina of pronotum not very low | ... | 2 |
| 2. Pronotal costa widely sulcate, the rami more or less abruptly widened between the antennae ; median carina of pronotum more or less compressed-arcuate forwards before the shoulders, highest at the sulci ; dorsum convex | ... | <i>gracilis</i>
(De Haan) |
| — Frontal costa not widely sulcate, the rami not widened between the antennae ; median carina of pronotum a little compressed, low arcuate forward | ... | 3 |
| 3. Moderately large ; frontal costa strongly arcuate ; blades of ovipositor generally long ; second and third pulvilli of the first joint of hind tarsi more or less equal in size | ... | <i>grossus</i>
Hancock |
| — Moderate ; frontal costa less strongly arcuate ; second and third pulvilli of the first joint of hind tarsi not equal in size | ... | <i>attenuatus</i>
Hancock |

64. *Hedotettix Costatus* Hancock, 1912 (Plate 28, fig. 8)

Hedotettix costatus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 147-148.

Medium sized. Colour brown or dark brown or grey, sometimes light yellow on dorsum with faint dark brown streak, and laterally dark brown, femora dark brown with brown or dull yellow shade, vertex also takes the shade of dorsum.

Male, female : Head not exserted above the pronotum ; vertex equal to or a little narrower than an eye, expanded, angularly produced

in front, middle carinate with a depression on either side, front and lateral carinulae distinct; frontal costa bifurcate between the paired ocelli, roundly arcuate, gently furcillate; paired ocelli placed above the middle of eyes. Antennae filiform, located between the middle of eyes. Eyes ovate or subconoidal when viewed in profile.

Pronotum obtusely angulate anteriorly, lengthily subulate posteriorly, extend beyond the hind femoral apices, narrowly rounded at apex; dorsum a little convex, finely granulose or with very thin uniformly linear markings or smooth; median carina low in front, a little compressed and elevated on the sulci and straight behind; abbreviated carinae on the shoulders indistinct; lateral carinae indistinct on the dorsum, distinct behind, elevate to the level of median carina; humeral angles obtusely rounded; prozonal carina distinct, parallel; posterior angles of lateral lobes of pronotum turned downwards, narrowly rounded; paranota with two projections. Elytra oblong, rounded at apex. Wings extend beyond the pronotal apex (1.6-2.1 mm.); anterior femora elongate, very finely serrulate by dots; middle femora elongate, a little compressed, wider in male, bicarinate, margins finely serrulate by dots; posterior femora elongate, a little crassate, finely serrulate on margins; first segment of hind tarsi longer than the third; first pulvilli of hind tarsi short, acute, second pulvilli more acute and a little longer, third pulvilli not acute, longer than the previous two, finely serrated on the superior margins.

Measurements (in mm.): Body length ♂ 7.9, ♀ 9.5-10; body length ♂ 10.5-12, ♀ 12-12.5; pronotum length ♂ 9.5-11, ♀ 10.5-11.5; posterior femora length / width ♂ 4.8-5.4/1.6-1.8, ♀ 5.4-6 / 1.9-2.1; shoulder width ♂ 1.8-2.3, ♀ 2.7.

Material examined: 1 ♀, Sikkim: Gangtok: Nayabazar, 1,000m, 28. iii. 1959, coll. A. G. K. Menon; 1 ♀ (nymph), West Bengal: 24-Parganas Distt., 9. xi. 1966, coll. S. B. Roy; 1 ♂, Tripura: Ambassa, 5. i. 1973, coll. V. C. Agarwal; 1 ♂, Tripura: Udaipur: Garjee, 7. xi. 1974, coll. M. S. Shishodia; 1 ♂, West Bengal: Berhampur: Murshidabad, 4. xi. 1974, coll. A. K. Hazra; 1 ♂, Tripura: Teliamura, 10. xi. 1974, coll. M. S. Shishodia; 1 ♀, Tripura: Ambassa, 19. xi. 1974, coll. M. S. Shishodia; 1 ♀, West Bengal: Birbhum Distt.: Rampurhat, 5. iv. 1986, coll. M. S. Shishodia.

Geographical distribution: India (Assam, Bihar, Uttar Pradesh); Nepal; Bangladesh.

Remarks: This species is quite distinct from the other species of *Hedotettix* described here and can be readily separated from them by the obtuse angulate vertex in front, low median carina of pronotum and

narrow sulcate frontal costa. It is somewhat similar to the European *Tetrix subulata* (Linnaeus), which has the inter ocular distance 1.5-2 times as wide as an eye, where as in the species under consideration, it is either equal or less.

65. *Hedotettix gracilis* (De Haan), 1842
(Plate 29, figs. 1-4)

Acridium (Tetrix) gracile De Haan, 1842, Temminck, *Verhandel., Orth.* : 167, 169.

Hedotettix gracilis, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 284.

Hedotettix festivus Bolivar, 1887, *Ibid* : 286.

Hedotettix gracilis abortus Hancock, 1904, *Spolia zeylan.*, 2 : 151.

Hedotettix diminutus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 148-149.

Hedotettix gracilis, Kirby, 1914, *Fauna Brit. India*, *Orth.* : 72, figs. 64-65.

Body small to large. Colour variable, yellow varied with brown and rose, or brown and green, with pale or reddish median and lateral carinae, a black oblong spot on each side before the lateral carinae in front, and a narrow angulate black mark touching the lateral carinae just behind the shoulders.

Male, female : Head not exserted above the pronotum surface, crown convex, vertex equal to or sub-narrower than one of the eyes, front margin rounded, middle carinula distinct upto the middle of eyes, elevate, depression present on either side, lateral carinulae roundly join the front carina, extend upto one-fourth the distance of eyes ; frontal costa strongly rounded, advanced before the eyes, widely sulcate, the rami widened between the antennae ; paired ocelli conspicuous just in front and barely above the middle of eyes. Antennae filiform, inserted below the middle of eyes. Eyes in profile sub-conoidal or globose.

Pronotum obtuse, angulate anteriorly, extend posteriorly upto the apex of hind femora or beyond, apex narrowly rounded, dorsum smooth or finely granulose, elevated and tectiform between shoulders ; median carina percurrent, a little eompresso-elevated longitudinally and arcuate anteriorly, straight posteriorly ; abbreviated carinae on each side between the shoulders on the dorsum distinct or indistinct ; humeral angles obtusely rounded ; lateral carinae visible, a little lower than median carina ; prozonal carinae distinct, parallel ; posterior angles of lateral lobes of pronotum turned downwards, narrowly rounded ; paranota with two projections. Elytra elongate, large in female, apical margin rounded. Wings extend upto the pronotum or surpass a little ;

anterior femora slender, a little convex, very finely granulose on margins ; middle femora elongate, compressed, bicarinate, wide in male, very finely granulose on margins ; posterior femora elongate, crassate, margins finely serrulate ; first tarsal segment of hind tarsi longer than

Plate 29

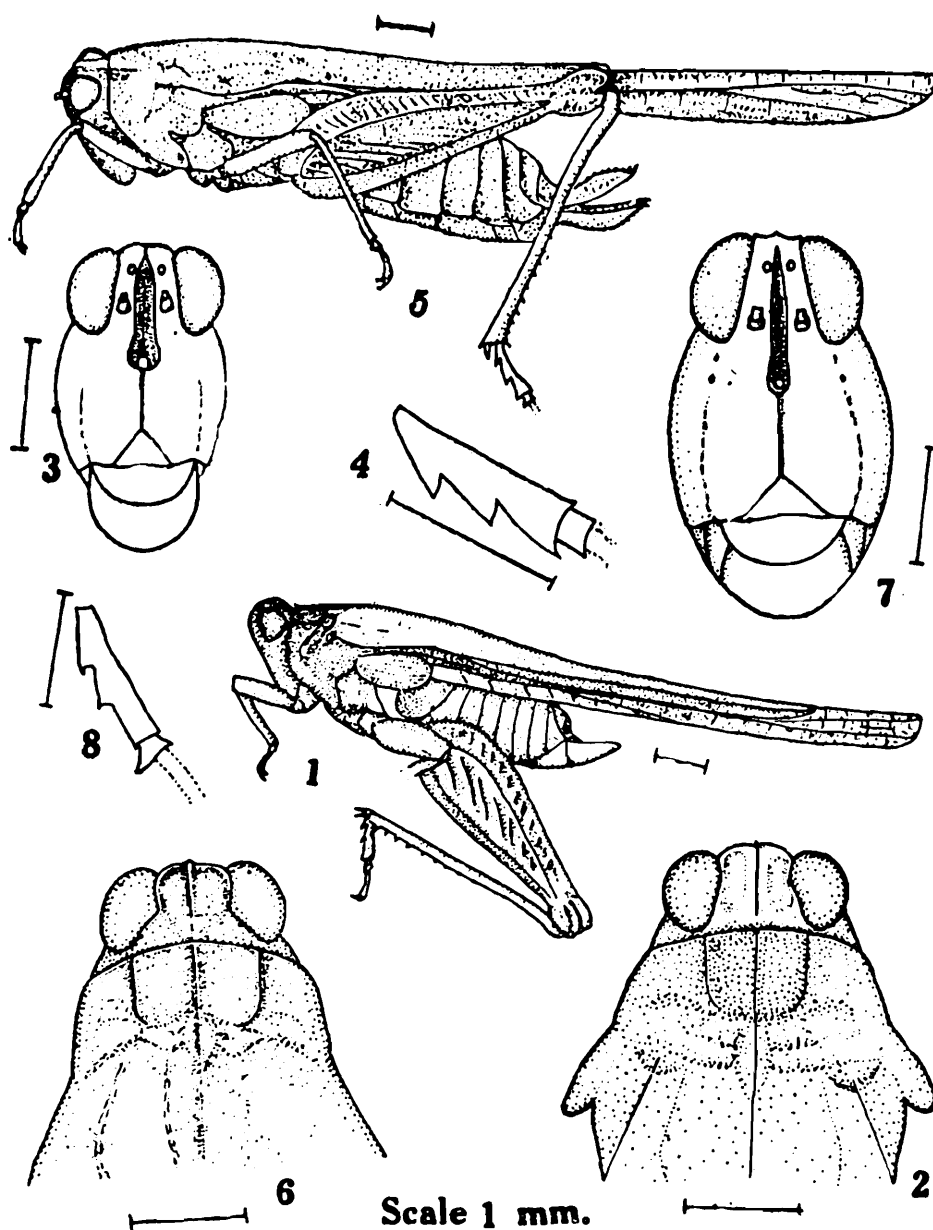


PLATE 29 : Fig. 1. Dorso-lateral view of *Hedotettix gracilis* (De Haan).
 Fig. 2. Top view of head and thorax of *H. gracilis* (De Haan).
 Fig. 3. Front view of head of *H. gracilis* (De Haan).
 Fig. 4. Posterior tarsal segments of *H. gracilis* (De Haan).
 Fig. 5. Dorso-lateral view of *H. grossus* Hancock (Type).
 Fig. 6. Top view of head and thorax of *H. grossus* Hancock (Type).
 Fig. 7. Front view of head of *H. grossus* Hancock (Type).
 Fig. 8. Posterior tarsal segments of *H. grossus* Hancock (Type).

third ; first and second pulvilli of posterior tarsi acute and smaller than third, third pulvilli longer than second and not acute.

Measurements (in mm.) : Body length ♂ 7.5-10, ♀ 9-10 ; body

length with pronotum ♂ 7.5-13, ♀ 8.6-13.5 ; pronotum length ♂ 7.5-12, ♀ 7.5-12.5 ; posterior femora length/width ♂ 5.4-6.4/1.5-2.1, ♀ 5.9-6.6/1.9-2.1 ; shoulder width ♂ 2.1-2.9, ♀ 2.1-3.

Material examined : West Bengal : 2 ♂♂, 2 ♀♀, Calcutta, —. vi. 1914, coll. F. H. Gravely ; 1 ♂, Calcutta, —. v. 1927, coll. H. S. Pruthi ; 1 ♂, Calcutta, —. vi. 1928, coll. H. S. Purthi ; 1 ♀, Darjeeling Distt. : East Himalayas : Sukna, 23-30. viii. 1928, coll. I. M. Puri ; 1 ♀, Calcutta, 11. ix. 1931, coll. S. R. ; 1 ♀, Calcutta University campus, 1948 ; 5 ♂♂, 4 ♀♀, Calcutta : B. garden, 26. x. 1949, coll. A. P. Kapur ; 1 ♀, Purulia, 23. ii. 1955, coll. A. P. Kapur ; 1 ♂, Calcutta : Basdhani, 4. xii. 1955, coll. A. Suroto and S. Ali ; 1 ♀, Calcutta : Ukilpara, 21. ix. 1961, coll. M. P. Kriplani ; 1 ♀, Hooghly Distt. : Bandel : Debababdapur, 26. x. 1964, coll. A. N. T. Joseph ; 1 ♀, Calcutta : Hastings, 31. v. 1965, coll. M. S. Shishodia ; 2 ♂♂, 3 ♀♀, 24-Parganas Distt. : Shyamnagar, 11. vi. 1965, coll. T. R. Chakraborty and B. K. Bhattacharya ; 1 ♂, 1 ♀, Nadia Distt. : Krishnanagar, 13. viii. 1965, coll. S. P. Chakraborty and K. D. Chatterjee ; 1 ♀, Hooghly Distt. : Chandannagar, 28. ix. 1965, coll. K. S. Pradhan ; 1 ♀, 24-Parganas Distt. : Ichapur, 8. xii. 1965, coll. K. R. Rao ; 5 ♂♂, 6 ♀♀, 24-Parganas Distt. : Diamond Harbour, 31. xii. 1965, coll. S. K. Tandon ; 1 ♀, 24-Parganas Distt. : Bangaon, 7. i. 1966, coll. B. K. Bhattacharya ; 2 ♀♀, Hooghly Distt. : Pandooah, 29. i. 1966, coll. K. S. Pradhan ; 2 ♂♂, 5 ♀♀, Burdwan Distt. : Ambika Kalna, 11. ii. 1966, coll. S. B. Roy ; 1 ♂, 3 ♀♀, 24-Parganas distt. : Khardah, 9, 21. xi. 1966, coll. S. B. Roy and T. K. Chakraborty ; 1 ♀, 24-Parganas Distt. : Baruipur, 8. xii. 1966, coll. K. R. Rao ; 1 ♂, 1 ♀, 24-Parganas Distt. : Datta Pukur, 8. ii. 1967, coll. K. R. Rao ; 4 ♂♂, 3 ♀♀, Darjeeling Distt. : Reyang, 31. iii. 1973, coll. H. S. Sharma ; 1 ♀, Darjeeling Distt. : Singla, 16. iv. 1973, coll. H. S. Sharma ; 1 ♀, Calcutta : Tollygunge, 10. x. 1977, coll. M. S. Shishodia ; 2 ♂♂, 6 ♀♀, Hooghly Distt. : Baidyabati, 8. xii. 1977, coll. M. S. Shishodia ; 2 ♂♂, 2 ♀♀, 24-Parganas Distt. : Narendrapur, 2, 30. viii. 1979, coll. M. S. Shishodia.

Arunachal Pradesh : 2 ♂♂, 1 ♀, Subansiri Divi. : Kimin, 198 m, 9. v. 1966, A. N. T. Joseph ; 1 ♀, Subansiri Divi. : Ziro, 1585 m, 13. v. 1966, coll. A. N. T. Joseph ; 1 ♀, Subansiri Divi. : Daporijo, 150 m, 28. x. 1966, coll. S. K. Tandon & G. S. Arora ; 1 ♂, Lohit Divi. : Sunpur, 100 m, 3. iii. 1969, coll. S. K. Tandon ; 2 ♂♂, 2 ♀♀, Lohit Divi. : Digaru Road, 150 m, 11. iii. 1969, S. K. Tandon ; 1 ♂, Lohit Divi. : Namsai, 100 m, 15. iii. 1969, coll. S. K. Tandon ; 1 ♀, Tirap Divi. : Jairampur, 225 m, 26. x. 1971, coll. G. S. arora.

Sikkim : 1 ♀ (nymph), Gangtok : Nayabazar : Lakship Road, 4.

i. 1976, coll. M. S. Shishodia.

Assam : 1 ♂, 3 ♀ ♀, Sonai Rupai Forest, 343 m, 29. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 2 ♀ ♀, Kaziranga, 100 m, 24. ii. 1969, coll. S. K. Tandon ; 1 ♂, Sadiya, 100 m, 28. ii. 1969, coll. S. K. Tandon ; 1 ♀, Cachar Distt. : Udhan band, 4. x. 1975, coll. N. Muralidharan ; 1 ♀, Mikir Hill, 3. xi. 1974, coll. S. K. Gupta ; 2 ♀ ♀, Goalpara Distt. : Bungalgaon, 9. xi. 1974, coll. S. K. Gupta.

Tripura : 1 ♀, Charilam, 16. xi. 1969, coll. V. C. Agarwal ; 1 ♀, Agartala, 31. x. 1974, coll. M. S. Shishodia ; 1 ♀, Teliamura : Golabari, 11. xi. 1974, coll. M. S. Shishodia ; 2 ♀ ♀, Ambassa, 25.v.1978, coll. J. K. Jonathan.

Manipur : 1 ♂, 1 ♀, Central Distt. : Toya Hills : Keibul sanctuary, 18. ii. 1975, coll. P. T. Cherian ; 1 ♂, Moreh, 24. ii. 1975, coll. P. T. Cherian ; 3 ♀ ♀, 2 kms north of Mao, 1710 m, 14. ix. 1975, coll. M. S. Shishodia ; 7 ♂ ♂, 5 ♀ ♀, New Churachandpur I. B., 18. ix. 1975, coll. M. S. Shishodia ; 1 ♀, Loktak Lake, 20. ix. 1975, coll. M. S. Shishodia ; 1 ♀, Moreh : Burma border, 24. ix. 1975, coll. M. S. Shishodia ; 2 ♂ ♂, 9 ♀ ♀, Ukhrul I. B., 1860 m, 29. ix. 1975 & 3. x. 1975, coll. M. S. Shishodia ; 1 ♂, Ukhrul : Hundung, 2. x. 1975, coll. M. S. Shishodia ; 13 ♂ ♂, 14 ♀ ♀, Ukhrul : Missionary school, 1860 m, 3. x. 1975, coll. M. S. Shishodia.

Meghalaya : 1 ♂, Rongram, 28. ix. 1975, coll. N. Muralidharan ; 1 ♂, Daru Giri Forest Rest House (at light), 14. v. 1979, coll. S. B. Roy.

Geographical distribution : India ; Pakistan ; Bangladesh ; Sri Lanka ; Burma ; Thailand ; Sumatra ; Java ; Celebes ; Vietnam ; Taiwan.

Remarks : About 240 examples are examined and it is found that there is considerable variations, especially in the pronotum and wings. There are two types of specimens, one with small and other with large pronotum and wings. Both types are found in the same place. Still smaller specimens are found in Calcutta and Arunachal Pradesh. The difference in size of the specimens show that the species occur in macro and microforms. This species is very closely related to *Hedotettix attenuatus* Hancock and *H. grossus* Hancock but differs from them in the frontal costa which is widely sulcate, and in the rami which are more or less abruptly widened in between the antennae.

66. ***Hedotettix grossus* Hancock, 1915**

(Plate 29, figs. 5-8)

Hedotettix grossus Hancock, 1915, *Rec. Indian Mus.*, 11 : 124.

Stature moderately large. Colour grey or dark brown with medio-longitudinally brown or dull yellow.

Female : Head not exserted above the pronotum ; vertex a little narrower than one of the eyes, a little narrowed forward, slightly depressed on either side, front margin convex and subroundly bent laterally, lateral carinulae receive the front carinulae roundly, extend upto one-fourth the distance of eyes, middle carinula raised and runs upto the middle of eyes ; frontal costa strongly arcuate, not widened between the antennae ; paired ocelli placed above the middle of eyes. Antennae filiform placed a little below the middle of eyes. Eyes globular when viewed from top, subconoid in profile.

Pronotum truncate anteriorly, acuminate posteriorly, extend beyond the hind femoral apices, narrowly rounded at apex ; dorsum convex, tectiform, granulose ; median carina low, a little compressed, low arcuate forward, substraight backward ; abbreviated carinae between the shoulders distinct ; prozonal carinae distinct, parallel ; lateral carinae low, very finely serrulate ; humeral angles obtusely rounded ; posterior angles of lateral lobes of pronotum turned downwards and narrowly rounded ; paranota with two projections. Elytra large (2.1 mm.), elongate, apices rounded. Wings surpass the pronotal apices (1.5-2.1) ; anterior femora elongate, margins entire ; middle femora elongate, compressed, bicarinate, margins very finely serrulate ; posterior femora elongate, crassate, margins very finely serrulate ; first joint of posterior tarsi longer than the third, finely serrulate above ; first pulvilli short, acute, second a little longer, acute, third a little longer than the second, not pointed ; valves of ovipositer generally large, curvate at apex, the margins above and below spined.

Measurements (in mm.) : Body length ♀ 10-12 ; body length with pronotum ♀ 13.5-15 ; pronotum length ♀ 12.5-14 ; posterior femora length/width ♀ 6.8-7/2.3-2.7 ; shoulder width ♀ 3.3-2.

Material examined : 1 ♀, Manipur : 16 miles north of Imphal on Dimapur Road, 1050 m, 8. x. 1945, coll. Maj. M. L. Roonwal ; 1 ♀, Assam : Garampani, 9. x. 1961, coll. R. N. Katiyar ; 1 ♀, Meghalaya : Khasi Hills : Mowphlong, 6. viii. 1963, V. D. Srivastava ; 1 ♀, Assam : Sonai Rupai Forest, 343 m, 29. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 1 ♀, Tripura : Agartala, 11. xi. 1969, coll. V. C.

Agarwal ; 3 ♀ ♀, Arunachal Pradesh : Tirap Divi : Margehrita, 125 m, 23. x. 1971, coll. G. S. Arora ; 1 ♀, Tripura : Agartala : Pratapgarh, 29. x. 1974, coll. M. S. Shishodia ; 1 ♀, Tripura : Ambassa, 25. v. 1978, coll. J. K. Jonathan.

Type specimen examined: Holotype ♀, Darjeeling Distt. : Singla, 450 m, —. v. 1913 (Lord Carmichael's colln.) [Reg. No. of Zoological Survey of India, 7810/20].

Geographical distribution : India (West Bengal).

Remarks: It is closely similar to the macropterous form of *Hedotettix gracilis* (De Haan) in the size and concavity of dorsum but differs from the latter only in the frontal costa which is strongly arcuate produced and not widened between the antennae, but this character is also seen in *H. attenuatus* Hancock. The species under study appears to be intermediate between *Hedotettix gracilis* (De Haan) and *H. attenuatus* Hancock. Hancock (1915) described *H. grossus* from a single female from Singla, Darjeeling Distt., West Bengal, and my collection also contains only females.

67. *Hedotettix attenuatus* Hancock, 1904

Hedotettix attenuatus Hancock, 1904, *Spolia zeylan.*, 2 : 108, 149, 151.

Body small to large, slender, somewhat smooth, finely granulose ; colour variable, ferrugineous or fusco-ferrugineous or green, sometimes with a broad longitudinal stripe of emerald green or light yellow with black oblong spot as in *Hedotettix gracilis* (De Haan).

Male, female: Head not exserted above the pronotum ; vertex narrower than an eye, front margin subtransverse, meet the lateral carinulae roundly, lateral carinulae extend behind upto one-fourth the distance of eyes, middle carinula raised with low depression on either side ; frontal costa bifurcate behind the paired ocelli, roundly arched, not suddenly divergent between the antennae, frontal sulcus gently wide anteriorly ; paired ocelli placed above the middle of eyes, conspicuous just in front. Antennae filiform, placed below the middle of eyes. Eyes in profile subconoid or globose.

Pronotum subtruncate or truncate anteriorly, extend posteriorly upto the apex of hind femora or considerably beyond, apex narrowly rounded ; dorsum smooth or finely granulose, convex and elevated between shoulders ; median carina hardly longitudinally arcuate anteriorly, straight posteriorly ; abbreviated carina distinct between the shoulders on the dorsum ; humeral angles obtusely rounded ; lateral

carinae as in *H. gracilis* (De Haan) ; prozonal carinae distinct and parallel ; posterior angles of lateral lobes of pronotum turned downwards, narrowly rounded ; paranota with two projections. Elytra elongate, large in female, apex rounded. Wings extend upto the pronotum or surpass slightly beyond ; anterior femora elongate, very finely granulate on margins ; middle femora elongate, compressed, more wide in male, bicarinate, very finely granulose on margins ; posterior femora elongate, crassate, finely serrulate on margins ; first tarsal segment of hind tarsi longer than third ; third pulvilli longer than the second and not acute at apex.

Measurements (in mm.) : Body length ♂ 8-10, ♀ 10-10.5 ; body length with pronotum ♂ 8.6-14, ♀ 11-14 ; pronotum length ♂ 7.5-10.5, ♀ 10-13 ; posterior femora length/width ♂ 4.8-6, ♀ 5.7-6.5/2.1 ; shoulder width ♂ 1.8-2.1, ♀ 2.5-2.7.

Material examined : *Meghalaya* : 1 ♂, 2 ♀ ♀, Dainadubi, 14. ix. 1975, N. Muralidharan ; 3 ♂ ♂, Songsak, 21. ix. 1975, coll. N. Muralidharan ; 2 ♀ ♀, One km S. E. of Rongram, 25. ix. 1975, coll. N. Muralidharan.

Assam : 3 ♂ ♂, 2 ♀ ♀, Sonai Rupai Forest, 343 m, 28, 29. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 2 ♂ ♂, 1 ♀, Tezpur : Majgaon, 79 m, 30. v. 1966, coll. A. N. T. Joseph ; 1 ♂, Bijri, 12. x. 1974, coll. S. K. Gupta ; 1 ♂, Kaziranga, 2. xi. 1974, coll. S. K. Gupta ; 1 ♂, Goalpara Distt. : Gosaingaon, 10. xi. 1974, coll. S. K. Gupta.

Arunachal Pradesh : 1 ♀, Daphabum Expd., Subansiri Divi. : Wakro, 516 m, 1. xii. 1969, coll. J. M. Julka ; 1 ♀, Tirap Divi. : Deomali Forest, 250 m, 10. xi. 1971, coll. G. S. Arora ; 1 ♂, Tirap Divi. : Pangsaupass, 1256 m, 28. x. 1971, coll. G. S. Arora ; 3 ♂ ♂, 2 ♀ ♀, Tirap Divi. : Margehrita, 125 m, 23. x. 1971, coll. G. S. Arora.

Manipur : 1 ♀, Imphal, 10-13. ix. 1945, coll. Maj. M. L. Roonwal ; 2 ♀ ♀, 16 miles N. of Imphal on Dimapur Road, 2550 m, 18. x. 1945, coll. Maj. M. L. Roonwal ; 1 ♂, Ukhrul : Horticulture Farm, 30. ix. 1975, coll. M. S. Shishodia ; 1 ♀, Ukhrul : Hundung, 2. x. 1975, coll. M. S. Shishodia ; 1 ♀, Ukhrul : Missionary School, 3. x. 1975, coll. M. S. Shishodia.

Tripura : 1 ♂, Saydibari, 29. xii. 1972, coll. V C. Agarwal ; 1 ♂, Ambassa, 25. v. 1978, coll. J. K. Jonathan.

Geographical distribution : India (Assam, Orissa) ; Sri Lanka.

Remarks : This species is closely related to *Hedotettix gracilis* (De Haan) and show dimorphism in the length of pronotum and wings. Two types of specimens are found to occur in the same locality, one is

smaller than the other. Hancock (1904) remarked that *H. attenuatus* Hancock is derived from *H. gracilis* (De Haan) and the present study also agrees with his observation as there are specimens with admixture of characters of both the species. *H. attenuatus* Hancock can be distinguished with difficulty from *H. gracilis* (De Haan) by the slender body, the narrower vertex, the narrowly sulcate frontal costa and not appreciably widened rami between the antennae.

(23) Genus *Coptotettix* Bolivar, 1887
Type species : *Coptotettix asperatus* Bolivar, 1887

Coptotettix Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 287.
Coptotettix, Kirby, 1914, *Fauna Brit. India, Orth.* : 74.

Size small to large. Colour testaceous or brown or grey to rufous or fuscous. Body more or less rugose or granulose.

Head not exserted or rarely a little exserted ; vertex subnarrower to narrower and narrowed forward ; front margin interrupted internally or recurved ; frontal costa rounded, more or less produced and furcillate. Antennae inserted below the middle of eyes, long, filiform. Eyes globular.

Pronotum truncate in front, extended behind upto the middle of hind femora or upto the apices of hind femora or very long and pointed ; dorsum granulose, rugulose, tuberculose, rarely tectiform ; median carina almost always depressed, rarely ridged. Elytra small, elongate or oblong. Wings abbreviated or caudate ; anterior femora often elongate, margins generally finely serrulate ; middle femora elongate or widened and lobate, margins finely serrulate ; posterior femora elongate or widened, stout, crassate, margins crenulate ; first article of posterior tarsi longer than third ; third pulvilli equal to second or longer.

Geographical distribution : India ; Pakistan ; Bangladesh ; Burma ; Sri Lanka ; Taiwan ; China ; Java ; Borneo ; Sumatra ; Philippines ; Key Inseln ; Australia ; Somali ; Guinea ; Natal ; West and East Africa ; Pegu.

Key to the species of *Coptotettix* Bolivar, 1887

- | | | |
|--|-----|------------------------------|
| 1. Size small ; elytra small | ... | 2 |
| — Size large ; elytra medium | ... | 3 |
| 2. Pronotum reaching upto the last abdominal segment or little more but never beyond the hind femoral apices ; dorsum not heavily granulose or tuberculose ; body length of male and female 7.5-13.5 mm. | ... | <i>annandalei</i>
Hancock |

- Pronotum reaching upto the last abdominal segment or upto the hind femoral apices ; dorsum strongly granulose or tuberculose ; body length of male and female 7.5-9.5 mm. ... *tuberculatus*
Bolivar
- 3. Head a little exerted ; vertex distinctly narrower towards front, middle carinula of vertex distinct and runs upto the end of fossulae ; frontal costa very low between lateral ocelli, more elevated and wide between antennae ; body length of male and female 8-10 mm. ... *tricarinatus*
sp. nov.
- Head not exerted ; vertex narrower towards front ; middle carinula of vertex runs upto the half distance of fossulae ; frontal costa not as above ... 4
- 4. Lateral lobe of pronotum narrow, roundly subtruncate ; body length of male and female 8-12 mm. ... *conspersus*
Hancock
- Lateral lobe of pronotum narrow or wide but distinctly truncate ... 5
- 5. Vertex a little wide ; shoulders wider ; third pulvilli distinctly longer than the first and second ; body length of female 11 mm. ... *manipurensis*
sp. nov.
- Vertex narrow ; shoulders medium ; third pulvilli of hind tarsal segment not as much longer as above ; body length of male and female 7.5-9.5 mm. ... *lohitensis*
sp. nov.

68. *Coptotettix annandalei* Hancock, 1915

(Plate 31, fig. 1)

Coptotettix annandalei Hancock, 1915, *Rec. Indian Mus.*, 11 : 119.

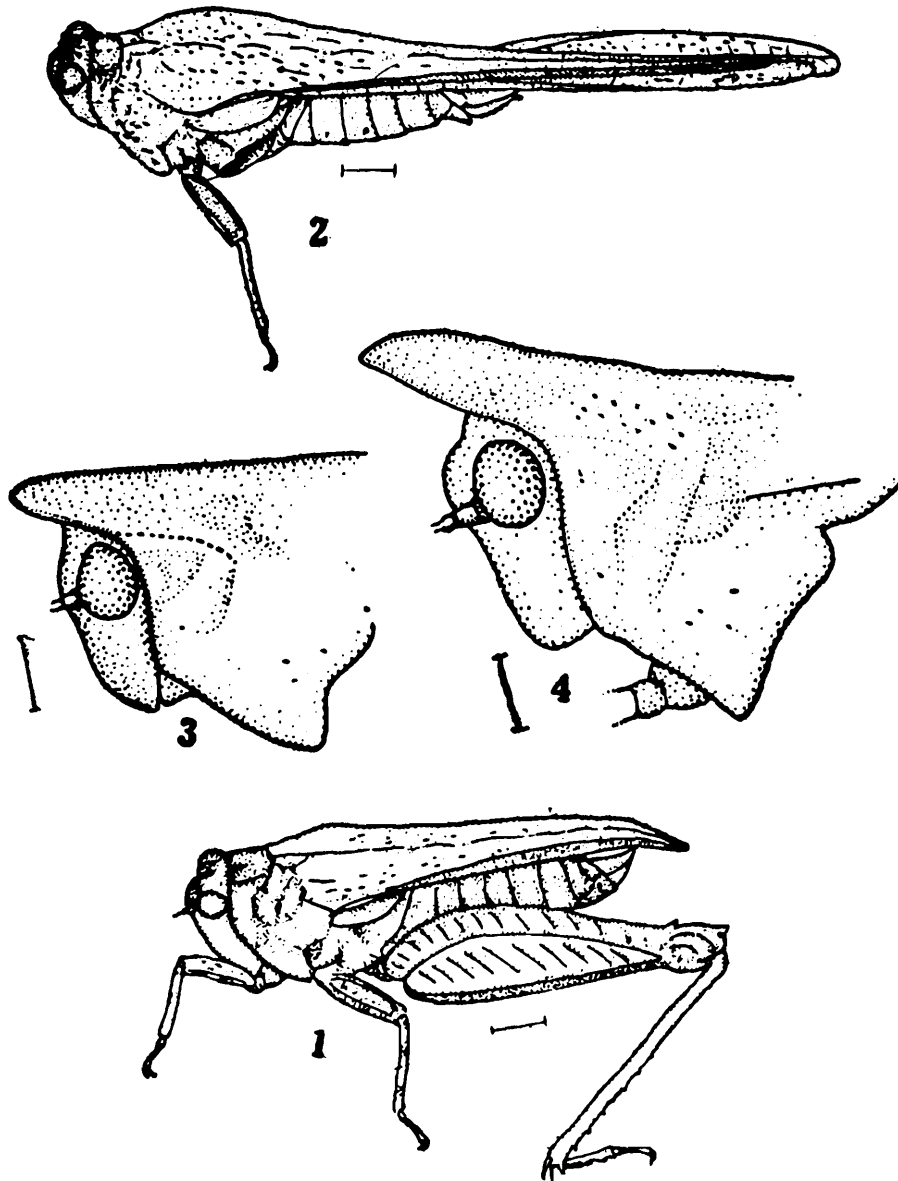
Size medium. Colour brown, dark brown, sometimes light yellow on the pronotum or light yellow with scattered dark brown spots on and around elevated median carina as well as on dorsum, hind tibiae with one or two dull yellow bands.

Male, female : Head not at all exerted above the pronotum ; vertex a little narrower than one of the eyes, slightly narrowed forward, fossulate on each side, not produced ; median and lateral carinulae normal but the front margin indistinct, bent on the side roundly ; frontal costa arcuately produced, slowly divergent anteriorly ; paired ocelli placed between the middle of eyes. Antennae placed at the base of eyes, filiform. Eyes large, globular.

Pronotum truncate anteriorly, extend upto the last abdominal segment or slightly more, rarely beyond the apices of hind femora, acute at apex ; dorsum flattened, finely granular or with scattered small

tubercles or well developed rugosity and tubercles on pronotal process ; median carina low at front, compressed elevated on the sulci, straight on dorsum, undulated with depressions behind ; humeral angles obtusely rounded ; lateral carinae low, finely serrulated ; prozonal carinae low,

Plate 31



Scale 1 mm.

PLATE 31 : Fig. 1. Dorso-lateral view of *Coptotettix annandalei* Hancock.

Fig. 2. Dorso-lateral view of *C. conspersus* Hancock.

Fig. 3. Dorso-lateral view of head and thorax of *Saussurella brunneri* Hancock.

Fig. 4. Dorso-lateral view of head and thorax of *S. decurva* Brunner.

represented by dots, slowly converge behind ; abbreviated lateral carinae on dorsum visible by dots ; posterior angles of lateral lobes of pronotum wide, roundly truncate at apex ; paranota with two projections. Elytra elongate, wide at middle, narrow at both ends, roundly at apex. Wings extend upto the pronotal apex or shorter, but never beyond ; anterior femora elongate, margins finely serrulate ; middle

femora a little widened specially in male, margins little wavy and finely serrulate ; posterior femora stout, finely crassate, superior margins finely serrulate ; first joint of hind tarsi longer than third ; first and second pulvilli acute, third longer than second and not pointed.

Measurements (in mm.) : Body length ♂ 7·8-8·8, ♀ 9·5-10·8 ; body length with pronotum ♂ 8·3-9·3, ♀ 9·2-10·5 ; pronotum length ♂ 7·5-8·5, ♀ 8·6-9·1 ; posterior femora length/width ♂ 5·4-5·9/1·7-2, ♀ 6·4-7/2·2-2·5 ; shoulder width ♂ 2·1-2·5, ♀ 2·5-3·7.

Material examined :

Arunachal Pradesh : 1 ♀, Siang Divi. : New Jining : Tarak, 200 m, 18. x. 1966, coll. S. K. Tandon and G. S. Arora ; 2 ♀ ♀, Lohit Divi. : Tezu, 10. iii. 1969, coll. S. K. Tandon ; 1 ♂, 1 ♀, Lohit Divi. : Namsai, 100 m, 17. iii. 1969, coll. S. K. Tandon.

West Bengal : 1 ♂, E. Himalalaya : Pankha Bari P. O. : Maria-bari : Tea Estate, 15-23. viii. 1928, coll. I. M. Puri ; 1 ♂, Calcutta : Nilgung, 13. xi. 1957, coll. A. P. Kapur ; 1 ♀, Darjeeling Distt. : Rangpo, 6. iv. 1973, coll. H. S. Sharma ; 1 ♂, Darjeeling Distt. : Singla, 18. iv. 1973, coll. H. S. Sharma ; 1 ♂, Darjeeling Distt. : Kurseong, 15. v. 1979, coll. M. S. Shishodia.

Manipur : 1 ♂, 16 miles N. of Imphal on Dimapur road, 2550 m, 7. xi. 1945, coll. Maj. M. L. Roonwal ; 1 ♀, Ukhrul : East Distt., 4. iii. 1975, coll. M. S. Shishodia.

Tripura : 1 ♀, Teliamura : Bramachara, 150 m, 10. xi. 1974, coll. M. S. Shishodia ; 2 ♂♂, 3 ♀♀, Ambassa, 200 m, 16. xi. 1974, coll. M. S. Shishodia.

Assam : 1 ♀, Nowgong, 4. xi. 1974, coll. S. K. Gupta.

Sikkim : 1 ♀, Rangli, 950 m, 23. xii. 1975, coll. G. K. Srivastava ; 1 ♀, Rangpo, 400 m, 26. xii. 1975, coll. G. K. Srivastava ; 1 ♀, Gangtok : Deorali, 1. vi. 1979, coll. M. S. Shishodia.

Type material examined : 2 ♀♀, Calcutta, Indian Museum [Zoological Survey of India, Reg. Nos. 7798/20 and 8133/11] ; 2 ♂♂, Darjeeling Distt. : Singla, 450 m, —. vi. 1913, coll. Lord Carmichael's collection.

Geographical distribution : India (West Bengal, Karnataka) ; Burma.

Remarks : Specimens from Sikkim and Darjeeling are larger whereas those from Calcutta are somewhat smaller. Sikkim specimens are more dark brown in colour. This species resembles *Coptotettix testaceus* Bolivar and *C. manipurensis* sp. nov. but can be easily recognised by the smaller size of pronotum, undulate median carina on dorsum and the distinctly sinuate frontal costa at median ocelli.

69. *Coptotettix tuberculatus* Bolivar, 1887

Coptotettix tuberculatus Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 291.

Size medium. Colour brown or dark brown, sometimes light yellow on dorsum and upper marginal area of hind femora and dark brown on the lateral side.

Male, female : Head not exserted above the pronotum surface or a little exserted ; vertex subnarrower than one of the eyes, narrowed forward, front margin not distinct, bent laterally, lateral and median carinulae visible as usual, fossulate on either side ; frontal costa bifurcate between paired ocelli and slowly divergent, frontal sulcus not wider ; paired ocelli placed between the middle of eyes. Antennae filiform, placed below the middle of eyes. Eyes globular.

Pronotum truncate anteriorly, extend upto the last abdominal segment or a little more posteriorly, acute at apex ; dorsum flattened above, granulose, rugose and tuberculose with flattened head thickenings ; fossae located in front as well as behind the dorsum ; median carina low at front, a little compressed and elevated on the sulci, low on dorsum and very well distinctly elevated behind, irregularly broken with depressions ; humeral angles roundly obtuse ; lateral carinae low with fine serrations represented by dots ; prozonal carinae distinct, convergent behind and reach upto the sulci ; abbreviated carinae on dorsum distinct or indistinct ; posterior angles of lateral lobes of pronotum wide, apex truncate ; paranota with two projections. Elytra elongate, round at apex. Wings extend upto the apex of pronotum. Anterior femora elongate, margins entire ; middle femora elongate, bicarinate, undulate on lower margin specially in male, margins finely serrulate ; posterior femora elongate, a little crassate, finely serrulate ; first joint of hind tarsi longer than third ; first and second pulvilli acute, short, third longer than first and second.

Measurements (in mm.) : Body length ♂ 7.5-8, ♀ 9-10.5 ; body length with pronotum ♂ 8.6-9, ♀ 9-11.5 ; pronotum length ♂ 8.8-5, ♀ 8-10 ; posterior femora length/width ♂ 5.5-5.9/1.9-2.1, ♀ 5.6-6.6/1.9-2.4 ; shoulder width ♂ 2.1, ♀ 2.1-2.8.

Material examined : *Arunnchal Pradesh* : 3 ♂♂, 1 ♀, Siang Divi. ; Old Jining, 500 m, 20. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Bame village, 600 m, 30. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Lohit Divi. : Namsai, 100 m, 15. iii. 1969, coll. S. K. Tandon.

Manipur : 1 ♀, Jiribam river bank, 13. ii. 1975, coll. P. T. Cherian ; 1 ♂, Keibul Sanctuary : Toya Hill, 18. ii. 1975, coll. P. T. Cherian ;

3 ♂♂, 1 ♀, Ukhrul, 4. iii. 1975, coll. P. T. Cherian ; 1 ♂, Moreh : Burma border, 24. ix. 1975, coll. M. S. Shishodia.

Geographical distribution : Borneo.

Remarks : It is recorded here for the first time from India and it is closely similar to *Coptotettix annandalei* Hancock but can be easily separated by the thick granulations or tuberculations on dorsum, raised and interrupted median carina with depressions, truncate posterior angles of lateral lobes of pronotum, anteriorly narrowed vertex, and the gently furcillate frontal costa. Indian specimens are micropterous.

70. *Coptotettix tricarinatus* sp. nov.

(Plate 26, fig. 7)

Body medium, wide at shoulders, narrow at front. Colour brown to dark brown.

Male, female : Head slightly exserted ; vertex narrower than one of the eyes, narrowed forward, fossulate on either side, lateral carinulae distinct, median carinula run backwards upto the end of fossulae, front margin not distinct, bent laterally ; frontal costa bifurcate behind the paired ocelli, elevated and wide between antennae ; paired ocelli placed between the middle of eyes. Antennae (damaged in Holotype) filiform, located at the root of eyes. Eyes large and globular.

Pronotum truncate anteriorly, acuminate posteriorly, extend beyond the hind femoral apices, narrowly rounded at apex ; dorsum convex, gently granulose, tuberculose, depressed behind shoulder and also on the rest part of pronotal process with sparingly scattered tubercles backwards, median carina low in front, compresso-elevated on sulci, straight on shoulders, undulated backward with depressions ; humeral angles roundly obtuse ; lateral carinae low ; prozonal carinae distinct, extend upto sulcus, convergent posteriorly ; abbreviated carinae distinct ; posterior angles of lateral lobes of pronotum wide, roundly subtruncate ; paranota with two projections. Elytra elongate, rounded at apex. Wings extended upto the end of pronotum ; anterior femora elongate, margins entire ; middle femora compressed, wide, comparatively wider in male, margins undulated and finely crenulate ; posterior femora elongate, a little crassate, margins finely serrulated ; first tarsal segment of hind tarsi larger than third ; first pulvilli acute, short, second pulvilli also acute, equal or a little shorter than third.

Measurements (in mm.) : Body length ♂ 8-9, ♀ 10-10.5 ; body length with pronotum ♂ 13-14, ♀ 14-15 ; pronotum length ♂ 11.5-

12.5, ♀ 12.5-13 ; posterior femora length/width ♂ (missing), ♀ 6.4-6.8/1.9-2.1 ; shoulder width ♂ 2.5-2.8, ♀ 3-3.2.

Material examined : Holotype ♂, West Bengal : Darjeeling Distt. : Singla, 20. iv. 1973, coll. H. S. Sharma ; Allotype ♀, data as above ; Paratypes 2 ♂♂, West Bengal : Darjeeling Distt. : Singla, 18. iv. 1973, coll. H. S. Sharma ; 1 ♀, Reyong, 31. iii. 1973, coll. H. S. Sharma.

Remarks : It is a very interesting species and is readily distinguished from all the other known species of the genus by the head which is slightly exserted above the pronotum, vertex a little more narrow than one of the eyes and narrowed forward, carinate in the middle, frontal costa not sinuated upto the middle of eyes but suddenly elevated and divergent between the antennae and then low towards anterior, and shoulder narrower in front.

71. *Coptotettix conspersus* Hancock, 1915

(Plate 31, fig. 2)

Coptotettix conspersus Hancock, 1915, *Rec. Indian Mus.*, 11 : 119-20.

Coptotettix artolobus Hancock, 1915, *Ibid.* : 121, *Syn. nov.*

Body elongate. Colour brown or dark brown with brown tinge or fuscous.

Male, female : Head not exserted above the pronotum ; vertex narrower than one of the eyes and narrowed forward, not produced in front of eyes, fossulae present on each side, front margin indistinctly bent laterally, lateral carinulae visible upto one-fourth distance of eye in front, median carinula visible upto half distance of fossulae ; frontal costa bifurcate just behind the paired ocelli, arcuate, more wide between antennae. Antennae filiform, placed below the middle of eyes. Eyes globular, more or less on the vertex level.

Pronotum truncate anteriorly, extended beyond the hind femoral apices posteriorly ; dorsum convex, with abbreviated curved carinae on either side which is broken and indistinct in some cases, finely granulose or rugose and tuberculose backwards ; median carina very low forward, barely compresso-elevated between sulci, low on shoulders, very gently undulate behind or very low elevated with interruptions and depressions ; humeral angles obtuse ; lateral carinae low and finely serrulate ; posterior angles of lateral lobes of pronotum narrow, roundly subtruncate ; paranota with two projections. Elytra longer than broad, round at apex. Wings extended upto the pronotal apices or slightly more ; anterior femora elongate, margins entire ; middle femora very little

crassate, wider in male, elongate in female, a little undulate, margins finely serrulate; posterior femora crassate, finely serrulate; first tarsal segment of hind tarsi longer than third; first and second pulvilli shorter than third, acute, third pulvilli either longer or equal to second but distinctly longer than first.

Measurements (in mm.) : Body length ♂ 8-9, ♀ 9-12; body length with pronotum ♂ 11-13, ♀ 12-16; pronotum length ♂ 9.5-10.5, ♀ 11-14.5; posterior femora length ♂ 5.5-6, ♀ 6.5-7.5; shoulder width ♂ 2.1-2.7, ♀ 2.7-3.2.

Material examined : Manipur : 3 ♀ ♀, New Churachandpur, 900 m, 18. ix. 1975, coll. M. S. Shishodia; 1 ♂, Loktak Lake, 20. ix. 1975, coll. M. S. Shishodia; 1 ♀, Moreh, Burma border, 24. ix. 1975, coll. M. S. Shishodia; 1 ♀, Jiribam river bank, 13. xi. 1975, coll. P. T. Cherian.

Tripura : 1 ♂, Agartala : Indira Nagar, 11. xi. 1969, coll. V. C. Agarwal; 1 ♂, Ambassa, 16. xi. 1974, coll. M. S. Shishodia; 1 ♀, Manu : Dhuma Cherra, 300 m, 24. xi. 1974, coll. M. S. Shishodia.

Arunachal Pradesh : 1 ♂, Lohit Divi. : Chaukham, 100 m, 16. iii. 1969, coll. S. K. Tandon; 1 ♂, 1 ♀, Tirap Divi. : Chonglong village, 600 m, 2. xi. 1971, coll. G. S. Arora.

Assam : 2 ♀ ♀, Cachar Distt. : Indra Nagar, 2. x. 1973, coll. N. Muralidharan; 1 ♂, Bijri, 12. xi. 1979, coll. S. K. Gupta.

Meghalaya : 4 ♂ ♂, 3 ♀ ♀, Dainadubi, 16. ix. 1975, coll. N. Muralidharan; 3 ♂ ♂, 1 ♀, Rongram : 1 km south east of I. B., 25. ix. 1975, coll. N. Muralidharan.

West Bengal : 1 ♂, 1 ♀, 24-Parganas Distt. : Barasat, 24. vi. 1965, coll. B. K. Bhattacharya.

Geographical distribution : India (West Bengal, Assam, Uttar Pradesh); Sri Lanka.

Remarks : Nearly 30 examples of *Copotettix conspersus* Hancock are examined and found that the colour and size of specimens are variable. Abbreviated carinae on either side of the dorsum variable in length which is generally broken or indistinct, rarely distinct and complete. Median carina of pronotum too vary in its height. It is undulated or in some it is indistinct while in few females distinct, interrupted and with clear depressions.

Copotettix conspersus Hancock is closely similar to *C. testaceus* and it seems that this species may be a synonym of the latter species. Since the Type of *C. testaceus* is not available to me, it is being kept as a separate species for the present. *Copotettix artolobus* Hancock is synonymous with *C. conspersus* Hancock because the differences exhibited

by the latter are only of intraspecific nature as has been observed in the series of specimens examined.

72. *Coptotettix manipurensis* sp. nov.

(Plate 34, fig. 2)

Size medium, but broader at shoulder. Body colour brown, with tinge of dark brown, laterally dark brown, hind femora externally dark brown between brown stripes.

Female : Head not exserted above the pronotum ; vertex subequal to one of the eyes, narrow forward, fossulate on either side, median and lateral carinulae distinct, front margin indistinct, reflexed laterally ; frontal costa narrowly furcillate, gently divergent ; paired ocelli placed between the middle of eyes. Antennae located on the base of eyes (flagellum damaged). Eyes globular.

Pronotum truncate anteriorly, extended beyond hind femoral apices posteriorly ; dorsum flat with two abbreviated and broken carinae, and a depression on either side, smoothly granular with scattered tubercles posteriorly ; median carina low in front, compressed elevated at sulci, gently undulate behind ; humeral angles roundly produced ; lateral carinae low ; prozonal carinae visible, gently converge behind ; posterior angles of lateral lobes of pronotum wide, truncate at apex ; paranota with two projections. Elytra elongate (apex hidden behind the hind femur). Wings extended upto the apex of pronotal process ; anterior femora and middle femora elongate, margins finely serrulate ; posterior femora elongate, crassate, finely serrulate ; first hind tarsal segment longer than third, finely serrulate at top ; third pulvilli longer than second, flat below, first and second pulvilli short and pointed.

Measurements (in mm.) : Body length ♀ 11 ; body length with pronotum ♀ 12 ; pronotum length ♀ 11 ; posterior femora length/width ♀ 7/2.4 ; shoulder width ♀ 3.2.

Material examined : Holotype ♀, Manipur : New Churachandpur, 19. ix. 1975, coll. M. S. Shishodia.

Remarks : This species is intermediate between *Coptotettix annandalei* Hancock and *C. testaceus* Bolivar but can be readily distinguished from both of them by its narrow subtruncate posterior angles of lateral lobes of pronotum, posteriorly not undulated median carina, well developed prozonal carinae and the thick callosity at some places of dorsum.

73. *Coptotettix lohitensis* sp. nov.

(Plate 34, fig. 3)

Size moderate. Colour fuscous, abdomen black with dull yellow spots.

Male, female : Head not exserted above the pronotum ; vertex narrower than one of the eyes, little narrower forward, not produced in front of eyes, fossulae present on each side, front margin indistinct, lateral and middle carinulae visible as usual ; frontal costa bifurcate just behind the paired ocelli, narrowly furcillate, not wide between antennae. Antennae filiform, placed at the base of eyes. Eyes globular.

Pronotum truncate anteriorly, extend beyond the abdominal segments (1.3 mm) posteriorly ; dorsum not convex, with abbreviated broken curved carinae on either side of median carina, finely granulose with scattered round head tubercles on dorsum as well as on the pronotal process backwards ; median carina low forward, a little compressed and elevated on the sulci behind, straight on dorsum, with irregular interruption posteriorly, humeral angles roundly obtuse ; lateral carinae low, finely serrulate ; prozonal carinae low, only represented by dots, convergent posteriorly ; posterior angles of lateral lobes of pronotum narrow, truncate at apex ; paranota with two projections. Elytra narrow at base, wide at middle, rounded at apex. Wings extend a little beyond the pronotal apices ; anterior femora elongate, margins entire ; middle femora elongate, a little compressed and wide in male, slightly crassate, margins finely serrulate ; hind femora damaged.

Measurements (in mm.) : Body length ♂ 7.5-8, ♀ 9.5 ; body length with pronotum ♂ 9.5-11, ♀ 13 ; pronotum length ♂ 8-10, ♀ 11.5 ; posterior femora length/width ♂ 5.4-5.8/1.9, ♀ (missing) ; shoulder width ♂ 2.1-2.4, ♀ 2.7

Material examined : Holotype ♂, Arunachal Pradesh : Lohit Divi. : Chaukham, 100 m, 16. iii. 1969, coll. S. K. Tandon ; Allotype ♀, similar data as above ; Paratype ♂, Namsai : M. T. Forest, 17. iii. 1966, coll. S. K. Tandon.

Remarks : It is quite similar to *Coptotettix annandalei* Hancock in the posterior angles of lateral lobes of pronotum and to *C. conspersus* Hancock in the interruptions and elevations in median carina, but it can be easily distinguished from them by its size, the rugosity on the surface of pronotum and the nature of frontal sulcus.

(24) Genus : **Ergatettix** Kirby, 1914

Type species : *Ergatettix tarsalis* Kirby, 1914

Ergatettix Kirby, 1914, *Fauna Brit. India Orth.*, : 69,

Indatettix Hancock, 1915, *Rec. Indian Mus.*, 11 : 127.

Ergatettix Hebard, 1929, *Revue suisse Zool.*, 36 : 587.

Size medium. Colour light yellowish brown or dark brown or rusty brown or ferruginous or grey variegated with fuscous ; disc ornate or not, with two hind black spots or transverse black band and sometimes yellowish or brownish ; hind femora generally with light black spots behind the middle on externo-superior margin, hind tibiae brownish or white, darker towards the apices with two distinct or indistinct dirty brown bands.

Head a little or distinctly exserted above the surface of pronotum ; vertex much narrower than one of the eyes, elevated, not produced in front ; frontal costa bifurcate and arcuate between the antennae, declivous in front ; paired ocelli placed between the lower third of eyes. Antennae inserted below the eyes. Eyes elevated and globular.

Pronotum truncate anteriorly, acuminate posteriorly and extend beyond the apex of hind femora ; dorsum granulose, tuberculose, with or without convexity between the shoulders ; median carina depressed in front, compresso-elevated on sulci, indistinct or distinct undulations behind ; abbreviated carinae on either side of shoulders indistinct, sometimes short curved lines visible ; lateral carinae low, with or without small dilated lobes ; prozonal carinae distinct or indistinct, parallel in front, a little converged behind ; humeral angles obtusely angulate ; posterior angles of lateral lobes of pronotum turned downwards, narrowly rounded at apex ; paranota with two projections. Elytra elongate, rounded at apex. Wings caudate, extended beyond the apex of pronotum ; anterior femora elongate, margins entire, ornate with sparse hairs ; median femora elongate, flattened, especially in males, margins undulate and ornate with sparse hairs ; hind femora elongate, external pagina with clear protuberent tubercles, margins finely serrulate ; first segment of posterior tarsi generally longer than the third ; first and second pulvilli spinose and generally shorter than the third ; third pulvilli generally longer than the second pulvilli.

Geographical distribution : India ; Bangladesh ; Sri Lanka ; Central Asia ; Taiwan ; South China ; Greater Sunda Island ; Sumba ; Celebes ; Turkmenia.

Key to the species of *Ergatettix* Kirby, 1914

1. Median carina of pronotum distinctly undulate, lateral carinae with small dilated lobes on the hind process of pronotum ; median femora sufficiently flattened, margins lobate ; hind femora strongly tuberculate on external pagina ... *güntheri*
Steinmann
- Median carina of pronotum indistinctly or distinctly undulate but not like the above ; lateral carinae without dilated lobes on the hind process of pronotum ; median femora less flattened, margins indistinctly or a little lobate ; hind femora with less protuberant tubercles on external pagina ... 2
2. Vertex sufficiently elevated above the pronotum surface ; shoulder less wider ; third pulvilli a little longer than the second... *dorsifera*
(Walker)
- Vertex less elevated above the pronotum surface ; shoulder more wider than the above mentioned ; third pulvilli more or less equal to the second pulvilli ... *callosus*
(Hancock)

74. *Ergatettix güntheri* Steinmann, 1970
(Plate 32, figs. 1-5)

Euparatettix nodulosus Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 155.

Indatettix nodulosus, Hancock, 1915, *Rec. Indian Mus.*, 11 : 129.

Ergatettix güntheri Steinmann, 1970, *Acta zool. hung.*, 16 (1-2) : 234 (new name for *nodulosus* Hancock).

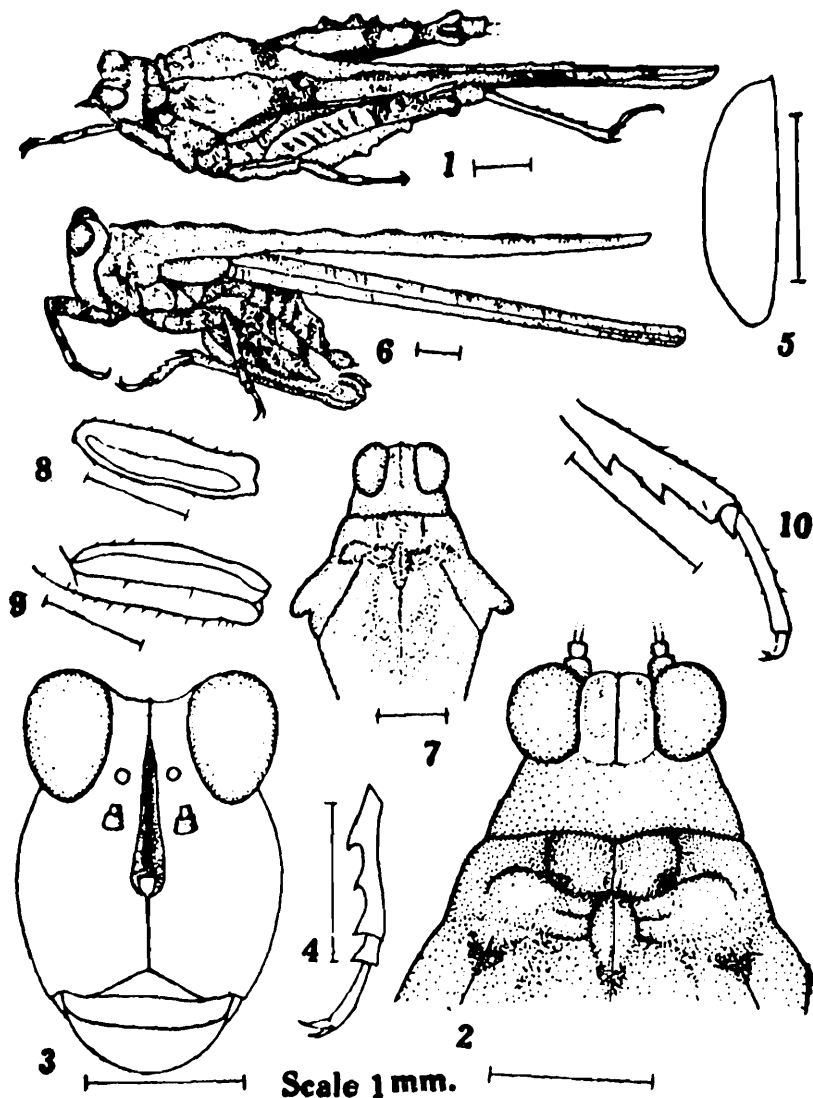
Size medium to large. Colour ferruginous or grey, sometimes dorsum brownish or dirty yellow, two dark brown spot present behind the shoulders which sometimes unite to form a band, superior carina of hind femora behind the middle with one or two small dark brown spots, hind tibiae brownish with two dark brown bands or dirty brown with indistinct and irregular dark brown shade.

Male, female : Head distinctly exserted ; vertex narrower than one of the eyes, a little narrower forward, not produced in front of the eyes, carinated in the middle ; frontal costa bifurcate behind the paired ocelli, moderately arcuate between the antennae, declined towards front ; paired ocelli placed below the middle of eyes. Antennae filiform, situated below the inferior margin of eyes. Eyes raised above the vertex and globular in shape.

Pronotum truncate anteriorly, attenuate posteriorly and extend beyond the apex of hind femora ; dorsum convex, widened between the shoulders, rugulose, minutely nodulose ; median carina depressed in

front, compresso-elevated behind on the sulci region, a little depressed and subundulated on shoulders, strongly undulate behind; lateral carinae also wavy with nodules, especially towards the apex of pronotal process provided with several pairs of projecting tubercles or

Plate 32



- PLATE 32 :** Fig. 1. Dorso-lateral view of *Ergatettix güntheri* Steinmann.
 Fig. 2. Top view of head and thorax of *E. güntheri* Steinmann.
 Fig. 3. Front view of head of *E. güntheri* Steinmann.
 Fig. 4. Posterior tarsal segments of *E. güntheri* Steinmann.
 Fig. 5. Elytra of *E. güntheri* Steinmann.
 Fig. 6. Dorso-lateral view of *E. callosus* (Hancock).
 Fig. 7. Top view of head and thorax of *E. callosus* (Hancock).
 Fig. 8. Lateral view of anterior femur of *E. callosus* (Hancock).
 Fig. 9. Lateral view of middle femur of *E. callosus* (Hancock).
 Fig. 10. Posterior tarsal segments of *E. callosus* (Hancock).

crenulations or dilated lobes; abbreviated carinae on shoulders broken; humeral angles obtusely produced, carinate; prozonal carinae small, indistinct, parallel in front, obscurely visible behind; paranota with two projections; posterior angles of lateral lobes of pronotum turned

downwards, moderate, the apex broadly rounded. Elytra elongate, the apex rounded. Wings extend beyond the pronotal apex ; anterior femora elongate, rugulose, with whitish hairs, margins undulate ; middle femora elongate, compressed, bicarinate, margins distinctly undulate and lobate, whitish hairs embeded on margins especially on inferior margins, in male distinctly crassate, sublobate at the middle ; posterior femora elongate, crassate, external pagina with distinct projecting tubercles, margins finely serrulate, with small lobe before the apex of superior margin ; first segment of posterior tarsi longer than the third ; first and second pulvilli small and spinose ; third pulvilli equal to or a little longer than the second.

Measurements (in mm.) : Body length ♂ 6.8-8, ♀ 8.5-9 ; body length with pronotum ♂ 9.5-11, ♀ 12-12.5 ; pronotum length ♂ 8.5-10, ♀ 11-11.5 ; posterior femora length/width ♂ 3.7-4.8/1.1-1.4, ♀ 4.8-5.4/1.8-2 ; shoulder width ♂ 2-2.1, ♀ 2.7-3.

Material examined : *West Bengal* : 2 ♀ ♀, 24-Parganas Distt. : Kankinara 18. viii. 1965, coll. K. Rao ; 9 ♂ ♂, 8 ♀ ♀, 24-Parganas Distt. : Diamond Harbour, 31. xii. 1965, coll. S. K. Tandon ; 1 ♂, 24-Parganas Distt. : Barasat, 5. i. 1966, coll. J. R. Singh ; 1 ♂, 1 ♀, Burdwan Distt. : Ambika Kalna, 11. ii. 1966, coll. S. B. Roy ; 1 ♂, Hooghly Distt. : Bhadrassarwar, 24. ii. 1966, coll. P. Parui ; 2 ♂ ♂, 1 ♀. 24-Parganas Distt. : Budge Budge, 24. i. 1967, coll. K. R. Rao ; 1 ♂, 1 ♀, Darjeeling Distt. : Rangpo, 7. iv. 1973, coll. H. S. Sharma ; 1 ♀, 24-Parganas Distt. : Hatberia, 1. viii. 1977, coll. N. K. Pramanik ; 2 ♀ ♀, Hooghly Distt. : Baidyabati, 20. i. 1978, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Darjeeling Distt. : Teesta bazar, 214 m, 24. v. 1979, coll. M. S. Shishodia.

Tripura : 2 ♂ ♂, 5 ♀ ♀, Ambassa, 25. v. 1978, coll. J. K. Jonathan.

Meghalaya : 2 ♂ ♂, 2 ♀ ♀. Jaintia Hills : Sonapardi : Jowai Road, 28. viii. 1974, coll. A. R. Lahiri.

Arunachal Pradesh : 1 ♂, Kameng Divi. : Rupa camp, 20. xii. 1965, coll. S. K. Bhattacharya and A. N. T Joseph ; 1 ♂, Kameng Divi. : Denling Forest, 229 m, 5. v. 1966, coll. A. N. T Joseph ; 1 ♀, Siang Divi. : Siji village, 200 m, 8. x. 1966, coll. S. K. Tandon ; 3 ♂ ♂, 16 ♀ ♀, Siang Divi. : New Jining : Around camp, 100 m, 18. x. 1966, coll. S. K. Tandon and G. S. Arora ; 5 ♂ ♂, 1 ♀, Subansiri Divi. : Daporijo, 150 m, 27, 28. x. 1966, coll. S. K. Tandon ; 2 ♀ ♀, Lohit Divi. : Namsai, 100 m, 14. iii. 1969, coll. S. K. Tandon ; 2 ♂ ♂, 29 ♀ ♀, Siang Divi. : Bhalukpong, 175 m, 21. iii. 1973, coll. S. K. Tandon ; 13 ♂ ♂, 21 ♀ ♀, Siang Divi. : Bhalukpong, 175 m, 23. iii.

1973, coll. S. K. Tandon.

Geographical distribution : India (West Bengal, Orissa, Bihar, Assam, Madhya Pradesh, Uttar Pradesh, Maharashtra) ; Bangladesh ; Sri Lanka.

Remarks : *Ergatettix güntheri* Steinmann is closely related to *E. dorsifera* (Walker) but it can be easily distinguished from the latter by strongly developed rugosity and nodulae on the dorsum of pronotum, more distinctly undulate median carina of pronotum, several pairs of projecting tubercles or dilated lobes on lateral carinae, and distinctly developed tubercles on external pagina of hind femora. Some examples collected from Meghalaya, Tripura and West Bengal are bigger in size than those from Arunachal Pradesh.

75. *Ergatettix dorsifera* (Walker), 1871

Tettix dorsifera Walker, 1871, *Cat. Derm. Salt. Brit. Mus.*, 5 : 825.

Acrydium dorsiferum, Kirby, 1910, *Cat. Orth.*, 3 : 45.

Paratettix (?) *dorsifer*, Kirby, 1914, *Fauna Brit. Indian Orth.*, : 63, fig. 55.

Euparatettix parvus Hancock, 1905, *Spolia zeylan.*, 2 : 145.

Euparatettix pilosus Hancock, 1909, *Trans. R. ent. Soc. Lond.*, 1908 : 409-410.

Ergatettix tarsalis Kirby, 1914, *Fauna Brit. India Orth.*, : 70, figs. 62, 63.

Euparatettix bengalensis Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 154-155.

Euparatettix crassipes Hancock, 1912, *Mem. Dep. Agric. India ent. Ser.*, 4 : 123-4.

Euparatettix crassipes hybridus Hancock, 1915, *Rec. Indian Mus.*, 11 : 31.

Euparatettix interruptus (Brunner) 1893, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 109-110 [*Paratettix*].

Euparatettix interruptus lobulatus Hancock, 1915, *Rec. Indian Mus.*, 11 : 130.

Euparatettix scabripes (Bolivar), 1898, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 39 : 76 [*Paratettix*].

Ergatettix dorsifera, Hebard, 1929, *Revue suisse Zool.*, 36 : 588.

Size medium to large. Colour light yellowish brown or dark brown or ferruginous or grey variegated with fuscous, sometimes the dorsum of pronotum dirty yellowish or brownish, two black spots present behind the shoulders which may or may not unite to form a complete band, hind femora with one or two small dark brown spots behind the middle of superior margin, hind tibiae with or without two dark brown spots.

Male, female : Head a little or distinctly exserted above the surface of pronotum ; vertex narrower than one of the eyes, a little narrower in front, not produced forward, carinated in the middle ; frontal costa bifurcate behind the paired ocelli, elevated and sinuated between the antennae, moderately sulcate ; paired ocelli placed below the middle of eyes. Antennae filiform, elongate, situated below the infe-

rior margin of eyes. Eyes globular in shape and elevated above the vertex.

Pronotum truncate anteriorly, attenuate posteriorly and extend beyond the apex of hind femora ; dorsum convex, a little widened between the shoulders, rugulose ; median carina depressed in front, compresso-elevated behind, a little depressed and subundulate on the shoulders, with or without undulations behind ; lateral carinae wavy with or without crenulations ; abbreviated carinae on shoulders indistinctly present ; humeral angles obtusely produced, a little carinate ; prozonal carinae small, parallel in front, obliterated behind ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, moderate in size, rounded at apex. Elytra elongate, the apex rounded. Wings extend beyond the pronotal apex ; anterior femora elongate, convex, margins a little or not undulate, with or without hairs ; middle femora elongate, compressed, bicarinate, margins undulate, with or without hairs ; posterior femora elongate, crassate, external pagina with protuberant tubercles, margins finely serrated ; first segment of posterior tarsi generally longer than the third ; first and second pulvilli small and spinose ; third pulvilli more or less equal to second pulvilli, rarely longer than second.

Measurements (in mm.) : Body length ♂ 6-8, ♀ 8.2-9 ; body length with pronotum ♂ 9-10.5, ♀ 10.5-12.5 ; pronotum length ♂ 8-9.5, ♀ 9.5-11.5 ; posterior femora length/width ♂ 3.7-4/1.1-1.5, ♀ 4.8-5.1/1.5-1.7 ; shoulder width ♂ 1.7-2, ♀ 2.1-2.9.

Material examined : *West Bengal* : 12 ♂♂, 10 ♀♀, Calcutta, 26. x. 1949, coll. A. P. Kapur ; 1 ♀, 24-Parganas Distt. : Dhapa, 26. vii. 1963, coll. C. S. Rao and S. Ali ; 1 ♂, Howrah Distt. : Santragachi, 19. ix. 1964, coll. K. R. Rao ; 1 ♂, 24-Parganas Distt. : Kankinara, 18. viii. 1965, coll. K. Rai ; 3 ♂♂, 2 ♀♀, 24-Parganas Distt. : Diamond Harbour, 31. xii. 1965, coll. S. K. Tandon ; 5 ♂♂, 5 ♀♀, 24-Parganas Distt. : Khardah, 9. xi. 1966, coll. S. B. Roy ; 1 ♂, 24-Parganas : Baruipur, 8. xii. 1966, coll. K. R. Rao ; 1 ♂, 2 ♀♀, Murshidabad Distt. : Berhampur : C. S. R. S. Campus, 3, 4. xi. 1974, coll. A. K. Hazra ; 1 ♂, Darjeeling Distt. : Manibhanjang, 22. v. 1975, coll. G. K. Srivastava and P. K. Maiti ; 1 ♂, 24-Parganas Distt. : Narendrapur, 16. v. 1979, coll. M. S. Shishodia ; 1 ♂, Darjeeling Distt. : Tiger Hill, 2573 m, 19. v. 1979, coll. M. S. Shishodia ; 7 ♂♂, 4 ♀♀, Darjeeling Distt. : Teesta bazar, 214 m, 24. v. 1979, coll. M. S. Shishodia.

Tripura : 1 ♂, 1 ♀, Ambassa, 4. ii. 1971, coll. V. C. Agarwal ; 1 ♂, 1 ♀, Agartala : Rajnagar, 25 m, 30. x. 1974, coll. M. S. Shishodia ; 5 ♂♂, 1 ♀, Udaipur : Garjee (at light), 100 m, 4. xi. 1974, coll.

M. S. Shishodia ; 3 ♂♂, 2 ♀♀, Teliamura (at light), 150 m, 10. xi. 1974, coll. M. S. Shishodia ; 1 ♂, Ambassa (at light), 200 m, 16. xi. 1974, coll. M. S. Shishodia ; 2 ♂♂, 2 ♀♀, Manu (at light), 300 m, 23, 24. xi. 1974, coll. M. S. Shishodia.

Assam : 2 ♂♂, 1 ♀, Sonai Rupai Forest, 343 m, 29. xi. 1965, coll. S. K. Bhattacharya and A. N. T. Joseph ; 4 ♀♀, Tezpur : Majgaon, 79 m, 30. v. 1966, coll. A. N. T. Joseph ; 2 ♂♂, 2 ♀♀, Khasi Hills : Mowkdok, 4. iii. 1970, coll. G. M. Yazdani ; 1 ♀, Goalpara Distt. : Gosaingaon, 18. vi. 1973, coll. R. P. Mukherjee.

Meghalaya : 3 ♂♂, Jaintia Hills : Sonapardi : Jowai Road, 28. viii. 1974, coll. A. R. Lahiri ; 1 ♂, 3 ♀♀, Songsak (at light), 21. ix. 1975, coll. N. Muralidharan ; 1 ♀, Rongram, 25. ix. 1975, coll. N. Muralidharan.

Sikkim : 1 ♀, Rangpo, 424 m, 27. v. 1979, coll. M. S. Shishodia ; 1 ♀, Gangtok, 1700 m, 2. vi. 1979, coll. M. S. Shishodia.

Manipur : 1 ♀, Imphal Valley, 19. ix. 1945, coll. Maj. M. L. Roonwal ; 1 ♂, 16 miles N. of Imphal on Dimapur Road, 2584 m, 18. x. 1945, coll. Maj. M. L. Roonwal ; 2 ♂♂, New Churachandpur (at light), 18. ix. 1975, coll. M. S. Shishodia.

Arunachal Pradesh : 1 ♀, Kameng Divi. : Bhalukpong : Tipi, 213 m, 3. v. 1966, coll. A. N. T. Joseph ; 1 ♀, Siang Divi. : Dali Camp, 300 m, 9. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Siang Divi. : Kambang, 200 m, 15. x. 1966, coll. S. K. Tandon and G. S. Arora ; 1 ♀, Subansiri Divi. : Daporijo, 150 m, 28. x. 1966, coll. S. K. Tandon and G. S. Arora.

Geographical distribution : India ; Bangladesh ; Nepal ; Sri Lanka ; Central Asia ; Turkmenia ; Taiwan ; South China ; Greater Sunda Island and Sumba.

Remarks : This species is quite similar to *Ergatettix g  ntheri* Steinmann but can be easily distinguished from it by less or indistinct undulate median carina of pronotum ; a little developed or without dilated lobes on the lateral carinae of hind process of pronotum ; dorsum with less developed rugosity and indistinct or less developed tubercles on external pagina of hind femora. An examination of both the series reveal that *Ergatettix g  ntheri* Steinmann may be only *E. dorsifera* (Walker) with highly developed rugosity as was also earlier pointed out by Hebard (1929).

76. *Ergatettix callosus* (Hancock), 1915 (Plate 32, figs. 6-10)

Indatettix callosus Hancock, 1915, *Rec. Indian Mus.*, 11 : 130.

Ergatettix callosus, Steinmann, 1970, *Acta zool. hung.*, 16 (1-2) : 234.

Size medium. Colour pale brownish, disc of pronotum variegated with fuscous, two dark brown spots behind the shoulders, hind process of pronotum brown with black maculations, legs pale and fasciate with fuscous, hind femora with one dark brown spot behind the middle of superior carinae, hind tibiae dirty yellow with smoky shade.

Female : Head distinctly exserted ; vertex more narrower than one of the eyes, a little narrower forward, not produced in front, indistinctly carinate in the middle, elevated above the dorsum of pronotum ; frontal costa bifurcate behind the paired ocelli, a little more elevated between the antennae, sinuated, declined towards front, moderately sulcate ; paired ocelli placed below the middle of eyes. Antennae (flagellum lost) inserted below the eyes. Eyes globular.

Pronotum truncate anteriorly, attenuate posteriorly and extend beyond the apex of hind femora ; dorsum granulose, a little callose, widened between shoulders ; median carina depressed in front, a little compresso-elevated between sulci, undulate on shoulders and hind process, especially clearly marked on hind process ; lateral carinae wavy and a little crenulate posteriorly ; small abbreviated carinae on shoulders present ; prozonal carinae distinct and more or less run parallel ; humeral angles obtuse and carinate ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, a little broadened, apex obtusely rounded. Elytra elongate, the apex rounded. Wings extend beyond the pronotal apex ; anterior femora elongate, convex, margins indistinctly undulate, white hairs present sparsely ; middle femora elongate, compressed, bicarinate, undulated with fine crenulations, white hairs present ; hind femora elongate, crassate, external pagina with protuberant tubercles margins finely serrated ; first tarsal segment longer than third ; first and second pulvilli spinose and more or less equal to third.

Measurements (in mm.) : Body length ♀ 6 ; body length with pronotum ♀ 12 ; pronotum length ♀ 11 ; posterior femora length/width ♀ 4.8/1.6 ; shoulder width ♀ 3.2.

Material examined : Holotype ♀, West Bengal : Darjeeling Distt. : Singla, 456 m, -. v. 1913, Lord Carmichael's colln. [Reg. No. of Zoological Survey of India, 7811/20].

Geographical distribution : India (West Bengal).

Remarks : *Ergatettix callosus* (Hancock) is quite similar to *E. dorsifera* (Walker) but it can be readily separated from the latter by its narrow pronotum widened shoulders and more or less equal pulvilli.

SUBFAMILY V BATRACHIDEINAE

(25) Genus : *Saussurella* Bolivar, 1887Type species : *Acridium (Tetrix) cornutum* De Haan, 1842*Saussurella* Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 189, 196, 303.

Moderately elongated in size. Colour light brown to dark grey-brown or black brown. Lighter areas of brown occur on face and hind border of posterior angles of lateral lobes of pronotum, and on the dorsal and lateral faces of posterior femora, central area of elytra dark brown bordered by light yellow or brown.

Head not exserted ; vertex broad, convex, slightly higher than eyes, completely or almost completely covered by anterior pronotal process, median carinula absent, lateral carinae short, extends more or less upto the level of eyes in front ; face slightly oblique, frontal costa bifurcate behind the paired ocelli, depressed between the eyes, slightly raised between the antennae, broadly sulcate, carinae nearly parallel ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted below the middle of the eyes. Eyes subglobular or subtriangular.

Pronotum produced over the head in front as a narrow strong horn like process which is raised or not on the lateral margin, and extends behind further to the apex of posterior femora ; dorsum granulate ; median carina percurrent ; prozonal carinae absent or weakly expressed ; abbreviated carinae on either side of median carina between shoulders absent ; lateral carinae low ; humeral angles not distinctly visible or absent ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, variably expressed, ventro-lateral angles angulately rounded or rounded. Elytra elongate to ovoid. Wings extend upto the pronotal apex posteriorly ; anterior femora elongate (except in *S. cornuta* (De Haan), conspicuously sulcate above the entire length ; median femora elongate (except in *S. cornuta* (De Haan) with a small blunt genicular spine ; posterior femora slender, finely serrulated on margins, antegenicular and genicular spine moderately produced ; first and third articles of posterior tarsi more or less equal in length. Subgenital plate of male upturned, broad, apically narrow or not, apex truncate or subtruncate ; subgenital plate of female trilobate apically, the mid ventral lobe shorter than the lateral lobes (except in *S. indica* Hancock).

Geographical distribution : India ; Burma ; Yenping ; Amoy ; Hong Kong ; South Vietnam ; Sumatra ; Java ; Borneo.

77. *Saussurella cornuta* (De Haan), 1842

(Plate 33, figs. 2 & 3)

Acridium (Tetrix) cornutum De Haan, 1842, *Temminck, Verhandel., Orth.* : 166, 167.

Tettix cucullifera Walker, 1871, *Cat. Derm. Salt. Brit. Mus.*, 5 : 829.

Saussurella cornuta, Bolivar, 1887, *Annls Soc. ent. Belg.*, 31 : 303.

Saussurella brunneri Hancock, 1912, *Mem. dep. Agric. India ent. Ser.*, 4 : 156.

Saussurella cornuta, Grant, 1966, *Pacif. Insects*, 8 : 589.

Moderately elongated in size. Colour brown mottled with dark brown, apex of femora and tarsal segments generally dark brown, elytra light brown with dark purple centre.

Female : Head not exserted ; vertex wider than an eye, convex, extends upto the level of eyes in front, median carinula and lateral carinulae not visible, front margin carinulate only on the lateral angles, granulose completely covered with anterior process of pronotum ; face oblique, frontal costa bifurcate behind the paired ocelli and depressed, compresso-elevated between the antennae, depressed in front, widely sulcate in front of paired ocelli ; paired ocelli placed between the middle of eyes. Antennae filiform, inserted on the inferior margin of eyes.

Pronotum produced over the head in front with a straight median carina as a narrow strong horn-like process, a little concave ventrally, convex medially, extends beyond the apex of posterior femora behind ; dorsum granulose, deeply depressed on either side in front of shoulders, laterally concave throughout ; median carina percurrent, compresso-elevated ; lateral carinae expressed, granulose behind the shoulders, interrupted on the sulci ; prozonal and abbreviated carinae absent ; humeral angles more or less subrounded ; paranota with two projections ; posterior angles of lateral lobes of pronotum turned downwards, widely rounded. Elytra elongate, slightly wide in middle, apex rounded. Wings extend upto the apices of the pronotal processes behind ; anterior femora elongate, sulcate dorsally, margins entire ; median femora elongate, compressed, bicarinate with widely separated carinae, dorsally sulcate, margins finely serrulate, genicular spine sharply pointed ; posterior femora elongate, wider at base, genicular spine short and blunt, margins serrulated ; first segment of posterior tarsi longer than the third ; first pulvilli shorter, depressed with concavity, second and third pulvilli more or less equal in length, obtuse. Subgenital plate trilobate apically, middle lobe shorter and angular.

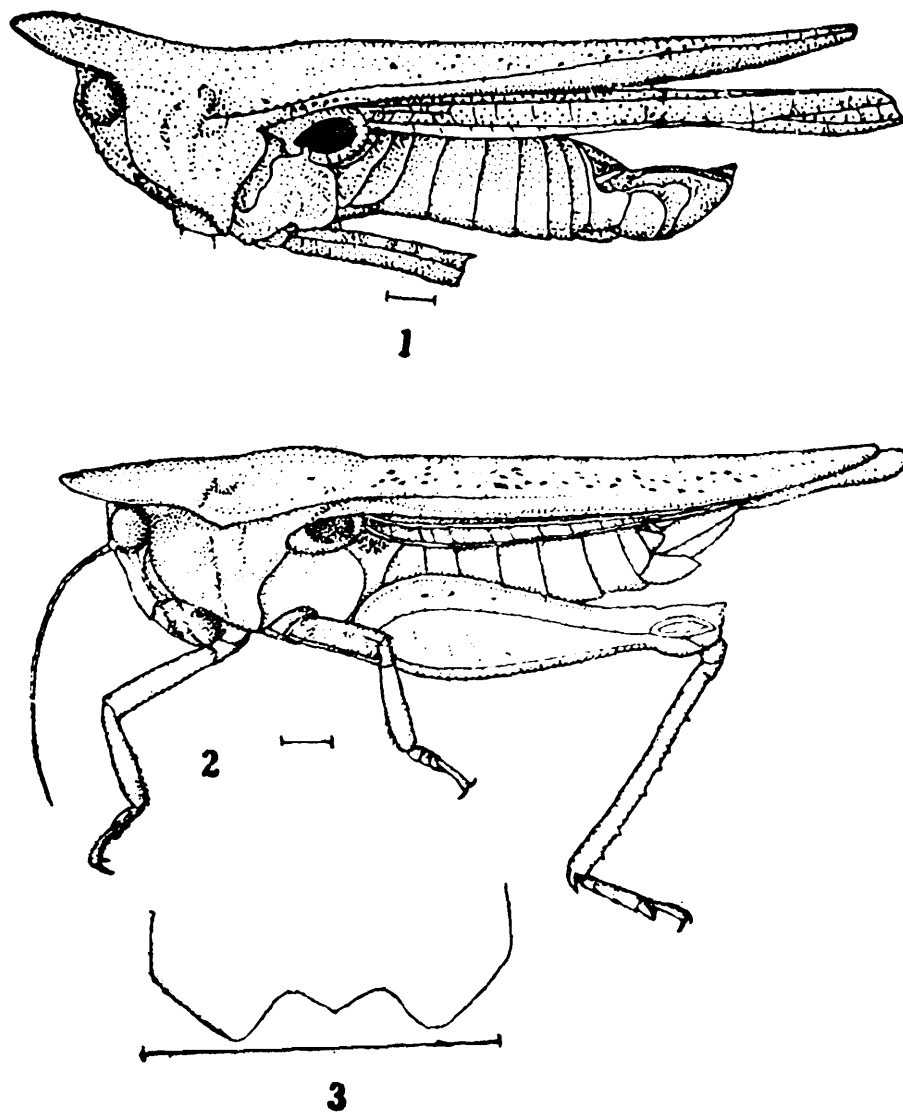
Measurements (in mm.) : Body length ♀ 12.5-13 ; pronotum length ♀ 17-17.5 ; posterior femora length/width ♂ 7.5-7.8 : Shoulder

width ♀ 3·7-3·9 ; anterior pronotal Process ♀ 1·9-2·4 ; elytra length ♀ 1·7-1·9.

Material examined : 3 ♀ ♀, Tripura : Ambassa, 200 m, 16. xi. 1974, coll. M. S. Shishodia.

Geographical distribution : Burma ; South China ; China ; South Vietnam ; Java.

Plate 33



Scale 1 mm.

PLATE 33 : Fig. 1. Dorso-lateral view of *Saussurella curticornu* Hancock.

Fig. 2. Dorso-lateral view of *S. cornuta* (De Haan).

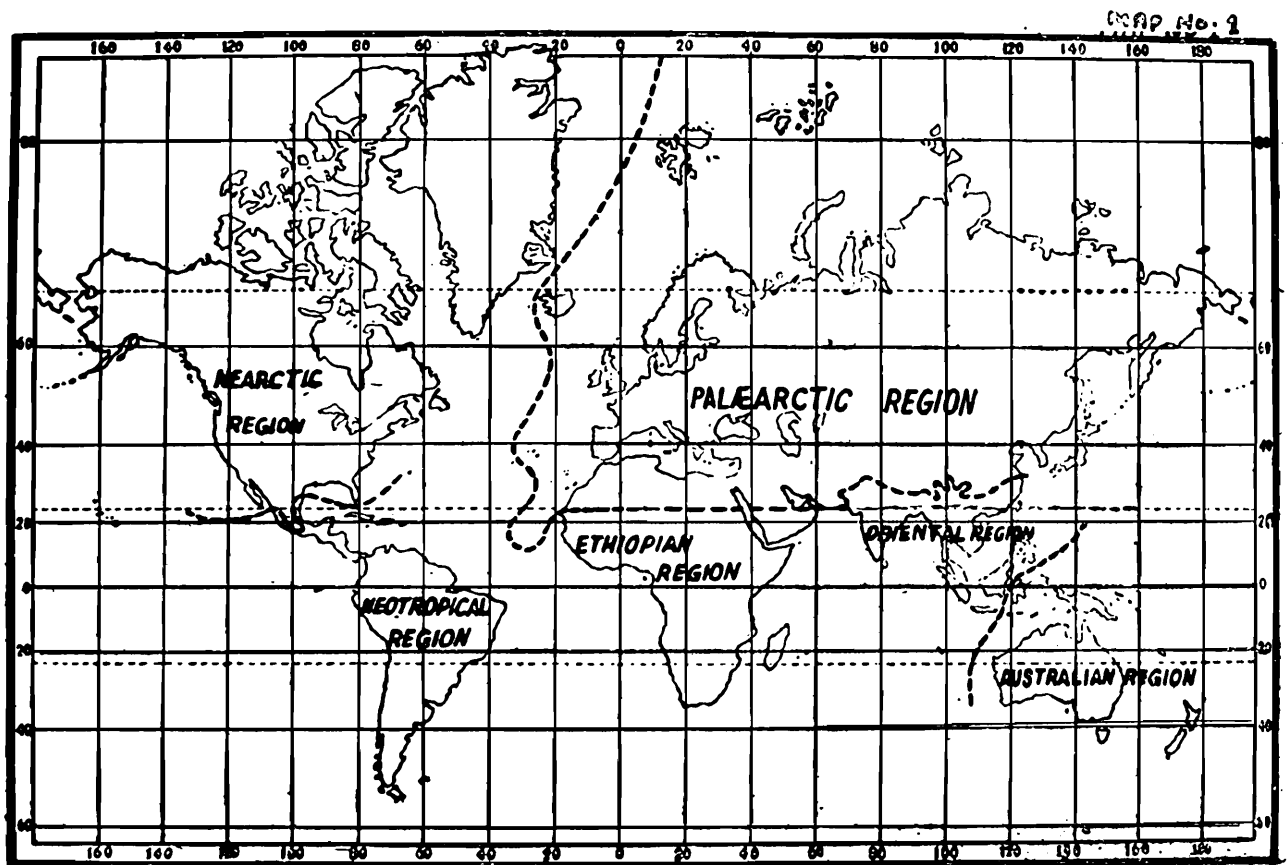
Fig. 3. Subgenital plate of female of *S. cornuta* (De Haan).

Remarks : It is reported here for the first time from India. *Saussurella cornuta* (De Haan) is characterised by the unelevated anterior pronotal process which is concave beneath, straight dorsal outline of pronotum, the variation of range of AP/T-ratio (the length of the anterior pronotal process, divided by the length of elytra) between 1·1 and 1·23,

elongated elytra, poorly developed median lobe of subgenital plate of females.

Zoogeography of North East India in relation to Oriental Fauna
(Maps 1-3)

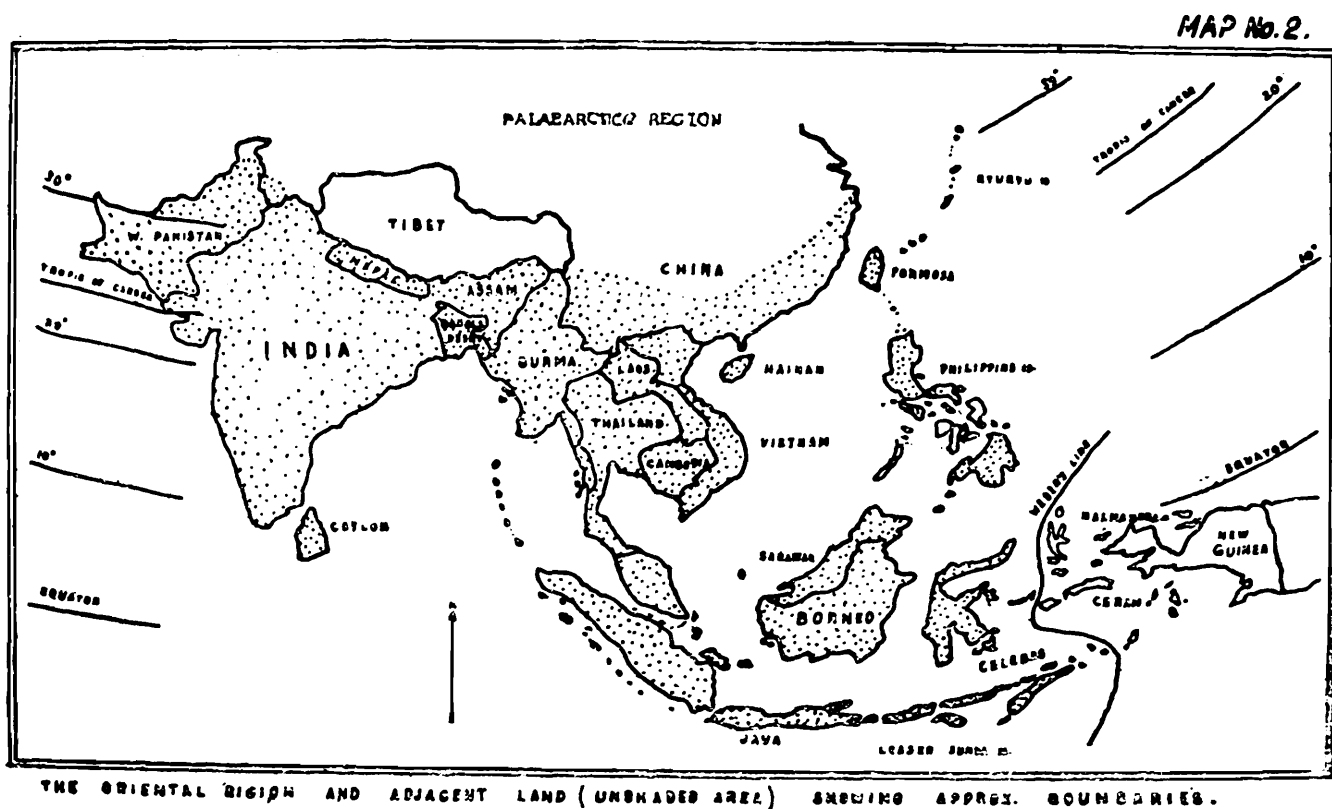
In the present study North East India means States of West Bengal, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura. They are situated between 22° and $29^{\circ} 30'$ North latitude and between 86° and 96° East longitude and spread over an area of about 3,68,532 sq. kms. This region is one of the most interesting zoogeographical part of the Oriental Region. The high and precipitous mountain peaks, sharp and steep hilly slopes with thick



coniferous tropical and sub-tropical forests and flat and low levelled forests of stunted growth make this region an extremely varied topographical one. Its maximum average rainfall per year is 2,000 mm. It can be broadly divided into two parts, East and West. The western division forms part of the physiographic provinces 'Bengal Basin', while the eastern one includes Assam Valley, the lofty Eastern Himalaya mountain ranges on the plains of Manipur, Tripura hills, Mizo hills and Cachar plains and Meghalaya.

Tetrigidae enjoy world wide distribution. The tropics are richly provided with diverse forms, in comparison with the less bizarre or

specialized forms that live in the temperate zone. Comparatively only very little is known about the geographic and zoogeographic distribution of the Tetrigidae. The Family Tetrigidae is circumtropical in distribution and the number of species steadily diminish towards the north and south of the Equator. The largest number of species are found in the Orinetal Region, where nearly fifty percent of the total known species of the world occur (Steinmann, 1970). Oriental Region comprises South and South-East Asia. The western border lies in the



desert between India, Afghanistan and Baluchistan and a long ranges of the mountains in North India, following the Hindukush and Himalaya, the border reaches China, touching the Yangtze-Kiang, and the Pacific Ocean at about Latitude 30° North. There is an intermingling of the Palaearctic and Oriental Regions. The South-Eastern border of the Oriental Region towards Australian Region decurrent between the Philippines, Malaku and Tinibar and New Guinea Kai and Aru respectively in the Ceram and Arafura Seas. The Indo-Australian and Oriental species overlap mostly between these islands. To the Oriental Region belongs the Great and Little Sunda islands, the Philippines, the islands of the Indian Ocean, the Laccadives, the Maldives, the Andaman and Nicobar islands, as well as South and South-East India, Sri Lanka, Hainan and Taiwan.

The Tetrigidae fauna of north eastern India is a complex admixture of endemic, Indo-Chinese, Malayan, Palaearctic, Ethiopian and rarely of Neotropical Regions. The Palaearctic species are dominant in

the upper ranges of Himalayas whereas Indo-Chinese and Malayan species are predominant in the area adjoining Burma and South China. The Zoogeography of the various genera known from the area is discussed below which indicates distinct patterns of distribution :



FIEBERIANA Kirby—This monotypic genus is represented by a single female specimen from Arunachal Pradesh and has not been recorded from anywhere else. So it seems to be an endemic genus.

EPITETTIX Hancock—The genus is mainly Oriental in distribution but its northern range extends to the Palaearctic border along the eastern part of the Himalayas. There are four known species of this genus of which only two are recorded from two distant and geographically different parts of India. *Epitettix elytratus* Günther from West Bengal and *E. tamilus* Günther from Kerala.

SCELMENA Serville—The genus is widely distributed in the Oriental Region but in India it is confined to the hilly forests of the North Eastern part.

INDOSCELMENA Günther—The genus has limited distribution in India viz., north east India extending to Burma.

THORADONTA Hancock—The genus is widely distributed in India as well as other parts of the Oriental Region.

CRIOTETTIX Bolivar—The genus is widely distributed in Oriental, Australian and Palaearctic Regions, but only one species is available from the North Eastern India.

EUCRIOTETTIX Hebard—Only four species are recorded from North East India, although there are many species occurring in Oriental Region. Out of these four species, two species namely *E. doherty* (Hancock) and *E. annandalei* (Hancock) are confined to the North East India.

LOXILOBUS Hancock—It is represented by several species in India, Sri Lanka, Burma and Philippines. Three species have been recorded from India which are restricted to the north eastern part of India. Their distribution extends up to Burma and Sri Lanka.

SYNALIBAS Günther—The genus is distributed in the north eastern India, especially in Sikkim and Darjeeling district of West Bengal but one species has been reported from New Guinea.

HEBARDITETTIX Günther—The genus is confined mostly to the north eastern part of India. Three species are reported here from this area.

SYSTOLEDERUS Bolivar—The genus occurs in the Oriental and Australian Regions. *Systolederus gravelyi* Günther is restricted to India.

TEREDORUS Hancock—The genus was originally reported from the Neotropical Region by a single species but later on two species have been described from the Himalayan Region of India. Under the present study some more species are described from North East India.

BOLIVARITETTIX Günther—The genus is distributed in the Oriental and Australian Regions.

XISTRELLA Bolivar—It is distributed in the Oriental Region. Two species *Xistrella dromadaria* Bolivar and *X. inermis* (Hancock), are endemic.

XISTRA Bolivar—This genus is found in the north eastern India (Sikkim), Philippines and Luzon.

HYBOELLA Hancock—It is Oriental in distribution and is generally available in the north eastern part of India, Burma, Thailand, Java and Malaya.

MIXOHYBOELLA Gen. nov.—It is a newly erected genus from Darjeeling District of West Bengal.

SPADOTETTIX Hancock—Restricted to the Oriental Region.

TETRIX Latreille—Cosmopolitan in distribution. *Tetrix bipunctata*

(Linnaeus) is an European species, but it also occurs in India.

EUPARATETRIX Hancock—This genus is widely spread in the Oriental Region, and to a lesser extent in the Australian and Palaearctic Regions.

PARATETRIX Bolivar—It is cosmopolitan in distribution with two Indian species.

HEDOTETRIX Bolivar—The genus is widely distributed in the Oriental Region but also occurs in the Australian Region, the African Region and Madagascar.

COPTOTETRIX Bolivar—It is distributed in Oriental Region, Australian Region and East and West Africa.

ERGATETRIX Kirby—The genus is Oriental in distribution and is commonly available in India, Turkmenia, Central Asia, Sri Lanka, Philippines, etc.

SAUSSURELLA Bolivar—The genus is distributed in south eastern Asia from China to Burma and north eastern India. It extends southwards into Indo-China, Malay Peninsula to Indonesia (Java, Borneo and Sumatra).

Thus, from the foregoing account it becomes clear that the fauna of North Eastern India is essentially Oriental, except in case of *Tetrix bipunctata* (Linnaeus), which also occurs in the Palaearctic. Altogether 77 species have been reported from North Eastern India which represents roughly half of the known Indian Fauna of the Family Tetrigidae. Endemic species are mostly confined to the eastern Himalayas, Assam Valley, Meghalaya, hills and plains of Tripura, Manipur, Cachar plains, Arunachal Pradesh and hilly areas of West Bengal and Sikkim. *Teredorus carmichaeli* Hancock, *T. frontalis* Hancock, *Fieberiana pachymera* Fieber, *Xistrella dromadaria* Bolivar, *X. inermis* (Hancock), *Xistra sikkimensis* Hancock, *Hyboella nullipennis* (Hancock), *Spadotettix subansiriensis* sp. nov., etc. show marked Palaearctic affinities.

The next common dominant group is that of Indo-Chinese and Malayan forms. These are mainly confined to the mountains of North Eastern India but some are spread in North West India also through the forest belt on the southern slopes of Himalayas.

Some genera are cosmopolitan in distribution like *Paratettix* Bolivar and *Tetrix* Latreille. *Spadotettix* Hancock, *Epitettix* Hancock and *Bolivaritettix* Günther are available only in the North Eastern India and South India.

ENDEMIC SPECIES

- | | |
|---|--|
| 1. <i>Fleberiana pachymera</i> Fieber | 24. <i>Bolivaritettix singlaensis</i> |
| 2. <i>Epitettix elytratus</i> Günther | (Hancock) |
| 3. <i>Scelimena discalis</i> (Hancock) | 25. <i>Bolivaritettix tandoni</i> sp. nov. |
| 4. <i>Scelimena kempi</i> (Hancock) | 26. <i>B. sikkimensis</i> (Bolivar) |
| 5. <i>Scelimena india</i> Hancock | 27. <i>B. laticeps</i> (Bolivar) |
| 6. <i>Indoscelimena saussurei</i> | 28. <i>B. dubius</i> (Hancock) |
| (Hancock) | 29. <i>B. roonwali</i> sp. nov. |
| 7. <i>Thoradonta pruthii</i> Günther | 30. <i>B. ghuntianus</i> (Hancock) |
| 8. <i>Thoradonta lativertex</i> Günther | 31. <i>Xistrella dromadaria</i> Bolivar |
| 9. <i>Thoradonta bengalensis</i> sp. nov. | 32. <i>Xistrella siangensis</i> sp. nov. |
| 10. <i>Eucriotettix doherty</i> (Hancock) | 33. <i>Xistrella inermis</i> (Hancock) |
| 11. <i>Eucriotettix annandalei</i> | 34. <i>Xistrella arorai</i> sp. nov. |
| (Hancock) | 35. <i>Xistra sikkimensis</i> Hancock |
| 12. <i>Loxilobus assamus</i> Hancock | 36. <i>Hyboella nullipennis</i> (Hancock) |
| 13. <i>Synalibas vagans</i> Günther | 37. <i>Hyboella obesa</i> Hancock |
| 14. <i>Synalibas perplexus</i> (Hancock) | 38. <i>H. conioptica</i> Hancock |
| 15. <i>Hebarditettix triangularis</i> | 39. <i>H. tentata</i> Hancock |
| (Hancock) | 40. <i>H. tumida</i> (Hancock) |
| 16. <i>Hebarditettix lobatus</i> | 41. <i>Mixohyboella srivastavai</i> sp. |
| (Hancock) | nov. |
| 17. <i>Hebarditettix quadratus</i> | 42. <i>Spadotettix subansiriensis</i> sp. |
| (Hancock) | nov. |
| 18. <i>Systolederus gravelyi</i> Günther | 43. <i>Paratettix rotundatus</i> Hancock |
| 19. <i>Systolederus abbreviatum</i> sp. | 44. <i>Paratettix alatus</i> Hancock |
| nov. | 45. <i>P. curtipennis</i> (Hancock) |
| 20. <i>Teredorus bhattacharyai</i> sp. | 46. <i>Hedotettix grossus</i> Hancock |
| nov. | 47. <i>Coptotettix tricarinatus</i> sp. nov. |
| 21. <i>Teredorus truncatus</i> sp. nov. | 48. <i>Coptotettix manipurensis</i> sp. nov. |
| 22. <i>T. carmichaeli</i> Hancock | 49. <i>C. lohitisensis</i> sp. nov. |
| 23. <i>T. frontalis</i> Hancock | 50. <i>Ergatettix callosus</i> (Hancock) |

ORIENTAL SPECIES

- | | |
|---|---|
| 1. <i>Thoradonta nodulosa</i> (Stal) ; | 5. <i>Eucriotettix grandis</i> |
| 2. <i>Thoradonta apiculata</i> Hancock | (Hancock) |
| 3. <i>Criotettix bispinosus</i> (Dalman) | 6. <i>Loxilobus acutus</i> Hancock |
| 4. <i>Eucriotettix pallidus</i> (Hancock) | 7. <i>Systolederus cinereus</i> Brunner |

- | | |
|--|--|
| 8. <i>Bolivaritettix sculptus</i> (Brunner) | 17. <i>P. tricarinatus</i> Bolivar |
| 9. <i>Bolivaritettix lativertex</i> (Brunner) | 18. <i>Hedotettix costatus</i> (Hancock) |
| 10. <i>Hyboella dilatata</i> (De Haan) | 19. <i>Hedotettix gracilis</i> (De Haan); |
| 11. <i>Euparatettix personatus</i> | 20. <i>H. attenuatus</i> Hancock |
| (Bolivar) | 21. <i>Copotettix tuberculatus</i> Bolivar ; |
| 12. <i>Euparatettix tenuis</i> Hancock | 22. <i>Coptotettix annandalei</i> |
| 13. <i>E. histicus</i> (Stal) | Hancock |
| 14. <i>Paratettix hancockus</i> (Shishodia & Varshney) | 23. <i>C. conspersus</i> Hancock |
| 15. <i>Paratettix cingalensis</i> (Walker) | 24. <i>Ergatettix güntheri</i> Steinmann |
| 16. <i>P. hirsutus</i> Brunner | 25. <i>Ergatettix dorsifera</i> (Walker) ; |
| | 26. <i>Saussurella cornuta</i> (De Haan) |

SUMMARY

The present study deals with the taxonomy and zoogeography of the Tetrigidae of North eastern India. As a result of such study 77 species are known of which 13 species have been described as new to science and 6 constitute new locality records for India. Over and above, the genus *Mixohyboella* has been erected new from Darjeeling district of West Bengal and also a couple of described species have been merged.

Besides, other remaining species have been redescribed with the help of Type specimens and also in the light of modern trends in taxonomy of Tetrigidae.

Geographical distribution of each species along with suitable illustrations and references have been included.

ACKNOWLEDGEMENTS

The author expresses his deep sense of gratitude to Dr. A. N. T. Joseph, Deputy Director, Marine Biological Station, Madras for the expert guidance and constant help during the course of this study. Grateful thanks are due to Dr. B. S. Lamba, the present Director and to Drs. B. K. Tikader, K. K. Tewari and T. N. Ananthakrishnan, the former Directors and S. Khera, ex-Joint Director-in-charge of Zoological Survey of India, for providing laboratory facilities and for their keen interest in this work. Thanks are also due to Dr. S. K. Bhattacharya, Joint Director, Dr. R. K. Varshney, Deputy Director, Z. S. I., Patna, Dr. S. K. Tandon, Superintending Zoologist for going through manuscript, Dr. G. K. Srivastava, Dr. Kuldip Rai, Dr. A. K. Hazra and

A. Pal of Zoological Survey of India for their help and encouragement. The author is also thankful to Dr. Lakshman Prasad Gupta, Z. S. I., Patna for his suggestions and untiring help.

Sincere thanks are due to Drs. W. J. Reynolds, D. R. Ragge, Mrs. Linda M. Pitkin, British Museum (Nat. Hist.), England ; Mrs. A. Z. Smith, M. W. R. de V. Graham, Oxford Museum, England ; Kurt K. Günther, Zoologisches Museum, Berlin ; A. Kaltenbach, Naturhistorisches Museum, Wien, Austria ; R. Krause, Staatliches Museum, Berlin ; Roberto Poggi, Museo civico, Di Storia Naturale, "Giacomo Doria", Geneva ; Curtis Dunn, Academy of Natural Sciences of Philadelphia, U. S. A. ; M. Donskoff, Paris Museum, France ; W. Bazyluk, Zoologischen Institute Polnischen Akademik, Poland ; Fer Willemse, Netherlands ; R. A. Farrow, International African Migratory Locust organisation, Kara, Republic of Mali ; D. K. Mc. Keven, Canada, for lending the Type specimens and for sending valuable literature.

REFERENCES

- *ANDER, K. 1939. Vergleichend-anatomische und Phylogenetische Studien über die Ensifera (Saltatoria). *Opusc. ent.*, **2** (Suppl.) : 1-306.
- *BEIER, M. 1955. Orthopteroides. In Bronn's Klassen und Ordnungen. Leipzig.
- *BEY-BIENKO, G. Y. 1962. On the general classification of Insects. *Rev. d' Entom. USSR.*, **41**(1) : 6-21.
- BEY-BIENKO, G. Y. & MISHCHENKO, L. L. 1951. *Locusts and Grasshoppers of the U. S. S. R. and the adjacent Countries* [in Russian]. Moscow and Leningrad, *Akad. Nauk. S S S R Pt. I* : 1-398.
- BOLIVAR, I. 1887. Essai sur les Acridiens de la tribu des Tetrigidae. *Annls Soc. ent. Belg.*, **31** : 175-313.
- BOLIVAR, I. 1902. Les Orthopteres de St. Joseph's College, a Trichinopoly (Sud de l' Inde). 3e Partie. *Annls Soc. ent. Fr.*, **70** : 580-634, pl. 1.
- BOLIVAR, I. 1909. Nouvelles especes d' Acridiens du Musee de Geneve, *Bol. Real. Soc. Esp.*, **9** : 393-408.
- BOLIVAR, I. 1917-1918. Contribucion al conocimiento de la Fauna indica Orthoptera (Locustidae vel Acridiidae). *Revta R. Acad. cienc. exact. fis. nat. Madr.*, (2) **16** : 278-412.
- BRUNNER VON WATTENWYL, C. 1893. Revision du systeme des Orthopteres. *Annali Mus. civ. Stor. nat. Giacomo Doria*, **33** : 6-230.
- *CAUDEL, A. N. 1927. On a collection of Orthopteroid Insects from Java made by Owen Bryant and William Palmer in 1909. *Proc. U. S. natn. Mus.*, **71** (3) : 1 42.
- *CHOPARD, L. 1929. Notes sur les Orthopteres du Hoggar. *Bull. Soc. Hist. nat. Afr. N.*, **20** : 234-246, pl. 15.
- *DE HAAN, W. 1842. Bijdragen tot de Kennis der Orthoptera. In: Temminck, C. J., *Verhandelingen Over de natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen*, pt. 12, zoologie : Orthoptera : 45-248, pls. 10-23. Leyden.
- DIRSH, V. M. 1961. A preliminary revision of the families and subfamilies of Acridoidea (Orthoptera : Insecta). *Bull. Br. Mus. nat. Hist. (Ent.)*, **10** (9) : 351-419.
- DIRSH, V. M. 1965. *The African genera of Acridoidea*, pp. xiii + 578. Cambridge, Anti-Locust Research Centre, At the University Press.

- *DIRSH, V M. 1973. Genital organs in Acridomorpha (Insecta) as taxonomic character. *z. f. zool. Syst. u. Evolutionsforschung* Bd. 11, H. 2 : 133-154.
- DIRSH, V M. 1975. *Classification of the Acridomorphoid Insects*. pp. vii+170. E. W. Classey Ltd. Faringdon, Oxon.
- FLETCHER, T. B. 1921. *Catalogue of Indian Insects*. pt. I Acrydidae (Tetrigidae) pp. iv+40.
- GRANT, H. J. Jr. 1966. The pacific genera of the subfamily Batrachideinae (Orthoptera : Tetrigidae). *Pacif. Insects*, 8 : 579-601, figs. 10-18.
- GÜNTHER, K. 1935. Acrydiinae von den Key Inseln (Orth. Acrididae). *Eos, Madr.*, 11 : 109-115, figs. 1-6.
- GÜNTHER, K. 1938 a. Zwei neue Dornschröcken (Orth. Acrididae, Acrydiinae) aus Hinterindien. *Ent. Rdsch.*, 55 : 465-468, figs. 1-4.
- GÜNTHER, K. 1938b. Revision der Acrydiinae I Sectiones Tripetalocerae, Discotettigiae, Lophotettigiae, Cleostratae, Bufonidae, Cladonotae, Scelimeniae Verae. *Mitt. zool. Mus. Berl.*, 23 : 299-437.
- GÜNTHER, K. 1938c. Revision der Acrydiinae (Orth.) II. Scelimenae spuriae. *Stettin. ent. Ztg.*, 99 : 117-148, and 161-230, pls. 1-8.
- GÜNTHER, K. 1939. Revision der Acrydiinae (Orthoptera) III. Section Amorphopi (Metrodora Bolivar, 1887, aut.). *Abh. Ber. Mus. Tierk. Völk. Dresden*. 20 (A) Zool. (N. F.) BD I : 16-335, figs. 1-250.
- GÜNTHER, K. 1941. Revision der Acrydiinenausbeute H. Sauters von Formosa (Orth.) *Stettin. ent. Ztg.*, 102 : 145-165, pl. 1-2.
- HANCOCK, J. L. 1904. The Tettigidae of Ceylon. *Spolia zeylan.*, 2 : 97-157, 4 tabs.
- HANCOCK, J. L. 1906. Orthoptera, Fam. Acrididae, Subfam. Tetriginae. *Genera Insect.*, Brussels, Fasc. 48 : 1-19, pls. 1-4.
- HANCOCK, J. L. 1907. Studies of the Tetriginae in the Oxford University Museum. *Trans. R. ent. Soc. Lond.*, 1907 : 213-244, tab. 21.
- HANCOCK, J. L. 1908. A new Ceylonese Tettigid of the genus *Eurymorphopus*. *Spolia zeylan.*, 5 : 113-114.
- HANCOCK, J. L. 1909. Further studies of the Tetriginae in the Oxford University Museum, *Trans. R. ent. Soc. Lond.*, 1908 : 387-426, tab. 22.
- HANCOCK, J. L. 1910 a. Notes on Ceylonese Tettiginae (Orthoptera),

- with descriptions of some new species. *Spolia zeylan.*, 6 : 140-9.
- HANCOCK, J. L. 1910 b. Third paper on the Tetriginae in the Oxford University Museum. *Trans. R. ent. Soc. Lond.*, 1910 : 346-365, tab. 49.
- HANCOCK, J. L. 1912. Tetriginae (Acridiinae) in the Agricultural Research Institute, Pusa, Bihar, with the descriptions of new species. *Mem. Dep. Agric. India ent. Series*, 4 (No. 2) : 131-160.
- HANCOCK, J. L. 1913. Zoological Results of the Abor Expedition, Orthoptera. *Rec. Indian Mus.*, 8 : 311-316, tab. 15.
- HANCOCK, J. L. 1915. Indian Tetriginae. *Rec. Indian Mus.*, 11 : 55-132, tab. 14.
- *HANDLIRSCH, A. 1908. Die fossilen insecten und die Phylogenie der rezenten Forman. Leipzig.
- HARZ, K. 1975. *The Orthoptera of Europe II (Series Entomology)* : 1-939. Dr. W. Junk B. V publishers, The Hague.
- HEBARD, M. 1929. Acrydiinae (Orthoptera, Acrididae) of Southern India. *Revue suisse zool.*, 36 : 565-592, figs. 1-10.
- HEBARD, M. 1932. A new species and records of Acrydiinae from Ceylon (Orthoptera, Acridinae). *Spolia zeylan.*, 17 (1) : 19-28, 2 figs.
- HENRY, G. M. 1933. Descriptions and records of Ceylonese Acrididae. *Spolia zeylan.*, 17 : 155-160.
- KEVAN, D. K. McE. 1953. The status of *Tetrix bipunctata* (Linn.) (Orthoptera : Tetrigidae) in Britain. *Entomologist's Gaz.*, 4 : 205-224.
- KEVAN, D. K. McE. (1954) 1955. A small collection of Acridoidea (Orthoptera) from the Agricultural 'department, Bangkok. Thailand. *Nat. Hist. Bull. Siam. Soc., Bangkok*, 16 : 45-47.
- KEVAN, D. K. McE. 1961. Proposal to suppress the names of certain unidentifiable nominal species in the family Tetrigidae (Insecta, Orthoptera) and to add two others to the official list. Z. N. (S). 673. *Bull. zool. Nom.*, 18 (6) : 377-379.
- KEVAN, D. K, McE. 1966. Some Orthoptera-Caelifera from the Philippine, Bismarck and Solomon Islands, with a few interesting records from New Guinea and the Moluccas. *Ent. Maddr*, 34 : 375-420.
- KIRBY, W. F. 1910. *A synonymic Catalogue of Orthoptera*. 3 : ix+674.
- KIABY, W. F. 1914. *The fauna of British India, including Ceylon and Burma*. Orthoptera (Acridiidae). : ix+276.
- *LATREILLE, P. A. 1793. *Precis des caracteres Generiques des Insectes*. Bordeaux.

- *LATREILLE, P. A. 1817. In Cuvier, G., *Regne Animal*, 1st ed. 3 : 365-384.
- LEFROY, H. M. 1909. *Indian Insect Life*. A manual of the insect of the plains (Tropical India) : 80--82.
- LINNAEUS, C. 1758. *Systema Naturae*, 10th ed. 1 : 424-433.
- QADRI, M. A. H. 1940. On the development of the genitalia and their ducts of Orthopteroid Insects. *Trans. R. ent. Soc. Lond.*, 90 : 121-175, pls. 1-7, figs. 1-17.
- REHN, J. A. G. 1904. Studies in the Orthopterous subfamilies Acrydiinae (Tettiginae), Eumastacinae and Proscopinae. *Proc. Acad. nat. sci. Philad.*, 16 : 658-683.
- REHN, J. A. G. 1929. New and little known Madagascar Grouse Locusts (Orthoptera, Acrididae, Acrydiinae). *Proc. Acad. nat. Sci. Philad.*, 81 : 477-519, pls. 1-5.
- REHN, J. A. G. 1930. Studies in African Acrydiinae I Cladonotae, Scelimenae Metrodora. *Proc. Acad. nat. Sci. Philad.*, 82 : 91-137.
- REHN, J. A. G. 1939. Studies in African Acrydiinae (Orthoptera : Acrididae) Part 2. *Proc. Acad. nat. Sci. Philad.*, 90 : 261-287, pls. 1-2.
- REHN, J. A. G. 1948. Replacement of two pre-occupied names of Tetrigidae (Orthoptera : Acridoidea). *Ent. News*, 59 : 154-155.
- REHN, J. A. G. 1952. The grasshoppers and locusts (Acridoidea) of Australia. Vol. I, Families Tetrigidae and Eumastacidae : 1-326, pls. 1-26, Melbourne (Commonw. Sci. & Ind. Res. Org.).
- REHN, J. A. G. & GRANT, Jr. H. J. 1955. *Tetrix subulata* (Orthoptera : Acridoidea : Tetrigidae) as occurring in N. America. *Proc. Acad. nat. Sci. Philad.*, 107 : 145-165, figs. 1-2.
- REHN, J. A. G. & GRANT, Jr. H. J. 1957. The genus *Paratettix* as found in N. America (Orthoptera : Acridoidea : Tetrigidae). *Proc. Acad. nat. Sci. Philad.*, 109 : 247-319, figs. 1-38, maps. 1-3.
- REHN, J. A. G. & GRANT, Jr. H. J. 1958. The Batrachideinae (Orthoptera : Acridoidea : Tetrigidae) of North America. *Trans. Am. ent. Soc.*, 84 : 13-103, pl. 1, figs. 1-33, maps. 1-4.
- SANDRASAGARA, T. R. (1949) 1950. A Catalogue of named Tetrigidae in Colombo Museum, with records of distribution. *Rec. Indian Mus.*, 47 : 135-141.
- SAUSSURE, H. De, 1861. "Etude sur quelques Orthopteres du musee de Geneve" *Annls Soc. ent. Fr.*, (4) 1 : 469-494. (1860).
- SERVILLE, J. G. A. 1839. *Histoire naturelle des Insectes Orthopteres* : 1-777, pls. 1-14, Paris.
- SHISHODIA, M. S. 1981. Taxonomy and zoogeography of the Tetrigidae

(Orthoptera : Tetrigoidea) of North Eastern India (Thesis submitted for the degree of Ph. D. to Agra University).

SHISHODIA, M. S. & VARSHNEY, R. K. 1987. Two unusual cases of homonymy in Orthoptera with new names for species from India. *J. Bombay nat. Hist. Soc.*, **84** (1) : 167-169.

SHISHODIA, M. S. 1987. A new combination proposed for Indian grouse locusts (Orthoptera : Tetrigidae). *Bull. zool. Surv. India*, **8** (1-3) : 131-134.

STAL, C. 1873. *Recensio Orthopterorum* Part 1. 154 Seiten.

STEINMANN, H. 1964. Some new Tetrigid species and subspecies from Asia (Orthoptera : Tetrigidae). *Acta zool. hung.*, Budapest, **10** : 457-468, figs. 1-30.

STEINMANN, H. 1969. The Tetricidae (Orthoptera) of the Neogaea. *Folia ent. hung.*, **22** : 383-404.

STEINMANN, H. 1970a. Check-List of the Tetricidae (Orthoptera) of the Oriental Faunal Region. *Acta zool. hung.*, **16** : 215-240.

STEINMANN, H. 1970b. The Tetricidae (Orthoptera) of the Notogaea. *Opusc. zool., Bpest*, **10** : 155-164.

STEINMANN, H. 1971a. The Tetricids of the Nearctic subregion. *Acta zool. hung.*, **17** : 381-385.

STEINMANN, H. 1971b. The Tetricidae (Orthoptera) of the Palaearctic Fauna. *Folia ent. hung.*, **24** : 323-332.

STEINMANN, H. 1973. *Vilma* gen. n. for *Vingselina willemsei* Günther, 1937 (Orthoptera : Tetricidae). *Acta zool. hung.*, **19** : 167-169.

TANDON, S. K. & SHISHODIA, M. S. 1972. Notes on the Collection of Grylloidea (Orthoptera) from NEFA, India. *Oriental Ins.*, **6** (3) : 281-292.

TINKHAM, E. R. 1936. A new species of *Eugavialidium* from Formosa. *Trans. nat. Hist. Soc. Formosa*, **26** : 207-210.

*TINKHAM, E. R. 1937a. Notes on the identity of Formosan Acrydiinae with description of a new genus and two new species (Orthoptera : Acrididae). *Trans. nat. Hist. Soc. Formosa*, **27** : 229-242, pl. 1.

*TINKHAM, E. R. 1937b. Notes on a small collection of Acrydiinae from N. China and E. Mangolia (Orthoptera : Acrididae). *Pecking. nat. Hist. Bull. Peiping*, **12** : 47-51.

TINKHAM, E. R. 1938. A new species of *Hydrotettix* from the Marquesas Islands with key to the genus [Orthoptera : Acrididae : Acrydiinae]. *Ann. Mag. nat. Hist.*, (11) **1** : 28-30.

UVAROV, B. P. 1925. Grasshoppers from the Mount Everest, subfamily Acrydiinae, *Ann. Mag. nat. Hist.*, (9) **16** : 165-173.

- UVAROV, B. P. 1928. Some Orthoptera of the families Mantidae, Tettigonidae and Acrididae from Ceylon. *Spolia zeylan.*, **14** : 113-114.
- UVAROV, B. P. 1940a. Twenty eight new generic names in Orthoptera. *Ann. Mag. nat. Hist.*, (11) **5** : 173-176.
- UVAROV, B. P. 1940b. Twenty four new generic names in Orthoptera. *Ann. Mag. nat. Hist.*, (11) **6** : 112-117.
- WALKER, E. M. 1919. The terminal structures of Orthopteroid insects. *Ann. ent. Soc. Am.*, **12** (4) : 285.
- WALKER, E. M. 1922. The terminal structures of Orthopteroid insects. *Ann. ent. Soc. Am.*, **15** (1) : 1-76.
- WALKER, F. 1871. *Catalogue of the specimens of Dermaptera and Saltatoria in the collection of the British Museum Part V. Tettigidae and supplements to earlier parts* : 4 + 811-850 + 43 + 116.
- *WESTWOOD, J. O. 1834. *Zool. J.*, **5** : 444.
- WILLEMSE, C. 1930. Fauna Sumatrensis. *Tijdschr. Ent.*, **73** : 1-210.
- WILLEMSE, C. 1931. Acrididae Celebicae. *Truebia*, Buitenzorg **12** (Suppl.) : 189-270.
- WILLEMSE, C. 1938. Descriptions of new Indo-Malayan Acrididae (Orthoptera) parts 7-9. *Natuurh. Maandbl.*, Maastricht, **27** : 42-44, figs. 1-2 ; 83-84, 95-96, 107-108, figs. 1-8 ; 116-120, figs. 1-5.

* Original not seen.

LIST OF ABBREVIATIONS USED

Ad,	Antegenicular denticle	M.P.,	Madhya Pradesh
Af,	Anterior femur	Occ,	Occiput
Al,	Anterior leg	Pa,	Paginal area
An,	Antenna	Pd,	Pedicel
Ao,	Anterior occilus	Plv,	Pulvilli
Cl,	Claw	Po,	Paired ocelli
Cx,	Coxa	Pr,	Pronotum
Distt.,	District	Prh,	Hind pronotal process
Divi.,	Division	Prz,	Prozonal carina
E,	Compound eye	Pt,	Paranota
El,	Elytra	r,	Rami
Fc,	Frontal costa	S,	Sulci
Fh,	Hind femur	Sc,	Scape
Fl,	Flagellum	Sf,	Frontal sulcus
Fs,	Fossulae	Sg,	Subgenital plate
Gd,	Genicular denticle	T,	Tibia
H,	Head	Ta,	Tarsi
Hl,	Hind leg	Ta 1,	First tarsal segment
Ic,	Inferior carina	Ta 2,	Second tarsal segment
lc,	Lateral carinulae	Ta 3,	Third tarsal segment
Lc,	Lateral carina	Tr,	Trochanter
km,	Kilometer	T.N.	Tamil Nadu
kms,	Kilometers	Uc,	Superior carina
Ll,	Posterior angles of lateral lobes of Pronotum	Uma,	Upper marginal area
Lma	Lower marginal area	U.P.,	Uttar Pradesh
mc,	Middle Carinula	V,	Vertex
Mc,	Median carina	W,	Wing
Mf,	Middle femur	W B.,	West Bengal
m,	Meter	Z.S.I.	Reg. No., Zoological Survey of India, Registration Number
mm,	millimeter		
mms,	millimeters		

ALPHABETICAL INDEX

N. B.—Names in italics are synonyms

- abbreviatum* (Systolederus), 68, 70
Acanthalobus, 35
Acridium, 127
Acrydium, 120, 127
acutus (Loxilobus), 46, 50, 51
alatus (Paratettix), 151, 152
annandalei (Coptotettix), 49, 165, 169, 172, 173
annandalei (Criotettix), 43
annandalei (Eucriotettix), 43, 44, 46
apiculata (Thoradonta), 27, 29, 31
aptera (Mazarredia), 109
arorai (Xistrella), 101, 103
artolobus (Coptotettix), 170, 171
asperatus (Coptotettix), 164
assamus (Loxilobus), 47, 49
attenuatus (Hedotettix), 160, 162, 164
bengalensis (Euparatettix), 178
bengalensis (Thoradonta), 34, 35
bhattacharyai (Teredorus), 71
bipunctata (Tetrix), 5, 128, 129
bipunctatum (Acrydium), 128
bipunctatus (Gryllus Bulla), 128
bipunctatus (Tettix), 128
bipunctatus (Tettix), 128
bispinosa (Tettix), 36
bispinosum (Acrydium), 35, 36
bispinosus (Criotettix), 36, 38
Bolivaritettix, 5, 55, 63, 77, 78, 84, 88, 89
Bolotettix, 60, 62, 101
brunneri (Saussurella), 183
Bulla, 127
callosus (Ergatettix), 180, 181
callosus (Indatettix), 180
carmichaeli (Teredorus), 73, 75, 75
cinereus (Systolederus), 66, 67
cingalensis (Euparatettix), 146
cingalensis (Paratettix), 146, 147
cingalensis (Tettix), 146
conioptica (Hyboella), 111, 112
conspersus (Coptotettix), 170, 171, 173
Coptotettix, 5, 112, 120, 127, 164
cornuta (Saussurella), 183, 184
cornutum (Acridium (Tettix)), 182, 183
corpulentus (Euparatettix), 135, 138
costatus (Hedotettix), 5, 155
crassipes (Euparatettix), 178
crassipes hybridus (Euparatettix), 178
Criotettix, 7, 9, 16, 35
cucullifera (Tettix), 183
curtipennis (Coptotettix), 144
curtipennis (Paratettix), 144, 152
dentata (Thoradonta), 25
dilatata (Hyboella), 115, 118, 120, 121
dilatatum (Acridium (Tettix)), 118
dilatatum (Acrydium), 118, 120
dilatatus (Tettix), 118
diminutus (Hedotettix), 157
discalis (Eugavialidium), 18
discalis (Scelimena), 8, 11
dohertyi (Criotettix), 41, 88
dohertyi (Eucriotettix), 41, 42
dohrni (Xistrella), 60

- dorsifera* (?) (*Paratettix*), 178
dorsifera (*Ergatettix*), 85, 178, 180, 181
dorsifera (*Tettix*), 178
dorsiferum (*Acrydium*), 178
dromadaria (*Xistrella*), 5, 94, 95, 97
dubia (*Mazarredia*), 88, 89
dubius (*Bolivaritettix*), 88, 89
elytratus (*Epitettix*), 5, 13, 14, 15
Epitettix, 11, 13
Ergatettix, 126, 174, 175
Eucriotettix, 9, 16, 38, 88
Eugavialidium, 16, 22, 25
Euparatettix, 126, 129, 130, 133, 154
ferruginea (*Tripetalocera*), 5
festivus (*Hedotettix*), 157
Fiberiana, 8, 10, 11, 13
flavopictum (*Eugavialidium*), 23
fletcheri (*Spidotettix*), 123
frontalis (*Teredorus*), 73, 75
ghumtiana (*Mazarredia*), 92
ghumtianus (*Bolivaritettix*), 87, 92, 94
gibbum (*Acrydium*), 128
gogorzae (*Xistra*), 103
gracile (*Acridium Tetrax*), 154, 157
gracilis abortus (*Hedotettix*), 157
gracilis (*Hedotettix*), 157, 162, 163, 164
grandis (*Criotettix*), 44
grandis (*Eucriotettix*), 44, 46
gravelyi (*Criotettix*), 44
gravelyi (*Eucriotettix*), 44
gravelyi (*Spidotettix*), 126
gravelyi (*Systolederus*), 64, 66, 67
grossus (*Hedotettix*), 160, 161, 162
Gryllus, 127
güntheri (*Ergatettix*), 175, 178, 180
haani (*Systolederus*), 63
hancockus (*Coptotettix*), 140, 143
hancockus (*Paratettix*), 8, 140
Hebarditettix, 5, 16, 56, 57, 60
Hedotettix, 126, 154, 155, 156
hirsutus (*Paratettix*), 148, 151
histrica (*Tetrax*), 135
histricus (*Euparatettix*), 135, 138
histricus (*Paratettix*), 135
histricus (*Tettix*), 135
Hyboella, 5, 63, 105, 106, 112, 120
Indatettix, 174
india (*Scelimena*), 22
Indoscelimena, 16, 23, 25
inermis (*Bolotettix*), 99, 101
inermis (*Xistrella*), 99, 103
inflatus (*Coptotettix*), 118
inornata (*Tettix*), 36
inornatus (*Acanthalobus*), 36
interruptus (*Euparatettix*), 178
interruptus lobulatus (*Euparatettix*), 178
javanicus (*Bolivaritettix*), 89
kempi (*Eugavialidium*), 20, 22
kempi (*Scelimena*), 20, 22
laticeps (*Bolivaritettix*), 87, 88, 91
laticeps (*Mazarredia*), 87
latifrons (*Criotettix*), 38
latifrons (*Mazarredia*), 93
lativertex (*Bolivaritettix*), 93, 94
lativertex (*Mazarredia*), 93
lativertex (*Thoradonta*), 32, 33, 35
lobatus (*Bolotettix*), 61
lobatus (*Hebarditettix*), 60, 61, 62
lobatus (*Systolederus*), 60
lohitensis (*Coptotettix*), 173
Loxilobus, 5, 16, 46
manipurensis (*Coptotettix*), 167, 172
maximus (*Criotettix*), 44
maximus (*Eucriotettix*), 44
Mazarredia, 55, 77, 84, 109
meridionalis (*Tetrax*), 138

- Mixohyboella*, 8, 9, 63, 121, 123
nodulosa (*Tetrix*), 29
nodulosa (*Thoradonta*), 29, 31, 33, 35
nodulosa spiculoba (*Thoradonta*), 29
nodulosus (*Criotettix*), 29
nodulosus (*Euparatettix*), 175
nodulosus (*Indatettix*), 175,
nodulosus (*Tettix*), 29
nullipennis (*Coptotettix*), 107
nullipennis (*Hyboella*), 107, 109
obesa (*Hyboella*), 112, 115
opacum (*Acrydium*), 128
pachymera (*Fieberiana*), 8, 11, 13
pachymerus (*Fieberiana*), 11
pachymerus (*Piezotettix*), 11
pachymerus (*Plagiocephalus*), 11
pallidus (*Criotettix*), 39
pallidus (*Eucriotettix*), 39, 41, 42
Paratettix, 105, 127, 138, 139, 143, 147, 154
parvispinus (*Loxilobus*), 50, 51
parvulus (*Coptotettix*), 140, 143
parvus (*Euparatettix*), 133, 178
perplexa (*Mazarredia*), 54
perplexus (*Synalibas*), 54, 56
personatus (*Euparatettix*), 129, 130
personatus (*Paratettix*), 130, 133
Piezotettix, 13
pilosus (*Euparatettix*), 178
Plagiocephalus, 11
producta (*Scelimena*), 20, 23
producta (*Tetrix*), 16
pruthii (*Thoradonta*), 31, 32
punctatus (*Epitettix*), 13
pusillus (*Coptotettix*), 143
quadratus (*Bolotettix*), 56, 59
quadratus (*Hebarditettix*), 59, 60, 62
ridly (*Systolederus*), 67
roonwali (*Bolivaritettix*), 90, 91
Rostella, 126
rotundatus (*Paratettix*), 150, 151
saginata (*Criotettix*), 36
saussurei (*Eugavialidium*), 24
saussurei (*Indoscelimena*), 24, 25
Saussurella, 8, 10, 182
scaber (*Paratettix*), 105
scabripes (*Euparatettix*), 178
Scelymena, 16
Scelhymena, 16
Scelimena, 9, 15, 16, 17, 22
schranksii (*Tettix*), 128
sculpta (*Mazarredia*), 82, 85
sculptus (*Bolivaritettix*), 77, 82, 84, 87
scutellatum (*Acrydium*), 128
siangensis (*Xistrella*), 97, 99
sikkimensis (*Bolivaritettix*), 5, 82, 86, 87
sikkimensis (*Mazarredia*), 86
sikkimensis (*Xistra*), 104, 105
singlaensis (*Bolivaritettix*), 79, 87
singlaensis (*Mazarredia*), 79
sinuata (*Thoradonta*), 29
spadotettix, 5, 7, 62, 123, 126
srivastavai (*Mixohyboella*), 122
stenofrons (*Teredorus*), 70, 75
subansiriensis (*Spadotettix*), 5, 124, 126
subulata (*Tetrix*), 157
subulatus (*Gryllus*), 127
Synalibas, 16, 51, 55
Systolederus, 5, 62, 63, 64
tandoni (*Bolivaritettix*), 80
tarsalis (*Ergatettix*), 174, 178
tentata (*Hyboella*), 5, 105, 116, 121
tenuis (*Euparatettix*), 133, 138
Teredorus, 5, 7, 62, 70
testaceus (*Coptotettix*), 167, 171, 172

- Tetrix, 120, 126, 127
Tettix, 127
Thoradonta, 9, 16, 25, 26
triangularis (*Bolotettix*), 57
triangularis (*Hebarditettix*), 57
tricarinatus (*Criotettix*), 38
tricarinatus (*Coptotettix*), 169
tricarinatus (*Paratettix*), 152, 154
truncatus (*Teredorus*), 72
tuberculatus (*Coptotettix*), 5, 168
tumida (*Hyboella*), 109, 110
tumidus (*Coptotettix*), 109
vagans (*Synalibas*), 51, 52
variabilis (*Euparatettix*), 138
variabilis (*Paratettix*), 135
Xistra, 63, 103, 105
Xistrella, 7, 63, 94, 95, 101

ERRATA

Page No	Line No	Instead of	Read
11	32	exerted	exserted
35	13	Critotettix	Criotettix
44	18	<i>Encriotettix</i>	<i>Eucriotettix</i>
56	11	<i>Heb rditettix</i>	<i>Hebarditettix</i>
59	12	<i>Bototettix</i>	<i>Bolotettix</i>
75	19	<i>Carmichaeli</i>	<i>carmichaeli</i>
80	32	fig 4 6	fig 4-6
85	2	<i>dorsiferus</i>	<i>dorsifera</i>
87	18	Boliveritettix	Bolivaritettix
89	32	<i>dubius</i>	<i>dubia</i>
89	38	<i>dubius</i>	<i>dubia</i>
125	3	bipunotata	bipunctata
140	16	(Shishodia & Varshney)	(Shishodia & Varshney), 1987
146	11	(Hancock)	Hancock