

XXIV DESCRIPTION OF A MINUTE HYMENOPTEROUS INSECT FROM CALCUTTA

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On August 25th while I was examining some microscopic specimens in oil of cloves, a minute insect appeared in the field of vision, having fallen into the oil as minute insects often do. An examination showed that this little animal, which is perhaps the smallest insect yet known, belonged to the family Myrmaridæ and was related to the species described and figured by Westwood¹ as *Alaptus excisus*. I have therefore ventured to describe it as the type of a new species of the same genus, for it is unlikely that it will be discovered by any professed student of the Hymenoptera, or, indeed, by anyone not engaged in microscopical work in India.

Alaptus magnanimus, sp. nov. (Plate xxiii.)

Size very minute (length 0.21 mm.; expanse, including wing fringe, 0.85 mm.).

Head viewed from above short and broad, the anterior margin appearing truncate owing to the fact that the anterior face is vertical; viewed from in front deep. Antennæ minutely hairy, with nine joints (in the ♂); the basal joint subcylindrical, tapering slightly at the tip, bending upwards and outwards from its point of origin, which is situated far forward on the head; second joint much shorter, pear-shaped, with the narrow end proximal; third and fourth joints subcylindrical, the latter much the shortest in the antenna; the other joints (fifth to ninth) pear-shaped, narrower at the base than at the tip, gradually increasing in size. Eyes large, elongately oval, separated by more than their own transverse diameter, curved when viewed from the side. Three ocelli, one close to the inner margin of each eye and one in the middle of the vertex; a minute bristle in front of each of the lateral ocelli. (The mouth parts are not visible in the type.)

Thorax.—Pronotum transverse, angulate, almost linear, produced at either side and bearing at the tip of the projection a bunch of minute hairs. Mesothorax much longer, transversely lozenge-shaped but with the posterior angle replaced by a broad concavity. Scutellum narrow, especially in front; the anterior margin depressedly convex forwards; a single bristle on either

¹ *Trans. Linn. Soc. Lond.*, Zool. (2), vol. i, p. 586, pl. lxxiii, figs. 10, 11 (1879).

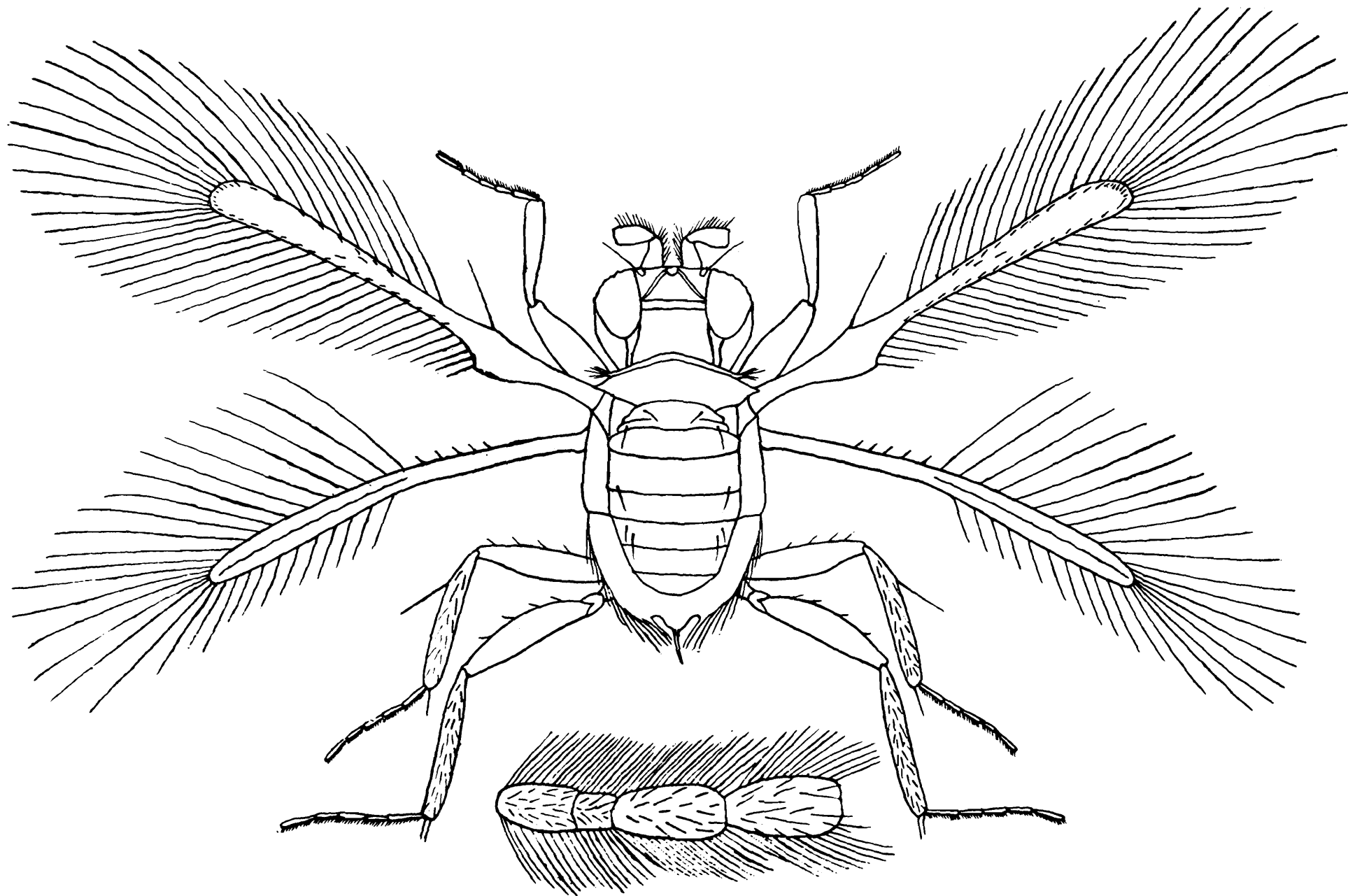
side of the disk near its centre. Postscutellum imperfectly separated, transverse, band-like, with a single bristle on either side. Metanotum large, transverse, with the anterior margin sinuous and the posterior convex. (The ventral surface and the sides are concealed in the type.)

Wings.—Fore wings long and slender with the tip obliquely rounded; the base very narrow, becoming somewhat dilated just behind the point at which the marginal fringe commences on the posterior margin. The hairs that form this fringe numbering about 45, long and slender, becoming shorter towards the base of the wing on both margins, the longest (at the tip) being rather less than half as long as the wing without the fringe; within the fringe, near the edge of the wing, a row of minute bristles, and two similar bristles near the centre of the disk; on the anterior surface a single long bristle at the widest part of the wing. Posterior wing almost linear, very little dilated distally; the tip narrowly rounded; the fringe without an inner row of bristles, consisting on the anterior margin of 5 short hairs followed, distally, by about 20 long ones, and on the posterior margin of about 11 moderate hairs, which are only a little longer at the distal end than towards the base; the basal half of the posterior margin bare; a minutely serrated ridge runs down the middle of the distal half of the wing.

Legs moderately long, with the femora, tibiæ and tarsi subequal; the tarsi minutely hairy, consisting of 5 subequal joints and bearing two minute claws at the tip. The tibiæ of the middle and hind legs clothed with minute recumbent hairs and bearing a pair of small bristles at the tip; those of the middle legs bearing a single, longer bristle on the anterior surface.

Abdomen (♂) stout and rounded; the sides clothed with scale-like hairs; the first dorsal segment bearing a single bristle on either side near the posterior margin; the penultimate segment with a pair of unequal bristles on either side, the longer bristle being posterior to and nearer the middle of the segment than the shorter one.

Remarks.—As the specimen was not discovered until it had fallen into clove oil, which had rendered it partially transparent, I cannot describe its coloration in detail. The head (including the antennæ), the thorax and the abdomen appear, however, to have been dark in colour, and the limbs pale. The wing fringes have evidently been dark also, and it is just possible to detect a faint white band running round those of the fore wings at a short distance from the base of the hairs. Unfortunately both antennæ were broken in mounting the specimen, but notes were taken on their structure before this occurred. In the type (Reg. No. $\frac{2502}{16}$ of the Indian Museum insect register), which is mounted on a glass slide for microscopic examination, only the first two joints remain *in situ*, with the third to sixth joints of one antenna free. Except the left fore wing, the wings have also become separated, but all are preserved.



Alaptus magnanimus, ♂, × 240, with the third to sixth joints of the antenna more highly magnified.

XXV THE INSECT FAUNA OF TIRHUT

I.—RHYNCHOTA HETEROPTERA.

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INTRODUCTION.

In another place (*Indian Insect Life*) I have discussed the general difference there is between the insect fauna of tropical India, and that of the sub-tropical moist hill slopes. I have also indicated the faunal zones of India as I believe they occur with regard to insects. In this memoir, a beginning is being made to elaborate these subjects, first by enumerating the insect fauna of a place lying well within the tropical area, secondly by contrasting that fauna, as far as may be, with neighbouring tropical areas and by discussing its origin. As is abundantly clear from a perusal of the localities in the "Fauna of India," nearly all the species are from sub-tropical or temperate places, very few from tropical India. The localities in the "Fauna" volumes do not, except in such as have been published so recently as to include our collections, enable us to contrast the tropical and sub-tropical faunæ; but the enumeration of the fauna of one spot, very carefully worked for a series of years, will afford some data.

The regional faunæ of India are, except in Lepidoptera, very little known; a compiled list of the fauna of one place (with other records of occurrence in tropical localities) will therefore be of permanent value; we have the material for all orders; we hope to do the Aculeate Hymenoptera, Coleoptera, Lepidoptera and Rhynchota Homoptera; we also hope to do the remaining orders, when we have secured the co-operation of systematists in working out our collections.

In this memoir, I enumerate the Heteropterous fauna of Pusa, following the order of the volumes on Rhynchota, by W. L. Distant, in the "Fauna of India"; I give other localities from which specimens have been collected and are in the Pusa collections, giving dates of capture where possible. I have included species found at Chapra by Mr. M. Mackenzie where we have not found them, as Chapra lies in the same area. Pusa lies in the "Gangetic Plain, West," north of the Ganges, in the Tirhut division of Bengal; it is at a distance of over 50 miles from the Himalayas, and so is well removed from any sub-tropical area; it lies nearly 40 miles north of the Ganges, and is in a flat, densely cultivated tract which should have a uniform fauna (see *Indian Insect Life*, page 25).

PENTATOMIDÆ.

PLATASPIDINÆ.

1. *Brachyplatys pauper*, Voll.

Pusa. 3-viii-05—11-viii-05—23-vii-05.

Podanur, Madras. 30-vii-07.

Khasi Hills. iv-07.

The Fauna gives Ceylon, Andamans, and the Malay Archipelago. It is clearly not a sub-tropical species, but a well-marked tropical one probably.

2. *Brachyplatys subaëneus*, Westw.

Pusa. 2-viii-05—26-vi-07—vii-08.

The Fauna gives this a wide distribution; it is known, for instance, from Mungphu and Calcutta, though not from any other place in the Himalayas. It would probably be a Malayan or Indo-Chinese species, penetrated up through Bengal and essentially tropical.

3. *Coptosoma cribrarium*, Fabr.

Pusa. 14-v-05—23-vi-07—vii-06.

Surat. 15-xii-03.

Muzaffarpur. 19-xi-04.

Ranchi. xi-06.

Nadiad. 6-xii-03.

Mahim. 22-ii-04.

Jalalpur. 7-v-04.

Jullundur. 19-vii-05.

The Fauna gives Calcutta, Bombay, Barwai, Burhanpur, Bangalore, Nilgiris, Nagas, Burma, China, Formosa.

In India, a very common tropical species, clearly not originating in sub-tropical India. Its season for activity and breeding is July to October as a rule, but the imago lives over and is captured at all times.

4. *Coptosoma siamicum*, Wlk.

Pusa. 16-vi-05—22-vii-05—2-viii-05—23-xi-04—1-xii-06—2-ix-07, etc.

Dacca. 13-i-06.

Bombay. x-05.

Raniganj. iii-06.

Surat. 10-vi-04.

The Fauna gives Calcutta, Barwai, Ceylon, Burma, etc. It is apparently a tropical species originating in Malaya or Weddaland.

5. *Coptosoma indicum*, Leth.

Pusa. 19-ix-06.

Palamau. ix-06.

So small as to escape notice. The Fauna gives Ceylon and Siam.

If the species of the sub-family occurring in Sikhim or the Western Himalayas are listed, it will be seen that there are ten species, not known from Pusa, occurring there.

SCUTELLERINÆ.

6. *Cantao ocellatus*, Thunb.

Pusa. 13-xi-05—8-vii-07—13-xi-05—5-vi-07.

Rangpur. 23-vii-05.

Nilgiris. 7,000 feet. 2-v-04.

Khasis. 4,000 feet. v-05.

Not a common species in the plains; essentially a tree insect.

The Fauna gives tropical and sub-tropical localities, and it occurs more abundantly in the latter, where its food is more plentiful.

7. *Scutellera nobilis*, Fabr.

Pusa. 20-iii-07—1-vii-08—24-vii-06—31-vii-05—6-viii-08.

Gojra (Punjab). 11-vii-06.

The Fauna localities are essentially tropical also.

8. *Chrysocoris stollii*, Wolff.

Pusa. 8-vi-05.

Tribeni. 23-iii-05.

Buxar Duars. v-07.

Matheran. iv-08.

Chindwara. 21-iv-08.

The Fauna localities are tropical and sub-tropical, and the species has probably spread up from Malaya.

9. *Chrysocoris patricius*, Wlk.

Pusa. xii-04.

Chapra. x-04.

Cawnpore. 14-x-05.

Dehra Dun. ix-06.

Raipur, C. P. vi-07.

A small species found on rice.

The Fauna gives Ceylon, Manipur, Khasis and Burma. A tropical species.

10. *Hotea curculionoides*, Herr.-Schäff.

Pusa. 3-xii-04—8-vi-05—17-i-05—22-i-05.

Nongpoh, Khasis. 2,000 feet. vii-07.

A rare species found singly on the surface of the soil, etc.

Given in the Fauna as Khasis and Nagas, Burma, Ceylon, Malay Peninsula, etc. Derived probably from Malaya.

11. *Arctocoris incisus*, Stål.

Pusa. 26-vi-08.

A very rare species, that occurs apparently just as an example of how little we *really* do know of our fauna.

The Fauna gives "Bengal," probably North-West India or Himalayas.

There are thirteen species, occurring in the Himalayas nearest to Pusa not found in Pusa and, as before, the species found occur more in Malaya than elsewhere.

GRAPHOSOMATINÆ.

12. *Podops coarctata*, Fabr.

Pusa. 6-i-05.

Salem, Madras. 14-viii-07.

Baroma, Kamrup. 2-iii-07.

Helem, Assam.

A widely spread tropical species, the Fauna giving Tranquebar, Ceylon, Burma, Malay Peninsula and Java.

13. *Podops dentata*, Dist.

Pusa. vi-07.

The Fauna gives only Calcutta and Malda.

14. *Podops limosa*, Wlk.

Pusa. vi-07.

The Fauna gives Calcutta, Tenasserim.

15. *Stortheocoris nigriceps*, Horv.

Pusa. 17-ii-05—8-vi-08—vii-08—7-iii-08.

Comes freely to light in June, July; is found abundantly in soil during January and February.

The Fauna gives only Khasi Hills and Sibsagar.

16. *Amauropepla denticulata*, Hagl.

Pusa. 6 to 13-ii-05. Found in soil.

Elsewhere known only from Assam and Burma.

17. *Melanophara spinifera*, Westw.

Pusa. 3-ii-05.

Like the others, found in soil in the cold weather.

The Fauna gives Bengal, Calcutta and Penang.

This sub-family is not well represented in the Himalayas, *Podops serrata*, Voll., being the only species in Sikhim; it is not in our fauna, which is essentially tropical and originate in Burma or Malaya.

CYDNINÆ.

18. *Stibaropus molginus*, Schiödte.

Pusa. 5-vii-07.

Mokameh. x-06.

This species is extremely abundant at the Ganges, for instance on the Mokameh ferry steamer at night at the arc lights.

The Fauna only records North India and Burma.

19. *Stibaropus callidus*, Schiödte.

Pusa. 15-vi-09—15-vii-07.

Sitamarhi. 15-i-05.

Muzaffarpur. 1-x-04.

Is found in soil in winter. Is sometimes extremely abundant, after rain, at light. Nymphs are found deep in the soil.

The Fauna records Serampore, Calcutta, South India, Burma.

20. *Stibaropus minor*, Wlk.

Pusa. 15-vi-09.

Mokameh. x-06.

Chapra (Mackenzie).

Recorded in the Fauna from North India and Burma.

21. *Lactistes rastellus*, Schiödte.

Pusa. vii-07.

Rampur Boalia. 28-ii-07.

The Fauna records it from Serampore, Burma, Tenasserim, Philippines.

22. *Cydnus indicus*, Westw.

Pusa.—Abundant from June to September, after rain, at light. Found in concealment in soil, fallen leaves, etc., all the winter.

Surat. 20-i-04—September, abundant.

Somastipur. 16-i-05.

Janakpur. 10-i-05.

Raniganj. iii-06.

Kasauli. 6-ii-08.

Shoranur. 31-vii-07.

The Fauna gives Bombay, Burma,—also South Africa, Madagascar, Malay Archipelago, Australia. This is the notorious "Gundy" of India, which comes to light in such immense and irritating profusion. All the records, except Kasauli, are of tropical localities.

23. *Cydnus nigrinus*, Fabr.

Pusa. 12-vi-06—1-vii-08.

Cuttack. vi-05.

Jorhat. vi-07.

The Fauna gives Burma, Eastern Europe, Cochin China, China and Japan.

24. *Cydnus varians*, Fabr.

Pusa. 8-vi-07—13-vii-06—6-ii-06.

The Fauna records Bengal, Bombay, Ceylon, Burma, Tenasserim.

25. *Macroscytus subaëneus*, Dall.

Pusa. 24-i-06—22-vi-06.

Buxar Duars. v-07.

The Fauna records Bombay, Deccan, Burma, Tenasserim, the Malay Archipelago, Japan.

26. *Geotomus pygmæus*, Dall.

Pusa.—Abundant in July, August, September. 25-ii-08—v-08.

Palamau. ix-06.

Muzaffarpur. 18-x-04.

Surat. 2-x-04.

The Fauna records Bombay, Ceylon, Burma, Malay Archipelago, China, Japan, Hawaii, New Caledonia.

27. *Brachypelta aterrima*, Forst.

Pusa.—Found from February to April, in each year, in the ripening crops. Appears to be a cold weather species, active only then.

The Fauna records Hardwar and Bombay; common in the Palæarctic Region, abundant in North Africa, Queensland. I should class this with the "cold weather species" of Palæarctic origin, which have wandered in and are active only in our cold weather and just after. More of this class follow.

28. *Chilocoris nitidus*, Mayr.

Pusa. 17-vii-08.

The Fauna records Kashmir and Japan.

This sub-family is very little represented in Himalayan sub-tropical localities, so far as the records show. Our fauna is largely Malayan and tropical, with one marked Palæarctic immigrant.

PENTATOMINÆ.

29. *Halys dentatus*, Fabr.

Pusa.—All months.

Poona. 12-xi-03.

Cuttack. xi-05.

Palamau. 7-ix-06.

Bombay. 20-iii-05.

Surat. 12-vi-04.

Amraoti. 15-iii-04.

Katni. ii-07.

Ranchi. xi-06.

Dacca. i-06.

The Fauna gives a wide distribution in tropical and sub-tropical India. This insect is found on tree trunks, on or under the bark.

30. *Laprius varicornis*, Dall.

Pusa. 12-vi-08—30-vii-08.

Surat. 8-viii-04.

Katni. ii-07.

Khasis. ?

The Fauna gives Sind, Khasis, Cochin, Calcutta, Bombay.

The species appears to be almost confined to tropical India.

31. *Æliomorpha lineaticollis*, Westw.

Pusa. 3-xi-05—27-vi-06—2-ix-07—2-iv-07.

Bombay. 14-iv-05.

Palamau. ix-06.

Ranchi. xi-06.

Balaghat. iii-07.

Munshiganj. 21-i-06.

The Fauna gives Bengal and Bor Ghat. A tropical species apparently.

32. *Adria parvula*, Dist.

Pusa. vii-08.

Cawnpore. 16-x-05.

Purulia. xi-06.

Surat. 8-vii-04—1-vi-04—1-xii-03—7-viii-04—26-xi-03—24-v-04
5-iii-04.

Palamau. ix-07.

The Fauna records Ranchi, Khandala and Burma. This distribution would point to the tropical areas and the sub-tropical hill areas they enclose (*i.e.*, exclusive of Himalayas, Assam, etc.).

33. *Mecidea indica*, Dall.

Pusa. 27-v-06—26-vi-06.

Lyallpur.

The Fauna gives Bombay and Poona. This insect is fairly conspicuous and if it occurred in the Himalayas would probably have been found.

34. *Ænaria elongata*, Dall.

Chapra (Mackenzie).

The Fauna records North India, Burma, Tenasserim, Philippines.

35. *Halyomorpha picus*, Fabr.

Pusa. II-vi-06.

The Fauna gives a wide distribution, including the Khasis, Calcutta, Burma: "a common species throughout Malaysia and found in China and Japan."

36. *Dolycoris indicus*, Stål.

Pusa.—Very commonly found from February to May. Found sparingly for rest of year.

Palamau. 30-ix-06.

Lahore. 20-iv-07.

The Fauna gives Naga Hills, Darjiling, Bombay, Deccan, Bangalore, Calcutta.

Probably universal in tropical India; it is a species that lives on green herbage and is easily confused with *Agonoscelis nubila*. The closely similar *Dolycoris baccarum*, Linn., does not appear to occur at Pusa.

37. *Æschrocoris tuberculatus*, Stål.

Pusa. 16-x-06—19-viii-08.

The Fauna records Sikhim, Garo and Naga Hills, Burma. A rare species in Pusa.

38. *Eusarcocoris guttiger*, Thunb.

Pusa. 18-iii-05—23-iv-07—19-v-05—9-iv-06—2-vii-06—vii-08—24-xii-04.

Surat. 24-v-04.

Belgaum. iv-08.

Simla. x-06.

Muzaffarpur. 12-x-04.

Dacca. 10-i-06.

Balaghat. iii-07.

Chapra. 20-x-04.

Nasik. 26-ii-04.

The Fauna records Sikhim, Naga Hills, Bombay, Calcutta, Ceylon, Burma, Tenasserim, China, Japan; a widespread species in tropical and sub-tropical India.

39. *Eusarcocoris ventralis*, Westw.

Pusa. 3-iii-05—30-ix-06—x-06—28-xi-04—10-iv-07—8-xi-05—viii-04.

Chapra. 20-x-04.

Muzaffarpur. 15-x-04.

Surat. 19-viii-04—17-i-04.

Khasis. 17-iii-07.

The Fauna includes Calcutta, Bangalore, Ranchi, Bombay, Burma, Malay Peninsula.

This is a tropical species ; compare with *E. montivagus*, Dist., the very distinct hill form of the Himalayas, found from Assam hills to Mussoorie.

40. *Eusarcocoris dubius*, Dall.

Pusa. 29-ix-06—12-viii-05—21-ix-08.

The Fauna records Tenasserim and Berhampore (? in Bengal).

I am a little doubtful of the identification but believe all mine to be this tropical species.

41. *Plautia fimbriata*, Fabr.

Pusa. 26-iii-06—27-v-06—14-vi-06—5-vi-07—30-vii-08—4-vii-07.

Surat. 26-i-04.

Arrah. 19-iii-08.

In the Fauna, a wide tropical and sub-tropical distribution in India, and also in Malaya, China and Japan. The Pusa dates imply nothing more than the fact that, like other bugs found on plants, they are commonly caught in those months because all crowd on to the small irrigated crops and are seen, when they are unnoticed later in the more abundant herbage.

42. *Antestia cruciata*, Fabr.

Pusa. 18-iii-06.

Nagpur. 6-vi-05.

Kasauli. 6-v-08.

Matheran. iv-08.

Igatpuri. iii-08.

Nilgiris. vii-05.

The Fauna records Sikhim, Calcutta, Bombay, Nilgiris, Ceylon, Tenasserim, Malay Archipelago.

A species well known to feed on fruit, peaches, plums and coffee-berries ; it is an abundant sub-tropical species, but is found sporadically in the plains ; possibly the occurrence of fruit orchards or wild fruiting bushes such as bér (*Zizyphus jujuba*) affect its occurrence.

43. *Apines concinna*, Dall.

Pusa. i-v-07—vi-07.

The Fauna gives Hardwar, Bombay. A rare tropical species.

44. *Agonoscelis nubila*, Fabr.

Pusa.—General throughout the year and extremely abundant on all green herbage and plants such as jute, maize, etc. Sometimes sucks forming grain.

Purulia. xi-06.

Jorhat. v-07.

Balaghat. iii-07.

Dacca. 10-i-06.

Munshiganj. 17-I-06.

Sitamarhi. 15-i-05.

Nilgiris. 7,000 feet. v-04.

Chapra. x-04.

The Fauna records it over a wide area from Kashmir to Bombay and Burma, Malay Peninsula, China, Japan; a tropical and sub-tropical species.

45. *Eurydema pulchrum*, Westw.

Pusa. 3-iv-05—12-iv-06—27-iii-06—18-v-06.

Khasis.

In the Fauna, is given as a sub-tropical species. Possibly an immigrant from sub-tropical Himalayas.

46. *Bagrada picta*, Fabr.

Pusa.—In all years, very common on ripening mustard, rape and allied crops in February, March, as on cabbage and similar *Cruciferae*.

The Fauna gives Hardwar, Tirhut, Calcutta, Manipur, Bombay, Ceylon.

It is common in the Konkan, the Deccan, Central Provinces, United Provinces, and a small form is common at Lebong. Essentially a "cold weather species," not possibly from climatic causes so much as that its food plants enable it to breed then.

47. *Placosternum taurus*, Fabr.

Pusa. I-vii-05.

Mussoorie. viii-06.

Yercaud.

The Fauna records it as a hill species from Sikkim, N. Khasis, Cochin and Burma. It is rare in Pusa and may have been a chance immigrant, as it is a very conspicuous form.

48. *Catacanthus incarnatus*, Dru.

Pusa. 9-vi-05—I-v-08.

Mahim. 22-ii-04.

Khasis.

Poona. 19-vi-05.

Kanara. viii-07.

The Fauna gives it a wide spread in the hills, but also includes Calcutta, Karachi, Bombay, Pondicherry.

It is a Malay Archipelago species, also from Japan and Korea.

It is the most conspicuous tropical form and is, in the plains, rare.

49. *Nezara viridula*, Linn.

Pusa.—In all months.

Surat. 2-iv-04—7-ii-04—18-xii-03.

Coonoor. 17-iv-04.

? Shevaroy. viii-07.

Coimbatore. 27-vii-07.

Bilaspur. ii-07.

Ranchi. x-06.

Purulia. xi-06.

The Fauna records all India, and almost the whole world. A tropical, sub-tropical and temperate species.

50. *Piezodorus rubrofasciatus*, Fabr.

Pusa.—All months.

Bilaspur. ii-07.

Katni. ii-07.

Surat. 18-xii-07—21-i-04.

Bassein. 23-xii-03.

Nadiad. 5-xii-03.

Burdwan. ii-05.

The Fauna records Sikhim, Assam, Bengal, Bor Ghat, Ceylon, Upper Burma, Malaya, Japan, Australia.

A well-established tropical and sub-tropical species, found abundantly on low vegetation.

51. *Menida histrio*, Fabr.

Pusa. 1-ix-04.

Chapra. 30-x-04.

Cuttack. 23-xi-05.

Dacca. 19-i-06.

The Fauna gives Calcutta, Bangalore, Burma, China, Formosa. A tropical species, as opposed to the sub-tropical *M. varipennis*, Westw., and *M. formosa*, Westw.

In this sub-family we have twenty-three species in our fauna, while there are at least forty sub-tropical species known from our nearest sub-tropical area that are not known from Pusa, though we have specimens of most of them in the collection and could recognise them. Our fauna here is essentially tropical.

AMYOTEINÆ (ASOPINÆ).

52. *Cazira verrucosa*, Westw.

Pusa. 19-vi-06.

Khasis. vii-07.

Nilgiris. v-06.

Calcutta is the only tropical locality given in the Fauna. It is a sub-tropical species apparently.

53. *Cazira ulcerata*, Herr.-Schäff.

Pusa. 31-viii-05—21-iv-06.

The Fauna gives Sikhim, Calcutta, Coromandel, Siam and Hong-Kong.

54. *Canthecona furcellata*, Wolff.

Pusa.—All months.

Daltonganj. viii-05.

Lebong. ix-08.

A widespread species, wholly predaceous on caterpillars and breeding when these are abundant.

The Fauna records are tropical mainly. It probably occurs throughout tropical India.

55. *Canthecona parva*, Dist.

Chapra.

Daltonganj. viii-05.

The Fauna records Bengal and Mysore.

56. *Picromerus griseus*, Dall. (*obtus*us, Wlk.).

Pusa. 17-vii-05.

The Fauna records only Sikhim, Nagas, Burma.

57. *Andrallus (Audinetia) spinidens*, Fabr.

Pusa. 22-ii-07—18-iv-07—14-vi-06—23-v-05—vi-07—27-viii-08—13-x-07—1-xi-08.

Lebong. ix-08.

Nagpur.

The Fauna records Sikhim, Assam, Khasis, Ranchi, Bangalore. It is probably common over part of the tropical plains; outside India, it is in the Malay Archipelago, Fiji, Tahiti, etc.

58. *Amyotea (Asopus) malabaricus*, Fabr.

Pusa. 10-x-08.

Nagpur. 24-vi-06.

The Fauna records Bengal, Calcutta, Bombay, Bangalore, Assam, Burma, Java, Borneo, Sumatra and the Philippines.

It is not a common species in Pusa.

59. *Zicrona cærulea*, Linn.

Pusa. 3-iv-05—18-ix-08—17-viii-08.

Mussoorie. viii-07.

Chandpur. i-08.

The Fauna gives Kashmir, Bengal, Naga Hills, Burma, Japan, China, Malaya and the Palæarctic Region. Its distribution may be determined by that of its food, *Haltica cyanea*, etc.

In this sub-family, nearly all the species of neighbouring areas are found here, even if only sparsely.

TESSARATOMINÆ.

Of the dozen species found in the Himalayas, not one has been found in Tirhut. The sub-family is markedly sub-tropical, with not one tropical species.

DINIDORINÆ.

60. *Aspongopus janus*, Fabr.

Pusa. 25-i-06—iv-07—31-v-05—22-vi-05—5-vii-05—viii-07—7-x-06.

Sawan. 4-x-06.

Surat. 8-vii-04.

Somastipur. 15-ii-05.

Muzaffarpur. 8-x-04.

Daltonganj. vii-05.

The Fauna records tropical and sub-tropical localities in India, also Ceylon and Burma.

61. *Aspongopus obscurus*, Fabr.

Pusa. 12-vii-07—27-vi-07—20-ii-08—9-ix-07.

Ranchi. xi-06.

Jorhat. v-07.

Daltonganj. viii-05.

Sawan. 4-x-06.

Rungpur.

Siripur. 18-viii-05.

Helem. viii-08.

Khasis. vii-07.

The Fauna records Assam, Bombay, Calcutta and Bangalore. A tropical form.

PHYLLOCEPHALINÆ.

62. *Schizops insignis*, Wlk.

Chapra (Mackenzie).

The Fauna gives Burma only.

63. *Diplorhinus quadricornis*, Stål.

Chapra (Mackenzie).

The Fauna gives Assam and Burma.

64. *Tetroda histeroides*, Fabr.

Pusa. 14-ix-08.

Salem. 14-viii-07.

The Fauna records are Sikhim, Nagas, Burma, Malay Peninsula.

65. *Megarhynchus rostratus*, Fabr.

Pusa. 10-iii-05—vi-05—3-xi-06—25-xi-04—19-xii-05.

Siripur. 18-viii-05.

Comilla. 21-i-06.

Chapra.

The Fauna records Sikhim, Assam, Burma, Malaya, etc.

66. *Megarhynchus truncatus*, Westw.

Pusa. 30-iii-06—iii-07.

The Fauna records Naga Hills, Khasis, Burma, Malaya, etc.

In this sub-family all our species are known also from Burma.

UROSTYLINÆ.

None have been found; there are fifteen species known from the neighbouring Himalayas, but none appear to occur in this tropical area.

ACANTHOSOMATINÆ.

67. *Microdeuterus megacephalus*, Herr.-Schäff.

Pusa. 25-xii-08—28-viii-07.

Belgaum. iv-08.

The Fauna records Bombay, Calcutta, Sikhim, Burma

68. *Microdeuterus dallasi*, Atk.

Pusa. xi-08—26-iv-08—3-v-06—26-iv-06.

Chapra (Mackenzie).

Recorded from North India.

Anaxandra and *Elasmostethus* have been found, but the specimens have been sent for accurate determination.

In this family, the dates of capture are not of much value, since the adult is always to be found; that is, hibernation or similar

seasons of rest are passed in that stage. We have mentioned a few "cold weather species" but such are far less marked than in other orders and this, which is so marked a feature of our tropical fauna, is here inadequately brought out.

The Pentatomidæ are a family which offer valuable data for faunistic purposes, because they have been more collected than any other families. The occurrence of Cydninæ and Graphosomatinae, the absence of Tessaratominæ and Urostylinæ, are marked features in comparing a tropical fauna such as this with the nearest sub-tropical one, and this family alone offers good reason for the fundamental distinctions between sub-tropical and tropical faunæ which I have suggested in *Indian Insect Life*.

Conclusions.

- (1) The fauna of the Gangetic Plain, West, as a tropical area, consists of a few species, well established and abundant, and some less abundant.

The well-established very abundant ones may be those that have accustomed themselves to dry heat and having less inter-species competition, and a greater amount of food, become abundant. That is, if a species can live at all, it is likely to do very well if its food is one of the common plants or insects, because there are few plants but many of each. That is a characteristic of the tropical zone, whereas in moist sub-tropical areas there is a greater diversity of food plants but less of each; there are in the latter more species, more inter-species competition, a greater diversity of fauna but few really abundant dominant species. One can see that, if one collects in both areas, very markedly.

- (2) There is a greater fauna of species living in soil than there is in a sub-tropical region. Plataspidinæ, Graphosomatinae, Cydninæ are actually largely soil-living, root-feeding forms very largely. They are enormously abundant in this tropical fauna, very scarce in a sub-tropical one.
- (3) A large percentage of the fauna is common also to Assam, Burma, Malay Archipelago.
- (4) The fauna owes little to the neighbouring sub-tropical ones of the Himalayas.
- (5) It contains a small definite number of cold weather species, derived probably from North-West India (the Indus Plain).
- (6) There is no real indigenous fauna; all is derived from areas of older geological formation.
- (7) There is a proportion of well-established species found all over the tropical plains; there is also a proportion probably peculiar to this and the Gangetic Plain, East,

not found for instance in the Deccan, West Coast, or Coromandel Coast.

- (8) A number of species established in the Gangetic Plain, East, are not so established or found in this area, and the division of Gangetic Plain, East and West, dividing somewhere about Purneah, is valid.

COREIDÆ.

COREINÆ.

69. *Elasmonia granulipes*, Westw.

Pusa. vi-08.

Lebong. ix-08—v-09.

A Sikhim species, rare in Pusa.

70. *Anoplocnemis phasiana*, Fabr.

Pusa. 21-ix-06—22-vi-05.

Siripur. 18-viii-05.

Nilgiris. 7,000 feet. v-04.

Igatpuri. 20-vi-04.

The Fauna records a widespread sub-tropical distribution but includes Sibsagar, Bombay and Bangalore. The species is Malayan and Himalayan.

71. *Homæocerus inornatus*, Stål.

Pusa. 10-vi-05—vi-07—vi-06—14-viii-07.

Jullundur. 25-vii-05.

Chapra (Mackenzie).

This species is confined to the sissu tree and breeds on it from June to August. Where it spends the intervening months is not known.

The Fauna gives Sikhim, Pondicherry, Burma, China.

72. *Homæocerus prominulus*, Dall.

Chapra (Mackenzie).

Surat. 16-xi-03—18-xii-03.

The Fauna records North Bengal, Bombay, Ceylon.

73. *Aschistus brevicornis*, Dall.

Pusa. ix-06—22-v-05.

Chapra (Mackenzie).

Bilaspur. iii-07.

The Fauna records North Bengal.

74. *Notobitus meleagris*, Fabr.

Chapra (Mackenzie).

Purulia. xi-06,

Ranchi. xi-06.

Simla. x-07.

The Fauna records Bombay, Khasi Hills, Burma.

75. *Plinachtus acicularis*, Fabr.

Muzaffarpur. 16-xi-04.

Matheran. iv-08.

The Fauna gives Bhutan, Bombay, Ceylon.

76. *Cletus bipunctatus*, Westw.

Pusa.—All months.

Surat.—April to August.

Tribeni. 22-iii-05.

Chapra. x-04.

Katni. ii-07.

Palamau. ix-06.

The Fauna gives Bombay, Calcutta, Bangalore, Ceylon, Burma. This is the tropical form, while *C. punctulatus*, Westw., is the sub-tropical one.

77. *Cletus punctiger*, Dall.

Pusa. 14-vi-06—7-vii-06.

The Fauna gives Murree, Calcutta, Pegu, China.

78. *Cletomorpha hastata*, Fabr.

Pusa. 9-viii-05.

Chapra.

Parel. 7-iii-05.

Matheran. iv-08.

The Fauna gives Karachi, Bombay, Calcutta; except for Matheran, a tropical species.

In this sub-family there is a marked absence of the large forms so common in sub-tropical India. If they occurred they would be found, and in quite short periods of collecting in sub-tropical areas we have obtained abundant species not found in Pusa. The difference is very marked and is, we believe, due largely to the scanty tree flora of the plains.

PSEUDOPHLÆINÆ.

79. *Clavigralla gibbosa*, Spin.

Pusa.—Most abundant from January to May when it breeds.

Surat.—December to April, abundant.

Bilaspur. ii-07.

Purulia. xi-06.

Katni. ii-07.

Lebong. ix-08.

Buxar Duars.

The Fauna records Bombay, Bangalore, Tenasserim; a tropical species.

80. *Stenocephalus laterarius*, Sign.

Pusa. 27-v-06.

The Fauna gives Bombay and Madras, Ceylon.

ALYDINÆ.

81. *Leptocoris varicornis*, Fabr.

Pusa.—Breeds May to November.

See *Memoirs Agricultural Department*, Entom. II, No. 1, for full localities. They include all rice areas, both tropical and sub-tropical localities. Ceylon, Burma, Malaya, China are added by the Fauna.

I cannot recognise *L. acuta*, Thunb., or *L. costalis*, Herr.-Sch., but the latter I believe I recognise in some of Mr. Mackenzie's Chapra specimens. I do not include it as a distinct species.

82. *Riptortus pedestris*, Fabr.

Pusa. 24-viii-06—25-ix-07—xii-08—24-x-05.

Lebong. ix-08.

Manickganj. 28-x-06.

The Fauna gives Bombay, Bangalore, Ceylon, Khasis, Burma, etc.; except for Lebong it might be a clear tropical species.

83. *Riptortus fuscus*, Fabr.

Pusa. 20-iii-05—25-ix-05—20-iii-05.

Cuttack. x-05.

Lebong. vi-09.

Manickganj. 25-x-06.

The Fauna gives Bengal, Bombay, Bangalore, Ceylon, Burma, Malaya.

84. *Riptortus linearis*, Fabr.

Pusa.—All months.

Balaghat. iii-07.

Cuttack. xi-05.

Comilla. 22-i-05.

Munshiganj. 21-i-06.

Manickganj. 29-x-06.

The Fauna records such sub-tropical spots as Sikhim, Bor Ghat, etc.; also Bangalore, Ceylon, Burma, Malaya, etc.

The species is the common one in Pusa, breeding freely when it can feed on leguminous pods.

85. *Akbaratus fischeri*, Dist.

Pusa. 24-vii-08.

Surat. 16-viii-04.

Chapra. '.

An insufficiently known species.

CORIZINÆ.

86. *Corizus rubicundus*, Sign.

Pusa. 20-xii-07—vi-07—iii-07.

Surat. vi-04—8-xii-04.

Recorded from Ceylon.

87. *Corizus bengalensis*, Dall.

Pusa. 10-vii-07—xi-07—9-iv-06—21-v-06—10-i-07—8-xii-05.

Surat. 19-ii-04.

Mussoorie. x-06.

Chiniot. 8-vii-07.

Jullundur. 12-vii-06.

Buxar Duars. v-07.

The Fauna gives North Bengal and the Bor Ghat.

I confess to doubt as to these being distinct and I lay no stress on their occurrence. In view of the remarkable colour changes of this insect at the last moult, I cannot believe they are distinct. I have however followed Distant, who presumably has clearly distinct series.

The insect is abundant at Pusa.

88. *Serinetha abdominalis*, Fabr.

Pusa. vi-07.

Kanara. viii-07.

Bankura. iii-07.

Burdwan. iii-06.

Tribeni. 23-iii-05.

The Fauna records Bombay, Calcutta, Assam, Ceylon, Tenasserim.

S. angur, Fabr., we have not found.

This family offers little but the marked paucity of large forms already commented on. Its members here are largely Burmese or Malayan, and our fauna owes little to neighbouring sub-tropical areas; rather our species may be those of the Gangetic Plain, East, able to stand the greater dryness and heat of our area and migrated in from the East.

BERYTIDÆ.

89. *Metacanthus pulchellus*, Dall.

Pusa. vi-06—iv-07.

LYGÆIDÆ.

LYGÆINÆ.

90. *Lygæus militaris*, Fabr.

Pusa.—In all months.

Igatpuri. 20-vi-04.

Bilaspur. ii-07.

Bankura. iii-05.

Surat. 27-v-04.

Lyallpur. 10-vii-06.

Purulia. xi-06.

Madras. 12-x-07.

The Fauna gives localities in tropical India, from Murree to Mysore, also Burma, Malay Archipelago.

A very common tropical species.

91. *Lygæus hospes*, Fabr.

Pusa.—In all months.

Surat. 6-v-04.

Muzaffarpur. 12-x-04.

Bankura. iii-06.

Palamau. ix-06.

Lyallpur. 10-vii-06.

The Fauna records Sind, Bombay, Madras, Bangalore, Nilgiris, Ceylon, Burma, Malay, etc.; Sind is a notable locality, as few of our species above have been recorded from further north-west than the north-western limits of this sub-province.

92. *Lygæus fimbriatus*, Dall.

Pusa. 26-viii-08.

Recorded in the Fauna from Assam and Burma. A rare species here.

93. *Graptostethus servus*, Fabr.

Pusa.—All months.

Surat. 6-v-04.

Chapra. 22-x-04.

Bilaspur. ii-07.

Another Malayan species, recorded in the Fauna from Assam, Bombay, Calcutta, Nilgiris, etc., as well as Ceylon and Burma.

94. *Graptostethus trisignatus*, Dist.

Pusa. 26-iii-05.

Jorhat.

The Fauna gives Naga and North Khasi Hills, and Burma.

95. *Graptostethus maculatus*, Dall.

Pusa. 28-ix-05—2-ii-05—13-iii-05.

The Fauna records North India and Narkanda.

96. *Aspilocoryphus guttiger*, Dall.

Pusa. 19-v-06—13-iii-06.

North Bengal is the only record.

97. *Nysius minor*, Dist.

Pusa.—Common at all times.

This is a species described since the Fauna volume. I am not prepared to recognise any other species in Pusa though Mr. Distant might and Mr. Kirkaldy presumably would find several. I believe that food plants and perhaps climate influence this species like all others, and I am extremely surprised a new species should be made of our form. My own feeling is that long series from different places and collected at different times will, in this genus, reduce the now existing six Indian species to fewer. *Nysius*, as a genus, is distinct enough; its species are not, but the genus is widespread in India, both in the plains and to such elevations as 7,000 feet as at Simla. I have omitted all records except Pusa as I cannot satisfactorily place our other forms among the six described species.

If any sub-family should give us data, it is this, as its members are those most likely to have been collected; we have not found *Graptostethus argentatus*, Fabr., nor *G. dixonii*, Dist., though we have the latter from several places in Central India, East. Several North Indian species, such as *Cænocoris*, are not found and our fauna appears to be from Assam or Burma, as in the previous families.

CYMINÆ.

98. *Cymus tabidus*, Stål.

Pusa. 19-vii-08.

Recorded from Bengal. Mr. Distant has seen our specimens. It is an inconspicuous insect, probably not confined to Bengal.

BLISSINÆ.

99. *Macropes punctatus*, Wlk.

Muzaffarpur. 17-x-04.

Recorded from North India.

100. *Macropes excavatus*, Dist.

Pusa.—All months.

Recorded from Shillong.

We have a very long series from Pusa, which may or may not be one species. Allowing for newly transformed individuals, which are brown, for the varying shrinkage of the abdomen according to the chitin being less or more hardened with the duration of time from the last ecdysis, and for variation, it is very hard to place a long series in any one species. At all events most of ours agree with this species but others, *e.g.*, *M. dilutus*, may also occur.

101. *Blissus gibbus*, Fabr.

Pusa. 29-xii-04—18-i-05—13-vi-05.

Belgaum. iv-08.

The Fauna gives Bor Ghat and Cawnpore. A retiring root-feeding species, seldom seen but probably widespread.

GEOCORINÆ.

102. *Geocoris tricolor*, Fabr.

Pusa.—All months.

Surat. 7-iv-04—9-vii-04.

Lebong. ix-08.

Chapra. 22-x-04.

The Fauna gives Calcutta, Bangalore, Bor Ghat, Ceylon, Burma. This is equivalent to its being widespread over tropical India.

COLOBATHRISTINÆ.

103. *Artemidorus pressus*, Dist.

Pusa. 30-v-06—26-i-04.

Matheran. iv-08.

The Fauna gives Calcutta, Ceylon, Burma.

HETEROGASTRINÆ.

104. *Epibomius pusa*, Dist.

Pusa.—Date removed in transit.

A new species, apparently rare.

105. *Dinomachus rhacinus*, Dist.

Pusa. 12-vii-06—26-iv-06—21-ix-08.

An abundant species on tree trunks, described since the Fauna.

PACHYGRONTHINÆ.

None found.

OXYCARENINÆ.

106. *Oxycarenum lætus*, Kby.

The species abundant wherever cotton is, from Tinnevely to the north-west. Its scanty record in the Fauna shows how little Lygæids have been collected.

107. *Oxycarenum lugubris*, Motsch.

Pusa. 13-vi-05.

Recorded from Ceylon only.

APHANINÆ.

108. *Paromius seychellesus*, Wlk.

Pusa. 3-viii-05.

Palamau.

Manickganj. 24-x-06.

Barisal. 8-vi-06.

Recorded from Ceylon, Burma, etc.

109. *Paromius exiguus*, Dist.

Pusa. 22-iii-06.

Recorded from Ceylon and Japan. Mr. Distant identified our specimens.

110. *Pamera pallicornis*, Dall.

Pusa. 31-viii-04—25-vi-06—6-x-06—5-vii-07—4-ix-07.

Chapra.

Lebong. ix-08.

The Fauna gives Shillong, Kurseong, Ceylon, Burma, etc.

111. *Pamera vineta*, Say.

Pusa. 27-vi-06—30-x-06—26-vi-07.

Manickganj. 26-x-06.

The Fauna gives Ranchi, Calcutta, Ceylon, Burma. It is a grass and soil species, probably widely spread in India, but not noticed.

112. *Appolonius cincticornis*, Wlk.

Pusa. 3-v-06.

Recorded from Ceylon.

113. *Lachnophorus cingalensis*, Dohrn.

Chapra (Mackenzie).

Nagpur. 21-i-06.

Recorded from Bor Ghat, Bombay and Ceylon.

114. *Adauctus cupreus*, Dist.

Pusa.—Date lost in transit.
A new species.

115. *Aphanus sordidus*, Fab.

Pusa. 14-xi-04—4-iii-05—17-vii-07.
Belgaum. iv-08.
Ranchi. xi-06.
The Fauna records Assam, Bengal, Bombay, Ceylon,
Burma, etc.

116. *Aphanus bengalensis*, Dist.

Pusa. 1-vii-07.
Chapra.
A new species.

117. *Dieuches uniguttatus*, Thunb.

Pusa.—All months.
Dacca. 10-i-08.
Belgaum. iv-08.
Recorded by the Fauna from Assam, Bangalore, Ceylon,
Andamans, Burma, etc.
A very common species here.

118. *Dieuches leucoceras*, Wlk.

Chapra (Mackenzie).
Mussoorie. viii-07.
Buxar Duars. iv-08.
Kangra (Dudgeon).
Lebong. ix-08.
Recorded from Kashmir, Bor Ghat, Bombay, Ceylon and
Bushire (Persia).

119. *Pæantius festivus*, Dist.

Pusa. 2-iii-05—29-xii-07—26-vi-07.
Recorded in the Fauna from Ceylon and Calcutta.

120. *Abanus coloratus*, Dist.

Chapra (Mackenzie).
A new species.

121. *Lethæus indicus*, Dall.

Pusa. vi-07—9-xii-05.
The Fauna gives North Bengal and Burma.

122. *Gonsalvus typus*, Dist.

Pusa. 8-iv-07.
Recorded by the Fauna from Mandalay.

With regard to the Lygæidæ as a whole not much can be said. There is a predominance of forms found also in Assam, Burma and Malaya, few of which extend either to the nearest sub-tropical area or to the tropical regions in the north-west. The palæarctic forms which have migrated from Sind into North India have not reached the Western Gangetic Plain. Unfortunately the Lygæidæ are little collected; they are small, not easy to identify, uninteresting as "specimens," and very little known. Many more of the obscurer forms of Pusa remain to be found and described probably, and a number are with Mr. Distant or are awaiting description. Such forms, however, being new, offer no data with regard to faunal zones.

PYRRHOCORIDÆ.

LARGINÆ.

123. *Iphita limbata*, Stål.

Pusa. 28-iii-05—23-iv-07—25-vii-05—6-ix-07—16-xi-04—25-xii-05.

Dacca. 15-i-06.

The Fauna records Assam, Hardwar, Calcutta, Tenasserim.

124. *Physopelta gutta*, Burm.

Pusa. 9-xii-05.

Lebong. ix-08.

Helem.

The Fauna records Assam, Ceylon, Burma, etc.

125. *Physopelta schlanbuschi*, Fabr.

Pusa. 23-xii-05—20-viii-07—3-ii-06.

The Fauna records Assam, Burma, etc.

In this sub-family, the only notable thing is the complete absence in Tirhut of *Lohita grandis* which has, apparently, not got beyond the limits of the Gangetic Plain, East. Our three Larginæ are all common to Assam and Burma.

PYRRHOCORINÆ.

126. *Antilochus coqueberti*, Fabr.

Pusa.—All months.

Helem.

Bor Ghat. 13-iii-03.

Baroma. 2-iii-07.

Jammoo. 11-iv-08.

Buxar Duars.

Cuttack. xi-05.

The Fauna records Kashmir, Assam, Calcutta, Secunderabad, Ceylon, Burma, etc.

127. *Euscopus indecorus*, Wlk.

Pusa. 6-xii-05.

Recorded from Assam, Ceylon, Burma, Siam.

128. *Dermatinus lugubris*, Dist.

Pusa. 17-vii-05.

Nilgiris. 10-iv-06.

Igatpuri. 20-vi-04.

Bilaspur. ii-07.

Recorded only from Pondicherry.

129. *Scantius pallens*, Dist.

Pusa. 6-vii-07—2-vi-08.

Katni. ii-07.

Nagpur. 5-iii-05.

Hafizabad. 21-vii-06.

Recorded from Sind.

130. *Scantius volucris*, Gerst.

Pusa. 11-vii-05.

Bulsar. 21-v-04.

Bilaspur. ii-07.

Lahore. 19-iv-08—7-ix-04.

Recorded from Madras, Coonoor, British East Africa.

131. *Dysdercus cingulatus*, Fabr.

Throughout the cotton-growing areas of India, and practically throughout the tropical area. In sub-tropical localities such as Sikhim up to 5,000 feet.

Recorded from Burma, Ceylon, Malaya, etc.

132. *Dysdercus evanescens*, Dist.

Pusa. 4-iv-07—10-viii-08.

Chapra.

Bor Ghat. 14-iii-01.

Buxar Duars. v-07.

Recorded from Sikhim, Assam, Bor Ghat and Burma.

Our fauna is a small one, not containing many species, *e.g.*, *Dindymus*, *Odontopus*, etc., of Assam, and without immigrants from the North-west such as *Pyrrhocoris* that one might expect.

TINGIDIDÆ.

133. *Cantacader uniformis*, Dist.

Pusa. 6-iii-05.

Recorded from North Bengal and Burma.

134. *Serenthia gibba*, Fieb.

Pusa. 25-ix-06.

Recorded from " East India."

135. *Paracopium cingalense*, Wlk.

Bhagalpur. iii-09. (E. J Woodhouse.)

The Fauna records Ceylon. Bhagalpur is in our area, doubtfully.

136. *Galeatus darthula*, Kirk.

Pusa. x-08.

Recorded from Ceylon.

137. *Celantia vagans*, Dist.

Pusa. 15-iv-08.

Recorded from Ceylon.

138. *Compseuta lefroyi*, Dist.

Pusa.—Date lost in transit.

A new species.

139. *Monanthia globulifera*, Walk.

Pusa.—All months.

Recorded from Ceylon and Madras.

140. *Belenus bengalensis*, Dist.

Pusa. 10-viii-08—20-xi-08.

Muzaffarpur. 10-x-04.

Records of Tingididæ are so scanty, there is nothing to say of our species. Many remain to be found here, and collecting is badly needed everywhere in the plains. The family is quite as much tropical as sub-tropical.

PHYMATIDÆ.

Of the nine Indian species, we have none from the plains at all. The family appears to be essentially sub-tropical, though nowhere abundant.

ARADIDÆ.

No species known from our Fauna. They are not uncommon in sub-tropical India.

HEBRIDÆ.

None known.

HYDROMETRIDÆ.

MESOVELIINÆ.

141. *Mesovelgia mulsanti*, Buch. Wh.

Pusa. 2-i-07.

Recorded from Ceylon, Sumatra, etc.

HYDROMETRINÆ.

142. *Hydrometra vittata*, Stål.

Pusa.—All months.

Muzaffarpur. 13-i-05.

Jalalpur. 24-v-04.

Recorded in the Fauna from Bombay, Bor Ghat, Ceylon, Burma, Malaya, etc.

VELIINÆ.

143. *Microvelgia repentina*, Dist.

Pusa. 16-i-07.

Recorded from Calcutta.

144. *Microvelgia singalensis*, Kirk.

Pusa. 16-i-07, etc.

Recorded from Ceylon. It is common on stagnant water with the last species.

GERRINÆ.

145. *Gerris nitida*, Mayr.

Pusa. 21-xii-04—9-i-05.

Recorded from Trivandrum, Ceylon and Burma.

146. *Gerris tristan*, Kirk.

Pusa. 24-xii-04.

Recorded from Ceylon.

147. *Gerris spinolæ*, Leth. et Sev.

Pusa. 24-xii-04.

The Fauna records North India, Calcutta, Ceylon, Burma, China.

HENICOCEPHALIDÆ.

148. *Henicocephalus basalis*, Westw.

Pusa.

Chapra.

Cuttack.

The Fauna gives Bengal, Bombay, Bor Ghat, Coromandel, Burma.

A widespread, retiring, tropical insect.

REDUVIIDÆ.

HOLOPTILINÆ.

We have none of the four likely species.

EMESINÆ.

We have three species, apparently new to the Fauna.

SAICINÆ.

Polytoxus occurs, apparently new species.

TRIBELOCEPHALINÆ.

None known.

STENOPODINÆ.

149. *Pygolampis fæda*, Stål.

Pusa. vii-07.

The Fauna records Ceylon, Burma.

150. *Staccia diluta*, Stål.

Pusa. 13-vi-06.

Recorded from Ceylon and Burma.

151. *Oncocephalus annulipes*, Stål.

Pusa. 4-vi-04—24-ix-05—28-vi-05.

Surat. 12-vi-04—7-vii-04.

The Fauna gives Kashmir, Bombay, Bor Ghat, Ceylon, Burma, etc.

152. *Caunus farinator*, Reut.

Pusa. 25-vii-08.

Recorded from Tranquebar.

In this sub-family, our fauna is small, with its origin to the South-east rather than the North-west. It is not complete enough to be satisfactory, and many species may remain to be found.

SALYAVATINÆ.

None found. Only three are recorded in India, two in Sylhet, one in Pondicherry.

ACANTHASPIDINÆ.

153. *Reduvius cincticrus*, Reut.

Pusa. 22-ix-06—26-vi-09.
Recorded from Sylhet.

154. *Acanthaspis coranodes*, Stål.

Pusa. 6-vii-06—17-ii-05.
Daltonganj. viii-05.
Recorded from Sylhet.

155. *Acanthaspis rama*, Dist.

Pusa. 5-iv-05—12-v-06—8-v-07—14-iii-09—viii-08.
Chapra.
Lebong. ix-08.
Recorded in the Fauna from Sikkim and Berhampur.

156. *Acanthaspis rugulosa*, Stål.

Pusa. 17-vii-05.
Chitrakot. iii-08.
Chapra.

In this sub-family, there are many species found in Burma that do not occur in our area. What we have is common to the Gangetic Plain, East, and Burma usually, while we have little in common with the Himalayas. We have few *Acanthaspis* but the abundant species. *Conorhinus* would probably be found, had not Pusa been uninhabited for many years prior to 1904, as it is essentially a household species.

PIRATINÆ.

157. *Phalantus geniculatus*, Stål.

Pusa. 1-vii-06.
Recorded from Burma and China.

158. *Ectomocoris cordiger*, Stål.

Pusa. iii-09—iii-06—16-v-06—10-vii-06.
Bankipur. vii-08.
Burdwan. iii-06.
Chapra.
Recorded from N. Bengal, Bor Ghat, Sylhet, Ceylon, Persian Gulf.

159. *Pirates sanctus*, Fabr.

Chapra (Mackenzie).
Baroma. 6-iii-07.
Recorded from Sind, N. Bengal, Burma, Ceylon.

160. *Pirates quadrinotatus*, Fabr.

Pusa. 27-i-05—7-vii-05—26-vi-07.

Chapra.

Recorded from Sylhet and Ceylon.

161. *Pirates lepturoides*, Wolff.

Pusa. 10-ii-09—10-x-08.

Chapra.

The Fauna records Khandala, Ceylon, Burma, Java, Barnes.

162. *Pirates mundulus*, Stål.

Pusa. 4-vi-07.

Surat. 21-ii-04.

Cuttack. 23-xi-05.

Dacca. 16-i-06.

Chapra (Mackenzie).

The Fauna records Tranquebar, Bor Ghat, Ceylon.

163. *Pirates atromaculatus*, Stål.

Pusa. iii-09—8-ix-08—18-vii-08—x-08—7-iv-07.

Chapra (Mackenzie).

The Fauna gives Assam, Burma, Ceylon, etc.

164. *Sirthenia flavipes*, Stål.

Chapra (Mackenzie).

Khasi Hills. v-05.

The Fauna records Naga Hills, Ceylon, etc.

In this sub-family our fauna is essentially Burmese, and not usually recorded from further North-west.

ECTRICHODIINÆ.

165. *Ectrychotes abbreviatus*, Reut.

Pusa. 6-ix-07—26-iii-05—27-i-05.

The Fauna records Calcutta only.

166. *Ectrychotes dispar*, Reut.

Pusa. 21-ii-05—17-xii-04—27-iv-06—14-iv-08.

The Fauna records Calcutta, Bombay, Bangalore.

167. *Physorhynchus tuberculatus*, Stål.

Pusa. 1-iii-07—3-iv-08.

The Fauna records Assam, Burma, Ceylon. It is with us a rare species, the largest of the Pusa fauna.

APIOMERINÆ.

None recorded.

HARPACTORINÆ.

168. *Harpactor marginatus*, Fabr.

Chapra (Mackenzie).

Katni. ii-07.

The Fauna records North India, Vizagapatam, Ceylon.

169. *Harpactor costalis*, Stål.

Pusa. 7-i-09—iii-09—25-vi-08—8-vii-07.

Lebong. ix-08.

The Fauna records Bengal, Assam, Burma, Malay Peninsula.

170. *Sphedanolestes mendicus*, Stål.

Pusa. 2-viii-07—I-vi-07.

Chapra (Mackenzie).

Mussoorie. viii-07.

The Fauna records Assam, Burma, Malay Peninsula.

171. *Sycanus versicolor*, Dohrn.

Pusa. 12-xi-06.

Recorded from Bengal, Burma, Penang.

172. *Cydnocoris crocatus*, Stål.

Chapra (Mackenzie).

Recorded from Burma.

173. *Coranus spiniscutis*, Reut.

Pusa.—All months.

Purulia. xi-06.

Cawnpur. 15-x-05.

The Fauna records Assam, Ranchi, Bor Ghat and Burma.

This is, in Pusa, very common all the year, predaceous on caterpillars and small insects.

174. *Coranus obscurus*, Kby.

Pusa. iii-09—15-i-05—28-viii-08.

Rasulpur, Bengal. iv-06.

Recorded from Sikhim, Assam, Calcutta, Ceylon and Burma.

I am not certain that *C. fuscipennis*, Reut., is not in our series as I do not regard the descriptions as very distinctive.

175. *Scipinia horrida*, Stål.

Pusa. 11-x-06.

Chapra. 22-x-04.

Recorded from Sikhim, Ceylon, Burma, Philippines.

176. *Irantha consobrina*, Dist.

Pusa. 12-iii-07.

Recorded from the Nilgiris only.

In the Harpactorinæ, our fauna has distinct affinities to that of Assam and Burma, but is very limited; it suggests that only a small number of forms really have passed on from Assam and Eastern Bengal (Gangetic Plain, East) to our area, that we are the extreme north-west limit of some forms and too far out of the moist warm areas for many more.

NABIDINÆ.

177. *Prostemma carduelis*, Dohrn.

Pusa. 17-xii-04.

Recorded from Ceylon and Burma.

178. *Prostemma flavomaculatum*, Leth.

Pusa. 21-xii-04.

Recorded from Burma.

179. *Nabis capsiformis*, Germ.

Pusa. 21-i-09—iii-07—15-vii-06—6-iv-07.

Surat. 15-viii-04.

Simla. x-07.

Recorded from Bombay and Bor Ghat, and Burma. Also the Palæarctic, Nearctic and Ethiopian regions. A very abundant species, which feeds on caterpillars.

The Reduviid Fauna of Pusa and Chapra is small, with many species not recorded which do occur in Eastern Bengal and Assam, and with very few species known also from the Himalayan sub-tropical areas to the north. Until the Reduviid Fauna of the Punjab is known, it is not possible to contrast our fauna, but its affinities, so far as can be seen, are with Eastern Bengal, Assam, Burma and Malaya, far more than with that of Sub-Himalaya or the North-west.

SALDIDÆ.

180. *Valleriola cicindeloides*, Dist.

Pusa. iv-08.

Nagpur. ii-09.

A new species, rare.

CIMICIDÆ.

181. *Cimex rotundatus*, Sign.

This is stated to be the Indian species, found at Pusa as generally in India.

CAPSIDÆ.

MIRINÆ.

182. *Callicratides rama*, Kby.

Chapra (Mackenzie).

Recorded only from Ceylon.

183. *Megaloceræa dohertyi*, Dist.

Pusa.—All months.

Recorded from Tenasserim.

I am not quite certain of this species; it is nearest to *M. dohertyi* of those in the Fauna.

184. *Megacælum stramineum*, Walk.

Pusa.—All months.

Surat.—All months.

Recorded from North Bengal, Kangra Valley, Ceylon. A very abundant insect.

CAPSINÆ.

185. *Pæciloscytus longicornis*, Reut.

Pusa. 20-iv-07.

The Fauna records Calcutta, Ceylon, Nicobar Islands, etc.

186. *Gallobelicus crassicornis*, Dist.

Pusa.—All months.

The Fauna records Bor Ghat and Tenasserim.

187. *Halticus minutus*, Reut.

Pusa. 7-vii-05.

Recorded from Ceylon, Singapur, etc.

The Capsid fauna is very inadequately known, compared with other families, but is a distinct one from that of sub-tropical localities; for instance the very abundant *Deræocoris* of the Himalayas, which are there quite common, are in Pusa wholly absent. Our Capsid fauna is probably distinct, being found on grass and on plants to which each species is more or less definitely confined. The Capsidæ, more than all other Heteroptera, are very insufficiently known all over India.

ANTHOCORIDÆ.

188. *Triphleps tantilus*, Motsch.

Pusa. viii-07.

We have also a not uncommon undescribed species.

PELOGONIDÆ.

189. *Pelogonus marginatus*, Latr.

Pusa.—All months.

The Fauna records India, Burma, S. Africa, etc.

NEPIDÆ.

190. *Laccotrephes ruber*, Linn.

Pusa. 19-viii-05—15-vi-06—24-iv-07.

Chapra.

Igatpuri. 20-vi-04.

Nilgiris. 7,000 feet. v-04.

Akalgarh, Punjab. 30-iii-08.

Recorded from Sind, Kashmir, Assam, Kangra, Bombay, Calcutta, Ceylon, Burma, China, etc.

191. *Laccotrephes maculatus*, Fabr.

Pusa.—All months.

Recorded in the Fauna from Bengal, Assam, Calcutta, Bombay, Ceylon, Burma.

192. *Ranatra elongata*, Fabr.

Pusa. 26-iii-04—viii-08.

The Fauna records Kashmir, Calcutta, Bombay, Nilgiris.

193. *Ranatra filiformis*, Fabr.

Pusa.—All months.

The Fauna records Quetta, Karachi, Behar, Assam, Tranquebar, Bombay, Philippines, etc.

NAUCORIDÆ.

None.

BELOSTOMIDÆ.

194. *Nectocoris stali*, Mayr.

I cannot find we have this, but am not certain.

195. *Sphærodema annulatum*, Fabr.

Pusa. 19-xii-04—19-viii-05—14-v-07.

Burdwan. ii-06.

The Fauna gives only Sind, Sylhet, Calcutta.

196. *Sphærodema rusticum*, Fabr.

Pusa. 25-ix-05—iv-05.

Dacca. xii-08.

Yercaud.

Gauhati. v-07.

The Fauna gives Bombay, Ceylon, Burma, Siam, etc.

197. *Sphærodema molestum*, Duf.

Pusa. 1-vii-07—v-07, etc.

Bangalore.

The Fauna records Kashmir, Calcutta, Malacca.

198. *Belostoma indicum*, Lep. et Serv.

Pusa.—May to September.

Asansol.

Mokameh.

Recorded from Sind, Malabar, Bombay, Trivandrum, Ceylon, Burma, etc.

The Korean *B. deyrollei*, Vuill, of the Brahmaputra, the only other Indian species, does not appear to extend to our area.

NOTONECTIDÆ.

199. *Enithares indica*, Fabr.

Pusa. 17-xii-06.

Surat. 16-vi-04.

Recorded from Tranquebar, Bombay, Trivandrum, Ceylon, Burma, etc.

200. *Anisops sardea*, Herr.-Schäf.

Pusa.—All months.

The Fauna gives Bombay, Burma, etc.

201. *Anisops fieberi*, Kirk.

Pusa.—All months.

Kirkaldy says "Distributed over British India," on whose authority is not stated. Distant records Ceylon and Celebes.

202. *Anisops niveus*, Fabr.

Pusa.—All months.

The Fauna records Bombay, Burma, and "suggests" all India.

203. *Plea pallescens*, Dist.

Pusa. x-08—ix-08—vii-09.

Recorded from Calcutta.

CORIXIDÆ.

204. *Corixa hieroglyphica*, Duf.

Pusa.—All months.

Recorded from Assam, N. Bengal, Bombay.

205. *Micronecta striata*, Fabr.

Pusa.—All months.

The Fauna records Calcutta, Kanara, Ceylon.

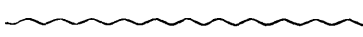
The aquatic Rhynchota have probably been little collected in India, and one would expect them to be widely spread, since neither heat nor drought would affect them in big rivers such as come down from sub-tropical areas. Still there are puzzles, notably *Belostoma deyrollei* from the Brahmaputra not being found in the Ganges. A feature, too, is the complete absence of *Mononyx*, so common in the hills, and of Naucoridæ. The former is a land insect typical of sub-tropical areas and the Naucoridæ apparently also are not plains' insects at all.

We have now enumerated 205 species of Rhynchota Heteroptera from Tirhut, mainly from one locality, Pusa, in which collecting has been done continuously by many students and others, as well as myself, for five years. We have probably found at least every common species; there may be another 100 rare species not listed, which are not identified or are new. The fauna as a whole is markedly Malayan and Burmese, very markedly distinct from that of the nearest sub-tropical zone, Sub-Himalaya, West. It contains also very few species stretching across the drier north-west, but probably many species common also to the hills of Chota Nagpur and other places to the south-west. How it will compare with the fauna of Central India, East, is uncertain, but we believe

that it shows a greater affinity with the Fauna of the Gangetic Plain, East, though distinct from it. The fauna is not a distinct one, in the sense that it is derived, not originating on the spot; it is derived probably by immigration through Lower Bengal and Eastern Bengal from Burma, and possibly Malaya. Many species which have penetrated into Lower Bengal have not penetrated to this area, possibly on account of the period of intense dry heat which prevails from March 15th to May 15th as a rule. It contains probably a number of species which are now established all over the plains of India, successful species whom heat does not affect or who find in the undiversified vegetation an abundance of the food-plant they require.

If our conclusions are correct, there is justification for considering what are the faunal zones of this continent. We cannot here repeat what is said in *Indian Insect Life*, but we would urge the collection of data upon this point; collectors situated in India can alone provide the data; we want collections made at widespread points by resident collectors; a collection is not a mere agglomeration of specimens, like postage-stamps, but a valuable mass of data from which can be drawn deductions regarding wide subjects such as this; there is scope for many collectors, and until such work is started, this cannot make the progress it should do.

It is perhaps unnecessary to say that we will give any assistance that can be given, and that this subject is being worked at both in the Indian Museum and Pusa. An impetus might possibly be given to collecting, were it realised how valuable are accurately localised collections. We would also point out to systematists and others in Europe that India is not just one level uniform plain and that the accurate record of localities and elevations in the specimens they describe increases the value of their work. Such a locality as "Indes Orientales" is meaningless; North Bengal may be Pusa at 150 feet elevation, Kurseong at 4,700 feet, or Darjiling at 7,000 feet, the three places being tropical, sub-tropical and palæarctic, respectively. If anyone is in doubt as to the elevation, latitude or longitude, or the faunal area of any Indian locality, we will do our best to enlighten him. The accurate record of localities is an extremely important matter, and we hope that such vague terms as "Indes Orientales," "India Orientalis," "Deccan," "Bengal," "South India," will pass completely out of use and give place to greater accuracy.



XXVI. DESCRIPTIONS OF NEW SPECIES OF *BOTIA* AND *NEMACHILUS*

By B. L. CHAUDHURI, B.A., B.Sc. (Edin.), Assistant
Superintendent, Indian Museum.

Botia birdi, sp. nov.

Br. iii, D I.10, P 14, V 8, A I.6, C 19.

Height of body 4, length of head 4 and length of caudal 9 in the total length. The distance of cloacal opening from root of caudal is contained three times in the total length.

Head rather compressed and deep, height of head being $1\frac{2}{3}$ and its breadth $2\frac{2}{3}$ in the length of head. The suborbital groove is shaped like a relaxed bow and is deep and wide for the lodgment of the erectile bifid spine when not in use. The length of the groove is contained three times in the length of head. The erectile spine reaches the anterior third below the orbit.

Eyes lateral, with a rounded ridge between and situated about the middle of the length of the head; rather small and contained 8 diameters in the length of head, 4 to $4\frac{1}{2}$ diameters from the end of snout and $2\frac{1}{2}$ diameters apart.

Barbels.—8 in all, 4 rostral in a bunch at the end of a fleshy prolongation of the pointed snout, the inner pair being superimposed by the outer pair. The mandibular pair, which are short and thick and only half as long as the maxillary (which are the longest with slender tapering ends) grow from a fleshy outgrowth of the lower lip. The maxillary pair reach the middle of the eye below, the length of the rostral barbels is intermediate between that of the maxillary and that of the mandibular; the outer and upper rostral pair being longer than the inner and inferior rostral pair.

Anterior nares are about the middle of the snout, have double funnel-shaped tufts and two deep pits, and do not open into the mouth, but the double series of muciferous glands in the head appear to terminate in front of them.

Lips.—Suctorial, thick, rounded and doubled up at the corners when the mouth remains closed, thus giving a crescentic appearance to the lumen. The upper lip is extended into an overhanging fleshy flap and the lower lip is corrugated or divided into four rounded fleshy protuberances, giving a characteristic appearance to the mouth.

Fins.—There are appendants on the outer side of pectoral and ventral fins. These appendants are small, thin, cuticular flat

outgrowths in the angles of the fins. The anterior root of the dorsal fin is slightly nearer to the snout than the middle point in the total length and is in advance of the anterior root of the ventral fin, which is slightly behind the middle point. The outer free margin of the dorsal is concave outward; the pectoral fin in length is contained $1\frac{1}{5}$ times in the interval between the anterior roots of the pectoral and ventral fins; the ventral fin is contained $1\frac{1}{5}$ to $1\frac{2}{5}$ times in the interval between the anterior roots of the ventral and anal fins, and the anal fin about $1\frac{2}{5}$ times in the interval between the anterior roots of the anal and caudal fins. (In each of these the length of the fin is measured as it lies contracted alongside the body length.) In the dorsal fin the spine is intimately joined with the first ray, so much so that the total number appears to be 10. The first ray though articulated is not branched, while the rest of the rays are both articulated and branched. The spine of the anal fin is also intimately joined with the first ray; thus the total number in the fins appears to be 6 and not 7 till the spine is separated out. Like that of the dorsal the first anal ray is articulated but not branched, but the rest are both articulated and branched. The caudal fin is deeply forked—more than $\frac{2}{3}$ of its total length.

Shape.—Body broader above than below. The dorsal profile is round and sloping in front of the dorsal fin, the slope increasing gradually further forward; behind the dorsal fin it is only slightly sloping. The ventral profile is almost a straight line and the abdomen is transversely rounded.

Lateral line is complete. It is almost straight from the root of the caudal fin to below the dorsal fin, from which point it slightly follows the curvature of the upper profile; it appears to terminate in the upper corner of the gill-opening. From this point again widely separated larger spots (openings of muciferous glands) are observed in two series, one curving up the eye and the other rounding below, meeting in front of the nasal openings.

Air-bladder is an elongated narrow tube lying on the upper part of the gut, and in length is only $\frac{1}{3}$ the length of the gut.

Scales very small and deciduous; all over the body except on the head.

Colour.—The snout was reddish at the time of capture but has lost its colour in spirit. The outer rostral barbels are dark brown, the rest are white. Dorsal and caudal fins are striped with broad black or dark brown bands on yellowish white ground; the dorsal with 2 to 3 cross-bands and the caudal with 3 to 4 wavy bands. The other fins, *viz.*, pectoral ventral and anal, are not at all striped but are of one uniform colour which is paler yellowish white; as is also the ventral (lower) surface of the body; the dorsal side is deeper and darker, and further variegated by irregular elliptical loops of brownish black; these loops send down broad brownish black bands on each side, but all these bands stop short of the ventral surface and sometimes interlace with each other. Just below the suborbital groove there is a half-moon-shaped area

conspicuously silvery which probably functions as a warning organ.

Size.—Three young specimens from Ambala measure 12.4 cm., 12.9 cm. and 13.3 cm. Full-sized ones weigh up to 1½ lb. each.

These fish were caught in the month of May, 1908, by W J A. Bird, Esq., Superintending Engineer, Sirhind Circle (Ambala), at Rupar, where the Sirhind Canal diverges from the Sutlej. The fish are said to be very good eating, and, as an individual reaches 1½ lb. in weight, are of considerable economic value.

This fish has some superficial resemblance to a small fish, *viz.*, *Botia geto* of Day (*Cobitis geto* of Hamilton Buchanan, *Schistura geta* of McClelland and *Geto rostrata* of Günther), which, besides being a smaller fish, differs in its most important proportions, shape and formation of head (figured by Dr. Günther in the *British Museum Cat. of Fishes*, vol. vii, p. 367). There is considerable difference in the coloration also; *Botia rostrata*, Günther, has its pectoral, ventral and anal fins conspicuously striped with brownish cross-bands; in the new species none of these fins are at all banded or striped.

Nemachilus macmahoni, sp. nov.

Br. iii, D I.8, P 10, V 8, A I.6, C 19.

Height of body $5\frac{4}{5}$, length of head $4\frac{1}{5}$, length of caudal 8, the distance of cloacal opening from the root of caudal $3\frac{1}{2}$ in the total length.

Head rather broad and thick, height of head being $2\frac{1}{5}$ and its breadth $1\frac{1}{2}$ in the length of head and the height of head being $1\frac{2}{5}$ in the breadth of head.

Eyes small, being $9\frac{1}{2}$ diameters in the length of head, 4 diameters in the length of snout and about $3\frac{1}{5}$ diameters apart; intra-orbital space very slightly convex.

Barbels.—6 in all, with thick bases and slender tips; maxillary pair reaching below hind edge of the orbit. The maxillary barbels appear to come out of the corners of a groove that surrounds the mouth.

Fins.—The single spine of the dorsal as well as of the anal is intimately joined with the first ray that follows, which, though articulated, is not branched. There is a peculiar thickening behind the dorsal fin which in appearance resembles the elongated adipose dorsal fin of some of the *Macrones*. This fin-like structure is continuous behind with the skin fold of the caudal; its length is $3\frac{1}{2}$ in the total length, and its height is contained 10 times and its thickness 12 times in the length of the fin. The anterior root of the spinous dorsal fin is in front of the middle point of the total length and also of the anterior root of the ventral fin which is behind the middle point of the total length. The length of the pectoral is $2\frac{3}{4}$ in the distance between the bases of the pectoral and ventral fins. The length of the ventral is exactly half the distance between the bases of the ventral and anal fins, and the length of the anal fin is

contained almost twice in the interval between the bases of the anal and caudal fins. Free end of dorsal fin is a straight line and the caudal is rounded.

Shape elongated and round; thicker in front and tapering from behind the dorsal fin. Dorsal profile curves up from the posterior root of the dorsal fin, reaching the highest point midway between the anterior root of the dorsal and the nape of the neck. Head not sloping but rather flat. The ventral profile is slightly curved downwards, the lowest point being the anterior root of the ventral fin.

Lateral line complete and slightly curved from below the anterior root of the adipose fin-like structure to the upper corner of the gill-cleft, and follows the curvature of the dorsal profile closely.

Scales very small and highly deciduous, found all over the body.

Colour.—Brown all over, head and dorsal part slightly darker than ventral surface. Barbels lighter brown. Dorsal and caudal fins banded with darker bands, pectoral also slightly banded; but anal and caudal of a uniform light brown colour.

The type, which is 28 cm. in length, is in the collection of the Indian Museum (No. F $\frac{1222}{1}$) and was collected in the affluents of the Helmand by Colonel Sir A. H. McMahon, K.C.I.E., C.S.I., and the officers of the Seistan Arbitration Commission. The species differs in many important characters from Tate Regan's *N. rhadinæus* from the same locality. One of the types of the latter species is also in the collection.



XXVII. NEW ORIENTAL SEPSINÆ.

By E. BRUNETTI.

The Acalypterate sub-family Sepsinæ recently received a substantial addition to the number of its Eastern species by Herr Meijere's publication of eight new ones, in addition to *javanica*, a species he had established two years earlier.

In the Indian Museum collection, this group is very liberally represented, and I now give descriptions of a number of new species therein contained, with notes on other known species and such new localities as the material presents. After careful examination of over 500 specimens, representing nearly thirty species, I find, as stated by Herr Meijere, that it is unsafe to rely too much on certain characters as bases of classification. The usual number of dorso-central bristles is four, but the front pair are frequently reduced in size, or are absent; in one specimen there was a distinct fifth bristle. The spiny bristles on the abdominal segments are also variable in size and, occasionally, in number. Moreover, all the bristles, also the spines on the fore femora, are very easily broken off, generally leaving no trace of their presence. In addition to the two conspicuous bristles on the scutellum, there are often two other very small ones towards the sides of the anterior part, and the presence of small additional bristles is not at all rare.

The two basal cells are in some species united by the absence of the intermediate veinlet, but this character is not invariably consistent, and in one specimen I found a supplementary veinlet joining the third and fourth longitudinal veins, in a line with, and apparently an extension of, the outer cross-vein.

The extent of the greyish white dust on the sternopleuræ is also more or less variable, and in some species, with an otherwise wholly black thorax, there is a tendency to a dark brown tinge on the shoulders and along the sides.

In studying the species herein recognised, I have considered all the above characters taken together, in preference to relying on any particular one. I do not feel able to present a satisfactory analytical table of species, but an approximate grouping for the present will, at least, give the affinities of my new species.

A. *Wing with a distinct black spot near tip.*

B. *Wing spot rather clearly cut, generally round or squarish.*

Two allied species form a first or *cynipsea* group; these are *cynipsea*, L., and *modesta*, Meij.

Four species allied to the *punctum*, F., of Europe; these are *himalayensis*, *rufibasis* (with two varieties), *similis* and *fulvolateralis*, all new.

BB. Wing spot indistinct; sometimes opened out hindwards, and fading away—never very pronounced.

In this group are *basifera*, Wlk., Meijere's *apicalis* and *limbata*, with my new ones, *flava*, *rufipectus*, *lineatipes*, *tincta*, *dilata* and *dissimilis*.

N.B.—Belonging to Group A are *fascipes*, Wlk., *linearis*, Wlk., and *monostigma*, Thoms., but from the descriptions it is impossible to tell whether they fall in my Group B or in BB.

AA. Wing entirely clear.

The species falling in this division appear divisible into two main groups, which I will designate the *indica* and *bicolor* groups respectively.

1. *indica*, Wied., group.—Mainly reddish yellow species of comparatively larger size. These are *indica*, W., *rufa*, Mcq., *trivittata*, Big., *spectabilis*, Meij., *tenella*, Meij., and my new species *brevicosta*, *adjuncta* and *brevis*. *Lateralis*, Wied., belongs here, but neither Meijere nor myself have been able to recognise it.

2. *bicolor*, Wied., group.—Mainly black species of comparatively smaller size. These are *bicolor*, W. (*javanica*, Meij.), *coprophila*, *decipiens* and *beckeri* of Meijere, and my new species *humeralis*, *nepalensis*, *pubipes* and *fasciculata*.

A last species, *viduata*, Thoms., is a somewhat isolated one, large, black, and with an ant-like appearance.

N.B.—Belonging to Group AA but not to be determined more closely owing to the brevity of the descriptions are *nitens*, *complicata* and *lateralis* of Wiedemann; *revocans*, *frontalis* and *testacea* of Walker.

The genus *Nemopoda* is, so far as my experience goes, not Oriental (*vide postea*).

Walker's two species of *Piophila* (the second one with a doubt)—*contecta* and *disjuncta*—I know nothing of; van der Wulp's *ruficornis* I have identified from Meijere's description, adding, moreover, a variety from Calcutta (*flavifacies*).

The genus *Saltella* now becomes Oriental as well as Palæartic, as a species occurs in Bengal, and a second in South India, both herein described. Two other species of this sub-family appear in van der Wulp's Catalogue, *Cephalia bicolor*, Big., and *Megamerina annulifera*, Big. Of these I also know nothing, and would prefer to regard them specifically and generically as uncertain.

Of the localities mentioned in this paper, Theog (8,000 ft.), Phagu (8,700 ft.), Matiana (8,000 ft.) and Dharampur (5,000 ft.) are all in the Simla (7,000 ft.) District in the W. Himalayas.

The following localities are all in South India (in Travancore State) and were visited recently (1908) by Dr. Annandale, all being

in the plains at low altitude, except Tenmalai which is among the hills :—

Trivandrum	Travancore State, near coast.
Nedumangad	10 miles N.E. of Trivandrum.
Pallode	20 miles N.E. of Trivandrum.
Shasthancottah.	12 miles N.N.E. of Quilon (Travancore).
Tenmalai	West side of Western Ghats (Travancore).
Maddathorai	West base of Western Ghats (Travancore).
Shencottah	Madras Frontier, east side of Western Ghats (Travancore).

Sepsis cynipsea, L.

This common species, which extends over the whole of Europe, North Africa and North America, probably extends also over the whole of the Palæarctic region.

The Indian Museum possesses it from the following places: Simla (7,000 ft.), 11-v-08 and 16-v-09 (on the latter date common on flowers of white stonecrop); Theog (8,000 ft.), Phagu (8,700 ft.) and Matiana (8,000 ft.), Kufri (8,000 ft.), 11-v-09; Dharampur (5,000 ft.), 28-iv—3-v-08, and also again at Theog and Phagu, 11—13-v-09 (all *Annandale*, and all these places in the Simla District). Naini Tal (6—7,000 ft.) [*Lloyd*]; also taken by the Indian Museum collector at Unchagaon, 7-iv-09, Bindukhera, 13-v-09; Kichha, 4-iv-09, these all in the Naini Tal District but in the plains; Kumaon (Naini Tal District, 6,000 ft.), 5-vi-09; Darjiling (6,000 ft.), 28-ix—1-x-08 [*Brunetti*]; Noalpur, Nepal, 23-ii-08; Bhachkati, Bahraich District (United Provinces, India). This latter place is near the base of the Western Himalayas. I have also examined a ♂ and ♀ taken in April on Paresnath Hill, Western Bengal, by Dr. Annandale, at a height of 4,350 feet. Paresnath Hill is separated by about 200 miles from the hills of Nepal, the nearest point in the Himalayas. It will be seen that the specimens examined by me are nearly all from localities of some altitude, except the few from the plains in the Naini Tal District. I think it probable that in the East it is practically a hill species, but occurs sparingly at the base of the hills, or on isolated elevated localities in their vicinity.

Sepsis himalayensis, mihi, sp. nov.

(Plate xlii, figs. 1, 2.)

♂ ♀ Darjiling. Long. $2\frac{1}{2}$ —4 mm.

Head—Frons shining blue-black, bare; ocelli red, equidistant, rather widely separated, with two strong, diverging bristles situated between them. A row of four equidistant bristles along the vertex, reaching from eye to eye, and some bristles of different lengths on the back of the head, which is black. Face, cheeks and mouth border red, varying to reddish brown and to reddish yellow, with a longitudinal row of strong bristles on each side of the

mouth. Proboscis light brown, with short pale hairs. Antennæ black, third joint more or less reddish, especially at base and on under side, the whole joint sometimes with a greyish reflection.

Thorax rather dull black, smooth, sometimes with a slight dark green or ænous tinge, especially on the sides. The dorsum bears five longitudinal rows of very minute spines; the middle row is central, and the outer rows nearly on the edges of the dorsum. Placed on the posterior half of the dorsum, and forming part of the two intermediate rows of minute spines, are two pairs of strong, black, spiny bristles, slightly curving backwards. *The front pair are sometimes smaller and often absent.* The lengths of the two spines forming the front pair often are unequal in the same specimen.

A strong spiny bristle in front of the insertion of each wing, and a lateral row of three on each side of the thorax, just below the dorsum. Scutellum concolorous, with two long spines; metanotum shining black. Sternopleura itself wholly grey dusted, the grey not carried forward over the mesopleura or any other portion of the side of the thorax.¹ Mesopleura shining, often with an ænous or dark green tint, but never grey dusted.

Abdomen shining violet-black, with scattered, soft short hairs. Sides of second segment often more or less reddish. Second segment with one or two comparatively small but distinct bristles towards the sides, almost on the posterior border. Third, fourth, fifth and sixth segments each with a strong bristle towards each side, placed near the posterior border, those on the fourth segment being just behind the middle line, although towards the sides of the segment like the others. Occasionally an additional bristle occurs on the fourth segment, and even on the fifth also, placed between the two normal ones.

Legs.—Coxæ reddish yellow, fore pair narrowly at base, and posterior pairs up the middle, black. Femora mainly shining black, but sometimes with a slight dark green tinge, with bases and tips narrowly reddish yellow. The yellow colour is variable in extent, sometimes occupying the greater part of the fore pair, especially on the under side; also in some specimens reducing the black part on the posterior femora almost to a wide, ill-defined band, or confining it (the black) chiefly to the upper side.

The fore femora in the ♂ much enlarged below, the enlargement terminating just before the end in a pair of small bumps (inner and outer) almost contiguous, which bear a few very short black spines. Three strong spines occur near together in the centre of the femora on the under side, followed by four or five shorter strong ones placed on a small bump just before the end of the incrassated part; and these stronger spines form, with some

¹ In this paper, by "sternopleura" I refer only to that subtriangular piece itself which in most Oriental species is more or less grey dusted, but in all such cases *wholly* so. In the few instances where the grey is carried forward in a thin line as mentioned by Herr Meijere in the European *Nemopoda cylindrica*, etc., I expressly take note of this fact.

intermediate small ones, a more or less regular row along the whole of the under side. Fore femora in ♀ simple. All the femora in both sexes minutely pubescent, the middle ones bearing a small spine (sometimes two) on the under side near the middle.

Tibiæ: fore pair in ♂ generally reddish yellow, narrowed at base (where there are two short black spines), also about the middle, in front of which are two small enlargements, of which the upper one bears three or four very short bristles. Fore pair in ♀ simple. Middle tibiæ with three or four bristles on the outer and hinder sides, placed on the apical half. Hind tibiæ with two bristles in the middle, on outer and hinder sides, and one on the outside near the tip, but neither the number nor the exact position seem to be constant. The hind tibiæ bear at the tip several bristles of varying length. In both sexes the colour of the four posterior tibiæ is black, with rather close, black pubescence, especially on the hind pair, but the base and tip are often pale.

Tarsi: yellowish brown, black towards the tips; with black bristly hairs below, which are strongest below the metatarsus in the ♂

Wings nearly clear: small transverse vein placed at about three-fifths of the discal cell. The spot at the tip of the second longitudinal vein is narrow on the bent up portion of that vein, below which it is enlarged, with a tendency to turn outwards towards the tip of the wing. It is never squarish in shape nor does it ever reach the third vein. This latter is *very* faintly suffused towards, but not at, its tip. Halteres pale.

Described from a considerable number of both sexes taken by me at Darjiling, 16-ix-08—2-x-08, mostly in fields of grass, mixed plants and weeds. Also in the Indian Museum from Darjiling, 10-viii-09, and Pashoke, Sikkim (2,800 ft), 5-ix-09. It is a well-marked species, but shows considerable variation, especially in the colour of the legs and at the base of the abdomen. The minute rows of spines on the thoracic dorsum are often inconspicuous or absent, and there seems a tendency towards occasional extra spines on the legs and on the fourth segment of the abdomen.

N.B.—A careful examination of all the specimens convinces me that they represent but a single species, and that the size, presence or absence, of the anterior pair of dorso-central thoracic bristles is a variable character, as about half the total number of specimens captured show four spines (the front pair generally slightly smaller, and not infrequently of different lengths in the same specimen) and the remainder show little or no trace of them, a few specimens having them of quite small size.

Sepsis punctum, Fab.

(Plate xiii, fig. 3.)

A specimen taken by me at Shanghai, 16-iv-06, agrees with the descriptions of *punctum*, F., as given by Schiner, but from comparison with four males of this species in the Indian Museum,

my specimen is much too slender and too small to be this species. It however possesses the four bristles on the fourth abdominal segment, and has only two dorso-central bristles on the thorax, in these characters agreeing with *punctum*. For the present, it will be wisest to omit the name from my list. In my collection.

Sepsis similis, mihi, sp. nov.

♂ Darjiling. Long. 3 mm.

Closely allied to *S. punctum*, F., a European species which is known to extend to North Africa. My species differs from that of Fabricius by having four dorso-central thoracic bristles, and by the absence of the middle pair of bristles on the fourth abdominal segment. Minor differences are the slightly darker hind legs, the wing spot reduced to a small dash, and the inner cross-vein being more nearly over the middle of the discal cell.

In the formation of the fore femora it agrees with *punctum*, and if the number of bristles on the thorax and fourth abdominal segment are inconstant, the two species may be identical.

Described from two males taken by me at Darjiling, 24—26-ix-08, in grassy fields. In the Indian Museum collection.

Sepsis rufibasis, mihi, sp. nov.

♂ Darjiling. Long. 3—4½ mm.

A handsome and conspicuous species, allied to *punctum*, *similis* and *himalayensis*.

The second abdominal segment is always more or less reddish (above as well as at sides), the colour extending sometimes to the base of the third segment, above also; the rest of the abdomen showing violet, bronze and green tints, the fifth segment also, with the anal appendage, being principally reddish yellow. Four dorso-central bristles are present. The shape of the wing spot is as in *himalayensis*. The fourth abdominal segment carries four bristles, sometimes of unequal length (one specimen possessing a fifth bristle).

A principal specific character is the presence of bristles on the legs, distributed as follows: Several on the apical half of the under side of the middle femora, also along the whole length of the middle tibiæ on the hinder and outer sides. On the front of the hind femora towards the tips are a few, and two are in the middle of the hind tibiæ, placed somewhat posteriorly.

From *himalayensis* it may be distinguished at once by its wholly reddish yellow femora, all the legs being of that colour except the tarsi and the hind tibiæ, which are blackish. Apart from any differences contained in the above remarks this species resembles *punctum*, F.

Described from four ♂♂ in the Indian Museum collection taken by me at Darjiling, 23—26-ix-08, in fields.

Var. *major*, mihi.

♂ Darjiling. Long. $4\frac{1}{2}$ mm.

Two males taken by me in company with the typical form appear at first sight to be a distinct species, although on examination it is difficult to point out any character of sufficient strength on which to separate them specifically. They are nearly $4\frac{1}{2}$ millimetres in length, the whole of the second segment (abdominal) and the basal half of the third, are shining reddish; the fifth segment being wholly yellowish, with the genitalia. There are four dorso-central bristles on the thorax, and four bristles on the fourth abdominal segment.

The bristles on the legs in one of the specimens correspond with those in the typical form, but in the other specimen they are placed more in a uniform row on the outside of the hind tibiae (except one towards the tip in front, and one on the inside).

The wing spot is slightly larger and very deep black.

Var. *obscuripes*, mihi.

♂ Darjiling. Long. 3 mm.

What appears to be a second variety of my *rufibasis* is represented by two ♂♂ taken by me in company with it at Darjiling, 24—26-ix-08, in fields. In one, the four dorso-central thoracic bristles are present, in the second specimen the front pair are very abortive. One example has the tip of the abdomen (fifth segment) yellow, but the other has no sign of this colour at the tip. The leg bristles are as in the typical form, the legs themselves being much more blackish, the fore femora being nearly wholly brown in one specimen, and with a blackish upper side in the other. The posterior femora are mainly black, with the bases broadly and their tips more or less narrowly pale, and the posterior tibiae almost wholly black, but with a tendency to paleness at the tip of the middle pair. The tarsi are dirty yellow, with blackish tips.

Sepsis fulvolateralis, mihi, sp. nov.

♂ Himalayas. Long. 3 mm.

Head.—Frons, face and cheeks bright reddish orange, frons touched here and there with black. Vertex blackish; back of head mainly reddish yellow, but black just behind vertex. Antennae reddish orange, upper side blackish, also the grooves in the face in which they lie; bristle on second joint very large. Mouth blackish, proboscis brownish yellow.

Thorax.—Dorsum blackish; four large dorso-central bristles, and five more or less uninterrupted rows of very distinct short stout bristles, the rows often double; in addition to scattered short bristly hairs over the whole dorsum. The dorsum is sharply

divided from the sides of the thorax, which, at least on the humeral calli and for some little distance around, are distinctly reddish orange. Sternopleura prominently grey dusted, and traces of grey dust here and there above the sternopleura. Scutellum blackish. Metanotum shining black.

Abdomen shining black, with a slight violet tinge, with short pubescence. Sides at base, especially on second segment, considerably orange-yellow. Second segment with a few stiff bristles towards each side; third and fifth with two spiny bristles placed as usual; fourth with a row of four such bristles. Abdomen tip orange-yellow. Genitalia large and prominent, yellow, with two small palpi shaped like the antenna of a *Tabanus*.

Legs orange-yellow, with short pubescence. Posterior tibiae brownish; tarsi brown, middle tarsi (except metatarsus) black.

Fore femora with the enlargement below bearing a strong spine before the middle, followed by two or three smaller ones on a small bump, and thence to the tip by several short ones. Hairs on upper side of fore femora rather stronger than in most species. Fore tibia widened behind up to the middle, where it is somewhat contracted, and again at three-fourths of its length; the basal half of the tibiae bearing three or four strong short spines.

Middle femora with a bristle on the front side, in the middle; middle tibiae with two bristles on outside, one behind and several at the tip. Hind femora with two on the outside in the middle and some at the tip. All the tarsi pubescent below, with rows of spines; fore metatarsus below with a thick fringe of bristly hair; hind metatarsus below with two stronger spines at its base.

Wings clear, with a distinct, generally round (but sometimes irregular) brownish spot at tip of second vein; third and fourth veins converging just before the tip; inner cross-vein at two-fifths of the discal cell.

Described from several ♂♂ in the Indian Museum collection with the following data: Darjiling, 26-ix-08 [*Brunetti*]; Phagu (9,000 ft.), 11-v-09 [*Annandale*]; Simla (7,000 ft.), 16-v-09, on flowers of white stonecrop [*Annandale*]; Matiana (8,000 ft., Simla District), 28—30-iv-07 [*Annandale*]; Naini Tal (6—7,000 ft.) [*Lloyd*]; and 5-vi-09 [*Ind. Mus. Coll.*]. A ♂ in the Pusa collection taken by Mr. Howlett at Simla in x-08.

N.B.—A very distinct and rather handsome species somewhat allied to *rufibasis*. Its black dorsum and yellow sides, to at least the front part of the thorax, will separate it from all my species with a wing spot, except *rufipectus*, from which it is, however, distinguished by its larger size, superior robustness, and usually round-shaped wing spot.

Sepsis violacea, Mg.

Five females taken by me at Shanghai, 16-iv-06, appear to be this European species, although they do not quite agree either with the description, or with specimens from Europe. The ♂

taken by me the same day at Shanghai, and which I dubiously refer to *punctum*, F., may possibly be the ♂ of *violacea*, as I have never seen that sex of this species, and two other ♂ ♂ taken with them (now in the Indian Museum) more nearly approximate to what I should expect *violacea*, ♂, to be like. I have never seen a ♂ *violacea* or a ♀ *punctum*.

Sepsis flava, mihi, sp. nov

(Plate xiii, figs. 4, 5.)

♂ India. Long. 2—3 mm.

Head.—Frons, face, back of head, proboscis, mouth, under side of head and antennæ wholly orange-yellow. Upper side of antennæ sometimes a little darker, and there is sometimes a blackish irregular line across the back of the head, just below the vertex.

The ocelli are placed on three small black spots, between which emerge two bristles. Three pairs of bristles occur along the vertex, one in the centre, and one behind the corner of each eye.

Thorax normally entirely orange-yellow, sometimes an irregular darker part or streak or two on dorsum. Four dorso-central bristles. Scutellum concolorous, a stiff bristle near fore border in front of each spine.

Abdomen reddish orange; the extreme base, the posterior border of second segment, and more or less of the third and fourth segments, blackish. Tip of abdomen, orange-yellow. The black colour varies considerably in intensity and extent, sometimes being reduced to the posterior half of the third segment, with a little on the fourth and fifth, and sometimes covering all the abdomen except the basal half of the second and the abdomen tip. The whole abdomen is covered with scattered, stiff hairs, including a more or less regular row near the posterior border of each segment. These are much longer than in any of my previously described species, and are almost as long as the usual pairs of spiny bristles towards the sides of the second to the fifth segments. Genitalia large and conspicuous, orange-yellow, with stiff hairs.

Legs.—Front pair entirely yellow, with soft hairs; femora with a large enlargement on basal half below, bearing five or six black spines of different lengths; tibiæ widened on apical half, this half being contracted in the middle and bare, whilst the basal half bears a row of short stout spines. Posterior legs yellow, with soft black pubescence; the basal half of the tibiæ and towards the tarsi tips, more or less brownish. Middle femora with a few spiny bristles below, about the middle; the hind pair with a bristle or two, apparently irregularly placed. Middle tibiæ with a row of spines behind, one on the outer side in the middle and a few at the tip. Hind tibiæ with a few on the apical half, irregularly placed on the outer and hinder sides. All the tarsi with short

hairs and some bristles; hind metatarsus bearing at extreme base a row of four strong spines close together, followed by a further row of several others, wider apart, along its whole length.

Wings clear; wing spot of considerably variable size and intensity, often reduced to a small brownish oval suffusion, or almost a mere dash at tip of second vein; third and fourth veins parallel, not diverging at tips. Inner cross-vein at a little beyond middle of discal cell. Basal cells united, through the absence of the intermediate veinlet. Veins yellowish brown.

Described from several ♂♂ in the Indian Museum collection, bearing the following data: Calcutta, 14-vi-07, 11-vii-07, 25-v-09. Jalpaiguri, 1-vii-08 (in railway carriage); Puri, 18-i-08 [*Annandale*]. Rajmahal, 5-vii-09 [*Annandale*]; Tinpahar, near Rajmahal, Bengal, 7-vii-09. Allahabad, 12-viii-09 [*Lord*]. Also from six specimens in the Pusa collection taken at that place on shrubs and manure, 29-v-06, 29-vi-07, 1-vii-07, 27-vii-07.

N.B.—The amount of black in both thorax and abdomen is very variable, especially in the latter. In one specimen from Puri, Bengal, the whole thorax is brownish; and in another from the same locality there are traces of four dorsal blackish stripes. A specimen in my collection taken by me at Jhansi, 2-viii-05, is similarly marked, and has in addition several additional strong spiny bristles on the posterior part of the thorax. Yet I have no doubt both specimens belong to this species.

Sepsis rufipectus, mihi, sp. nov.

♀ India. Long. $2\frac{1}{4}$ mm.

Head.—Frons brown, black about the vertex and on back of head. Face, cheeks and antennæ light yellow ochre; mouth border narrowly black; proboscis brown.

Thorax (slightly injured).—Dorsum shining black, apparently four dorso-central bristles. Sides shining black; shoulders reddish yellow, the colour spreading immediately downwards to the lower part of the thorax and carried forward below in front. Sternopleura shining black; no signs of grey dust. Scutellum and metanotum blackish, moderately shining.

Abdomen shining black to the tip; base at sides a little light brownish. Apparently no large spiny bristles, but towards posterior border of third, fourth and fifth segments, a row of somewhat stronger bristly hairs than the general pubescence of the abdomen. Genitalia small, shining black, with some hairs.

Legs yellow, with soft pubescence; middle tibiæ nearly to the tip, hind tibiæ wholly, and the apical half of all the tarsi, rather dark brown. Fore femora with a few bristly hairs below, near the base. Posterior femora apparently unspined. Middle tibiæ with a bristle on inner side, about the middle; hind tibiæ (of the unique specimen) do not possess any bristles but they have probably been accidentally broken off. All tarsi with bristles below, longest on fore pair, two spines at base of hind metatarsus.

Wings clear; spot fairly well defined, but without clear-cut edges, brownish, oval. Inner cross-vein at just beyond middle of discal cell.

Described from a single ♀ in the Indian Museum collection, labelled Bhogaon (West Bengal), 6-x-08 [*Paiva*].

N.B.—Several specimens of both sexes in the above collection may represent varieties of this species, or further additional ones.

Sepsis tincta, mihi, sp. nov.

(Plate xiii, figs. 6, 7.)

♂ ♀ India. Long. $2\frac{1}{4}$ — $2\frac{1}{2}$ mm.

Head.—Frons shining black. Face, mouth, proboscis, lower part of head and lower part of ocular orbit, reddish yellow to reddish brown, the colour often extending to just above the antennæ, which are reddish yellow to reddish grey, the basal part and the upper side of third joint more or less blackish.

Thorax blackish, shining, no tinge of any other colour. Four conspicuous dorso-central bristles. Sternopleura shining black.

Abdomen shining black. The second segment (which sometimes is faintly pale at sides or on posterior border) is barely humped up in the ♂, as in most species. Moreover it is somewhat attenuated in the ♂, and the whole abdomen in this sex is somewhat narrower than usual. There are in one specimen two or three rather small spiny bristles on the fourth and fifth segments, but in the remainder they are absent, although some of the bristly hairs occurring in the spots where the spines usually occur, are somewhat longer than those scattered over the entire abdomen. Practically it is a species bare of abdominal spiny bristles. Genitalia very large and conspicuous in the ♂, triangular in shape, shining black; in the ♀ very small and pointed, or withdrawn.

Legs.—Coxæ yellow, fore pair wholly so, paler; posterior coxæ reddish yellow, blackish on basal portion.

Fore femora reddish yellow, with upper side more or less blackish, the variation in colour being considerable. On the under side is an enlargement (narrowing towards and at the tip), which bears two large spines, with a smaller one between them, also, just beyond (on a small elevation) two small spines. There are two or three bristles at the base.

Fore tibia (♂) narrow on basal half, with a row of short spines on inner side, extending nearly to the middle, where, to the end, the tibia suddenly widens considerably, but is bare; in the ♀ the difference in width is inconspicuous, the tibia gradually widening.

Posterior femora and tibiæ black, the former always narrowly pale at base, the middle tibiæ slightly pale at tips. Knees rarely, narrowly pale.

The femora are apparently bare of spiny bristles, the middle tibiæ bear two in the middle (outside and behind), with some at

the tip; the hind tibiæ have two similarly placed about the middle, but none at the tip.

All the tarsi minutely spined below, with larger ones intermixed, hind metatarsi with three strong spines of uneven length, below at base. All tarsi dirty yellow, blackish towards tips.

Wings practically clear wing spot in the form of a distinct suffusion at the end of the second vein, and diminishing gradually posteriorly, its extent varying in different specimens, sometimes to the third longitudinal vein, or, in one example, almost to the hind border of the wing. The third and fourth veins are slightly tinged, as though thickened, immediately in a line behind the suffusion, and they are more nearly parallel than in *lineatipes*. The inner cross-vein at just beyond the middle of the discal cell. The basal cells are united, by reason of the absence of the usual intermediate vein. Halteres yellow.

Described from three ♂♂ and six ♀♀ in the Indian Museum collection, all from localities in India.

Locs.—Puri (Orissa, East Coast), 18—19-i-08; Jalpaiguri, 1-vii-08, in railway carriage; Shencottah (South India), 25-xi-08 [all *Annandale*]; Calcutta, 29-v-07, 17-vii-07, 1-vi-07 [*Annandale*, *Paiva*, *Caunter*]; between Bolpore and Rampore Haut (Bengal), at light in railway carriage, 3-viii-07 [*Paiva*]; Katihar (Bengal), 24-iii-09, one ♀ [*Paiva*]; Rajmahal (Bengal), 5-vii-09 [*Annandale*]; Sitarampore, Bengal, 10-viii-09 [*Lord*]; Dhikala, 9-v-07; Jumnogwar, 14-v-09, both in the Garhwal District, Western Himalayas; Tinpahar (Bengal), 7-vii-09; Unchagaon (plains of Naini Tal District), 7-iv-09; Allahabad, 15-viii-09 [*Lord*]. In the Pusa collection, from Pusa, 14-xii-07 and v-08.

N.B.—Although near to *lineatipes*, this species is very distinct, and may be at once distinguished by the shining black sternopleura, the attenuated second abdominal segment in the ♂, the practical absence of spines on the abdomen, the almost wholly black posterior femora, the large ♂ genitalia, the differently shaped fore femora in the ♂, and by the darkened wing mark, which always appears as a *suffusion*, gradually dying away posteriorly, instead of a fairly distinct *spot*, although tolerably faint, and with ill-defined but roughly circular outline. Moreover the present species seems to occur in the plains only, whereas *lineatipes* I only know from Darjiling.

Sepsis lineatipes, mihi, sp. nov.

♂ Darjiling. Long. $2\frac{1}{2}$ —3 mm.

Head.—Frons shining black, with a tendency to change just above the antennæ to the reddish brown colour of the face and mouth. On each side of the mouth, a narrow black stripe, on which is placed the usual row of bristles. Proboscis reddish yellow. Antennæ black, the whole under side of third joint reddish yellow.

Thorax black, with a slight dark green tinge. Four dorso-central bristles. Sternopleura grey dusted.

Abdomen shining violet-black, second segment at sides and above *sometimes* with a reddish brown or violet-brown tint, but sometimes entirely violet-black. Tip of abdomen (sixth segment) yellowish in one specimen, which has the apical half of the abdomen of a greenish bronze tint. Second segment with two or three rather small but distinct bristles towards the sides, third, fourth and fifth segments with a strong bristle towards the side of each, sixth segment with some bristly hairs.

Legs yellow; all the femora with a black streak on upper side, which on the fore pair becomes more or less diffused over the sides. Fore femora with under side as in *punctum*, posterior femora apparently without spines, except one in the middle of the middle pair in front. Middle tibiæ on basal half and hind tibiæ wholly black. The middle pair with three or four spiny bristles on the outer side, also one in the middle, in front, and three at the tip. Hind tibiæ with two or three similar bristles about the middle, on outer and hinder sides. Tarsi dirty yellow, with short, spiny bristles below, black towards tips.

Wings nearly clear, the spot rather indistinct but roughly circular, and always of the nature of a "spot" and not a "suffusion." Inner cross-vein at about two-fifths of the discal cell.

Described from five ♂♂ in the Indian Museum collection taken by me at Darjiling, 24-ix—2-x 08, in fields.

N.B.—A variable species in the colour of the abdomen, at base and tip, and to a less degree in that of the legs also, but the black streaked femora, in conjunction with the nature of the wing spot and the reddishness of the face extending above the antennæ, will distinguish it. I have no doubt whatever that the five examples represent but a single species.

Sepsis dissimilis, mihi, sp. nov.

(Plate xiii, fig. 8.)

♂ ♀ India. Long. $1\frac{1}{2}$ —2 mm.

Head, ♂, entirely yellow, frons reddish yellow, vertex round, ocelli blackish, antennæ reddish yellow, eyes black; ♀, frons blackish, with reddish marks, antennæ darker, back of head black.

Thorax, ♂, in one specimen wholly reddish yellow, with a dusky dorsum which is slightly darker on the posterior part; in the other ♂, dull reddish yellow with two blackish ill-defined stripes towards the sides. Sternopleuræ reddish yellow, a little grey dusted. ♀, wholly shining black, including the sternopleuræ. Sides of thorax reddish in front below the shoulders. Scutellum brownish yellow (♂), or black (♀). Four distinct and large dorso-central bristles in both sexes.

¹ These are not fully present in any one specimen, but in two or three there are certain traces of them having been present, and in at least one specimen, a single bristle (rather short) of the anterior pair is still intact.

Abdomen, ♂, reddish yellow, dorsum, especially of the third and fourth segments, violet-black, fifth yellow. ♀, wholly violet-black, tip greenish, shining.

In the ♂ the third, fourth and fifth segments each bears a pair of strong bristles towards the posterior border, but they are not visible in the ♀ (the ♀ specimen is in equally good condition as the ♂).

Legs (middle pair wanting in ♂) yellow, posterior tibiæ brownish; tips of tarsi black; coxæ in ♂ pale yellow; posterior femora in ♀ brownish towards tips. Fore femora in ♂ enlarged with a bump in the middle, below, bearing three short spines. A single strong long spine precedes the bump, which is followed by the leaf-shaped appendage bearing a short spine. A little black hair at the base, on the inside of the fore femora, and a strong spine on the outer side, in the middle. Fore tibiæ (♂) contracted at base and middle, with a few bristles on basal half. Posterior femora apparently bare of bristles; posterior tibiæ with a few bristles on apical half.

Wings as in *tincta*; inner cross-vein distinctly beyond middle of discal cell; two basal cells distinctly separated.

Described from a pair *in cop.* and an additional ♂ taken at Shasthancottah, 12 miles N.N.E. of Quilon, South India, by Dr. Annandale, 8-xi-08; a ♂ from Rajmahal, Bengal, 5-vii-09 [*Annandale*]; and a ♂ from the Garhwal District, Western Himalayas, 9-v-09.

N.B.—This species is the only one seen by me in which so much difference appears in the sexes, and but for Dr. Annandale's assurance that they were personally taken *in cop.* by him, I should have regarded them as distinct. The species is near both *flava* (♂) and *coprophila* (♀) but may be distinguished from each by the basal cells being distinctly separate, instead of united. I know of no species in which the abdominal strong bristles are present in the ♂ only, yet there is no trace of any in the type ♀ of this species, which specimen is in as equally good condition as the ♂

Sepsis dilata, mihi, sp. nov.

? ♂. Bengal. Long. $2\frac{3}{4}$ mm. barely.

Head.—Frons and back of head black; antennæ, face, proboscis and lower part of head, reddish.

Thorax black, two dorso-central bristles, curved inwards at tip. The two scutellar bristles rather close together, long, somewhat erect and waved. Sides of thorax, especially towards the front, slightly dark brown. Sternopleuræ not white dusted.

Abdomen shining black, with soft hairs only.

Legs.—Fore pair yellow, posterior legs reddish, hind femora slightly brownish, hind tibiæ black, also tips of tarsi, and hind metatarsi, the latter with a few large spines below at base. *Hind tibiæ distinctly dilated on apical half.* Middle femora with a bristle in the middle in front and a row of short stiff hairs below near tip; middle tibiæ with a bristle on inner and on hinder sides towards tip.

Wings clear, but with a distinctly perceptible but rather faint suffusion at tip of second vein. Inner cross-vein at middle of discal cell; basal cells distinctly united; third and fourth veins parallel.

Described from one example in the Pusa collection taken at Pusa, on tobacco, 22-iii-06.

N.B.—The fore femora are somewhat flattened and distorted, evidently by accident, and it is rather difficult to determine the sex, but from their apparent depth I believe the specimen to be a ♂. No spines or bumps are visible on the fore femora, the tibiæ of which are simple. The *dilated hind tibiæ* will easily distinguish this species from all others known from the East.

This species is the only one I have seen which causes any doubt as to whether to include it in the "wing spotted" or "wing clear" division of the genus. As in some of the specimens of both my *tinctoria* and my *flava*, the spot becomes much fainter than usual, though always distinctly present, I include the species in the "wing spotted" division.

Sepsis indica, Wied.

(*Nemopoda fusciventris*, Big., *nom. nud.*, in Indian Museum collection.)

Herr Meijere classed this species with the unrecognisable ones of the older authors. Having identified a good series from South India to my satisfaction with this species, specimens were sent for comparison with the type to the Vienna Museum, where they were kindly confirmed by Herr Handlirsch as correctly named. I therefore redescribe it at some length from the good series of freshly captured specimens in the Indian Museum, because it must be taken as the typical form of a group of more or less common Oriental species; its nearest allies being *rufa*, Mg., and *trivittata*, Big., from which the differences are noted in my redescription. It is evidently widely distributed in the East, and appears in the Indian Museum from the following localities:—

Calcutta, 15-xi—xii-06 [*Brunetti*]; 29-iv-07, 30-ix-07, 8-x-07 [*Caunter*]; Rajmahal (Bengal), 31-vii-07; Sadiya (Assam); Rungpo (Sikkim), 1,400 ft., 6-ix-09; Maddathurai, 19-xi-08, and Pallode, 15-xi-08 (both South India, taken by Dr. Annandale; at the latter place he found it swarming on dung). Tinpahar (near Rajmahal, Bengal), 7-vii-09; Goalbathan, East Bengal, 9-vii-09. Also in my collection from Calcutta.

Redescription.

(Plate xiii, figs. 9—13.)

♂ ♀ India and the Orient. Long. 3 to nearly 5 mm.

Head.—Frons, face and antennæ vary from lighting reddish yellow to nearly black; second joint of antennæ with fairly long

bristle. Proboscis yellow. Back of head reddish yellow, blackish towards vertex, some bristles in the centre, behind.

Thorax normally, wholly reddish yellow, with a broad black dorsal stripe which varies very considerably in width, sometimes occupying the greater part of the dorsum and being of uniform width throughout, sometimes reduced to a much narrower stripe, which narrows still more at the anterior margin. What I consider the typical form are those examples with a fairly wide stripe of equal width. Sides of thorax with a rather broad greyish white shimmering band across the sternopleuræ, extending narrowly to the pectoral corners. *Beneath* this grey shimmer, and shining through it, the ground colour on this part is in some specimens black, the sternopleuræ bearing also in these a small black streak on each side, towards the front. Four strong dorso-central bristles. Two rows of distinct, short bristles extend from them almost to the anterior margin, the first in each row (contiguous to the anterior pair of dorso-central ones) being considerably larger than the remainder. A third longitudinal row of minute bristles occurs in the middle of the dorsum. Scutellum and metanotum reddish yellow.

Abdomen normally, reddish yellow, more or less irregularly marked with black, which sometimes occurs as a dorsal stripe, sometimes as large spots on the segment, sometimes occupies nearly the whole abdomen. Third, fourth and fifth segment with four strong spiny bristles, the two outer ones on the fifth segment being placed at the sides. Second segment generally with two bunches of bristly hairs at each side, the hinder bunch the stronger. Genitalia reddish yellow, with two strong bristles, rather large and complicated.

Legs reddish yellow; fore pair paler, hind tibiæ dark brown, and all the tarsi black towards the tips. Fore femora not so thickened as in many species, lightly pubescent, bearing a peg-like bump below, in the middle (which bears three or four short spines), followed by the leaf-shaped appendage. There are no strong spines on the fore femora below, but three or four stiff hairs towards the tips, and two or three spiny bristles above, near tip. Fore tibiæ slightly enlarged just beyond the base, and again on apical half, which latter bears a row of stiff very short, spiny bristles towards the outer side and for the *whole length of the apical half of the tibia*. The basal half of the fore tibia is entirely bare of bristles or spines. Fore metatarsi with two long black spines below at base, and some yellowish red pubescence. Posterior femora with no conspicuous bristles, but one or two at tip above, on the middle pair, and a few small ones on hind pair above at tip. Middle tibiæ sometimes blackish towards the base, with three or four insignificant bristles in the neighbourhood of the middle, one on the outer and two on the hinder side, also a few at the extreme tip. Hind tibiæ with normally, two on hinder side on apical half, and one on outer side just below the middle.

Wings clear; fourth longitudinal vein rather bowed, but parallel to the third towards tip.

Described from numerous ♂♂ and ♀♀ in the Indian Museum, captured by Dr. Annandale in South India. Other specimens in the Museum collection, and in my own from various Oriental localities, agree with the species. The South India series show all varieties, were very common on dung, and were examined and described soon after capture when in perfect condition.

This species is nearest to *trivittata*, Bigot, and *rufa*, Macq. The former is recognised by the wholly red-yellow thoracic dorsum, in conjunction with the very spiny legs. *Rufa*, Macq., is nearest to *indica*, but the fore legs will always at least distinguish the males. In *indica* the fore femora are only slightly thickened, there are no separate strong spines below before the bump, which latter takes the form of a rather elongated peg, and the fore tibiæ are bare at the base and possess a row of bristles on apical half.

In *rufa* the fore femora are considerably thickened, with two strong spines just before the bump, which is short, fan-shaped, with four or five short spines; the fore tibiæ have a short row of bristles near the base, the apical half being bare.

Sepsis trivittata, Big.

Males of this species are in the Indian Museum from Margherita (Assam): Rangoon, 24-ii-08 [*Annandale*]; Pallole, 15-xi-08, and Maddathorai, 19-xi-08 [both South India, *Annandale*]. In the Pusa collection from Pusa, 15-vii-07.

Sepsis rufa, Macq.

Both sexes in the Indian Museum from Tharbari (Nepal), 27-ii-08; Gangtok, Sikkim (6,100 ft.), 9-ix-09; Shillong; Mandalay, 12-iii-08 [*Annandale*]; Rangoon, 24-ii-08 [*Annandale*]; Darjiling, 7,000 ft., 28-ix-08 [*Brunetti*]; Kurseong, 5,000 ft., 3-9-vii-08 [*Annandale*]; Calcutta, 20-ii-07, 17-ix-07, 28-x-07, 27-xi-07; Puri, 18-i-08 [*Annandale*]; Bhogaon, 6-x-08 [*Paiva*]. Katihar (Bengal), common, 23-26-iii-09 [*Paiva*]; Tinpahar (Bengal), 7-vii-09. Taken also by Mr Howlett at Simla in October 1908, and I have seen it from Pusa, 29-v-06.

The dark variety mentioned by Herr Meijere (Ann. Mus. Hung., iv, 182) with all-black thorax (with or without a more or less distinct dark red side-stripe), second abdominal segment often with two slightly yellowish marks, dark red-brown frons and posterior femora often only streaked above with black, was common at Katihar (Purneah District, Bengal), 23-26-iii-09 [*Paiva*]. The males are easily recognised from those of *coprophila*, Meij., by the fore femora, but the females of this variety approximate very closely to those of *coprophila*. The variety is smaller than the typical form.

Sepsis spectabilis, Meij.

Specimens of both sexes collected by Dr. Annandale at Madathorai, 18-xi-08, Pallode, 15-xi-08, and Nedumangad, 14-xi-08 (all Travancore, South India), are certainly referable to this species, and agree very well with specimens named by Meijere. I have a ♀ in my own collection which I took at Penang, 3—8-viii-06; and two specimens taken by me in Calcutta, 6-x-04 and 6-iii-05. It is a somewhat variable species, as stated by its author.

Sepsis brevicosta, mihi, sp. nov.

♂ ♀ India. Long. 3 mm.

This species is very closely allied to *spectabilis*, Meij., and for some time I regarded it as a variety of that species, especially as I had seen no ♂ that I could join with the ♀ form. However, a ♂ captured recently in Calcutta agrees so well that I am constrained to believe it to be this species.

The fore femora are not easily seen in the specimen, but they are fairly strongly thickened on the basal two-thirds, and bear a strong spine some distance from the base, a small bump with three or four strong short spines, and possibly a further spine or two on the distal portion.

The fore tibiæ bear a short row of short spines at the base. In this species the dorsum of the thorax is much more covered with short black bristles than in *spectabilis*; and the sternopleura alone are blue-grey dusted, instead of this colour being carried forward as in Meijere's species.

The abdomen is wholly black, except the (usually) reddish basal portion of the second segment. Another and more striking peculiarity is the costal vein, which becomes suddenly so faint as to appear to terminate abruptly just beyond the second longitudinal vein. In nineteen specimens of true *spectabilis* examined by me (including a ♂ and two ♀ ♀ sent by Herr Meijere), this latter peculiarity is not present; yet I have seen it occasionally in specimens of *rufa*, Macq., and a tendency to it in two specimens I refer to the vicinity of my *rufipectus*. Moreover, the tip of the wing just below the apparent termination of the costa, is distinctly whitish, another character that I have not observed in *spectabilis*.

The two species are about equal in size, and *brevicosta* seems to be generally distributed in India.

The only ♂ I have seen comes from Calcutta, 28-v-09. Females are from Calcutta, 24—28-iv-09, Shencottah, 25-xi-08 [Annandale]; Tinpahar, Bengal, 7-vii-09. The Pusa collection has it from Pusa, 26-xi-08, taken on a manure heap at that place; also one from Lahore, May 1907. A ♀ in my collection was taken by me in Calcutta, 28-x-04.

***Sepsis adjuncta*, mihi, sp. nov.**

(Plate xiii, fig. 14.)

♂ South India. Long. 3 mm.

This species is very closely allied to Herr Meijere's recently described *spectabilis*, ♂ ♀, from New Guinea and Singapore. The distinctly differently formed fore femora separate it; as in my species, this limb bears on a not very pronounced bump five or six short but strong black spines, whilst two longer and stronger spines are situated just before the bump. Meijere only mentions two spines, placed on the peg—not bump—and his figure is quite unlike the foreleg of my species; and on comparison with a ♂ and two ♀ ♀ (co-types) the species appears distinct.

The middle tibiæ have some spines on the inner side, and the middle femora three or four short but distinct spines on the front side, about the middle. The abdomen possesses a few bristles towards the side of the second segment, four distinct long bristles near the posterior edge of both third and fourth segments, two on the fifth and some bristly hairs on the genitalia, which in one specimen is almost entirely concealed.

The thorax bears very distinct short hairs over its entire surface; they are more numerous than in most species, whereas Meijere says his species is nearly bare on the thorax.

In all other respects my species agrees with *spectabilis*.

Described from two ♂ ♂ taken by Dr. Annandale at Pallode, 15-xi-08.

***Sepsis brevis*, mihi, sp. nov.**

(Plate iii, fig. 15.)

♂ Central India. Long. 1½ mm.

Head wholly reddish yellow, including antennæ and proboscis; ocelli black.

Thorax rather broader and deeper than usual. Wholly reddish yellow, the dorsum with traces of black indistinct marks. Four dorso-central bristles. Scutellum black on under side.

Abdomen reddish yellow, marked irregularly with black; third segment with some bristly hairs on posterior border; fourth and fifth with a strong spiny bristle towards each side.

Legs wholly reddish yellow, practically to the tips. Fore femora below with a *thick row of strong black spines of irregular length*, and extending nearly the whole length of the femur. Fore tibiæ with a short row of strong, short, black spines on inner side at base. Middle tibiæ with three bristles behind, in the middle; one on inner side, in the middle, and a few at tip. Middle metatarsus with a row of well separated bristles below. Hind femora with a bristle above, near tip; hind tibiæ with bristles as on middle pair; hind tarsi bristly below, the metatarsus with four strong ones in a row at the base.

Wings clear; third and fourth veins parallel; inner cross-vein at middle of discal cell; basal cells united. Halteres reddish brown.

Described from a ♂ in the Pusa collection (type) and a second ♂ in the Indian Museum collection (co-type). Both specimens from Baroda, Central India, taken 1-iv-05.

N.B.—This is a well-marked species, distinguishable by its rather short and thick-set appearance, and easily identified by the conspicuous row of spines on the fore femora, which latter are thickened but without any bumps or peg-like protuberances. The species is in general appearance something like my *flava*, but will be grouped as a somewhat abnormal one with the *indica* set of species, coming nearest to Herr Meijere's *tenella*.

Sepsis tenella, Meij.

Specimens that I can refer without doubt to this species (♂ ♂ only) occur in the Museum collection from Sylhet, 15-v-05 [*Hall*]; Chittagong, 5-viii—21-ix-08 [*Hall*]; Sukna (base of Darjiling Hills), 1-vii-08 [*Annandale*]; Tinpahar (Bengal), 7-vii-09; Rajmahal (Bengal), on cowdung, 5-vii-09 [*Annandale*]; Trivandrum (S. India), 12-xi-08 [*Annandale*].

Sepsis coprophila, Meij.

The Indian Museum possesses this species from Darjiling, 9-viii-09; Calcutta, 16-iii-07, 5-viii-08, 23—31-x-07; Barrackpore (near Calcutta), 1-viii-09; Pallode (S. India), 15-xi-08; Rangoon, 24-ii-08; Mandalay, 12-iii-08 [all *Annandale*]; Bhogaon (Bengal), 6—20-viii-07 and 2—6-x-08; also Katihar (Purneah District, Bengal), 23-iii-09, five ♀ ♀ [both *Poiva*]; Tinpahar (near Rajmahal, Bengal), three ♂ ♂, two ♀ ♀, 7-vii-09; Batavia, xi-07, and Samarang (Java), i-06 [both *Jacobson*].

In my collection I have it from Peradeniya, Ceylon, xi-07 [*Green*].

N.B.—The variety mentioned by the author of the species, with reddish sides to the thorax, bears considerable resemblance to my *fulvolateralis*, from which, of course, the clear wings separate it. In one ♂ the second basal cell is merged in the first, through the absence of the intervening veinlet; this irregularity, by the way, occurs occasionally in other species. This form approximates closely to the small dark form of *rufa*, Mcq., and the females are often difficult to distinguish.

Sepsis humeralis, mihi, sp. nov.

♂ ♀ Simla. Long. 3—3½ mm.

Head ♂.—Frons and antennæ black; under side of head reddish brown, back of head blackish.

Thorax blackish; two dorso-central bristles. Sides blackish, mesopleura shining black, sternopleura barely dusted. Humeral

cells and sides of thorax below them, and the whole prothorax below, red-brown. Scutellum blackish, tip reddish brown.

Abdomen blackish, with a violet tinge; a little reddish at base of second segment. No strong bristles, but a row of rather longer hairs on the posterior border of third and fourth segments, the fifth bearing numerous long hairs. Abdomen rather swollen towards tip; genitalia concealed, but apparently of large size and complicated form.

Legs.—Coxæ reddish brown, front pair pale yellow towards tips. Fore femora brownish yellow, bases and tips paler, with a row of about 12 strong bristles below, extending nearly all the length of the limb, and diminishing in size towards the tip. A single long stiff hair at the base. Fore tibiæ pale yellow, with a row of short black spines on inner side, extending well beyond the middle. Fore metatarsi brown with golden yellow pubescence below; rest of fore tarsi black. (Middle legs missing.) Hind femora blackish brown, pale at tips, with some stiff hairs below; hind tibiæ black.

Wings clear; third and fourth longitudinal veins nearly parallel; inner cross-vein at three-fifths of the discal cell.

Described from one perfect ♂ (except for the absence of middle legs) in the Pusa collection taken by Mr. Howlett at Simla in October 1908, and a ♀ in my collection from Hongkong, 4-iii-06. Another ♀ example was taken by Mr. Howlett at Simla in October 1908. The face, antennæ and frons just above them are all reddish brown, the back of the head yellowish. There are four dorso-central spines; two strong bristles on the third, and four on the fourth abdominal segment. The legs are nearly all yellow, the middle femora slightly brown; the middle tibiæ bear a few bristles, and the hind femora possess no stiff hairs below. I can only presume the abdominal bristles have been broken off in the ♂ specimen, leaving no trace, as the examples are so similar, and from the same locality.

N.B.—In a headless specimen in the Indian Museum collection taken by me at Shanghai, 16-iv-06 (the head was present when I first identified it with this species), the legs are nearly all yellow as in the above ♀. The specimen also shows the bulged abdomen at tip, and also has no spines on the abdomen. I cannot, however, suggest that the spines are a sexual character.

Sepsis nepalensis, mihi, sp. nov.

♀ Nepal. Long. $4\frac{1}{4}$ mm.

Head.—Frons and back of head shining black, mouth black. Lower part of head yellowish; antennæ dull reddish yellow, third joint cinereous grey dusted. Face brownish yellow (probably variable), with a slight violet-grey dust along the cheeks; proboscis brownish yellow.

Thorax.—Dorsum dark olive-green, four dorso-central bristles. Sides shining blue-black, shoulders bright yellow. Sternopleuræ

wholly and conspicuously pale bluish-grey dusted, whilst there is also a distinct bluish grey narrow line just below the dorsum of the thorax, passing above the humeral yellow spot. Mesopleura shining aënous black; scutellum with posterior half reddish yellow, as are also the hind corners of the thoracic dorsum.

Abdomen shining violet-black; first two segments black, with some soft hairs towards the sides of the second. Third segment without spines (? broken off), fourth and fifth with four spines each, towards posterior border; some bristles about the tip of the abdomen. Whole abdomen with soft hairs.

Legs wholly yellow, with a faint indication of brownish on upper side of hind femora; last three tarsal joints black. Hind femora with two bristles above, near tip; middle tibiæ with some bristles on lower half and at tip; hind tibiæ with two on outer side beyond the middle.

Wings clear; inner cross-vein at three-fifths of the discal cell.

Described from a single perfect unique ♀ taken at Nagarkote, Nepal. Indian Museum collection.

***Sepsis bicolor*, Wied.**

(*S. javanica*, Meij.)

Wiedemann's description of this species is very brief, but specimens thus identified by me sent to both Herr Meijere and to the Vienna Museum have been confirmed as correctly determined; by the former as identical with his *javanica*, and by Herr Handlirsch at Vienna as identical with *bicolor*, W., after comparison with the type.

This species extends over a considerable region of the Orient, the Indian Museum possessing it from the following localities:—

Thamaspur, 18-ii-08, Benikhola, 17-ii-08, and Sarah, 24-ii-08 (all Nepal); Sylhet, 20-ii-05, 3—10-v-05 [*Hall*]; Gangtok, Sikkim, 9-ix-09; Kurseong, 5,000 ft., 5-vii-08, 10—26-ix-09; Darjiling, 2-x-08 [*Brunetti*], 6-viii-09; Simla, 7,000 ft., 11-v-08; and 10-v-09 on flowers of white stonecrop; Naini Tal (6,000 ft.), 2-vi-09. Calcutta, 2-viii—12-ix; (occurs "at light") Rangoon, 24-ii-08 [all *Annandale*]; Bhogaon, 6-x-08, Katihar (Bengal), 23-iii-09 [*Paiva*]; Tinpahar (Bengal), 7-vii-09; Rajmahal (Bengal), 5-vii-09 [*Annandale*]. On board launch (at light), Mud Point, Hooghly R. [*Jenkins*].

Dr. Annandale found both sexes common in South India during November 1908, the localities being Shasthancottah, Trivandrum, Pallode, Tenmalai and Maddathorai (all Travancore State). Amongst these, several specimens of both sexes show traces of reddish colour on the sides of the thorax, this variation being mentioned by Herr Meijere in his description of *javanica*. In the Pusa collection it figures from Pusa, 11 and 7-xii-08; also from the outskirts of Calcutta, 13-iii-08.

***Sepsis pubipes*, mihi, sp. nov.**

(Plate xiii, figs. 16—18.)

♂. Nepal and Sikkim. Long. $2\frac{1}{2}$ —3 mm.

Head shining black, antennæ reddish.

Thorax blackish; four dorso-central bristles. Sternopleura distinctly grey dusted, the grey dust extending forwards narrowly, and hindwards more broadly. Scutellum and metanotum shining black.

Abdomen shining violet-black, with soft pubescence, under side occasionally a little pale. Second segment somewhat elongated and contracted a little at tip. Dorsum apparently without prominent strong bristles, but there are two on the large, black genitalia, which are more conspicuous in some specimens than in others.

Legs yellow, with soft black hairs. Hind femora and tarsi tips brown. Fore femora somewhat considerably enlarged below, with three small spines on a bump placed about the middle, and four long spines in a row towards the tip, and verging round somewhat towards the outer side of the femur. Fore tibiæ swollen on lower side about the middle and again towards the tip, bearing four long spines between the base and the first swelling (verging round somewhat towards the inner side), and several smaller ones on the second swelling. Fore tarsi with bristly hair below.

Femora without bristles. Middle tibiæ with rather close rows of long black bristly stiff hairs on inner side, which contain also a row of a few strong bristles; the outer sides of this pair of tibiæ being quite bare. Middle metatarsi with four rows of stout bristles placed on the outer, inner, front and hinder sides respectively, those on the front side being the strongest; rest of tarsus with bristly hair below.

Hind tibiæ covered with rather close black hairs except on the inner side: hind metatarsus with a single row of long stiff bristles below, a row of much smaller ones on the outer side, and a fringe of very short golden pubescence below; rest of tarsus with short bristles below.

Wings clear; inner cross-vein at about two-fifths of the discal cell; third and fourth veins parallel.

Described from four ♂♂ in the Indian Museum collection taken at Thamaspur, Nepal, 18—20-ii-08, and one ♂ from Shamdang, Sikkim (3,000 ft.), 7-ix-09.

N.B.—The most distinct species of any described here, for although it is of normal appearance, the thick bristly hair on the posterior legs will distinguish it at once from all others known to me.

***Sepsis fasciculata*, mihi, sp. nov.**

♂. Ceylon; Calcutta. Long. $2\frac{1}{4}$ mm.

Head.—Frons shining black, with a pair of additional bristles, placed midway between those springing from amid the ocelli, and

the antennæ, and situated at the extreme edge of the frons, touching the eyes. Face black, with a perpendicular reddish stripe just below the antennæ, which are reddish, with the upper side a little blackish. Under side and the rather bristly proboscis reddish. Back of head shining black.

Thorax blackish (posterior part of dorsum injured by the pin), apparently four dorso-central bristles. *Sternopleura* grey dusted only above; *mesopleura* shining black; *scutellum* blackish.

Abdomen shining black. Second segment with several strong bristly hairs towards sides; third and fourth with the usual pair each, which are hardly larger than the bristly hairs which are scattered over the whole dorsum, intermixed with hairs of various lengths.

Genitalia shining brownish black; very large, conspicuous and of peculiar shape, elongated, thick, with two long palp-like organs at the tip; with two stiff bristles at the extreme base above, and with generally scattered hairs. The fourth abdominal segment is drawn out below and carries a bunch of long, ciliated filaments

Legs mainly yellow. Fore femora only slightly enlarged below on basal half, where is placed a stiff long bristle, followed by a strong spine. In the middle of the under side is another strong spine followed by a much wider, shorter and slightly curved one. The fore tibiæ are narrow for the basal half and then suddenly widened to double their width. A single spine is placed on the inner side of the basal half; the rest of the tibia bearing (with the fore femora) short hairs, as is the case with all the legs.

Posterior femora without spines or strong bristles, the apical half mainly blackish. Posterior tibiæ mainly blackish, without spines, even at tips. All the tarsi blackish towards tips, with a row of short, strong bristles below, intermixed on all the tarsi with short, thick, golden yellow pubescence below, the hind pair bearing also a pair of small spines at the base, below.

Wings clear; inner cross-vein at only just beyond middle of discal cell.

Described from two ♂♂; one (now the type) is in my own collection sent me by Mr. E. E. Green from Ceylon; the other was in the Indian Museum collection from Calcutta, 16-vi-07, but was accidentally destroyed.

Sepsis viduata, Thoms.

Nemopoda formiciodes, Big., *nom. nud.*, in Indian Museum.

This species is commonly distributed over the East, but appears more rarely in the hills.

Locs.—Sukna (E. Himalayas, 500 ft.), 1-vii-08 [*Annandale*]; Berhampur (Bengal), 1-i-08 [*Lloyd*]; Calcutta, 29-v-07, 10-viii—31-x; Maddathorai, 18-xi-08, and Pallode, 15-xi-08 [*Annandale*]; Rangoon, 25-ii-08 [*Annandale*]; Margherita (Assam), Batavia, x-07 [*Jacobson*]. The above localities are represented in the Indian

Museum, whilst I have taken it myself at Rangoon, 18-viii-06, Manila, 13-iii-06, Soerabaya (Java) and Mussoorie, these being in my own collection. Thomson recorded it from China.

It is an easily recognised species, from its larger size (5—6 mm.), dull black colour, the abdomen bearing whitish cross-bands; its whole appearance resembling that of an ant.

***Enicita annulipes*, Meig.**

This common European species is quite common at most of the Himalayan hill stations, but it does not appear to frequent the plains except occasionally close to the base of the Himalayas.

Locs.—Simla (7,000 ft.), 24-iv-07, 6-v-07, 12-v-08 [*Annandale*]; Phagu (Simla District, 8,700 ft.), 3-v-07, ♂ ♀ *in cop.* [*Annandale*]; Kufri (8,000 ft., Simla District), 11-v-09 [*Annandale*]; Darjiling (5,000 ft.), 26-ix—1-x-08 [*Brunetti*]; (7,000 ft.), 7-viii-09, common; Kurseong, 4-vii-08 [*Annandale*]; Mussoorie, 20—24-v-05 [*Brunetti*]; Kichha (plains of Naini Tal District), 4-iv-09; Pashoke (2,200 ft.), 5-ix-09, and Gangtok (6,100 ft.), 9-ix-09 (both Sikkim); Shillong; Siliguri (base of Darjiling Hills), 18—20-vii-07. Manipur (Assam, 6,400 ft.), vii-08, two pairs *in cop.* [*Pettigrew*].

I have not seen any specimen from the plains, except the single one from Siliguri and one from Kichha, which places, it will be noted, are at the foot of the hills.

NEMOPODA, R. Desv.

Of this genus I have not seen a specimen from the Orient. A species has been described by Bigot (*retronotata*, Ann. Soc. Ent. Fr., 1886, p. 391) from Celebes, but there is no certainty of it belonging to *Nemopoda*, although van der Wulp's Catalogue has it under that genus. Three "species" of *Nemopoda* by Bigot figure in the Indian Museum collection all as *nomina nuda*. These are "*N. fusciventris*" which is certainly *S. indica*, W.; "*N. formicoides*" which is *S. viduata*, Thoms.; and "*pallipes*," which is too damaged to recognise. The last being a female, its real genus cannot be ascertained.

PIOPHILA, Fln.

A ♀ specimen taken by Dr. Annandale at Calcutta, 15-vii-08, and another at Kurseong, 9-vii-08, agree perfectly with Herr Meijere's redescription of *P. ruficornis*, v. Wulp.

A second specimen also in the Indian Museum is a ♂ and differs from *ruficornis* by the whole face and under side of the head being yellow; moreover the front tarsi are not dilated. The scutellum bears four spines as in typical *ruficornis* but the bristles on the thorax are too damaged to describe with certainty. I have named it as a var. (*flavifacies*) of *ruficornis*, and am not sure that it is not a distinct species. Taken in Calcutta, 17-iv-07.

Van der Wulp's measurement was 2 mm., my variety is $2\frac{1}{2}$, the Calcutta specimen above mentioned, $3\frac{1}{4}$.

Saltella setigera, mihi, sp. nov.

(Plate xiii, fig. 19.)

♂ South India. Long. $4\frac{1}{2}$ mm.

Head.—Frons, vertex and antennæ orange-red; frons with two broad, darker oval brownish marks in the shape of a V. Ocelli triangle blackish, with two small proclinate bristles. A small bristle on each side; in the middle of the frons close to the eye margin. Lower part of head, and proboscis yellowish; latter with some stiff hairs; mouth border with a row of stiff hairs on each side.

Thorax tawny orange. Dorsum with a broad black stripe occupying one-third of the entire width. The dorsum is covered rather freely with small black spines, which form four rows on the part occupied by the black stripe, and form a rather broad irregular oval around the black part. There are also numerous similar short spines on the humeral region; two large ones each side in front of the wing, and a pair of large strong dorso-central ones, near the posterior border; also two strong ones on the posterior corner of the dorsum, on the edges. Many small ones are intermixed with the general plan of distribution.

Scutellum bright (but not at all shining) orange-red, with a strong spine each side at the base and two apical ones, close together, directed horizontally backwards.

Abdomen flat, normal; shining orange-yellow; major part of dorsum except at base and tip, black, shining, nearly bare. Numerous small hairs on each side of the basal segment, which appears somewhat long, a fan-shaped row towards the side near the posterior border, and a few very small ones scattered over the dorsum and sides of the whole abdomen. A fairly stiff bristle at the extreme edge, on each side of the second, third and fourth segments, and two diverging ones at the abdomen tip. Genital apparatus large, yellow, softly hairy, curved under tip of abdomen, with small black spines at its tip.

Legs orange-yellow, wholly covered, moderately thickly, with short black bristly hairs; tibiæ slightly darker; metatarsi yellowish white; rest of tarsi black; onychia brownish grey with a white fringe. Coxæ bare, except for two strong bristles and several very small ones all near the tip. Fore femora thickened on basal two-thirds, with six strong spines on upper side, six shorter strong ones below, in the centre, placed a little towards the inner side. On the outer side of this row is another row of eight or nine somewhat smaller ones and on the inner side of the femur is a single one, just above the centre lower row. On the fore tibiæ is a long row (extending from just beyond the base to the extreme tip) of strong very short spines, about twenty in number. On the middle femora, a long row on the front and lower side; on the middle tibiæ, a row of smaller ones on the outer, and a row of strong ones on the hinder side, a shorter row of strong ones on the inner side; also a circlet of strong but not long ones at tip. On the

hind femora a row of long ones on upper side, placed on the distal two-thirds, and a row of about six on the lower side near the tip. On the hind tibiæ there are no strong ones, but the bristly hair is arranged in several longitudinal rows. Metatarsi with long, rather soft, pale yellow hair below, posterior pairs with two rows of black spines below. In addition, the whole of the metatarsi have irregular, small stiff black hairs.

Wings very pale yellowish grey. Two short rows of minute black spines at the base. Veins yellow; halteres orange-yellow.

Described from a single perfect ♂ in the Indian Museum collection taken by Dr. Annandale, 14-xi-08, at Nedumangad, near Trivandrum, Travancore State, South India.

Saltella metatarsalis, mihi, sp. nov.

♀ Bengal. Long. $3\frac{1}{4}$ mm.

Head.—Top of head dark shining brownish red, more or less blackish in parts. Face, mouth and lower part of head yellowish, a little more brownish behind. Ocelli flat on the surface, with two diverging hairs between them. Antennæ yellow, microscopically pubescent; arista, basal half yellow, thickened, remainder forming a black bristle; second joint of antennæ with a short bristle. Proboscis yellow, pubescent; oral orifice with two stiff, short, curved bristles each side, with a row of several hairs below them.

Thorax mainly reddish yellow; dorsum, except extreme edges, wholly dull black, with some very short bristles, apparently irregularly placed. Humeral regions with several short black bristles, followed by a row of four strong ones from the shoulder to beyond the base of the wings—all these placed just below the dorsum. Two bristles near posterior corners. Apparently only one pair of strong dorso-central bristles, possibly a smaller front pair (thorax in both specimens slightly damaged). Scutellum conspicuously orange-red, two basal bristles placed near the edge, and two apical ones close together directed horizontally backwards.

Abdomen flat, normal, practically bare, shining black, except tip, which is whitish on under side.

Legs.—Fore coxæ yellowish; posterior coxæ brownish, base of femora brownish yellow. Remainder of legs black, except all the metatarsi which are pale yellowish white. All the legs rather closely beset with black hairs and short bristles; in addition to which there is a row of stronger bristles on the upper and lower sides of the fore femora, the lower side of the middle femora, and a double row of short bristles below the hind tarsi. The posterior tibiæ are rather thickened towards the ends and bear in that part a few stronger bristles.

Wings clear; veins and halteres yellow.

Described from two examples in the Indian Museum collection, taken at Tinpahar (near Rajmahal, Bengal), 7-vii-09, by Dr. Annandale.

REVISED LIST OF THE ORIENTAL SPECIES OF SEPSIS.

A. *Wing with a spot at the tip.*

- cynipsea*, L., 1761. F. Suec.
Loc.—Himalayas, Nepal.
- modesta*, Meij., 1906. Ann. Mus. Hung., iv, 172, ♂ ♀
Loc.—Ceylon; Western India.
- himalayensis*, mihi, sp. nov., ♂ ♀; plate xiii, figs. 1, 2.
Loc.—Darjiling.
- similis*, mihi, sp. nov., ♂
Loc.—Darjiling.
- rufibasis*, mihi, sp. nov., ♂
var. *major*, mihi, ♂
var. *obscuripes*, mihi, ♂
Loc.—Darjiling (typical form and both varieties).
- fulvolateralis*, mihi, sp. nov., ♂
Loc.—Himalayas.
- violacea*, Meig.
Loc.—Shanghai.
- apicalis*, Meij., 1906. Ann. Mus. Hung., iv, 168, ♂ ♀, pl. ii, 1,
fore leg ♂
Loc.—Papua (Astrolabe Bay, Paumomu-Fluss, Moroka).
- limbata*, Meij., 1906. Ann. Mus. Hung., iv, 169, ♂ ♀, pl. ii, 2,
fore leg ♂
Loc.—Papua (Paumomu-Fluss, Moroka).
- basifera*, Wlk., 1859. Pr. Linn. So. Lond., iii, 124, ♂ ♀
Meij., Ann. Mus. Hung., iv, 170, ♂, pl. ii, 3 (wing), 4 (middle
metatarsus), ♂
Loc.—Amboina, Aru Islands, Papua (Paumomu-Fluss).
- flava*, mihi, sp. nov., ♂; pl. xiii, 4 (fore leg, ♂), 5 (hind leg, ♂).
Loc.—India (Bengal, Orissa).
- rufipectus*, mihi, sp. nov., ♂
Loc.—West Bengal.
- tincta*, mihi, sp. nov., ♂ ♀; pl. xiii, 6 (fore leg, ♂), 7 (tip of ♂
abdomen).
Loc.—India, Himalayas, Bengal, Orissa, South India.
- lineatipes*, mihi, sp. nov., ♂
Loc.—Darjiling.
- dissimilis*, mihi, sp. nov., ♂ ♀; pl. xiii, 8 (fore leg, ♂).
Loc.—South India (Quilon).
- dilata*, mihi, sp. nov. (? ♂).
Loc.—Bengal.
- fascipes*, Wlk., 1860. Pr. Linn. So. Lond., iv, 163, ♀
Loc.—Macassar.
- linearis*, Wlk., 1849. List. Dipt. Brit. Mus., iv, 998, ♂
Loc.—Philippines.
- monostigma*, Thoms., 1868. Eugene Resa, Dipt., 587, ♂
Loc.—China.

B. Wing entirely clear.

indica, Wied., 1830. Auss. Zweifl., ii, 467; pl. xiii, 9—12 (thorax vars.), 13 (fore leg, ♂).

Loc.—India; Calcutta, Bengal, South India, Assam.

trivittata, Big., 1886. Ann. So. Ent. Fr., 388.

Loc.—Bengal, South India, Assam, Rangoon.

rufa, Macq., 1850. Dipt. Exot. Supp., iv, 269, ♀.

Meij., Ann. Mus. Hung., iv, 179, ♂ ♀, and notes.

Loc.—Nepal, Assam, Himalayas, Bengal, Orissa, Bombay, Rangoon, Papua. Also Egypt, from whence originally described.

spectabilis, Meij., 1906. Ann. Mus. Hung., iv, 179, ♂ ♀, pl. ii, 10 (fore leg, ♂).

Loc.—Singapore, Papua (Stephansort), South India.

brevicosta, mihi, sp. nov., ♂ ♀

Loc.—Bengal, Punjab, South India.

adjuncta, mihi, sp. nov., ♂; pl. xiii, 14 (fore leg, ♂).

Loc.—South India.

brevis, mihi, sp. nov., ♂; pl. xiii, 15 (fore leg, ♂).

Loc.—Central India.

tenella, Meij., 1906. Ann. Mus. Hung., iv, 183, ♂ et (?) ♀, pl. ii, 12 (fore leg, ♂).

Loc.—Singapore, Sylhet, Chittagong, base of Darjiling Hills (Sukna, 500 ft.), Bengal, South India.

coprophila, Meij., 1906. Ann. Mus. Hung., iv, 178, ♂ ♀, pl. ii, 10 (fore leg, ♂).

Loc.—Singapore, Papua (Stephansort), South India, Calcutta, Bengal, Ceylon, Rangoon.

humeralis, mihi, sp. nov., ♂

Loc.—Simla, ? Shanghai.

nepalensis, mihi, sp. nov., ♀

Loc.—Nepal.

bicolor, Wied., 1830. Auss. Zweifl., ii, 468.

javanica, Meij., 1904. Bijd. Dierk., xviii, 107, pl. viii, 18 (fore leg, ♂).

id., Meij., 1906. Ann. Mus. Hung., iv, 184, ♂ ♀, pl. ii, 13 (fore leg, ♂).

Loc.—Java, Papua, Rangoon, Colombo, South India, Bengal, Darjiling, Sylhet, Nepal, Naini Tal. Also China, from whence originally described.

N.B.—Herr Meijere's two diagrams of the fore leg do not agree. Specimens identified by me agree with his second figure.

decipiens, Meij., 1906. Ann. Mus. Hung., iv, 177, ♂ pl. ii, 9 (fore leg, ♂).

Loc.—Papua (Stephansort).

beckeri, Meij., 1906. Loc. cit., 185, ♂ ♀, pl. ii, 14 (fore leg, ♂).

Loc.—Bombay, Singapore.

pubipes, mihi, sp. nov., ♂; pl. xiii, 16 : 17, 18 (fore, middle; hind legs, ♂).

Loc.—Nepal.

fasciculata, mihi, sp. nov., ♂

Loc.—Ceylon, Calcutta.

viduata, Thoms., 1868. Eugene Resa, 587.

Loc.—China, Assam, Eastern Himalayas, Bengal, Calcutta, South India, Rangoon, Batavia, Manila.

N.B.—In addition to the above, all of which appear to be distinct species, the following have been described, the descriptions being too brief or too weak for identification.

S. nitens, Wied., 1824. Analec. Ent., 57, and (1830) Auss Zweifl., ii, 467.

Loc.—China.

N.B.—This is, according to Handlirsch (who kindly compared a specimen with the type), quite distinct from both typical *bicolor*, Wied. (*javanica*, Meij.), and the red variety of *bicolor*, with which I had thought it might have been identical.

S. lateralis, Wied., 1830. Auss. Zweifl., ii, 468.

Loc.—China.

N.B.—A specimen in indifferent condition in the Indian Museum collection, incorrectly determined by Bigot as this species, is my *brevicosta*. An example of my *brevicosta*, sent to the Vienna Museum, and kindly compared by Herr Handlirsch with Wiedemann's type, was returned as certainly distinct from that author's species.

S. complicata, Wied., 1830. Auss. Zweifl., ii, 468.

Loc.—China.

S. testacea, Wlk., 1860. Pr. Linn. So. Lond., iv, 163, ♂ ♀

Loc.—Macassar.

S. frontalis, Wlk., 1860. Loc. cit., iv, 163, ♂ ♀

Loc.—Macassar.

N.B.—In this species Walker describes the ♂ as black, and the ♀ as with a yellow thorax and black abdomen. This is the only instance to my knowledge in which the sexes differ in colour, with the exception of my new species *dissimilis*, in which, however, the colours are reversed.

S. revocans, Wlk., 1860. Loc. cit., iv, 163, ♀

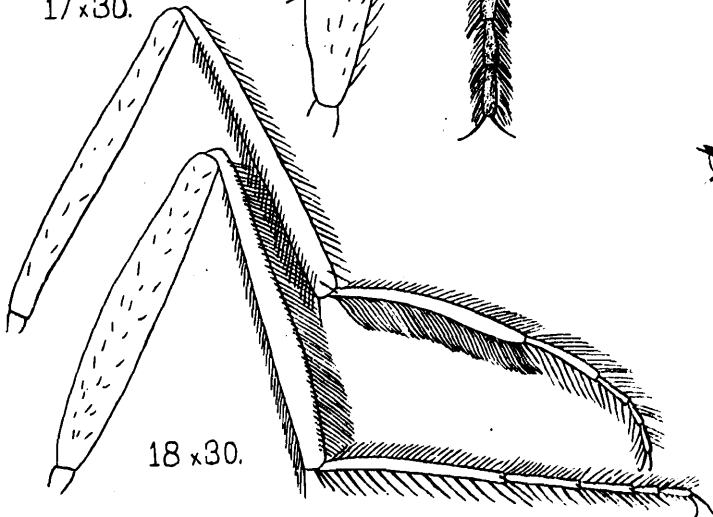
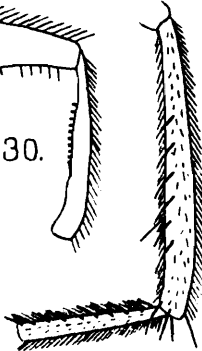
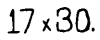
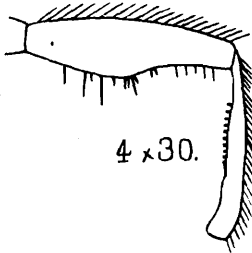
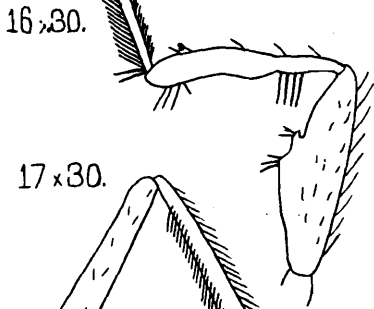
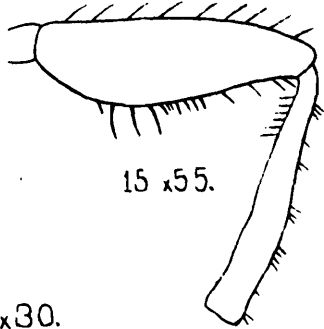
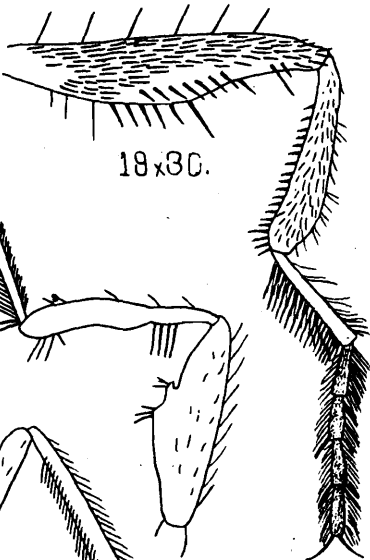
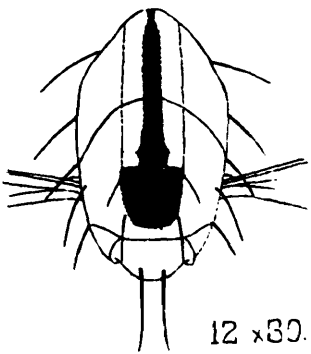
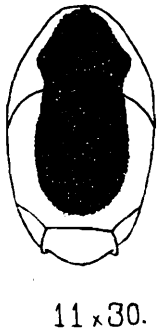
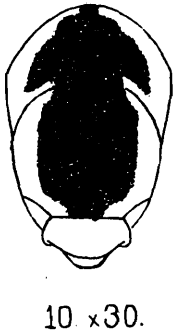
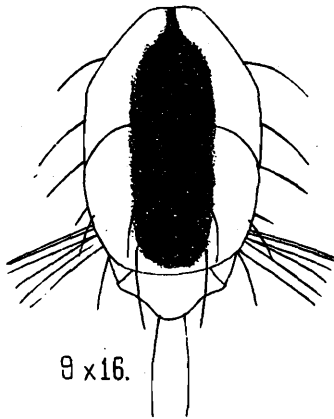
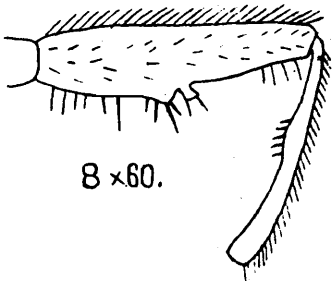
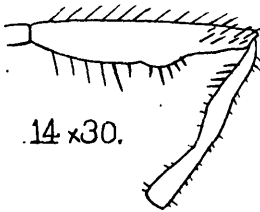
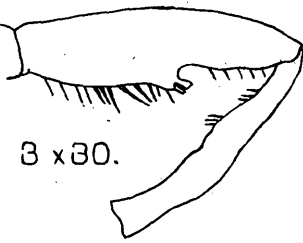
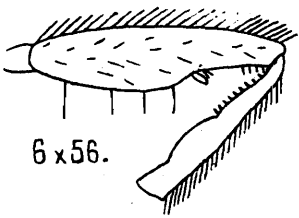
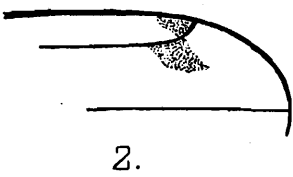
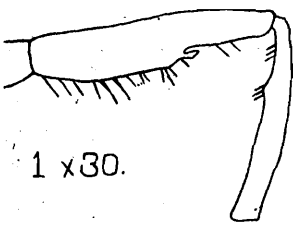
Loc.—Macassar, Philippines.

N.B.—As in none of these six descriptions is any mention made of a wing spot, the presumption is that they will all fall in the "wing clear" division of the genus.



EXPLANATION OF PLATE XIII.

- FIG. 1.—*Sepsis himalayensis*, Brunetti, fore leg, ♂
 „ 2.— „ „ „ „ wing spot.
 „ 3.—*S. punctum*, Fab., fore leg, ♂
 „ 4.—*S. flava*, Brunetti, fore leg, ♂
 „ 5.— „ „ „ „ hind leg, ♂
 „ 6.—*S. tincta*, Brunetti, fore leg, ♂
 „ 7.— „ „ „ „ tip of ♂ abdomen.
 „ 8.—*S. dissimilis*, Brunetti, fore leg, ♂
 „ 9.—*S. indica*, Wied., thorax.
 „ 10.— „ „ „ „
 „ 11.— „ „ „ „
 „ 12.— „ „ „ „
 „ 13.— „ „ „ „ fore leg, ♂
 „ 14.—*S. adjuncta*, Brunetti, fore leg, ♂
 „ 15.—*S. brevis*, Brunetti, fore leg, ♂
 „ 16.—*S. pubipes*, Brunetti, fore leg, ♂
 „ 17.— „ „ „ „ middle leg, ♂
 „ 18.— „ „ „ „ hind leg, ♂
 „ 19.—*Saltella setigera*, Brunetti, fore leg, ♂



XXVIII. A NEW SPECIES OF *FREDERICELLA* FROM INDIAN LAKES.

By N. ANNANDALE, D.Sc., Superintendent, Indian Museum.

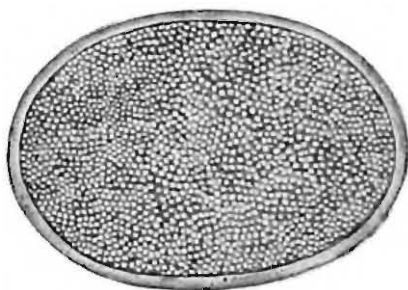
Fredericella indica, sp. nov.

Zoarium delicate, branching sparsely, recumbent or with upright (or rather dependent), lax branches consisting of two or three zoecia only.

Zoecia very slender, distinctly but slightly emarginate at the tip, with a strong furrowed keel running along the dorsal surface from the emargination; the external surface minutely roughened, sometimes with small sand grains adherent to it, practically colourless but imperfectly transparent.

Lophophore bearing about twenty tentacles, which are of moderate length and very slender; the web at their base very narrow.

Alimentary canal elongated and slender, practically colourless.



Statoblast of *Fredericella indica* (upper surface). $\times 120$.

Statoblast variable in shape and size but as a rule broadly oval, sometimes kidney-shaped, surrounded by a stout chitinous ring and smooth on the surface of the lower valve; the upper valve covered with minute prominences the base of which is somewhat star-shaped and the apex rounded. The prominences sometimes cover the whole surface almost uniformly but are sometimes sparser in the middle than towards the edges.

Habitat.—Western India; under stones in Igatpuri lake, Western Ghats, Bombay Presidency, and on lower surface of leaves of water-plants in Shasthancottah lake, Travancore; at both places taken by myself in November.

The most definite character in which this species differs from *F. sultana* is the ornamentation of the statoblast, but there also appear to be differences in the structure of the zoecium and the lophophore. From *F. tanganyikæ*, of which the statoblasts are

unknown, it differs in having emarginate zoecia with a well-defined furrowed keel and in not being thickly encrusted with comparatively large sand grains.

At Shasthancottah the zoarium was found entangled with that of a delicate form of *Plumatella fruticosa* which closely resembled it externally. With a little care, however, it was found possible to disentangle the two species. The point is important as tending to explain Jullien's¹ belief that *Fredericella* is merely an abnormal form of *Plumatella*, and in this connection I may state that in Scotland I have found a statoblast of *Plumatella* adhering to and partially embedded in the ectocyst of *Fredericella*.

Fredericella has not hitherto been recorded from the Oriental Region, although *F. sultana* is said to occur in Australia as well as in Europe and North America.

¹ Bull. Soc. Zool. France, vol. x, p. 121 (1893).



XXIX. DIAGNOSES OF NEW SPECIES
AND VARIETIES OF FRESHWATER
CRABS

By A. ALCOCK, F.R.S.

No. 4.

Genus **Paratelphusa**, Edw.

(Type: *P. tridentata*, Edw.)

Subgenus **Paratelphusa**.

Paratelphusa (Paratelphusa) trilobata, sp. nov.

Differs from *P. spinigera* only in the following particulars :—

The carapace is flatter, and the “cervical groove” is broader : its antero-lateral border on either side is produced between the external-orbital and lateral-epibranchial spines into a broad and very prominent, laminar lobe.

The subterminal spine on the upper border of the arm is blunt and coarse.

From Sibsagar, Assam : a single adult female.

Paratelphusa (Paratelphusa) blanfordi, sp. nov.

This is an aberrant member of the subgenus, having no spines or lobes between the external-orbital and lateral-epibranchial tooth, and no spine on the upper border of the arm. It is, however, closely related to *P. spinigera*.

It has much the appearance of *P. spinigera* except that its carapace is flatter ; but is distinguished from that and every other Indian species but one in the form of the fingers, which have broad, blunt, “spooned” tips.

It has nothing to do with *Paratelphusa spinescens*, Calman, which has spiny antero-lateral borders and is not a *Paratelphusa* at all since it has the simple mandibular palp of *Potamon*.

From various places in Baluchistan : 10 males, 10 females.

Paratelphusa (Paratelphusa) grayi, sp. nov.

This is very close indeed to *P. sinensis*, from which it differs only in the following particulars :—

The “cervical groove” is distinct, and in places is almost deep : the front shows no trace of division into two lobes : the teeth

of the antero-lateral borders are not so sharp. The merus of the external maxillipeds is longer.

The abdomen of the adult male is even more decidedly hour-glass-shaped than in *P. sinensis*, the fifth segment being a long tapering joint, and the long sixth segment being narrower at its proximal end than in *P. sinensis*.

From Moung Sal, Makhok River : 13 males, 15 females.

Subgenus **Barytelphusa**.

(Type : *Paratelphusa jacquemontii* (Rathbun) = "*Telphusa indica*" of many authors.)

Paratelphusa (*Barytelphusa*) *lamellifrons*, sp. nov.

Very closely related to "*Telphusa indica*," from which it may be recognised by the following characters :—

The carapace is longer, and the ends of the wings of the "cervical groove" are broad, superficial and vague.

The front is a very prominent, hardly-deflexed lamella.

The distance between the tip of the external orbital tooth and the base of the epibranchial spine forms half the antero-lateral border of the carapace.

The epigastric portion of the continuous post-orbital crest is as thin as the true post-orbital portion; the outer end of the crest forms a prominent, but undetached, lobe, and the edge of the whole crest is elegantly crenulate.

From Travancore : 1 adult female, 1 young female.

Paratelphusa (*Barytelphusa*) *edentula*, Alcock.

I have already mentioned this species as a variety of "*Potamon lugubre*." At that time, although I knew that the terminal joint of the mandibular palp was bifurcate in "*Potamon lugubre*" (= *Telphusa lugubris*, Wood-Mason), I did not realize that the mandible was going to be so destructive to the established nomenclature, and that *Telphusa lugubris*, Wood-Mason, belongs to the present subgenus of *Paratelphusa*.

Paratelphusa (*Barytelphusa*) *napæa*, Alcock.

This has also been mentioned as a species of *Potamon* allied to "*Potamon lugubre*" (Wood-Mason). It is very closely related to *Paratelphusa* (*Barytelphusa*) *lugubre* (Wood-Mason).

Paratelphusa (*Barytelphusa*) *pulvinata*, sp. nov.

This species is distinguished from everything in the subgenus (1) by the carapace, which is subcylindrical, with the cervical groove running in a long and comparatively narrow loop, as in *Gecarcinus*, and (2) by the long, narrow, sixth abdominal segment of the adult

male—the greatest breadth of this segment is barely two-thirds of its length.

From Coorg and from Ootacamund : 6 males, 2 females.

Paratelphusa (Barytelphusa) pollicaris, sp. nov.

Although this species comes from South India its closest relative is the Eastern Himalayan *P. lugubris* (Wood-Mason). As in the type of that species the carapace is flattish and about half of its antero-lateral borders lie in front of the lateral epibranchial spine.

The cervical groove is very deep and broad, and runs wide, to a point behind the much-retreated lateral epibranchial denticle.

The epigastric and post-orbital crests form one strong, nearly straight ridge, which runs, on either side, from the mesogastric furrow obliquely into the lateral epibranchial denticle.

The fingers are peculiarly broad, particularly the fixed finger.

From South India, probably Travancore : 3 males and 3 females, adult, and 6 non-adults of small size.

Subgenus **Phricotelphusa** (Type: *Telphusa callianira*, de Man).

Paratelphusa (Phricotelphusa) campestris, sp. nov.

Singular to tell, this species, from Barnagore near Calcutta, is so closely related to *P. gageii* from an elevation of about 5,000 feet in the Eastern Himalayas that, having only a single (male) individual to examine, I almost hesitate to separate it.

It resembles a *P. gageii* that has been holy-stoned, the epigastric crests being, not distinct elevations, but mere eroded patches ; the post-orbital crests being low, blunt, and faint ; and the lateral epibranchial tooth being entirely absent.

The carapace is more convex, and the antero-lateral borders are blunt and ill defined. The colour is greenish yellow. In the single specimen—an adult male with a carapace $\frac{5}{8}$ ths of an inch long and $\frac{7}{8}$ ths broad—the exopodite of the external maxillipeds has no trace of a flagellum.

Subgenus **Liotelphusa** (Type: *Telphusa levis*, Wood-Mason).

Paratelphusa (Liotelphusa) levis (Wood-Mason) var. *quadrata*.

Wood-Mason did not separate this variety, but to me it seems worthy of recognition.

The carapace is almost square, and its length is seven-eighths its greatest breadth. The "cervical groove" is hard to make out in any part of its course. The outer orbital angle and the lateral epibranchial tooth are more prominent than in the type of *P. levis*. The antero-lateral borders of the carapace, under a lens, are sub-cristiform. The epigastric crests, such as they are, are not so plainly continuous with the post-orbital crests, and the latter are almost sharp in their outer half.

From the Naga and Khasi Hills and from Assam : 19 males, 25 females.

Paratelphusa (Liotelphusa) austrina, sp. nov.

This species from South India is close to *P. levis*, but is easily distinguished by the form of the front and of the male abdomen.

The free edge of the front proper is quite distinct and separate from the antennular edge of the front, as it is in *P. hydrodromus* (Herbst).

The three terminal segments of the male abdomen are much contracted; the sixth segment is narrow and has parallel sides, and its length exceeds its maximum breadth.

Subgenus **Globitelphusa** (Type: *Paratelphusa bakeri*).

Paratelphusa (Globitelphusa) bakeri, sp. nov.

Carapace broad, subcylindrical, with the regions barely distinguishable, the cervical groove being distinct only where it bounds the mesogastric area posteriorly.

Front broad, square-cut, almost vertically deflexed.

External orbital angle and lateral epibranchial denticle insignificant.

Epigastric crests just recognizable, post-orbital crests more distinct but still not conspicuous.

Length of 6th abdominal segment just equal to its distal breadth: 7th segment very much longer than broad.

Mandibular palp as in *P. tridentata*, Edw. Exopodite of external maxillipeds pointed, hairy, non-flagellate. Exopodite of 1st and 2nd maxillipeds with a vestigial flagellum.

Chelipeds unequal. Legs rather slender.

Chiefly from Ganjam in North Cachar: 10 males, 8 females.

Paratelphusa (Globitelphusa) bakeri var. *cylindrus*.

The cylindrical or barrel-like carapace has the branchial regions independently inflated in this variety. The epigastric crests are more distinct, and the post-orbital crests are less distinct, than in the type.

From the Naga Hills and from Assam: 9 males, 1 female.

Paratelphusa (Globitelphusa) pistórica, sp. nov.

P. pistórica is like *P. bakeri* var. *cylindrus* in form. It differs in having the side walls of the carapace rugose, and in having the exopodites of the 1st and 2nd maxillipeds flagellate: there may be a papillary vestige of a flagellum on those of the external maxillipeds.

From Assam and Cachar: 8 males, 7 females.

The three following species have a squarish and flattish carapace quite unlike the broad cylindrical carapace of the three previous species; but as the epigastric and post-orbital crests and the lateral epibranchial spine are all insignificant, and the cervical groove is indistinct, and the exopodite of the external maxillipeds is

non-flagellate, I include them in the subgenus *Globitelphusa*: all three are very small species and come from Mahableshwar.

Paratelphusa (Globitelphusa) gubernatoris, sp. nov.

Carapace flat, square; "cervical groove" reduced to a fine crescent bounding the mesogastric area posteriorly.

Front broad, square, strongly deflexed. Epigastric crests just distinguishable: post-orbital crests distinct only at their outer end.

Three terminal segments of male abdomen much contracted: in the 6th segment the distal breadth slightly exceeds the proximal breadth and equals the length.

Mandibular palp as in *P. tridentata*, Edw. Chelipeds unequal: tips of fingers pointed. Legs long, none of the joints particularly hirsute.

From Mahableshwar: 35 males, 22 females.

Paratelphusa (Globitelphusa) pilosipes, sp. nov.

Very like *P. gubernatoris*, but the epigastric and post-orbital crests can be imagined rather than discerned, and the lateral epibranchial tooth may be altogether absent. The antennal flagellum is vestigial. The finger-tips are broad, blunt, and spooned. The dactyli of the legs are short and clumsy and are thickly clothed with tufts of bristles.

From Mahableshwar: 5 males.

The question naturally arises: is this a second form of the male of *P. gubernatoris*?

Paratelphusa (Globitelphusa) fronto, sp. nov.

Much like *P. gubernatoris* and *pilosipes*, but the carapace is convex. Front of the adult immensely broad, half the maximum breadth of the carapace. Lateral epibranchial tooth distinct, very near the angle of the orbit. Epigastric and post-orbital crests very indistinct. Fifth segment of male abdomen very narrow, its length equal to its distal breadth: sixth segment also very narrow, its length considerably exceeds its distal breadth which is greater than its proximal breadth: seventh segment much longer than broad. Antennal flagellum much impacted and contracted: antennal flagellum absent. Chelipeds unequal: fingers pointed. Legs studded all over with tufts of long, coarse bristles.

From Mahableshwar: 23 males, 6 females.

Genus *Gecarcinucus*, Edw.

In this genus the front is a long, narrow, greatly deflexed lobe, hardly wider than the orbit: the dactyli of the crawling legs are slender. In other respects it agrees with *Paratelphusa*; and it is doubtful whether the two genera are really distinct.

Subgenus **Gecarcinucus** (Type : *G. jacquemontii*, Edw.).

In this subgenus the lower outer corner of the orbit forms a gutter-like recess and there is no trace of a lateral epibranchial denticle.

Gecarcinucus (Gecarcinucus) edwardsi, Wood-Mason, sp. nov.

Differs from *G. jacquemontii* in that the sides of the front are convergent, and the finger-cleft and the neighbouring part of the inner surface of the palm are covered with a thick, shaggy mat of hair.

From Khandalla: one male.

Subgenus **Cylindrotelphusa** (Type : *Gecarcinucus steniops*).

Carapace and front as in *Gecarcinucus*, but the orbit is of the usual form and there is a small lateral epibranchial denticle.

Gecarcinucus (Cylindrotelphusa) steniops (Wood-Mason), sp. nov.

“*Telphusa steniops*,” Wood-Mason (MS. name only).

Carapace subcylindrical: “cervical groove” forming a long narrow loop, the trend of which is fore-and-aft; very broad and deep and dividing the carapace into tumid lobe-like regions. Front a long, narrow, square-cut, strongly-deflexed lobe, hardly wider than the orbit. Antero-lateral borders of carapace full, blunt, coarsely crenate: a small lateral epibranchial tooth, placed close to the orbit. Epigastric crests broad and low: post-orbital crests low, blunt, indistinct, crenulate or broken in their outer half. In the sixth segment of male abdomen the length equals or slightly exceeds the distal breadth: seventh segment a good deal longer than broad.

Efferent branchial openings subtubular and exposed, as in *Gecarcinucus* (and in some species of *Paratelphusa*). Mandibular palp as in *Paratelphusa tridentata*, Edw. Exopodites of all the maxillipeds with a strong flagellum.

From Travancore: 14 males, 11 females.

With reference to my last paper in this series, I find that a subgeneric name *Oziotelphusa* was given by P. Müller to “*Telphusa hippocastanum*, Müll. = “*Potamon*” *hydrodromus* (Herbst). This name *Oziotelphusa* must therefore be adopted for the subgenus *Leschenaultia*, though I may explain that in using the name *Oziotelphusa* it is the bare name, and nothing but the bare name, that I accept. *Paratelphusa (Leschenaultia) hydrodromus* and *bouvieri* will, therefore, now stand as *Paratelphusa (Oziotelphusa) hydrodromus* and *bouvieri*.

Again, I find that “*Paratelphusa*” *nilotica*, Edw., is not a true *Paratelphusa* of the *Paratelphusa tridentata*, type; but has a simple mandibular palp like those species (*dayanum*, *wood-masoni* (= *edwardsi*), *crenuliferum*, and *martensi*) which I have here separated as a subgenus of *Potamon* under the name of *Paratelphusula*.

But, for reasons quite distinct from mine, Ortmann long ago made "*Paratelphusa*" *nilotica* the type of a subgenus of *Potamon* which he named *Acanthotelphusa*. This name, therefore, must be substituted for *Paratelphusula*; and I am very glad of it, for "*Paratelphusula*" is too much like "*Paratelphusa*," and the "*Telphusidæ*" are confusing enough already. *Potamon* (*Paratelphusula*) *dayanum*, *wood-masoni* (= *edwardsi* No. 2), *fungosum*, *jeæ*, *calvum*, *crenuliferum*, and *martensi*, will therefore now stand as *Potamon* (*Acanthotelphusa*) *dayanum*, *wood-masoni*, *fungosum*, *jeæ*, *calvum*, *crenuliferum*, and *martensi*.

XXX. ON SOME NEW OR LITTLE-KNOWN
MYGALOMORPH SPIDERS FROM THE
ORIENTAL REGION AND AUSTRALASIA

By STANLEY HIRST.

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The following note contains the descriptions of a new genus and six new species of mygalomorph spiders, and also notes on some incompletely known species. The forms dealt with are nearly all from the Oriental region and are preserved in the collections of the British Museum (Nat. Hist.) or of the Indian Museum (Calcutta). The new genus differs from all other Oriental mygalomorph spiders in having a sound-producing organ between the mandibles.

Damarchus assamensis, sp. nov.

Colour a more yellowish brown than *D. oatesii*, Thorell.

Carapace considerably shorter than patella and tibia of first or fourth legs or than metatarsus of fourth. Anterior row of eyes more strongly procurved than in *D. oatesii*.

Palp. Spine of palpal organ longer, as compared with the bulb, than is the case in *D. oatesii* (plate xxiv, fig. 8).

Legs. Patella and tibia of first leg a little shorter than those of the fourth; metatarsus of first armed below towards the posterior side with 1.1 spines and with a pair of apical spines; its anterior surface unarmed. Metatarsus of the second leg armed in the same way as that of the first, but an additional anterior spine is present below and an antero-dorsal spine also. Tibia of first leg with its armature resembling that of the metatarsus of the second but with 1.1 upper anterior spines; the large inner apical spine with its curvature less pronounced than that of *D. oatesii* (fig. 7).

Tibia of second leg lacking the inner ventral spine. Tibiæ and metatarsi of posterior legs armed below with a number of spines. Patella of third leg with two or three anterior spines. Tarsi of all four pairs of legs scopulate, the metatarsi of the anterior legs also scopulate apically.

Measurements in mm. Total length 14, length of carapace 7.25, of first leg 24, of second leg 22.5, of third leg 21, of fourth leg 28.

Material. A single adult male from Sibsagar, Assam, collected by Mr. Peal. (Indian Museum collection.) A number of females

were found in the same bottle, but they do not differ in structure from the female of *D. oatesii*.

Genus SELENOCOSMIA.

In 1897 Mr. R. I. Pocock¹ instituted a new genus *Phlogiellus* for a Selenocosmid spider in which the claws of the fourth leg are three in number. This third claw is present, however,² in the great majority of the species of *Selenocosmia* and *Chilobrachys* (including the type species of these two genera) and it will be necessary therefore to abandon the genus *Phlogiellus* and to regard it as a synonym of *Selenocosmia*. The division of the tarsal scopulæ of the legs of all four pairs is mentioned by Mr. Pocock in his description of *Phlogiellus*, and this character seems peculiar to the species for which the genus was founded. It must be remembered, however, that the structure of the tarsal scopulæ varies considerably both in *Selenocosmia* and *Chilobrachys* and can not be regarded as a satisfactory generic character. In most of the species belonging to these two genera the tarsi of the fourth legs alone are divided, but in *S. stirlingi*, Hogg, the fourth tarsus is entire or very indistinctly divided. Whilst in *S. insulana*, sp. nov., *S. sarawakensis*, *C. sericeus*, Thorell, and *C. subarmatus*, Thorell, the tarsal scopulæ of both the posterior pairs are divided.

Selenocosmia honesta, sp. nov.

♂. *Colour*. Cephalothorax buff-coloured, appendages russet, the abdomen ochraceous.

Carapace shorter than patella and tibia of first or fourth legs and almost equalling metatarsus of fourth in length. Anterior row of eyes procurved; anterior medians a little closer to one another than to the anterior laterals.

Mandible furnished with long and fine bristles on its outer surface.

Palp. Numerous long, fine hairs, which are not set so close together as in a typical *Chilobrachys* are present above the stridulatory bacilli. Spine of palpal organ long, curved and rather thick, the point blunt and slightly enlarged (fig. 4).

Legs 4, 1, 2, 3. Patella and tibia of first leg a little shorter than the metatarsus and tarsus of fourth and much longer than its patella and tibia. Metatarsi of the three anterior legs scopulate for almost their entire length. Scopula of metatarsus of fourth leg occupying

¹ *Abhandl. d. Senckenb. naturf. Ges.*, xxiii, pp. 595—597, pl. xxv (1897).

² In searching for this minute unpaired claw it is necessary to remove the ungual tuft on one side and sometimes the pad supporting it also; great care must be used in doing this as the claw itself is easily destroyed. A third claw is present in the following species—*Selenocosmia fuliginea*, Thorell, *S. himalayana*, Poc., *S. inermis*, Auss., *S. javanensis*, Walck., *S. lanipes*, Auss., and in the new species described above; *Chilobrachys brevipes*, Thorell, *C. fumosus*, Poc., *C. cervinus*, Thorell, *C. fimbriatus*, Poc., *C. hardwicki*, Poc., *C. nitelinus*, Karsch, *C. sericeus*, Thorell, *C. stridulans*, Wood-Mason, *C. thorelli*, Poc., and *C. (Neochilobrachys) subarmatus*, Thorell.

more than two-thirds of the length of the segment and extending laterally almost to its base. Tarsal scopulæ of the first three legs undivided, that of the fourth divided by a line of setæ.

Measurements in mm. Total length 41, length of carapace 20, of first leg 71.5, of second 65, of third 55.5, of fourth 74, of patella and tibia of first leg 27.5, of patella and tibia of fourth 25, of metatarsus of fourth 20.5.

Material. A single male from Fak Fak, Dutch New Guinea. (Brit. Mus. coll.)

Selenocosmia insulana, sp. nov.

♂ *Colour.* Carapace covered with short yellowish hair, the chitin below very dark; appendages fawn; abdomen with long cinnamon-coloured hairs.

Carapace shorter than patella and tibia of first or fourth legs, equal to patella and tibia of second or to metatarsus and tarsus of first and slightly exceeding patella, tibia and tarsus of palp in length. Anterior median eyes further apart from one another than from the anterior laterals. Fovea small in extent.

Mandible with the outer surface furnished with very long stridulatory setæ.

Palp. Bacilli of coxa of palp very slender. Spine of palpal organ fairly long, curved and keeled, the terminal part slender (fig. 5).

Legs 1, 4, 2, 3. First and fourth legs almost equal in length. Patella and tibia of first leg equalling tibia, metatarsus and tarsus of third in length and considerably exceeding patella and tibia of fourth. Metatarsus of fourth a little longer than its tibia and equal in length to the tibia of the first. First and second pairs of legs with the tarsal scopulæ undivided and with their metatarsi scopulate except at the base. Tibia of first leg also with a scopula which is especially thickened apically. Tarsal scopulæ of the legs of the two posterior pairs divided by a line of setæ. Metatarsus of fourth with a scopula (in which long hairs are intermingled) occupying almost two-thirds of the length of the segment.

Claws of fourth leg three in number.

Measurements in mm. Total length 18; length of carapace 9, of first leg 28.5, of second leg 24, of third leg 20, of fourth leg 27.5, of patella and tibia of first leg 11.75, of patella and tibia of fourth 9.75, of metatarsus of fourth 7.

Material. A single adult male from Djampea Island (South of Salayer Island), collected by Mr. A. Everett. (Brit. Mus. coll.)

Selenocosmia obscura, sp. nov.

♂ *Colour.* Carapace pale brown, upper side of legs walnut-brown with narrow yellowish apical bands, paler below; abdomen brown, the long hairs yellowish.

Carapace much shorter than patella and tibia of first or fourth legs, slightly shorter than metatarsus of fourth and slightly longer

than patella, tibia and tarsus of palp. Front row of eyes slightly procurved, the medians a little further apart from one another than from the laterals.

Mandible. Stridulatory setæ of mandible very long and fine.

Palp. Bacilli of anterior surface of coxa of palp numerous and arranged in a number of rows. They are mostly rather fine and become finer until they shade in to the hairs above. Spine of palpal organ long, strongly curved and twisted, its basal part very wide and furnished with a strong keel which ends at the base of the spine in a projecting lobule. Basal part of spine very wide, the distal part very slender and the point not distinctly enlarged (fig. 6).

Legs 4, 1, 2, 3. Patella and tibia of first leg a little longer than the corresponding segments of the fourth and a little shorter than the metatarsus and tarsus of the fourth. Metatarsus of fourth shorter than patella and tibia of second but exceeding patella and tibia of third in length. Tarsal scopulæ of first and second legs entire, that of the third divided by a very fine line of setæ and the fourth by a distinct line of setæ. Metatarsi of first and second legs scopulate for their entire length, metatarsus of fourth distally scopulate. Fourth leg with three claws.

Measurements in mm. Total length 26·5; length of carapace 12·75, of first leg 44·75, of second leg 38·5, of third leg 33·5, of fourth leg 47·5, of patella and tibia of first leg 17·5, of patella and tibia of fourth 16, of metatarsus of fourth 13·25.

Material. A single adult male (the type) and several young females from Sarawak, collected by Mr. C. Hose. (Brit. Mus. coll.)

Remarks. This species is closely allied to *S. inermis*, Auss., chiefly differing from that species in its much larger size and in the greater length of the limbs as compared with the carapace.

Chilobrachys fumosus, Pocock.

Musagetes fumosus, Poc., *Ann. Mag. Nat. Hist.* (6), xv, p. 174, pl. x, fig. 7 (1895); *Chilobrachys fumosus*, id., *Fauna Brit. India*, p. 196 (1900).

♂ *Cephalothorax* much shorter than patella and tibia of first or fourth legs and equalling metatarsus of fourth or patella and tibia of palp in length.

Mandible with the spines on the outer side rather fine and a little longer than is usually the case in the genus *Chilobrachys*.

Palp. Bacilli of coxa of palp with a well-marked band of hairs dorsally. Palpal organ with the spine long, slender and twisted. The bulb is traversed by a keel which runs along the spine forming the inner limit of a conspicuous groove. Terminal part of spine with the edges turned down so as to enclose a groove and with the edge of the outer side forming a projecting lateral lobe just before the point; the point itself being slightly enlarged (fig. 3).

Legs 4, 1, 2, 3. Patella and tibia of first and fourth legs almost equal in length. Metatarsi of anterior legs scopulate throughout their length, metatarsus of the fourth leg scopulate for more than a

third of its length, the scopula being divided by a line of bristles. Tarsi of legs of fourth pair alone divided and ending in three claws.

Measurements in mm. Length of cephalothorax 14.25, its width 12; length of first leg 47, of second 42, of third 39, of fourth 52, of patella and tibia of first 18, of patella and tibia of fourth 17.5.

Material. A male from Kurseong, Eastern Himalayas (Dr. N. Annandale). A male and four females from Sureil, Darjiling (Col. A. Alcock). A female specimen from Burroi, at the foot of the Daffa Hills.

Remarks. The type is a female specimen labelled "North India." The specimens which I have identified as belonging to this species differ from the typical specimen in having the spines on the outer surface of the mandible more numerous and not so clearly arranged in rows.

Chilobrachys assamensis, sp. nov.

♂ *Colour.* Carapace yellowish; body and legs russet-brown, lower surface of body a little paler.

Carapace much shorter than patella and tibia of first or fourth leg, longer than patella and tibia of palp and equal to metatarsus of fourth. Eyes of anterior row slightly procurved and subequal in size, the anterior medians further apart from one another than the anterior laterals. Fovea wide and only slightly procurved.

Mandible. Outer surface of mandible furnished with slender setæ which are not very long and are either arranged in definite rows or irregular in disposition.

Palp. A narrow fringe of setose hairs with a metallic sheen, overhangs the bacilli. Spine of palpal organ short and with a spiral twist; the basal part broad, the narrowed apical portion short and blunt. A sharp keel traverses the bulb and runs along the spine, forming the outer limit of a deep groove, which is limited on the inner side by a second keel. A second slight groove makes its appearance towards the apex of the spine running parallel with the main groove, on its outer side (fig. 1).

Legs 4, 1, 2, 3. Patella and tibia of first leg equal in length to or slightly longer than the patella and tibia of the fourth. Patella and tibia of third leg and palp equal in length. Metatarsi of first and second legs scopulate for almost their entire length; the scopula of the fourth metatarsus occupying about a third of the length of the segment, and divided by a line of setæ. Tarsal scopulæ of the three anterior pairs of legs undivided, that of the fourth being divided by a fine line of setæ. Claws of the fourth leg three in number.

Measurements in mm. Total length 25, length of carapace 10.5, of first leg 33.5, of second leg 29.5, of third 27, of fourth 36.75, of patella and tibia of palp 9, of patella and tibia of first leg 12.5.

♀ *Carapace* equal to or slightly less than patella and tibia of first or fourth leg and much less than metatarsus and tarsus of fourth; width of anterior edge of carapace much less than the length of the metatarsus of the fourth leg.

Measurements in mm. Total length 25.5, length of carapace 9.5, of first leg 25, of second leg 22, of third leg 20, of fourth leg 27.5, of patella and tibia of fourth 9.5, of metatarsus of fourth 7.25.

Material. A large number of males and females collected by Mr. S. E. Peal, at Sibsagar, Assam. (Ind. Mus. coll. and Brit. Mus. coll.)

Chilobrachys stridulans, Wood-Mason.

Mygale stridulans, Wood-Mason; *Proc. As. Soc. Bengal*, p. 197 (1875); id., *Tr. Ent. Soc.*, p. 281, pl. vii (1877).

Chilobrachys stridulans, Poc., *Fauna Brit. India* (Arachnida), p. 198 (1900).

Musagetes masoni, Poc., *Ann. Mag. Nat. Hist.* (6), xv, p. 174, pl. x, fig. 6 (1895).

Chilobrachys masoni, Poc., *Fauna Brit. India* (Arachnida), p. 197 (1900).

Material. Two adult males and many females from Sibsagar, Assam (Peal coll.). Three males from Aideo (Peal coll.) and a female from Goalpara, Assam. A male and two females from Punkabaree, Sikkim.

Var. *masoni*, Poc.

Material. A male and a female from Silcuri, Cachar. Five females (the types) from Sylhet, Assam.

Remarks. Both the male and female of *Chilobrachys masoni*, Poc., are very closely allied to *C. stridulans*, Wood-Mason, and only seem to differ in the broader and more conspicuous bands of white at the apices of the tibiæ, patellæ, etc., of the limbs. Whilst these bands of white are clearly visible in the females of *stridulans* from Sibsagar, they are less conspicuous in the males accompanying them. I think that it would be best to regard *C. masoni* as a colour variety of *C. stridulans*.

Chilobrachys (Neochilobrachys) subarmatus, Thorell.

Ischnocolus subarmatus, Thorell, *Kongl. Sv. Vet. Akad. Handl.*, xxiv, No. 2, p. 13 (1891).

I. inermis (Auss.), Thorell, *Ann. Mus. Civ. Genova*, xxxvii, p. 172 (1897).

Phlogiellus subarmatus, Pocock, *Fauna Brit. India* (Arachnida), p. 202 (1900).

Mandible. Outer surface of mandible furnished with short spinules.

Palp. Anterior surface of coxa of palp with a single row of spiniform bacilli, which vary in number from two to six and have no band of hair above them (fig. 2). In young specimens the bacilli may be absent.

Legs. Tarsal scopulæ of first and second legs entire; tarsi of third and fourth legs with their scopulæ divided by a line of setæ, which is much wider in the case of the fourth leg. Fourth leg with three claws.

Material. A single adult male and numerous females from the Nicobars. (Ind. Mus. coll. and Brit. Mus. coll.)

Remarks. This interesting species is chiefly characterised by the structure of its stridulatory apparatus, the half which is situated on the coxa of the palp being exceptionally simple and elementary in character. I think that it would be best to institute a subgenus of *Chilobrachys* for it, and I propose the name *Neochilobrachys* for this new subgenus.

ANNANDALIELLA, gen. nov.

Carapace. Thoracic fovea straight, transverse. Eyes of anterior row strongly procurved.

Labium broader than long and spinulose apically.

Sternum. Posterior sigilla of small size, widely separated from one another and separated from the margin by about one-and-a-half times their diameter.

Mandibles with their inner surfaces furnished with a stridulatory organ consisting of an oblique row of spines, few in number; the two halves of the organ being exactly similar in structure.

Legs slender. Tibiæ and metatarsi of anterior pairs armed with apical spines alone, below; tibiæ and metatarsi of posterior legs armed with a number of spines.

Spinnerets. Upper spinnerets four-jointed, the apical segment being longer than the penultimate segment.

¹ *Annandaliella travancorica*, sp. nov.

♀ *Colour* (specimen rubbed) pale yellowish brown.

Carapace equal in length to patella and tibia of first or fourth legs, considerably longer than patella and tibia of second and a little shorter than patella, tibia and tarsus of palp. Anterior median eyes further apart from one another than from the elongate anterior laterals, and of smaller size.

Legs. Metatarsus of fourth leg equal in length to patella and tibia of second and almost equal to metatarsus and tarsus of third. Patella and tibia of third leg about equal to patella and tibia of palp.

Metatarsus of first leg scopulate for almost its entire length; metatarsus of fourth only scopulate at the apex. Tarsal scopula of first leg undivided, that of the second faintly divided, and the scopulae of the tarsi of the third and fourth distinctly divided by a line of setæ.

Tibia of first leg, and metatarsi of first and second, armed below with a single apical spine; tibia of second with three apical spines. Tibia of fourth furnished ventrally with two strong spines and also with a number of apical spines; its anterior side with two spines, and the posterior with four. Metatarsus of fourth leg with 1.1 antero-dorsal spines and with postero-dorsal spines corresponding

¹ The stridulatory organ of this spider is described and figured in *Ann. Mag. Nat. Hist.* (8), ii, p. 402, text-fig. 3 (1908).

to them in position ; its ventral surface armed with two spines and with apical spines besides. Tibia and metatarsus of third leg also spined.

Measurements in mm. Total length 28·5, length of carapace 12·5, of first leg 30·75, of second 26·75, of third 26, of fourth 36·5, of patella, tibia and tarsus of palp 13·25, of patella and tibia of first leg 12·5, of metatarsus of fourth leg 10.

Material. A single adult female from Travancore. (Ind. Mus. coll.)



EXPLANATION OF PLATE XXIV.

- FIG. 1.—*Chilobrachys assamensis*, Hirst.
,, 2.— ,, (*Neochilobrachys*) *subarmatus*, Thor.
,, 3.— ,, *fumosus*, Poc.
,, 4.—*Selenocosmia honesta*, Hirst.
,, 5.— ,, *insulana*, Hirst.
,, 6.— ,, *obscura*, Hirst.
,, 7.—*Damarchus assamensis*, Hirst.
,, 8.— ,, ,, ,,

