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Results of the Austrian-Ceylonese Hydrobiological Mission 1970, of the Institute of Zoology of the University of Vienna (Austria) and the Department of Zoology of the University of Sri Lanka, Vidyalankara Campus, Kelaniya

Part XIX: Aquatic and Semiaquatic Hemiptera of Sri Lanka from the Austrian Indo-Pacific Expedition, 1970-71

By

JOHN T. POLHEMUS *

This report concerns the aquatic and semiaquatic Hemiptera collected in Sri Lanka by Prof. Ferdinand Starmühlner and Prof. H.H. Costa during November and December, 1970. The preparation of this work has been much delayed by the necessity of revising, either by myself or others, many of the groups represented in the Starmühlner Costa material. The synopsis of Ceylonese freshwater Hemiptera given by Mendis and Fernando (1962) has proved to be incomplete and replete with misidentifications ; a revised list will be published in a later work. A surprising number of new species have been found in the Starmühlner-Costa material, even in groups for which comprehensive revisions exist, e.g. *Micronecta, Rhagovelia.* Seven new species are described here. The new *Tetraripis* species is described jointly with Mr. P. B. Karunaratne ; we both had manuscripts completed on this species before we communicated on the matter.

All material reported here collected by Prof. Starmühlner and Prof. Costa is divided between the Polhemus (JTP) and Vienna Museum (VM) collections unless otherwise noted. The Starmühlner-Costa collection locations are identified by FC numbers. Extensive data on these locations have already been published elsewhere (Costa and Starmühlner 1972) and are not repeated here. For new species discribed here all available material has been utilized, including specimens from the Vienna Museum of Natural History (VM), Polhemus Collection (JTP), the Department of National Museums of Sri Lanka (Colombo), and the Smithsonian project "Biosystematic Studies of the Insects of Ceylon" (U. S. National Museum of Natural History, USNM). The type disposition is given under each new species as well as the disposition of paratypes, using the abbreviations given above where possible.

Under each species, the citation for the original description is given in addition to other selected citations deemed important to understanding the status of the taxa or its presence on Sri Lanka. Complete synonymies for many species are given in Hoffmann's (1941) catalogue of aquatic Hemiptera

* Contribuiion from the University of Colorado Museum, Boulder, CO 80309 and Martin Marietta Corporation, Denver, CO 80201. Address for correspondence and reprints, 3115 South York, Englewood CO., USA 80110.

covering much of Asia, Lundblad's (1933) work on the aquatic and semiaquatic Hemiptera of the Malay Archipelago, and various revisionary works. These will be indicated where appropriate. Complete synonymies are not intended in this work.

I am gateful to Dr. Starmühlner for permitting me to study the material he collected and for his patience during the lengthy preparation of this work. To the following, who assisted with the diagnosis of groups not familiar to me or furnished material for comparison and study, I am very grateful : P. D. Ashlock, University of Kansas ; K. V. Krombein, Smithsonian Institution ; the late I. LaRivers ; I. Lansbury, Oxford ; N. M. Andersen, Zoological Museum, Copenhagen ; A. Wroblewski, Polish Academy of Sciences, Poznan ; C. H. Fernando, University of Waterloo, Canada.

I especially appreciate the generous assistance of P. B. Karunaratne (Entomology Section, Department of National Museums, Colombo, Sri Lanka), who has done excellent work in assembling extensive collections and habitat data, recognizing species new to science or new to Sri Lanka, and searching out pertinent literature. He probably has a better knowledge of Ceylonese aquatic Hemiptera than any other person. He has freely provided me with specimens, data and unpublished notes; without his unselfish assistance, this project would have been much more difficult.

Unless otherwise noted, measurements given in the descriptions are in units, 60 units = 1 mm.

List of taxa discussed in the following pages :—

Family Gerridae

Cylindrostethus productus (Spinola)
Limnogonus nitidus (Mayr)
Limnometra anadyomene (Kirkaldy)
Metrocoris stali (Dohrn)
Onychotrechus sakuntala (Kirkaldy)
Ptilomera cingalensis Stal
Rheumatogonus custodiendus (Distant)
Tenagogonus ceylonensis Hungerford and Matsuda
Ventidius henryi Esaki

Family Hebridae

Timasius splendens Distant

Family Hydrometridae

Hydrometra greeni Kirkaldy

Family Mesoveliidae

Mesovelia horvathi Lundblad

Family Veliidae

Microvelia douglasi Scott
Microvelia longicornis Bueno
Microvelia pererai Polhemus, n.sp.
Pseudovelia gnoma Polhemus, n.sp.
Rhagovelia ceylanica Lundblad

Rhagovelia karunaratnei Polhemus, n.sp.
Strongylovelia formosa Esaki
Tetraripis asymmetricus Polhemus and Karunaratne, n.sp.
Xiphoveliaiota Polhemus, n.sp.

Family Belostomatidae

Diplonychus rusticus (Fabricius)

Family Corixidae

Micronecta alterna Wroblewski
Micronecta anatolica Lindberg
Micronecta desertana (Distant)
Micronecta memonides (Kirkaldy)
Micronecta punctinotum Chen
Micronecta quadristrigata (Breddin)
Micronecta sanctae-catherinae Hutchinson
Micronecta wroblewskii Polhemus, n.sp.
Sigara nilgirica Hutchinson

Family Helotrephidae

Hydrotrephes kirkaldyi (Esaki and China)
Tiphotrephes indicus (Distant)

Family Naucoridae

Aphelocheirus clivicolus Polhemus, n.sp.
Heleocoris breviceps Montandon

Family Nepidae

Cercotmetus strangulatus (Montandon)

Family Notonectidae

Enithares simplex (Kirby)

Family Ochteridae

Ochterus marginatus (Latreille)

Cylindrostethus productus (SPINOLA)

Gerris producta Spinola 1840, Essai sur les insectes Hemipteres, Rhynchotes ou Heteropteres, pp. 64.

Cylindrostethus productus Hungerford and Matsuda 1962, Univ. Kans. Sci. Bull. 43 : 86 (revision, distribution).

Material.—Belihuloya; 1♀(alate), FC 27, Kuda-Oya near Buttala, XII-9-70; *Ratnapura*; 1♂, 1♀(apterous), FC 12, Kalu-Ganga, XI-20-70; 2 ♂♂ (apterous), FC 13, Kalu Ganga near Malwalla, XI-21-70.

Limnogonus nitidus (MAYR)

Hydrometra nitida Mayr 1865, Verh. Zool.-bot. Ges. Wien 15 : 443.

Limnogonus nitidus Andersen 1975, Ent. Scand. Suppl. 7 : 62 (monograph, distribution).

Material.—Ratnapura; 1 ♀ (alate), FC 9, Bodathpitiya-Ela, XI-17-70.

Limnometra anadyomene (KIRKALDY)

Gerris (Limnometra) anadyomene Kirkaldy 1901, Ent. 34 : 117.

Limnometra anadyomene Hungerford and Matsuda 1958, Unvi. Kans. Sci. Bull. 39 : 402 (revision, distribution).

Material.—Belihuloya; 3 ♂♂ (apterous), 1 ♀ (alate), 3 nymphs, FC 25, Hirikatu-Oya, XII-8-70.

Metrocoris stali (DOHRN)

Halobates stali Dohrn 1860, Stett. Ent. Zeit. 21 : 408.

Metrocoris stali den Boer 1965, Zool. Verh. Leiden 74 : 8 (revision, distribution).

Material.—(All apterous). *Belihuloya* ; 1 ♂, 2 ♀♀, 3 nymphs, FC 26, Veli-Oya, XII-8-70. *Maskeliya*; 1 ♂, 1♀, 3 nymphs, FC 16, Mocha-Dola, XI-28-70 ; 3♂♂, 1♀, 1 nymph, FC 17, Gartmore-Dola, XI-29-70 ; 1 ♂, 1 ♀, 4 nymphs, FC 18, Gartmore-Dola, XI-30-70 ; 1 ♂, 4 ♀♀, FC 19, Gartmore Estate, XI-30-70; 3 ♂♂, FC 20, Maskeliya-Dola, XII-1-70; 4 ♂♂, 2 ♀♀, FC 21, Hakgala-Dola, XII-2-70 ; 1 ♂, 1 ♀, 2 nymphs, FC 23, Dickoya River, XII-3-70.

Onychotrechus Sakuntala (KIRKALBY)

Gerris sakuntala Kirkaldy 1901, Ent. 34 : 117.

Onychotrechus sakuntala Distant 1902, Fauna Brit. India Rhyn. 2 : 183 (distribution).

Material.—(All apterous). *Belihuloya ;* 1 ♀, FC 24, Belihul-Oya, XII-7-70 ; 2 ♂♂, FC 26,; Veli-Oya, XII–08–70. *Ratnapura ;* 1 ♂, 1 nymph, FC 14, upper reaches of Kalu-Ganga, XI-22–70 ; 1 ♀, 3 nymphs, FC 15, Ira-Handha-Pana-Ela, XI-23-70.

Ptilomera Cingalensis STAL

Ptilomera cingalensis Stal 1855, Ofvers af K. Vet. Aked. Forh. 12:190; Hungerford and Matsuda 1965, Univ. kans. Sci. Bull. 45:427 (revision, distribution).

Material.—(All apterous unless otherwise noted). *Belihuloya ;* 1♂ (alate), 3 ♀♀, FC 24, Belihul-Oya, XII-07-70 ; 2♂♂, 2 ♀♀, 4 nymphs, FC 25, Hirikatu-Oya, XII-08-70 ; 1 ♂, 2 ♀♀, FC 26, Veli-Oya, XII-08-70. *Deniyaya ;* 2 ♀♀, 2 nymphs, FC 1, Meda-Dola River, XI-09-70 ; 1♂, 1♀, FC 3, Hola-Dola River, XI-10-70; 1♀, FC 5, Campden-Hill-Dola, XI-11-70 ; 1♀, FC 8, Nagahaketa, XI-13-70. *Kitulgala ;* 1 ♂, 2 ♀♀, 1 nymph, FC 34, Bibili-Oya, XII-26-70 ; 1♂, 4 ♀♀, 5 nymphs, FC 35, Hal-Oya, XI-27-70 ; 1 ♂, 2 ♀♀, FC 36, Rambukpoth Oya, XII-27-70. *Maskeliya ;* 1 ♀, FC 16, Mocha-Dola, XI-28-70 ; 3 nymphs, FC 23, Dickoya River, XII-03-70. *Ratnapura ;* 1 nymph, FC 9, Bodathpitiya-Ela, XI-17-70 ; 1♂, 1♀, 4 nymphs, FC 10, Katugas-Ela, XI-18-70 ; 2♂♂, 2 ♀♀, 7 nymphs, FC 11, Rajanawa, XI-19-70 ; 3♀♀, FC 14, Upper Kalu-Ganga, Carney, XI-22-70 ; 3♂♂, 1♀, FC 15, Ira-Handha-Pana-Ela, XI-23-70.

Rheumatogonus custodiendus (DISTANT)

Jucundus custodiendus Distant 1910, Ann. Mag. Nat. Hist. (8) 5 : 143.

Material.—(All apterous unless otherwise noted). *Belihuloya ;* 3♂♂, 1♀, 7 nymphs, FC 25, Hirikatu-Oya, XII-8-70 ; 1♂, 1♀, 1♀ (alate), FC 27, Kuda-Oya near Buttala XII-9-70 ; 4 ♂♂, 3 ♀♀, 2 nymphs, FC 30, We-Ganga near Balangoda, XII-10-70. *Deniyaya ;* 3 nymphs, FC 8, Nagahaketa-Dola XI-13-70. *Kitulgala ;* 1 ♀, FC 34, Bibli-Oya. Kelani-Ganga, XII-26-70 ; 2 nymphs, FC 36, Rambukpoth-Oya, XII-27-70 ; 1♂ (alate), 1♀, FC 37, Kelani-Ganga, XII-28-70. *Maskeliya;* 2 nymphs, FC 16, Gartmore-Dola, XI-28-70. *Ratnapura ;* 4 nymphs, FC 10, Katugas-Ela, XI-18-70 ; 2♂♂, 1♀ (alate), 13 nymphs, FC 13, Kalu-Ganga near Malwalla, XII-21-70.

Tenagogonus ceylonensis HUNGERFORD AND MATSUDA

Tenagogonus ceylonensis Hungerford and Matsuda 1962, Bull. Brooklyn Ent. Soc. 57 : 141.

Material.—(All apterous) *Ratnapura* ; 1♂, 3♀♀, FC 10, Katugas-Ela, XI-18-70; 1♂, 1♀, 3 nymphs, FC 11, Rajanawa, XI-19-70.

Ventidius henryi ESAKI

Ventidius henryi Esaki 1928, Ann. Mag. Nat. Hist. (10) 2 : 509 ; Hungerford and Matsuda 1960, Univ. Kansas Sci. Bull. 40 : 327 (revision, distribution).

Material.—(All apterous unless otherwise noted). *Belihuloya ;* 1♀ (alate), FC 30, We-Ganga near Balangoda, XII-10-70. *Ratnapura ;* 1♀, FC 9, Bodathpitiya-Ela, XI-17-70 ; 1♂, 2♀♀, 1♀ (alate), FC 12, Kalu-Ganga, XI-20-70.

Timasius splendens DISTANT

Timasius splendens Distant 1909, Ann. Mag. Nat. Hist. (8) 3 : 498.

Material.—Belihuloya ; 1♀ (alate), FC 26, Veli-Oya, XII-08-70.

Hydrometra greeni KIRKALDY

Hydrometra greeni Kirkaldy 1898, Ent. 31 : 2 ; Gunawardane and Karunaratne 1965, Spolia Zeylanica 30 : 5 (revision of Ceylonese *Hydrometra*).

Material.—(All apterous). *Kitulgala* ; 1♂, FC 34, Bibili-Oya, XII-26-70. *Maskeliya* ; 1♂, FC 16, Mocha-Oya, XI-28-70.

Mesovelia horvathi LUNDBLAD

Mesovelia horvathi Lundblad 1933, Arch. Hydrobiol, Suppl. Bd. 12, Tropische Binnengewasser 4, p. 190.

Lundblad (1933) described this species from Java and Sumatra. It apparently is quite widely distributed ; I have confirmed specimens from Malaya and Viet-Nam in addition to Sri Lanka and all are new records.

Material.—Belihuloya ; 1♂ (apterous), FC 30, We-Ganga near Balangoda, XII-10-70. *Kitulgala ;* 1♂ (alate), FC 34, Bibili-Oya, Kelani-Ganga, XII-26-70 ; 2♂♂ (alate), 1♀ (apterous), FC 37, Kelani-Ganga, XII-28-70. *Ratnapura ;* 2♂♂ (alate), FC 11, Rajanawa-Dola, XI-19-70.

Microvelia douglasi SCOTT

Microvelia douglasi Scott 1874, Ann. Mag. Nat. Hist. (4) 14 : 448 ; Lundblad 1933, Arch. Hydrobiol., Suppl. Bd. 12, Tropische Binnengewasser 4, p. 347 (synonymy, type notes, distribution. Ceylon).

Microvelia singalensis Kirkaldy 1903, Ent. 36 : 180. (New synonymy).

I have studied the "type" (No. 44370) of *singalensis* in the U.S. National Museum collections, It is a female from Pundaluoya, Ceylon collected by Green, so seems indeed to be part of the type series. Lundblad (1933) tentatively synonymized this species with *douglasi*, and I hereby formalize the synonymy. Lundblad also gives a number of other species as being formally or tentatively synonymous with *douglasi*.

Material.—(All alate). *Kitulgala*; 13 ♂♂, 12 ♀♀, FC 34, Bibli-Oya. Kelani-Ganga, XII-26-70. Ratnapura ; 1 ♀, FC 15, Ira-Handha-Pana-Ela, XI-23-70.

Microvelia (Kirkaldy) *longicornis* Torre-Bueno.

Microvelia longicornis Torre-Bueno 1925, Spolia Zeylanica 13 : 231.

This species belongs to the subgenus *Kirkaldya*, characterized by a vertically oriented narrow leaf-like upper arelium (see Polhemus, 1970). *M. longicornis* is apparently endemic to Sri Lanka.

Material.—(All apterous unless otherwise noted). *Belihuloya*; 2♂♂, 1 ♀, FC 25, Hirikatu-Oya, XII-8-70; 2 ♂♂, 2 ♀♀, 1 nymph, FC 27, Kuda-Oya near Buttala, XII-9-70. *Kitulgala*; 1 ♂, FC 34, Bibli-Oya. Kelani-Ganga XII-26-70; 1 ♂- 1, ♀, 2 nymphs FC 37, Kelani-Ganga XII-28-70. *Maskeliya*; 2 ♀♀ (alate), FC 16, Gartmore-Dola, XI-17-70. *Ratnapura*; 1 nymph, FC 9, Bodathpitiya-Ela, XI-17-70; 1 ♂, 1 ♂ (alate), 3 ♀♀, 1 ♀ (alate), FC 12, Kalu-Ganga, XI-20-70 ; 3 ♂♂, FC 13, Kalu-Ganga near Malwalla, XII 21-70.

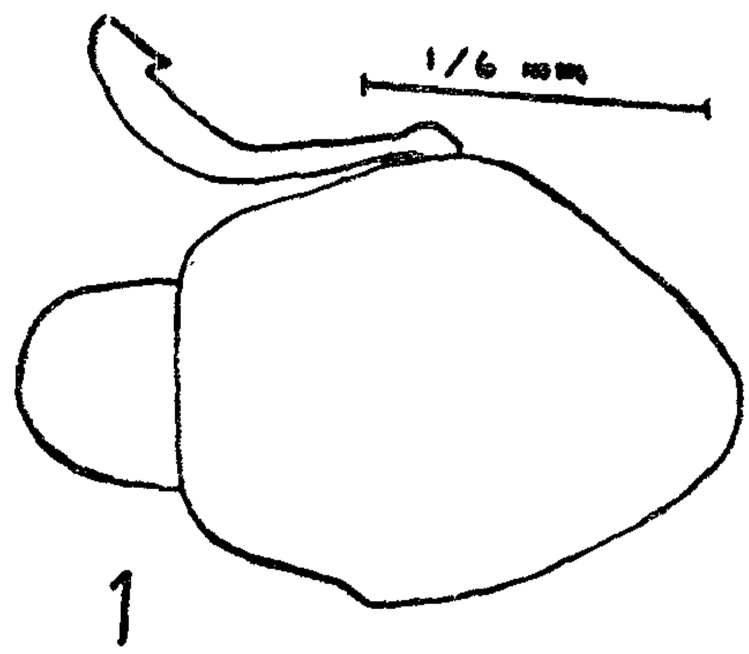
Microvelia pererai POLHEMUS, N. SP.

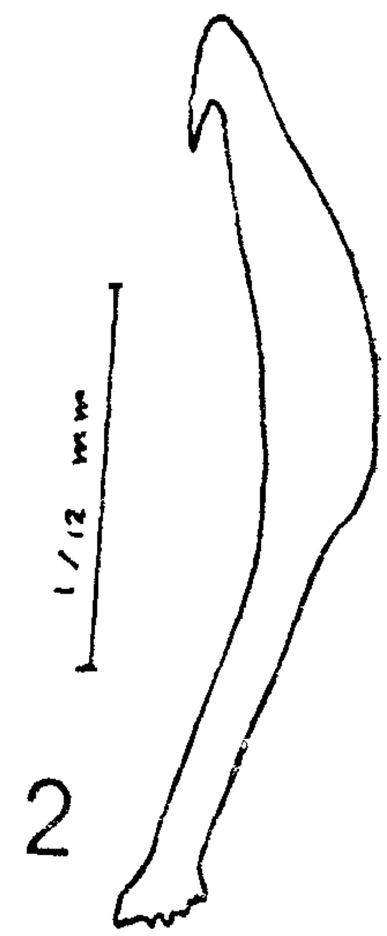
Apterous Male

Elongate, orange brown, anterior lobe of pronotum yellow brown behind vertex on head, overlain silvery pubescence reaching lateral margins, both interuped medially ; abdominal tergite 1 with laterally, head along eyes, with silvery pubescence ; tergites 2-3 laterally, tergites 5 medially; connexiva posteriorly frosted ; tergites 6–7, genital segments venter, legs, antennae yellow brown knees and tarsi distally dark; lateral margins and pleura of pronotum, intersegmental areas of abdominal pleura 1-3 fuscous.

Head with median impressed line reaching caudal margin ; width across eyes equal to width of pronotum ; vertex convex ; width of eye/interocular space, 6/15 ; rostrum reaching beyond anterior coxae. Pronotum long, reaching tergum 1 ; anterior lobe/posterior lobe , 4/13 ; width/length, 28/20 ; collar narrow. Tergites 1-6 subequal in length (6–7), tergite 7 long (12–2) ; connexiva slightly raised ; first genital segment long (10), broad (14).

Abdominal pleura 1-2 slightly depressed, glabrous. Genitalia asymmetrical ; genital capsule and right paramere as in figures 1 and 2.





Figures 1-2 — *Microvelia pererai* n. sp. 1, male genital capsule, ventral view ; 2, right paramere.

Antennae long, segment I stout, segments III-IV slender, all covered with pubescence and scattered longer setae ; lenght of segments I-IV, 8 : 7 : 12 : 18. Anterior and middle tarsi with short tribial combs. Anterior femur dorso-ventrally flattened. Measurements of legs as follows :

	Femur	*Tibia*	*Tarsal* 1	*Tarsal* 2
Anterior	22	18	10	—
Middle	26	23	7	7
Posterior	33	35	8	10

Length, 2.40 mm ; width 0.70 mm.

Apterous Female

Similar to male in colouration, but with connexiva vertical basally, increasingly reflexed over the abdomen caudally, meeting over the midline of last abdominal tergite. First visible abdominal pleuron depressed, glabrous, black, evidently to facilitate phoresy.

Length 2.53 mm ; width 0.93 mm.

Macropterous Form

Hemelytra brown to fuscous, with a white V-shaped basal mark, seven scattered pale areas medially and an oblong distal spot. Female with connexiva almost vertical, not reflexed, so the hemelytra are curved in a furrow distally. The venter varies from fuscous to orange brown, consistently much darker than apterous specimens.

Material.—CEYLON : Holotype, apterous male and allotype, apterous female, Dambuwa Estate, VI-17-1965, K. L. A. Perera (JTP). Paratypes as follows : 9 apterous ♂♂ , 1 macropterous ♂ , 4 apterous ♀♀, 1 macropterous ♀, same data as type (JTP, VM) ; 1 apterous♂, 1 macropterous ♂, *Belihuloya,* Veli-oya, FC26, XII-8-1970, F. Starmühlner (JTP) Material from the Smithsonian Ceylon Insect Project : 1 ♂, Col. Dist., Labugamas Reservoir, 400 ft. Elev., 2-3 Oct., 1976, G. F. Hevel, R. E. Dietz, I. V. P. B. and S. Karunaratne, D. W. Balasooriya (paratype, USNM).

Derivation oj Name:—This species is named in honour of K. L. A. Perera who collected the type series and many other insects of Sri Lanka.

Discussion

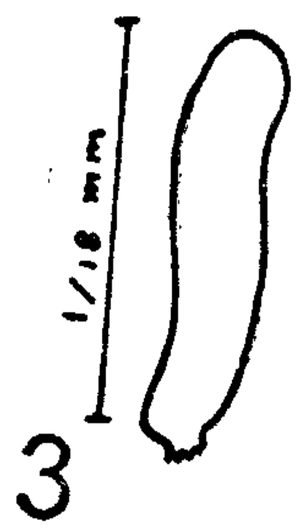
Microvelia pererai is perhaps closest to *M. rennellensis* Brown, but differs in lacking the long golden hairs and the well-defined glabrous areas on tergites 5-7 of the male, and the female connexiva are vertical in *rennellensis* but folded flat onto the dorsal surface in *pererai*. The hooked right male paramere is very different from *rennellensis* or *M. genetalis* Lundblad, and does not resemble any Asian species for which the paramere has been figured. Most of the Asian *Microvelia* species are grey to black ventrally, so the light colored venter of (apterous) *pererai* immediately sets it apart from *M. douglasi* Scott and allied species . Apterous males of *douglasi*, aside from coloration and a relatively longer fourth antennal segment, resemble *pererai* in form, size, prominence of the genital capsule and asymmetrical parameres. Macropterous specimens are more difficult to separate from *douglasi*, as the venter is much darker than in apterous forms. The white markings on the hemelytra are brighter and more numerous in *pererai* than in *douglasi*.

Pseudovelia gnoma POLHEMUS, N.SP.

Apterous Male

Elongate, black ; rectangular area on pronotum behind vertex of head orange brown ; two large irregular areas (1 + 1) laterally on tergite 1, broad median areas on tergites 6 and 7, narrow fringes on posterior connexival margins 3-6, silvery pubescent ; entire body, head, legs clothed with shaggy pubescence as long as width of a tibia medially ; antennae similarly clothed, but sparser ; setae on legs longer than width of a tibia medially. Legs, antennae, rostrum brown ; rostrum posteriorly, coxae, trochanters, basal half or more of femora yellowish.

Head with faint median impressed line not reaching posterior margin ; width across eyes (32) much narrower than pronotum width (44) ; eyes small, width of eye/interocular space, 5/21 ; rostrum reaching between middle coxae. Pronotum very long, covering all but metanotal angles, broadly arcuate posteriorly ; length of pronotum/length of head (midline), 19/17 ; width, 45 ; Tergite 1 long (12), tergites 2-6 subequal in length (10), tergite 7 long (16) ; genital segments very small, inconspicuous ; connexiva barely raised, not produced posteriorly. Parameres symmetrical, minute (length, 3), shape as in figure 3.



3 — *Pseudovelia gnoma* n. sp., left male paramere.

Antennae moderately long ; first segment stout and curved, II–IV slender ; all covered with short pubescence and scattered longer setae ; length of segments I–IV, 22 : 16 : 17 : 20. Anterior tibia with small rounded distal comb, and very long black comb (22) almost two-thirds as long as tibia ; small

distal comb on middle tibia ; swimming hairs on posterior tarsi much shorter than usual for the genus, about twice as long as width of first tarsal segment. Legs unarmed ; anterior femur slightly bowed, flattened beneath ; hind tibia slightly bowed ; leg proportions as follows :

	Femur	*Tibia*	*Tarsal* 1	*Tarsal* 2
Anterior	36	36	16	—
Middle	45	44	7	16
Posterior	45	52	13	14

Length, 2.0 mm ; width, 0.83 mm.

Female and macropterous forms unknown.

Material.— CEYLON : Holotype, male, Maskeliya, Gartmore-Dola, XI-29-1970, F. Starmühlner (JTP) ; 16 nymphs, same data as type.

Derivation of Name.— The name *gnoma* is derived from the Latin *gnomus,* meaning small.

Discussion

Pseudovelia gnoma n.sp. differs from other Asian *Pseudovelia* species by lacking the very long swimming hairs on the hind tarsi common to most of them. Also, one or more of the following characteristics differ from any described Asian species : antennal proportions, tarsal proportions, colouration. The closest species geographically would be those described (as *Microvelia)* by Lundblad (1933) from the Malay Archipelago. Compared with these the proportions of the middle and hind tarsi of *gnoma* differ from those of *tjurupensis,* the minute male genital capsule separates *gnoma* from *hypodonta.*

The unsettled status of the generic name *Pseudovelia* has been discussed previously by Polhemus and Reisen (1976).

Rhagovelia ceylanica LUNDBLAD

Rhagovelia ceylanica Lundblad 1936, Ark. Zool. 28A (21) : 32.

Material.— (All apterous unless otherwise noted). *Belihuloya* ; 1 ♂, FC 26, Veli-Oya, XII-8-70 ; 1♀(alate), 2 nymphs, FC 27, Kuda-Oya near Buttala, XII-9-70, *Deniyaya*; 1 ♂, 1 ♀-, FC 4, Pasumale-Dola, XI-10-70 ; 1 ♂, 1 ♀, 4 nymphs, FC 5, Campden-Hill-Dola, XI-11-70 ; 1 ♂, 1 nymph, FC 6, Kiriwel-Dola, XI-11-70. *Kitulgala* ; 1 ♂, FC 34, Bibli-Oya, Kelani-Ganga, XII-26-70 ; 1 ♂, 1 ♀, 2 nymphs, FC 37, Kelani-Ganga, XII-28-70. *Ratnapura* ; 1 ♂, 1 ♂, (alate), 1♀, 10 nymphs, FC 12, Kalu-Ganga, XI-20-70 ; 1 ♂ (alate), FC 13, Kalu-Ganga near Malwalla XI-21-70 ; 1 ♂, 1 ♂ (alate), FC 15, Ira-Handha-Pana-Ela, XI-23-70

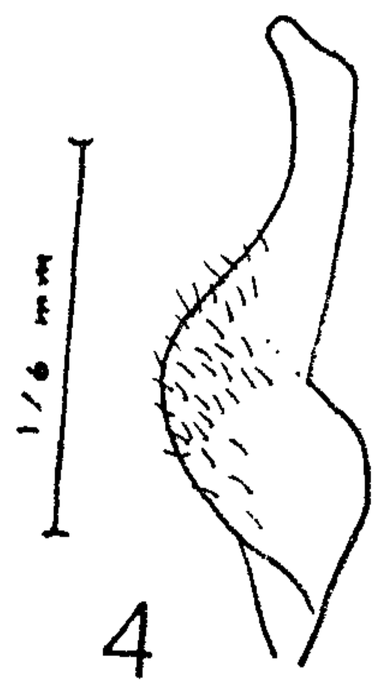
Rhagovelia karunaratnei POLHEMUS, N.SP.

Apterous Male

Robust, back ; pronotum orange brown behind vertex of head, streak not divided ; dorsum without glabrous areas, dull ; legs, antennae, rostrum, clypeus, genital segments fuscous to piceous; fore-coxae, trochanters, basal half of femora, middle trochanters, posterior coxae, trochanters, basal quarter of femora, leucine ; body covered with very fine silvery pubescence ; longer pubescence on

abdominal dorsum and genital segments, faintly shaggy in side view ; scattered curved stiff black setae on thoracic pleura, dorsum of head ; stiff black slender spines on atnennal segments 1 and 2, legs ; proepisternum thickly set with minute black conical setae, barely visible against black background.

Head with median impressed line reaching middle of vertex posteriorly, and two oblique impressed lines (1+1) posteriorly on vertex, all forming a posteriorly directed arrow with none of the lines touching ; width across eyes, 46 ; width of eye/interocular space, 18/10 ; rostrum reaching beyond anterior coxae. Pronotum length on midline shorter than head length (11/15) ; width at posterior angles, 50 ; posterior margin arcuate. Mesonotum wider (56) than long (36), truncate medially behind. Tergites 1-6 subequal in length (8-10) ; tergite 7 longer (18), equal to first genital segment (18); connexiva without spines, raised at a 45° angle ; genital segments cylindrical; parameres symmetrical, shaped as shown in figure 4. Sternite 7 not carinate, bordered laterally by a longitudinal brush of short stiff brown setae on each side (1+1).



4 — *Rhagovelia karunaratnei* n. sp., right male paramere.

Antennae long ; segment I stoutest, curved ; segments II–IV barely slenderer ; segment IV fusiform, slightly asymmetrical ; lengths of segments I–IV, 35 : 18 : 25 : 26. Anterior tibia flattened, widest distally, truncate distal part carrying short tibial comb. Posterior femur stout, not incrasate ; armed beneath at middle with one stout spine, bent backwards at basal one-fourth, followed by 5 or 6 much smaller spines. Posterior tibia armed with a single row of small, evenly spaced teeth. Measurements of legs except first tarsal segments, as follows :—

	Femur	*Tibia*	*Tarsal* 2	*Tarsal* 3
Anterior	46	48	12	—
Middle	83	63	27	37
Posterior	60	63	3	12

Length, 2.63 mm. ; width, 1.05 mm.

Apterous Female

Similar to male except slightly more robust. Abdomen tapering posteriorly almost evenly ; width across tergite 7,20. Connexiva more strongly raised than in male, vertical on segments 6-7 ; produced into short triangular connexival spines (7) not half as long as first genital segment.

Macropterous Forms

Unknowr.

Material.—CEYLON:—Holotype, apterous male, and allotype, apterous female Deniyaya, FCI, Meda-Dola, F. Starmühlner, XI-9-1970 (USNM). Paratypes (all apterous unless otherwise noted); 7♂♂, 5♀♀, 5 nymphs, same data as type (JTP,VM); 1♂, 2♀♀, 1 nymph, *Ratnapura*, FC 14,

upper reaches of Kalu-Ganga, XI-22-1970, F. Starmühlner (JTP) ; 1♀, Udugama, Homadola Estate, III-13-1965, P. B. Karunaratne (JTP) ; 1♂, Arakawila Jungle, Padukka-Ingiriya RD., IV-2-1971, P. B. Karunaratne (JTP); 1 ♂, 1 ♀, Arakawila Jungle, Padukka, stream, VII-7-1971, P. B. Karunaratne (Colombo, JTP) ; 2♂♂, 3♀♀, 1 nymph, same as last, except VIII-30-1968 (Colombo).

Derivation of Name.—This species is named in honour of P. B. Karunaratne, in recognition of his splendid contributions to our knowledge of Ceylonese aquatic Hemiptera.

Discussion

Rhagovelia karunarātnei n.sp. closely resembles *R. femorata* Dover in general facies and the form and hairiness of the male paramere; however, *femorata* has many small teeth basally from the large median spine on the hind femur, and a carinate abdominal venter, both lacking in *karunaratnei ;* the latter also has a faintly arcuate posterior pronotal margin (straight in *femorata*) and is more hairy.

In Lundblad's (1936) key, *karunaratnei* drops out at couplet 6, the longest spine of the posterior femur not being curved and stout as in *biroi ;* the latter also has the last abdominal sternite carinate (smooth in *karunaratnei*), 8 or 9 small teeth distal to the large spine on the posterious femur (5 or 6 in *karunaratnei*), and the parameres of the two species are different.

Strongylovelia Formosa Esaki

Strongylovelia formosa Esaki, 1924 Ann. Ent. Soc. Amer. 17 : 229.

Only one adult of this pretty species is present in the Starmühlner material. *S. formosa* has a wide distribution. A more complete analysis will be published in a forthcoming paper. The genus has not been recorded previously in Sri Lanka.

Material.— : *Kitulgala :* 1 ♀ (apterous), FC 34, Bibili-Oya, XII-26-70. *Maskeliya :* 1 nymph, FC 21, Hakgala-Dola, XII-2-70.

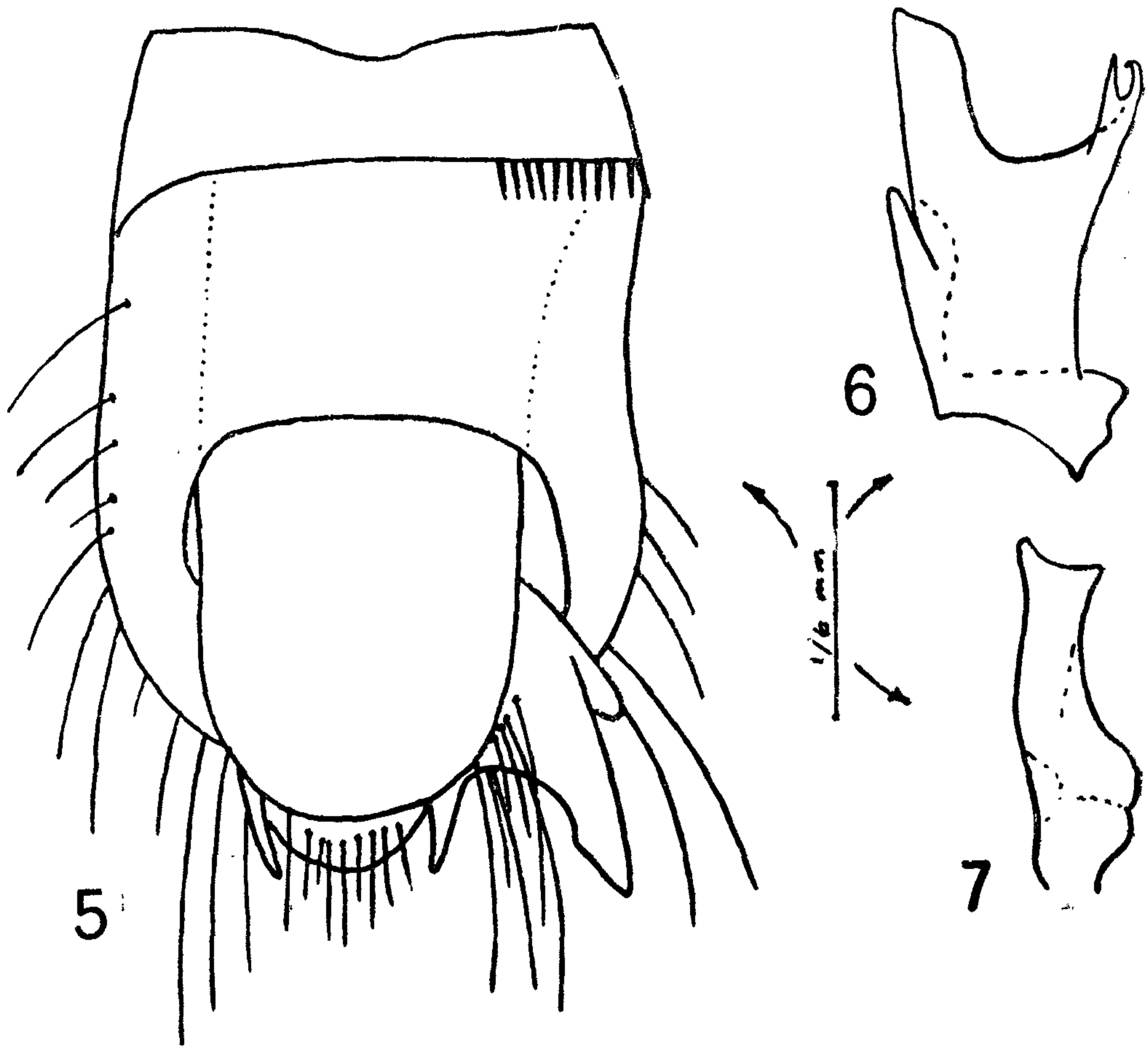
Tetraenpis asymmetricus Polhemus and Arunaratne n. sp.

Apterous Male

Elongate, yellow brown to orange brown ; anterior lobe of pronotum laterally behind eyes, abdominal tergites 1–3 (3 barely) laterally, frosted. Legs, rostrum and antennae luteous to yellow brown. Dorsum, venter, legs, first two antennal segments, with long setae and fine pubescence.

Head short (23) ; vertex raised, with median impressed line terminating much before posterior margin ; eyes closely appressed to pronotum ; width across eyes, 42 ; width of eye/interocular space, 13/13 ; rostrum reaching beyond anterior coxae. Pronotum long (37), covering mesonotum ; deeply punctate on posterior lobe, punctures dark brown ; width, 62 ; anterior lobe/posterior lobe, 10/27. Abdomen with tergites 1, 3–6 subequal (12–13) ; tergites 2, 7 longer (17–19) ; tergites 4–7 shining ; genital segments long (24), wide (23), left paramere projecting cauda as far as tip of genital segments ; connexiva raised at about a 45° angle, tapering more or less evenly posteriorly, with small connexival spine.

Abdominal and thoracic pleura frosted medially. Sternite 7 with small tumescence, covered with short brown setae, near caudal margin. Genitalia asymmetrical ; genital capsule and parameres as in figures 5–7.



5–7—*Tetraripis asymmetricus* n. sp. 5, male genital capsule, ventral view ; 6, left paramere ; 7, right paramere

Antennae long ; segment I stoutest, curved ; segments II–IV slender, segment III slightly flattened ; lengths of segments I–IV, 45 : 27 : 32 : 23. Anterior tibia slightly flattened ; tibial comb prominent, occupying about 1/4 of tibial length. Posterior femur incrassate, almost half as wide as long ; armed beneath with numerous small black spines, one large spine medially, one moderate spine at distal 1/4, followed by 3 or 4 smaller spines distally. Posterior tibia armed with a double row of black teeth ventrally, one large spine at distal 9/10, a sickle-shaped spur arising from dorsal edge distally. Middle and posterior tarsi with swimming plumes (*see* Lundblad, 1929, Figs. 31 and 32). Measurements of legs are as follows :—

	Femur	*Tibia*	*Tarsal* 1	*Tarsal* 2	*Tarsal* 3
Anterior	42	50	1	12	—
Middle	74	56	3	10	34
Posterior	75	70	3	3	22

Length, 3.30 mm ; width, 1.08 mm.

Apterous Female

Very similar to male except connexiva, more vertical caudad,tapering more abruptly over segments 1–5 than 6–7. Legs similar to male, including incrassate and armed posterior femur, and armed posterior tibia.

Length, 3.30 mm ; width, 1.05 mm.

Macropterous Female (Macropterous male unknown)

General body colour similar to apterous form. Hemelytra brown with three white spots, one on base of corium cell, one in median cell, one in apical cell. Veins of hemelytra well defined. Hemelytra attaining apex of abdomen.

Pronotum as long as broad, slightly convex, with numerous dark spots except on collar which is well defined by a yellowish stripe flanked by two (1+1) bluish silvery irregular spots.

Length, 3.8 mm ; width (across pronotum), 1.4 mm.

Material.—(All apterous specimens unless otherwise noted). CEYLON : Holotype, male, Kitulgala, Hal-Oya, FC 35, XII–27–1970, F. Starmühlner (USNM 76124) ; allotype, female. *Ratnapura*, Rajanawa-Fall, FC 11, XI–19–1970, F. Starmühlner (USNM). Paratypes as follows, 2 ♂♂, 2 nymphs (not paratypes), same data as allotype (VM, JTP); 2 ♀♀, Kandumulla, II–9–1967 K.L.A. Perera (JTP) ; 2 ♀♀, Ambagaspihiya, II–1–1967, K.L.A. Perera (JTP) ; 1 ♂, Monaragala, VII–2–1970, P. B. Karunaratne (JTP). *Western Province ;* 5 ♂♂, 3 ♀♀, 1 ♀(alate), Arakawila Jungle. Padukka, VIII–12–1969, P. B. Karunaratne (Colombo, JTP); 2 ♀♀, same place and collector, VIII–30–1968 (Colombo) ; 1 ♀, same place and collector, IV–2–1971 (Colombo) ; 2 ♂♂, 2 ♀♀, Kalatuwawa, Labugama, VIII–7–1971, P. B. Karunaratne (Colombo). *Central Province* ; 2 ♂♂, 2 ♀♀, Maliboda, Noori, IX–6–1968, P. B. Karunaratne (Colombo). *Matale District ;* 1 ♂, 2 ♀♀, Laggala, VII–28–1971, P. O. Karunaratne (Colombo). *Uva Province* ; 1 ♂, 1 ♀, Nilgala, Damunuwinna, VII–3–1968, P. B. Karunaratne (Colombo). *Material from the Smithsonian Ceylon Insect Project.* Gal. Dist. 1 ♂, 1 ♀, Kanneliya Jungle, Hiniduma, 500 ft., III–11, 12–1972, K. V. Krombein (USNM). *Kan. Dist.* 1 ♂, 1 ♀, Kandy Reservoir Jungle, III–29–1975, S. & P. B. Karunaratne (JTP) ; 1 ♂, 1 ♀, Dickoya, Castlereagh Reservoir, VI–11–1978, P. B. Karunaratne (USNM).

Derivation of Name.—The species name *asymmetricus* refers to the unusually asymmetrical male genitalia.

Discussion

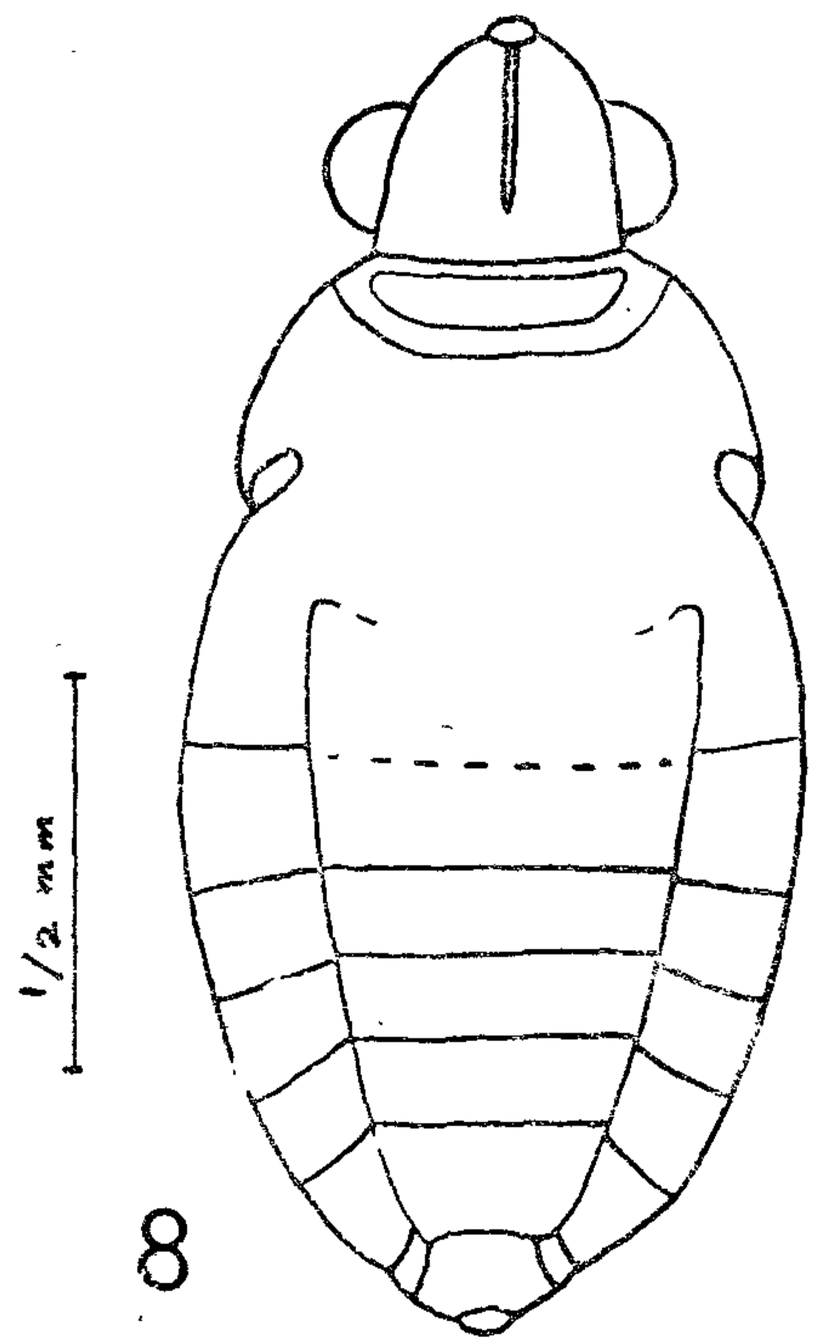
Both males and females of *Tetraripis asymmetricus* n.sp. may be separated from *T. ravana* (Kirkaldy) by the distal black spine on the posterior tibia of both sexes, about as long as the width of the tibia where it arises ; *ravana* has no pronounced distal spine. The heavily punctate pronotum of *asymmetricus* separates it from *T. doveri* Lundblad. (*See* figures of *ravana* and *doveri* in Lundblad, 1936). The asymmetrical male genitalia immediately separates *asymmetricus* from the other *Tetraripis* species. Both *asymmetricus* and *ravana* were taken in the same place on one occasion at Moneragala, Ceylon.

Xiphovelia iota POLHEMUS N. SP.

Apterous Female

Ovate, black ; transverse streak on pronotum behind vertex of head orange brown ; legs, rostrum, antennae yellow to orange brown. Body widest at middle of abdomen, constricted and vertically sulcate on pleura at mesonotal–metanotal suture (Fig. 8). Silvery hair patches diagonally furrowed

and matted on mesonotum (and metanotum ?). Sutures dorsally separating mesonotum, metanotum, and anterior abdominal segments obliterated ; first well-defined suture between abdominal tergites 3–4 ; division of metanotum-tergite 2 and tergites 2–3 marked with transverse rows of pits. Mesonotum depressed behind pronotum forming a shallow longitudinal sulcus ; dorsum broadly depressed behind pleural constriction. Dorsum covered with moderately long recumbent pubescence except medially where sutures are obliterated, feebly shining there, naked.



8 — *Xiphovelia iota* n. sp., female, dorsal view.

Head long (19), wide (30) ; vertex convex, with impressed median line ; width of eye/interocular space, 7/16 ; rostrum reaching beyond anterior coxae. Pronotum very short (5), half the length of an eye. Abdominal tergites 3–5 and 7 subequal in length (6–8), 6 longer (10) ; connexiva flat, not raised.

Antennae short, segment I stout, segments II and IV fusiform, III slender, all covered with pubescence and scattered longer setae ; length of segments I–IV, 10 : 12 : 11 : 18. Femora, tibia stout, not incrassate ; middle trochanter longest ; middle tarsi with down-curving arolium blade-like; proportions as follows :

	Femur	*Tibia*	*Tarsal* 1	*Tarsal* 2
Anterior	24	19	9	—
Middle	31	28	14	13
Posterior	30	23	6	10

Length, 1.72 mm ; width, 0.87mm.

Apterous Male

Ovate, but much narrower than female, black ; colouration similar to female, except dorsum covered with dense brown pubescence and not modified ; two broad areas (1+1) laterally on mesonotum, tergites 2–3 laterally, with silvery pubescence. General facies typical for the genus (*see* Esaki and Miyamoto, 1959).

Fore-femur incrassate ; fore-tibia slightly flattened and dilated, curved ventrad distally, with prominent tibial comb distally (not evident in female). Hind-tibia with spur-like distal comb. Genital segments not conspicuous.

Length, 1.00 mm ; width, 0.45 mm.

Material.—(All apterous). CEYLON : Holotype, female and allotype, male, Kalu-ganga, Ratnapura, FC 12, XI-20-1970, F. Starmühlner (JTP). Paratypes as follows : 2 ♂♂, 1 ♀, same data as holotype (JTP, VM); 7 ♂♂, 6 ♀♀, 10 nymphs, Kelani-Ganga, Kitulgala, FC 37 XII-28-1970, F. Starmühlner (JTP, USNM, VM); 1 ♀, Southern Province, Hiniduma, at wooden bridge, XII-20-1968, P. B. Karunaratne (Colombo).

Derivation of Name.—The species name is from the Greek, iota, anything very small.

Discussion

I have before me the types of *Xiphovelia ensis* Lundblad as well as paratypes of *Xiphovelia glauca* Esaki and Miyamoto and *Xiphovelia japonica* Esaki and Miyamoto, and specimens of *Xiphovelia curvifermur* Esaki and Miyamoto.

Xiphovelia iota is typical of the genus in many respects, e.g. very short pronotum, male smaller than female, dark grey colouration, pitted dorsum, short antennae, dorso-ventrally compressed body (especially female) and modified middle tarsi. *X. iota* differs from all other species in having a very evident modification in the female to facilitate phoresy, and the male, barely a millimetre long, is among the smallest known veliids and much smaller than any known *Xiphovelia* species. In addition, the sutures separating the mesonotum, metanotum and first abdominal segments in the female are obliterated, a characteristic not seen in the other species studied. *X. iota* females drop from the Esaki and Miyamoto (1959) key at couplet 2, and the males drop at couplet 3.

Diplonychus Rusticus (FABRICIUS)

Nepa rustica Fabricius 1794, Ent. Syst. Emed. 4 : 62.

Sphaerodema rusticum Hoffman 1941, Lingnan Sci. J. 20 : 9 (synonymy, distribution).

Diplonychus rusticus Lauck and Menke 1961, Ann. Ent. Soc. Amer. 54 : 649 (status of genus, discussion of taxonomy).

D. rusticus seems to be a common and widely distributed species in southeast Asia, but the name is applied only provisionally because the genus is badly in need of revision.

Material.—Belihuloya ; 1 ♀, FC 30, We-Ganga near Balangoda, XII-10-70. *Deniyaya ;* 1 ♂, 1 ♀, FC 7, Thanipita River, XI-12-70.

Micronecta alterna WROBLEWSKI

Micronecta alterna Wroblewski 1972, Bull. Ent. Pologne 42 : 33.

Material.—Ratnapura ; 1 ♂, 1 ♀, FC 15, Ira-Handha-Pana-Ela, XI-23-70.

Micronecta anatolica LINDBERG (?)

Micronecta anatolica Lindberg 1922 Not. Ent. Helsingfors 2 : 116 ; Wroblewski 1968 Bull. Ent. Pologne 38 : 774 (synonymy) ; Wroblewski 1972, Bull. Ent. Pologne 42 : 45 (Ceylon).

Only females of this species are present in the material at hand, so the identification is tentative.

Material.—Ratnapura ; 2 ♀♀, FC 10, Katugas-Ela, XI–18–70 ; 1 ♂ (genitalia missing), FC 12, Kalu-Ganga XI–20–70.

Micronecta desertana DISTANT

Micronecta desertana Distant 1920, Rec. Ind. Mus. 18 : 206 ; Wroblewski 1972, Bull. Ent. Pologne 42 : 42 (Ceylon).

Brachypterous forms are present in the series at hand however the body proportions are approximately those used by Wroblewski (1972) in his key to Ceylonese, *Micronecta,* e.g. length/width = 2.0.

Material.—Belihuloya; 5 ♂♂, 7 ♀♀, 2 nymphs, FC 30, We-Ganga near Balangoda XII–10–70. *Ratnapura ;* 2 ♀♀, FC 11, Rajanawa-Dola, XI–19–70.

Micronecta memonides KIRKALDY

Micronecta memonides Kirkaldy 1905, Ent. News 16 : 262; Wroblewski 1972 Buil. Ent. Pologne 42 : 44 (Ceylon).

Material.—Belihuloya ; 3 ♂♂, FC 25, Kirikatu-Oya, XII–8–70. *Deniyaya ;* 1 ♀, 7 nymphs, FC 3, Hola-Dola, XI–10–70 ; 1 ♂, 1 ♀, FC 4, Pasumale-Dola, XI–10–70. *Maskeliya ;* 1 ♂, FC 20, Maskeliya-Dola, XII–1–70.

Micronecta punctinotum CHEN

Micronecta punctinotum Chen 1960, J. Kans. Ent. Soc. 33 : 111 ; Wroblewski 1972, Bull. Ent. Pologne 42 : 43 (Ceylon).

Material.—Ratnapura; 1 ♀, FC 15, Ira-Handha-Pana-Ela, XI–23–70.

Micronecta quadristrigata BREDDIN

Micronecta quadristrigata Breddin 1905, Soc. Ent. Zurich 20 : 5 ; Wroblewski 1968, Bull. Ent, Pologne 38: 753 (discussion and synonymy); Wroblewski 1972, Bull. Ent. Pologne 24:29 (Ceylon. distribution, synonymy).

This widespread species is common in Sri Lanka. Wroblewski (1972) recognized *minthe* Distant 1910 as a form present in his Ceylonese material and raised the possibility that it may deserve subspecies rank.

Material.—Kitulgala ; 1 ♂, 1 ♀, FC 34, Bibili-Oya, XII–26–70; 3♂♂, 4 ♀♀, FC 37, Kelani-Ganga XII–28–70. *Ratnapura;* 2 ♀♀, FC 9, Bodathpitiya-Ela , XI–17–70 ; 1 ♀, FC 10, Katugas-Ela, XI–18–70 ; 1 ♂, FC 15, Ira-Handha-Pana-Ela, XI–23–70.

Micronecta sanctae - catherinae HUTCHINSON

Micronecta sanctae-catherinae Hutchinson 1940, Trans. Conn. Acad. Arts Sci. 33 : 384 ; Wroblewski 1972, Bull. Ent. Pologne 42 : 37 (Ceylon).

Material.—Kitulgala ; 1 ♂, 1 ♀, FC 34, Bibili-Oya, XII–26–70 ; 2 ♂♂, FC 37, Kelani-Ganga, XII–28–70. *Ratnapura ;* 1 ♂, 1 ♀, FC 10, Katugas-Ela, XI–18–70; 1 ♀, FC 15, Ira-Handha-Pana-Ela, XI–18–70.

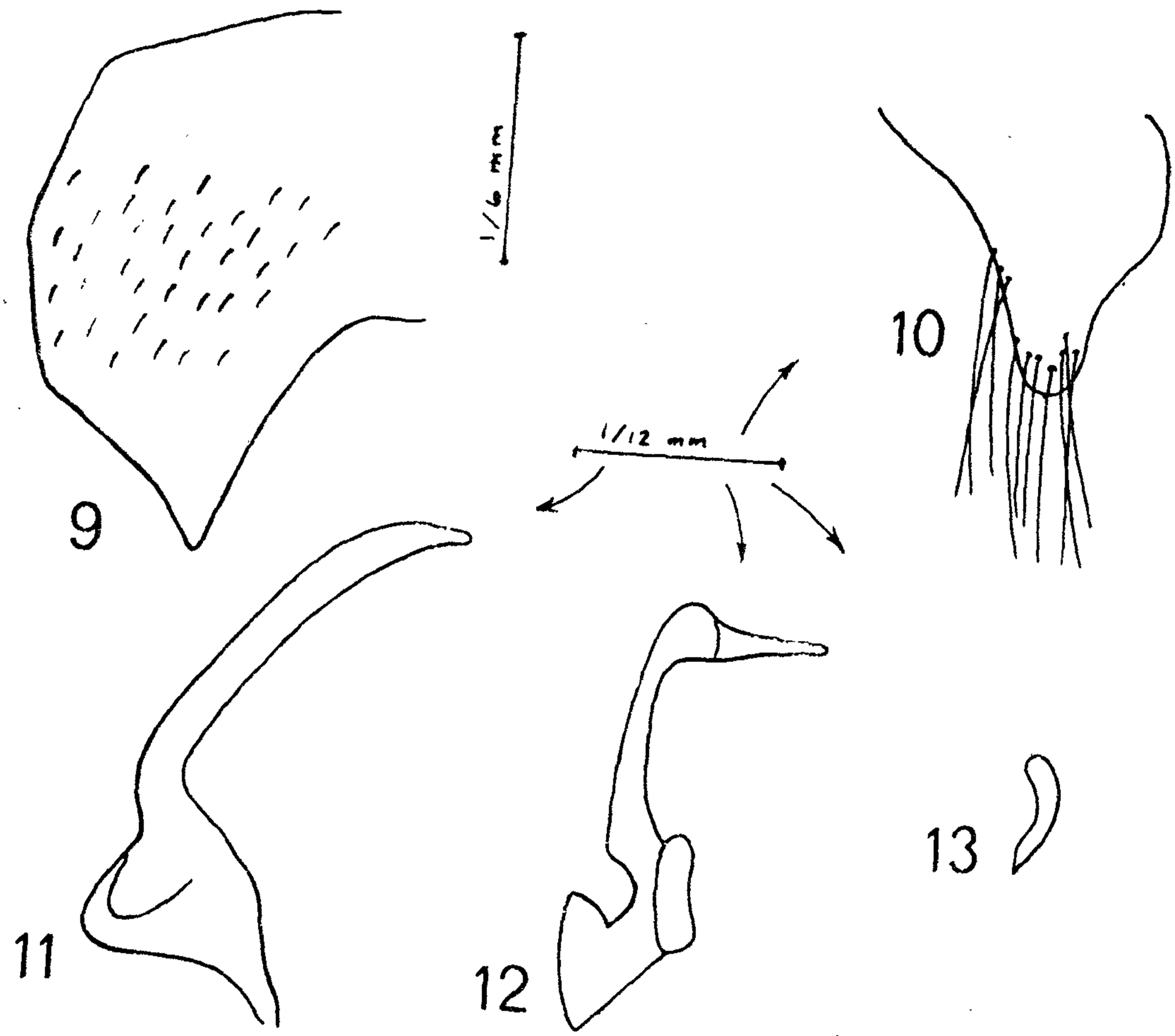
Micronecta wroblewskii POLHEMUS, n. SP.

Macropterous Male

Dorsum brown ; sublateral arearon pronotum, posterior pronotal margin, scutellum and broad adjacent area of clavus, distal angles of clavus, embolium, distal angles of corium, yellow to yellow brown. Head leucine, with small brownish markings mesad of eyes, raised knob at centre of posterior margin piceous. Longitudinal striations of hemelytra evident as weak depressions, barely lighter than corium ground colour. Venter brown, lighter on thorax and terminal sternites. Legs leucine, tarsal tips dasker, posterior tarsi with two brown lines on inner face.

Head (7) shorter than pronotum (17) on midline. Interocular space (19) twice the width of an eye (9). Pronotal margins faintly curved, weakly convergent anteriorly ; length subequal (8) to length of head ; anterior margin arcuate, posterior margin almost straight. Hemelytra widest in middle, with scattered minute setae. Median scutellum length, 7 ; distance, apex of scutellum to apex of clavus, 31. Dorsum minutely rugulose, hemelytra (except membrane) glabrous distally. Seventh abdominal sternite with submedian lobe as in Fig. 9 ; free lobe of eighth tergite as in Fig. 10; right and left claspers as in Figs. 11 and 12 respectively ; fore-leg claw as in Fig. 13.

Length 1.55 mm ; width 0.80 mm.



9-13 — *Micronecta wroblewskii* n. sp., male. 9, submedian process of seventh abdominal sternite ; 10, free lobe : 11, right paramere ; 12, left paramere ; 13, claw.

Macropterous Female

Very similar to male except sexual characteristics and somewhat larger.

Length, 1.80 mm ; width, 0.80 mm.

Material.—Holotype, male, and allotype, female, Ceylon, Ratnapura, FC 14, Oberlauf der Kalu-Ganga-Carney, XI-22-1970, F. Starmühlner (JTP) ; paratypes, 29 ♂♂, 15 ♀♀, same data (JTP Polish Academy, Colombo, USNM, VM).

Derivation of Name.—This species is named for Professor Aleksander Wroblewski in recognition of his fine work on the *Micronecta* of Sri Lanka.

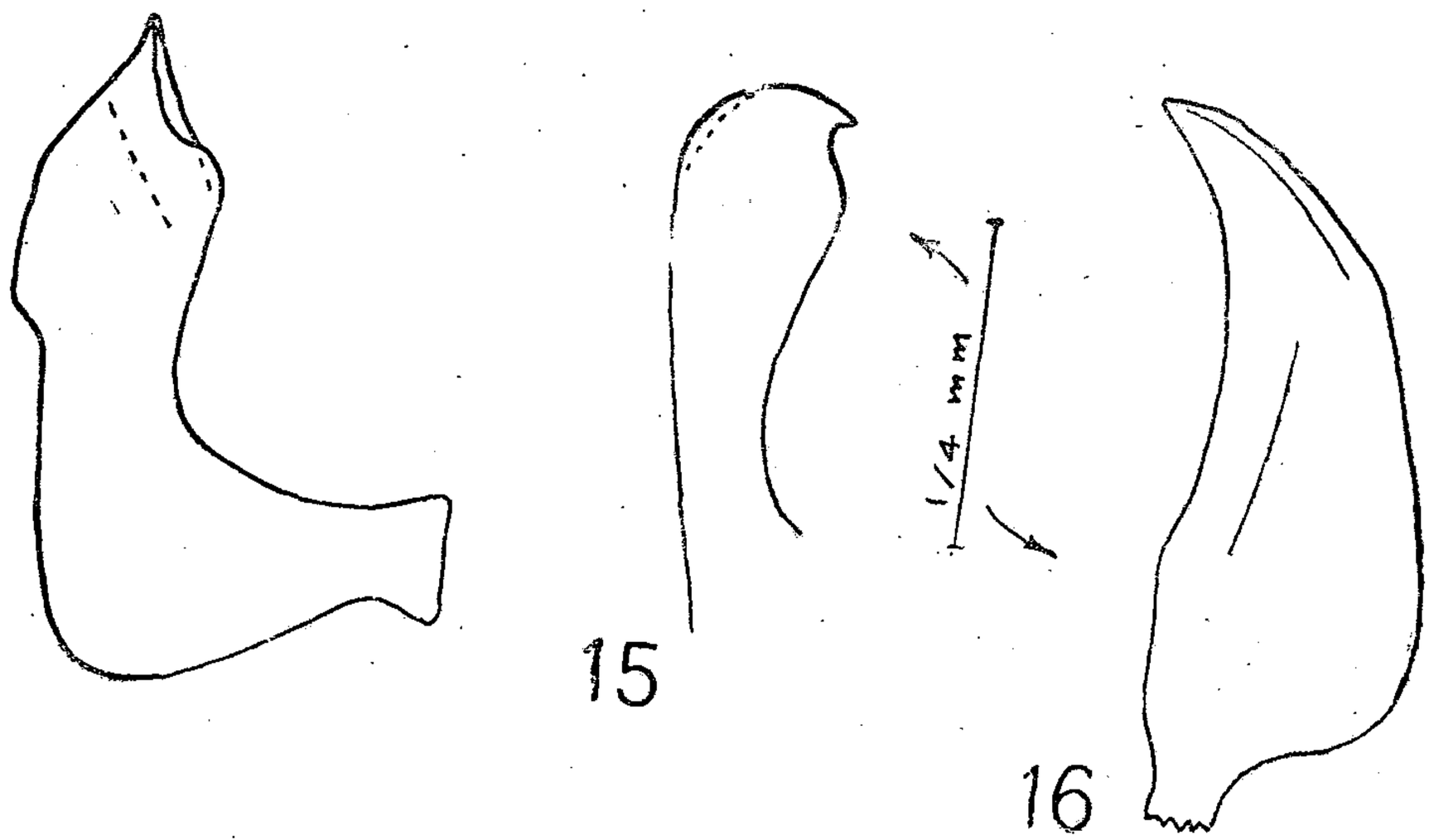
Discussion

Micronecta wroblewskii n. sp. is very similar to *M. memonides* Kirkaldy in size, shape, brown venter and morphology ; the parameres, however, are greatly different than any described Asian, Australian or African species.

Sigara nilgirica HUTCHINSON

Corixa (Tropocorixa) nilgirica Hutchinson 1940, Trans. Conn. Acad. Arts Sci. 33 : 450.

The specimens before me vary somewhat from Hutchinson's (1940) description (e.g. 29 palar pegs instead of 19 to 23), however the essentials of the morphology are in agreement. The pronotal pattern, strigil, deeply cleft seventh abdominal segment, anchor-shaped penis sheath, and right and left parameres (Figures 14–16) are in reasonable agreement with Hutchinson's figures. I am reluctant to burden the literature with a synonym, so I am provisionally naming this species *nilgirica* until additional material can be compared with the types or topotypic material.



14-16 — *Sigara niligrica* Hutchinson, male. 14-15, right paramere, two views ; 16, left paramere.

Material.—2 ♂♂, 4 ♀♀, 2 nymphs, FC 17, Maskeliya, Gartmore-Dola, XI-29-1970 (One male and one female in the collection of Dr. I. Lansbury).

Hydrotrephes kirkaldyi (ESAKI AND CHINA)

Helotrephes kirkaldyi Esaki and China, 1928, Rev. Espanola Entomol. 4 : 141.

The nymph before me is larger than the adults of either *Tiphotrephes indicus* (Distant) or *Limnotrephes campbelli* Esaki and China, and does not match the dorsal pattern of either of them illustrated by Esaki and China (1928). The specimen is therefore provisionally assigned to *Hydrotrephes kirkaldyi*, the only other species of Helotrephidae known from Ceylon.

The figures presented by Esaki and China indicate that in the former two species of nymphs and adults have essentially the same pattern on the cephalonotum, but this apparently does not hold true for all species of helotrephids. In a series of an unnamed species from Taiwan the nymph has a pattern similar to the one before me and the adults have a quite different pattern.

Material.—1 nymph, FC 12, Ratnapura, Kalu-Ganga, XI-20-70.

Tiphotrephes indicus (DISTANT)

Helotrephes indicus Distant 1910, Fauna Brit. India Rhyn. 5 : 338.

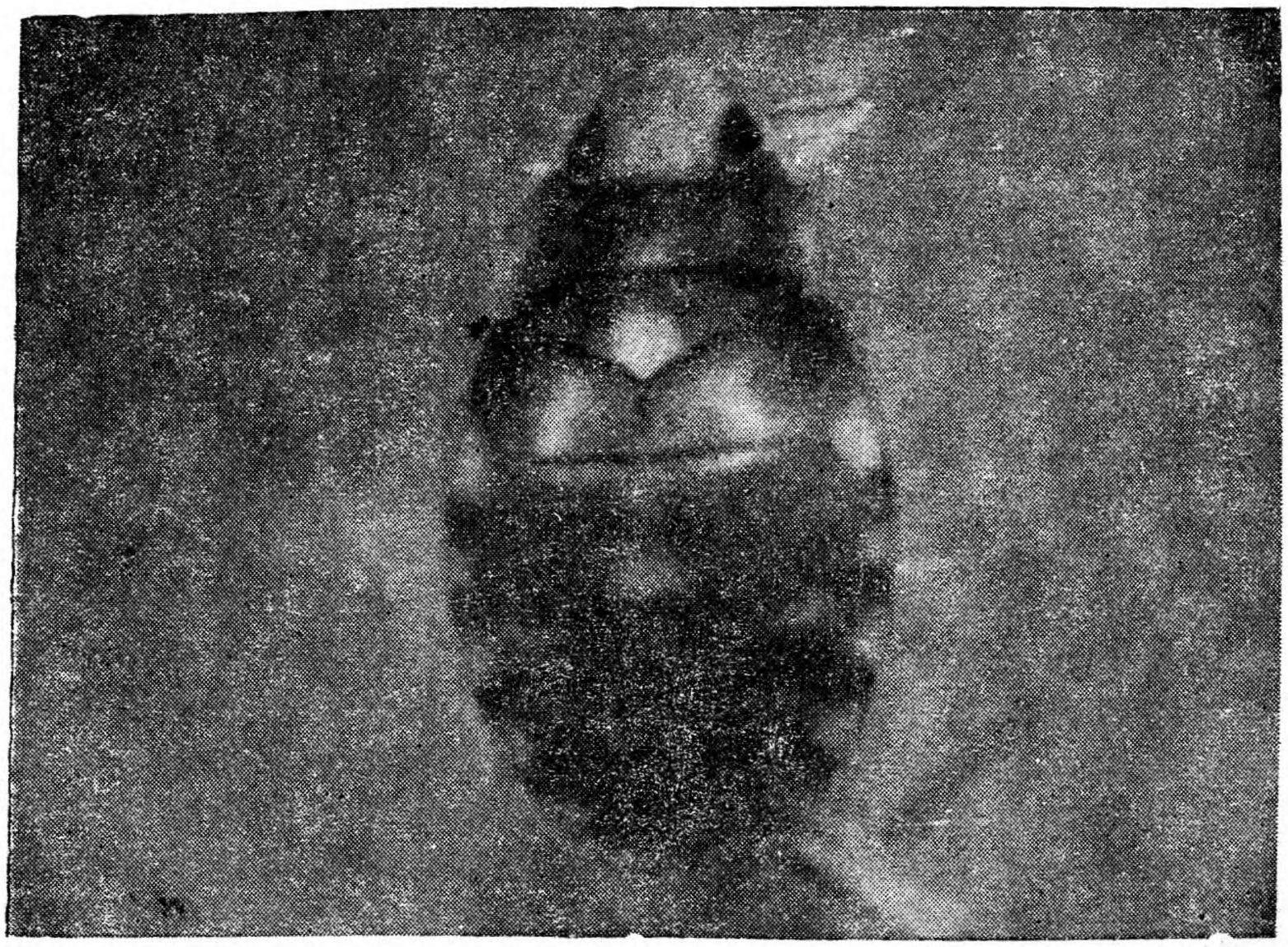
Tiphotrephes indicus Esaki and China 1928, Rev. Espanola Ent. 4 : 151 (monograph, distribution) ; Mendis and Fernando 1962, *Bull. Fish. Res. Sta.* 12 : 78 (Ceylon).

Material.—Ratnapura ; 3 ♂♂, 2 ♀♀, 1 nymph, FC 10, Katugas-ela, XI-18-70.

Aphelocheirus clivicolus POLHEMUS, n. SP.

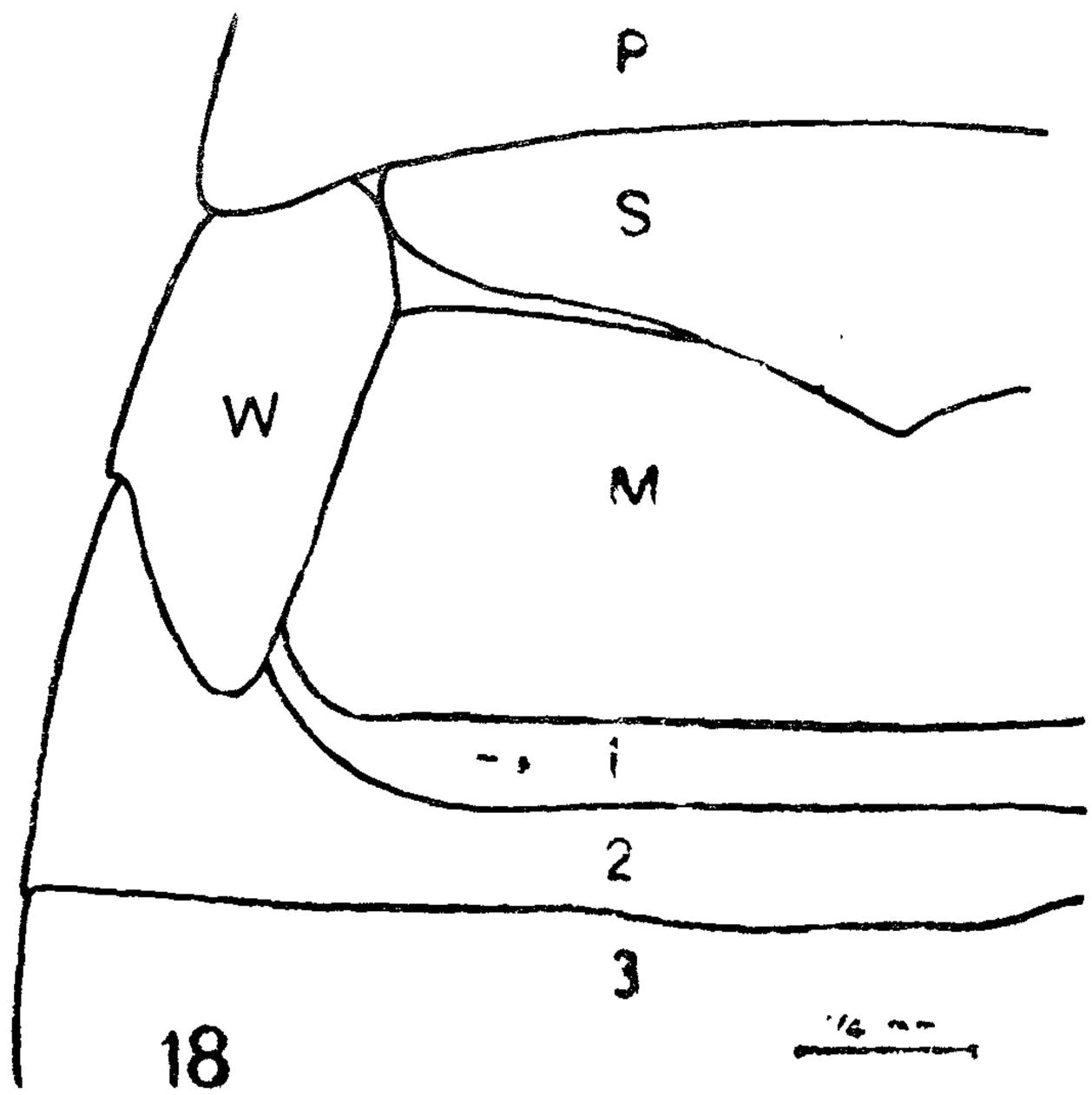
Micropterous Male

Ground colour leucine to yellow brown, marked with darker brown ; dorsum rugulose, not pitted sparsely set with very fine pubescence ; general plan of body, head, pronotum, scutellum similar to the female shown in Fig. 17. Venter leucine with scattered brown markings on thorax and abdomen ; dull to faintly shining.

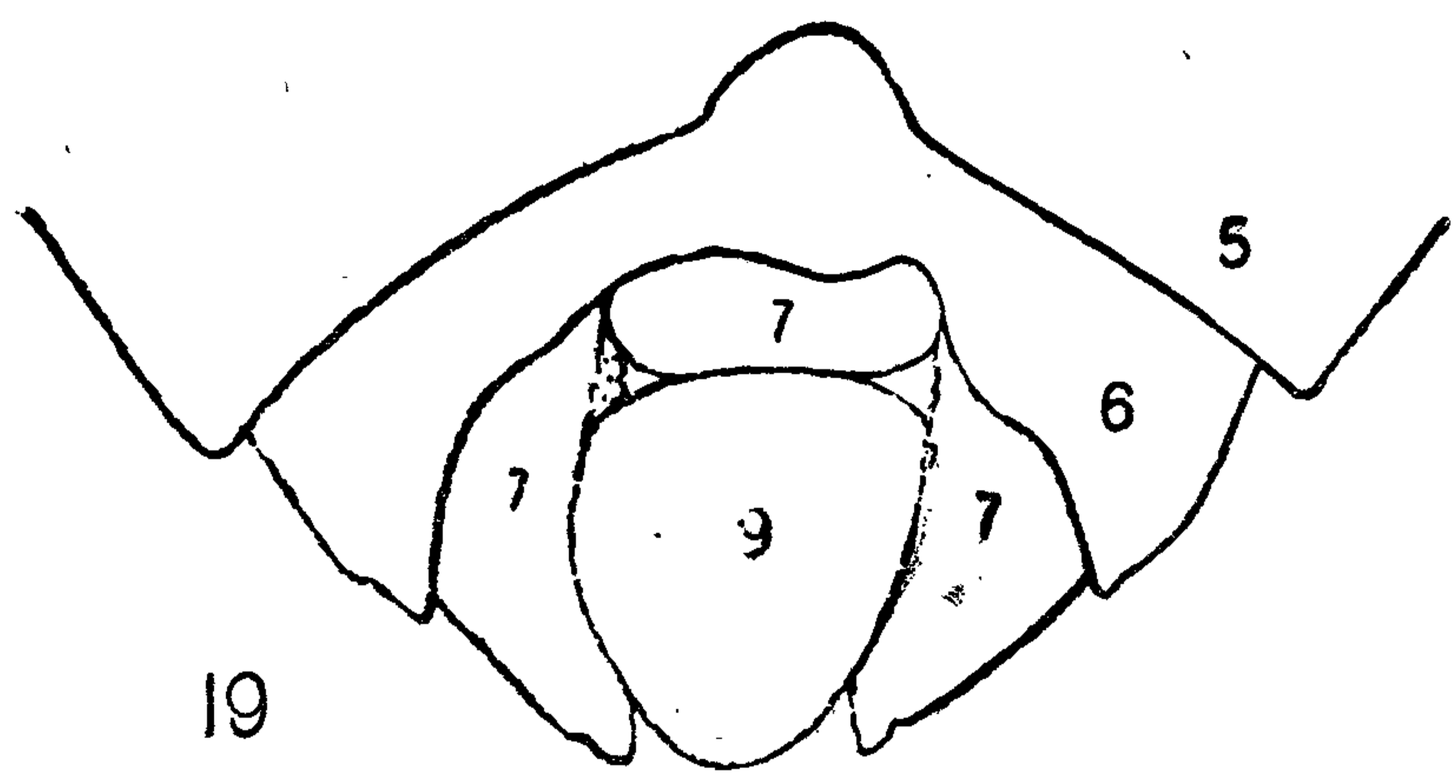


17

Head across eyes wider than long, 70/40 ; width of an eye/interocular space, 17/38. Pronotum length on midline, 37 ; width, 118. Scutellum length, 29 ; width, 85. Metanotum length, 23 ; lateral margins hidden under micropterous wing pads (Fig. 18). Wing pads very small ; length, 43 ; width, 22 (measured along axis of wing pads, not body). Tergites 1 and 2 fused, very short (10, 8), distinguishable by a suture ; length of tergites 3–5, 22 : 26 : 40 ; only posteriorly directed lateral angles of tergites 6 and 7 visible from above, tergite 7 embracing genital capsule (abdominal segment 9).



Rostrum reaching between middle coxae. Antennae slender, last two segments visible from above ; segments I–II stoutest, III–IV slender ; proportions I–IV, 4 : 6 : 8 : 17. Fore-femora greatly incrassate, tibia and tarsi slender. Middle femora incrassate, each armed beneath with an irregular row of about 20 small yellow brown spines ; tibia stout, armed with numerous stout spines. Posterior femora thickened, each armed beneath with about 26–28 small yellow brown spines scattered along its length ; posterior trochanter with several similar spines ; tibia with numerous stout spines and a thick plume of swimming hairs ; tarsi long, with long swimming hairs.



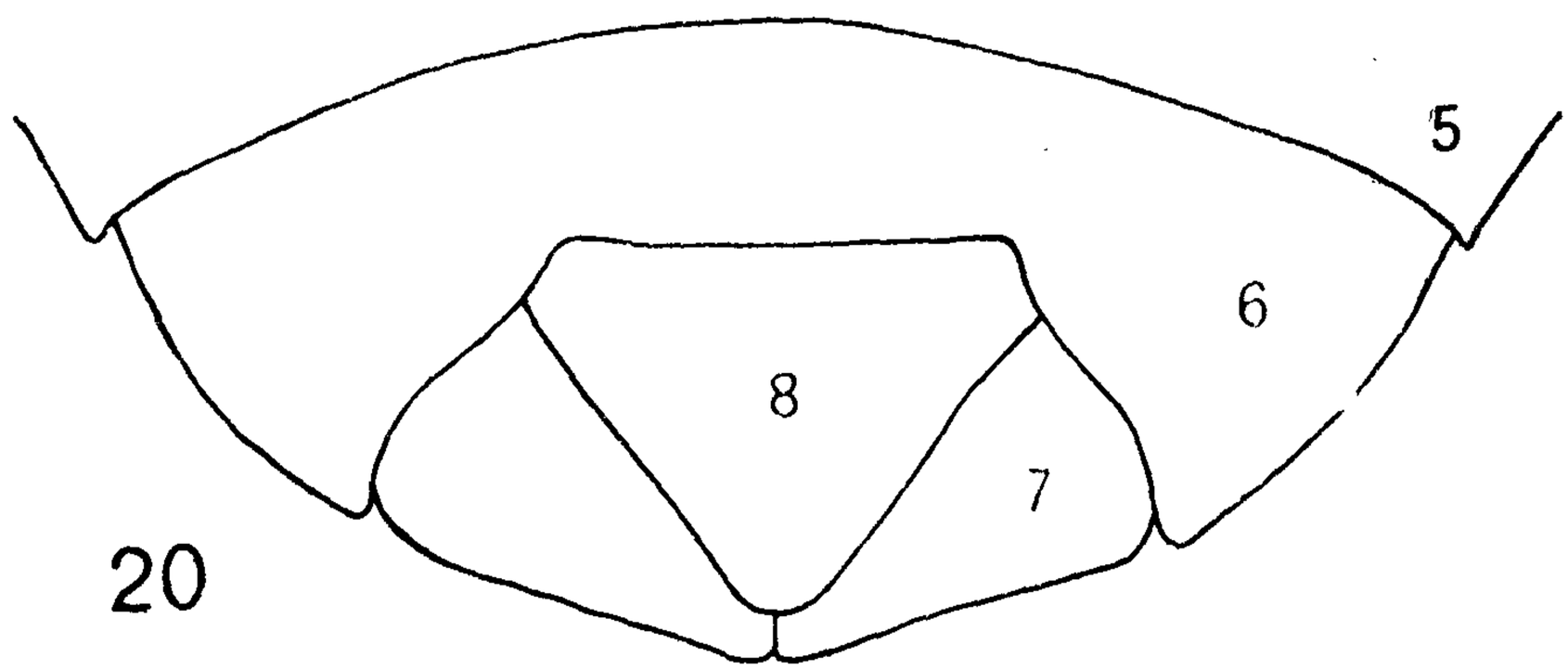
Mesothoracic venter raised medially into a sculptured keel, highest posteriorly, carinatl medially, abruptly terminating posteriorly in a vertical keel between middle coxae (Fig. 23). Sense organ located laterally on sternite 2 large, silvery ; length, 20 ; width, 7. Sternites 6–7 and genital segments asymmetrical (Fig. 19). Connexival angles faintly produced.

Length, 4.38 mm ; width, 2.75 mm.

Micropterous Female

Similar to male in most respects ; six complete abdominal tergites visible from above, 7 visible but divided longitudinally (Fig. 17). Subgenital plate (abdominal segment 8) triangular, apex sharply rounded (Fig. 20).

Length, 4.25 mm ; width, 2.70 mm.



Macropterous Female

Similar in many respects to micropterous form. Head more narrowly rounded anteriorly. Pronotum with lateral margins straighter ; postero-lateral angles obtusely angulate (Fig. 21) ; posterior margin curving forward laterally instead of backward, slightly indented anterad of scutellum. Scutellum length, 47 ; width, 82. Hemelytra with claval sutures distinct. Length, commisure of clavus, 35. Embolium expanded similarly to *pymaeus* (Fig. 21) ; line of demarcation indistinct.

Hemelytra broken off at distal angle of corium.

Ventral corina of mesosternum not truncate or carinate as in micropterous form ; gently curving over its length, terminating in a smooth curve posteriorly (Fig. 22). Length, 4.08 mm ; width, 2.38 mm.

Length, 4.08 mm ; width, 2.38 mm.

Material.—Holotype, micropterous male, and allotype, micropterous female, Ceylon, Ratnapura, FC 13, Kalu-Ganga near Malwalla, 100 m., XI–21–1970, F. Starmühlner (JTP) ; Paratypes, same data, 2 ♀♀ micropterous, 1 ♀ macropteruus (JTP, VM) ; 1 nymph (not a paratype), Kitulgala, FC 37, Kelani-Ganga, XII–28–1970 ; 1♀ micropterous, FC 9, Bodathpitiya Ela, XI–17–1970.

Material from Smithsonian Ceylon Insect Project.—Paratype, 1 ♀, micropterous, Sri Lanka, Keg. Dist., Seethawaka River. III–12–1973, 1000 ft., Baumann and Cross (USNM).

Derivation of Name.—From the Latin *clivus*, hill, and *-colus*, inhabiting.

Discussion

Aphelocheirus clivicolus is the first member of this genus to be found in Sri Lanka. It is one of the smallest species known, rivalling *pygmaeus* in this regard. *A. Clivicolus* differs from the latter in its dull rugulose surface without pits, more rounded pronotal margins, colouration, much more spinos femora, and size. In general appearance *pygmaeus* is shining and dark coloured, whereas *clivicolus* is dull and lighter colored, particularly the head. I am indebted to the late Ira LaRivers for confirming my determination that *clivicolus* is new to science.

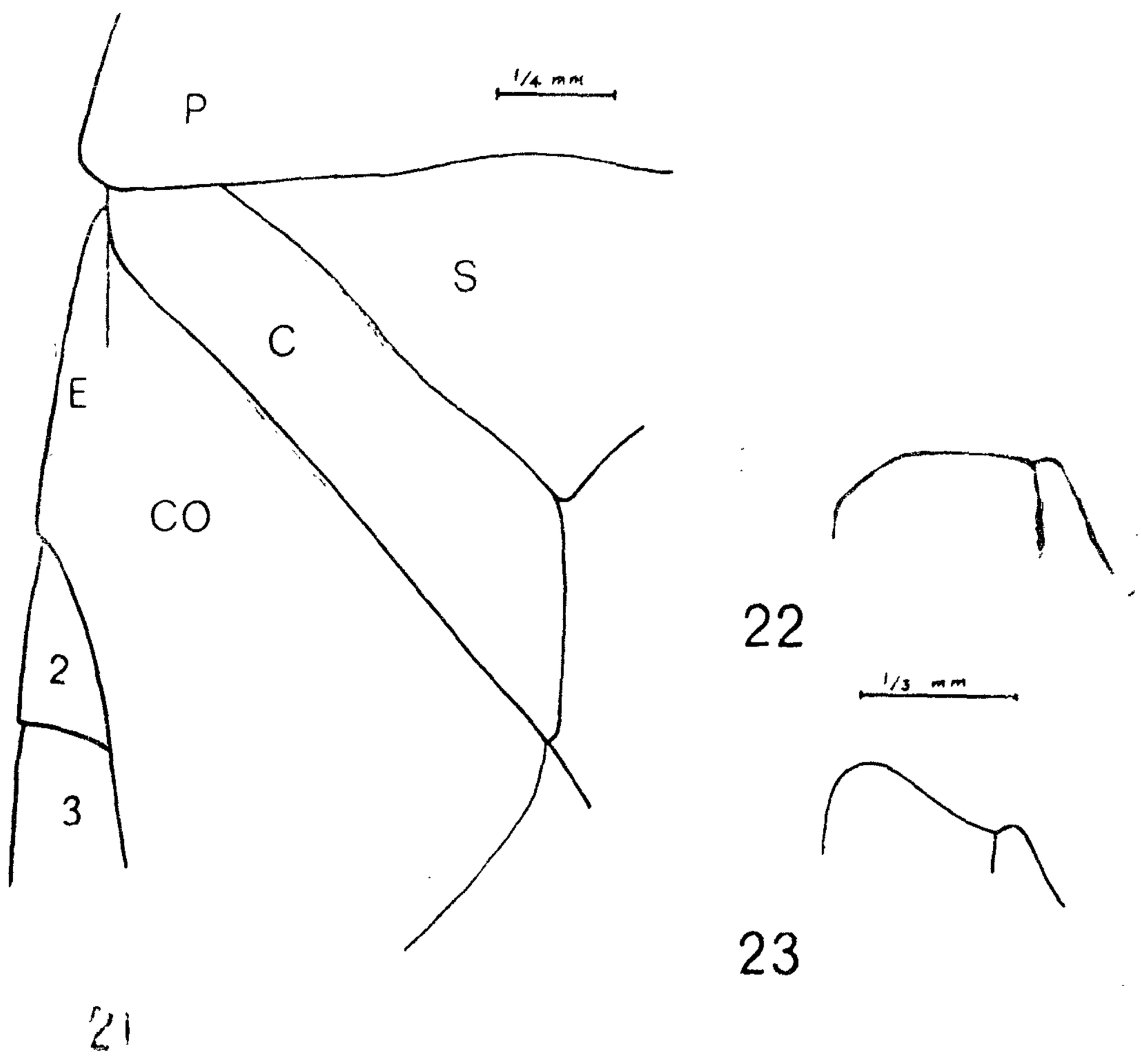


Fig. 17-23 — *Aphelocheirus clivicolus* n sp. 17, female, dorsal view ; 18, portion of thorax and abdomen, micropterous female, dorsal view ; 19, male abdominal terminalia, ventral view ; 20, female abdominal terminalia, ventral view ; 21, portion of thorax and abdomen, macropterous female, dorsal view ; 22-23, pro-and mesosternal carinae, side view, anterior to right ; of macropterous female (22) and micropterous female (23). Legend : c, clavus ; co, corium ; e, embolium ; m, metanotum ; p, pronotum ; s, scutellum ; w, wing pad ; 1, 2, 3, etc., abdominal segments 1, 2, 3, etc.

LaRivers (1971) misinterpreted some of the morphology of *Aphelocheirus* in spite of a splendid work by Parsons (1969) that dealt with the thoracic and first abdominal segments. LaRivers stated that the static sense organ occurs on the venter of abdominal segment 1, whereas it actually occurs on segment 2, the latter being the first abdominal segment visible ventrally. The metanotum is immediately posterior to the scutellum, and abdominal tergites 1 and 2 are fused but demarcated by a suture (Fig. 18).

Heleocoris breviceps MONTANDON

Heleocoris breviceps Montandon 1897, Ann. Soc. Ent. Belg. 41 : 54 ; Montandon 1897, Verh. Zool. -bot. Ges. Wien 47 : 447 (Key, India) ; Hoffmann 1941, Lingnan Sci. J. 20 : 47 (India, Indo-China ; synonymy) ; LaRivers 1971, Mem. Biol. Soc. Nevada 2 : 78 (synonymy).

The rather abundant material of *Heleocoris* is entirely referable to this species. Some of the material reported as *Heleocoris bengalensis* Montandon by Mendis and Fernando (1962) came from the same locality as part of the material listed below, thus it would seem that *breviceps* has been previously misidentified as *bengalensis*.

Material.—Belihuloya ; 3 ♀♀, 4 nymphs, FC 24, Belihul-Oya, XII-7-70 ; 1 ♂, 2 ♀♀, 2 nymphs, FC 25, Hirikatu-Oya, XII-8-70 ; 4 ♂♂, 3 ♀♀, 2 nymphs, FC 26, Veli-Oya, XII-8-70 ; 1 ♂, 1 ♀, 7 nymphs, FC 27, Kuda-Oya near Buttala, XII-9-70 ; 3 nymphs, FC 30, We-Ganga bei Balangoda, XII-10-70. *Deniyaya* ; 1 ♂, 2 nymphs, FC 4, Pasumale-Dola, XI-10-70 ; 2 ♂♂, 1 ♀, 2 nymphs, FC 5, Campden-Hill, XI-11-70 ; 3 nymphs, FC 6, Kiriwel-Dola, XI 11 70 ; 1 ♂, 3 ♀♀, 6 nymphs, Thanapita River, XI-12-70. *Kitulgala* ; 1 ♂, 6 nymphs, FC 34, Bibili-Oya, Kelani-Ganga, XII-26-70 ; 1 ♀, 5 nymphs, FC 37, Kelani Ganga, XII-28-70. *Maskeliya ;* 6 ♂♂, 1 ♀, 1 nymph, FC 16, Mocha-Dola, XI-28-70 ; 1 nymph, FC 20, Maskeliya-Dola, XII-1-70 ; 2 nymphs, FC 23, Dickoya River, XII-3-70. *Ratnapura ;* 1 nymph, FC 9, Bodathpitiya-Ela, XI-17-70 ; 2 ♀♀, 2 nymphs, FC 12, Kalu-Ganga, XI-20-70 ; 1 nymph, Ira-Handha-Pana-Ela, XI-23-70.

Cercotmetus strangulatus MONTANDON

Cercotmetus strangulatus Montandon 1911, Bull. Soc. Rom. Sti. 20 : 650 ; Lansbury 1973, Tijdschr. Ent. 116 : 101 (monograph, Ceylon).

Two *Cercotmetus* species occur in Ceylon, however, all of the nymphs before me are listed here as being *strangulatus* because all of the adults in the Starmuhlner material belong to this species.

Material.—Belihuloya ; 1 ♀, FC 27, Kuda-Oya bei Buttala, XII-9-70. *Deniyaya* ; 1 nymph FC 7, Thanipita River, XI-12-70. *Kitulgala* ; 1 nymph, FC 37, Kelani-Ganga, XII-29-70. *Ratnapura*; 1 ♂, 2 ♀♀, FC 9, Bodathpitiya, XII-17-70 ; 1 nymph, FC 12, Kelani-Ganga, XI-20-70.

Enithares simplex (KIRBY)

Notonecta simplex Kirby 1891, J. Linn. Soc. (Zool.) 24 : 125.

Enithares simplex Lansbury 1968, Pac. Ins. 10 : 375 (Revision, Ceylon).

Material.—Belihuloya ; 1 nymph, FC 24, Belihul-Oya, XII-7-70 ; 2 ♂♂, 4 ♀♀, 4 nymphs, FC 26, Veli-Oya, XII-8-70. *Deniyaya* ; 3 ♀♀, Meda-Dola, XI-9-70 ; 1 ♂, FC 3, Hola-Dola River, XI-10-70 ; 1 ♂, 3 ♀♀, 2 nymphs, FC 4, Pasumale-Dola, XI-10-70 ; 2 nymphs, FC 5, Campden-Hill-Dola, XI-11-70. *Kitulgala ;* 1 ♂, 1 ♀, 8 nymphs, FC 35, Hal-Oya, XII-27-70 ; 1 ♀, 2 nymphs, FC 36, Rambukpoth-Oya, XII-27-70. *Maskeliya* ; 1 ♂, FC 18, Gartmore-Dola, XI-30-70 ; 2 ♂♂, 1 ♀, FC 19, Gartmore Estate, XI-30-70 ; 1 ♂, 1 ♀, FC 20, Maskeliya-Dola, XII-1-70.

Ochterus marginatus (LATREILLE)

Acanthia marginata Latreille 1804, Hist. Nat. Crust. Ins., Paris 12 : 242.

Ochterus marginatus Kormilev 1971, Pac. Ins. 13 : 433 (revision, distribution, Ceylon).

Salda rutherfordi Distant 1915, Ann. Mag. Nat. Hist. (8) 15 : 506 (synonym of *marginatus* ?).

Ochterus rutherfordi Torre-Bueno 1925, Spolia Zeylanica 13 : 234.

According to Torre-Bueno (1925), W. E. China was the first to notice that *Salda rutherfordi* was an ochterid. I have not studied the type, from Ceylon, so I cannot formalize the synonymy of *rutherfordi* with *marginatus*, but the description leads me to believe they are the same. In this revision of Asian Octeridae, Kormilev (1971) overlooked *rutherfordi*.

Meterial.—*Kitulgala ;* 1 nymph. FC 36, Rambukpoth-Oya, XII–27–70.

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